HANDBOOK ON POVERTY STATISTICS: CONCEPTS, METHODS AND POLICY USE

SPECIAL PROJECT ON POVERTY STATISTICS

UNITED NATIONS STATISTICS DIVISION

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PREFACE

Poverty is multifaceted, manifested by conditions that include malnutrition, inadequate shelter, unsanitary living conditions, unsatisfactory and insufficient supplies of clean water, poor solid waste disposal, low educational achievement and the absence of quality schooling, chronic ill health, and widespread common crime. Through the signing of the Millennium Development Declaration in 2000, 191 UN member states unanimously committed to reducing poverty. However, because it is not easy to define or measure, monitoring poverty in its broad manifestations is a complex task conceptually and empirically.

The provision of benchmark data needed for monitoring global targets rests on national statistical offices, and meeting the current demands for poverty statistics is still beyond the reach of most poor countries. The current status of reporting on the indicators of the major UN global conferences - and more recently - the follow up of the Millennium Development Goal (MDG) targets, raises concerns about the readiness of national statistical offices to respond to this demand. A review of countries practices of poverty measurements reveals that there is no uniform standard in the way countries collect and process their data and there are large gaps in the development of poverty statistics among the countries. With regard to the overall findings, however, current practices show important similarities, with some variations as well. Poverty estimates based on dietary caloric intake, for example, are well conceptualized and implemented with a fair degree of consistency within regions and to some extent across regions.

This handbook is the first United Nations publication on the methodology of assessing poverty. In line with the goals set forth by the Millennium Declaration, The United Nations Statistics Division's immediate concern is to strengthen each country's capacity to provide fundamental, consistent statistical information on poverty:

- How much poverty is there?
- Who are the poor?

- What are the characteristics of their living conditions? and
- How does poverty evolve over time?

These apparently simple questions involve complex responses. The most practical challenge is attributable to the differences in national conditions and policy needs, evidenced across the globe in the wide range of measurement practices.

The handbook provides a comprehensive review of the current practices of poverty measurement worldwide and sketches a road to improving country practices while achieving greater comparability within and across countries. It is hoped that this book will serve as the basis for formulating national, regional and international statistical programs to strengthen the capacity in member countries to collect and analyze data. Our hope is that better data can directly improve national and international policies aimed at reducing poverty globally.

Paul Cheung, Director
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[1] I wish to acknowledge the contribution and support of my colleagues in United Nations Statistics Division and in particular that of Christoff Paparella and Stefan Schweinfest.

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We gratefully acknowledge the important contributions of Michael Bamberger, Christiaan Goortaert, and Sanjay Reddy--who reviewed and commented on the chapters.

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We would like to also thank members of the Steering Committee on Poverty Statistics for their contribution in the early phases the Poverty Statistics Project, in particular for their comments on the preliminary outline of the book. We acknowledge the invaluable contribution of countries who participated in the regional workshops and, in particular, those who shared their practices and made available their data which were used to exemplify improvements but also difficulties countries still face in compiling poverty statistics. The list of the members of the UN Steering Committee on poverty statistics and that of the participating countries in the regional workshops are provided in the Annexes at the end of the book.

CHAPTER 1. INTRODUCTION

Gisele Kamanou

Hundreds of millions of people struggle with poverty around the world. Their plight may be obvious to the eye, but statisticians have had to labor hard to create reliable, consistent, and comparable measures of poverty. Being poor is generally viewed in terms of deprivation of some of life's basic needs, such as food, shelter, clothing, basic education, primary health care, and security. But accurately measuring these indicators is no simple task, and philosophers still debate specifics of definitions. Balancing philosophical understandings against the practical needs and constraints faced by national statistical offices has been challenging, but great progress has been made in the past several decades. This handbook is dedicated to furthering the process of improvement.

Governments around the world define and measure poverty in ways that reflect their own circumstances and aspirations. Income is universally an important element, even while most agree that money metrics are too narrow to capture all relevant aspects of poverty. Still, the challenges of measuring poverty narrowly defined by a lack of money are substantial in themselves, and statistical offices have adopted a wide array of methodological approaches. These methodological choices can matter greatly, and the ultimate users of data are usually left unaware of which choices were made and how they matter. Without that knowledge, it is impossible to make fully reliable comparisons of poverty rates across countries, or even to confidently compare rates for a single country across different years.

To assist countries in responding to the increasing demand of poverty monitoring, the United Nations Statistics Division (UNSD) launched in 2003 a *Special Project on Poverty Statistics* with the ultimate goal being the preparation of this *Handbook on Poverty Statistics: Concepts, Methods and Policy Use*. The next section describes the process put into place to prepare the Handbook and the following one defines its scope and contents, together with suggestions on how best to use the Handbook.

1.1 A broad consultative process

Four regional workshops--in Latin America and the Caribbean (May 2004), Africa (July 2004), Asia and the Pacific (October 2004), and in the ESCWA countries (November 2004)--on poverty measurements were conducted to support the drafting of the handbook's chapters. The specific objectives of the workshops were to discuss the content of the handbook with countries to incorporate practical regional perspectives and to identify common problems countries face in this area. UNSD also implemented a global survey of poverty measurement approaches in 2005 to gauge the range of ways poverty is measured. A questionnaire based on current measurement practices was developed and sent to all countries worldwide (see Chapter 9 for a more details on the survey and the questionnaire in the Annexes at the end of the book). An expert group consisting of authors and chapter reviewers met in New York in June 2005 to comprehensively review the first draft of the handbook.

This review of national poverty measurement practices from around the globe showed that the basic needs approach to poverty assessment has gained highest acceptance among the developing countries. Basic needs are grouped broadly into food and non-food, while the income approach to measurement involves estimating the costs of the two groups. The review however, showed a wide range of practices. For example, the data reveal that 63 percent of 91 respondent countries apply the absolute concept of poverty (41 countries responded that they use the absolute concept of poverty only and 16 other said both absolute and relative). Likewise there is a wide range of practice among the 69 countries (for who adjusting for adult equivalent was applicable) who indicated whether or not they make adjustments for adult equivalence in their poverty analyses with 23 countries (33 percent) making some kinds of adjustments for age and/or sex. Noteworthy is the difference in the minimum calorie requirement for an individual which ranges from below 2000 kilocalories to close to 3000 kilocalories in some cases. The thresholds spread almost uniformly between these two values, with a slight mode (17 countries) having a threshold between 2100 and 2300 kilocalories.

A complement of the income-based basic needs approach is the so-called minimum basic needs (MBN) or unmet basic needs (UBN) approach. In the latter, non-monetary indicators representing different dimensions of poverty are chosen, estimated, and monitored. A few numbers of countries the UNSD surveyed also collect data on "unmet basic needs." Methods here are still being developed, and there is much less uniformity of practice than there is around the analysis of income and spending-based poverty measures. The three broad categories of basic needs often considered are dwelling characteristics, access to safe water, and access to sanitation facilities. Basic education and economic capacity (e.g., GDP growth rate) are sometimes included in an expanded UBN set of indicators. Most commonly, statisticians calculate an index of deprivation that combines the degrees of access to the various components.

Together, the data show a broad consensus about the guiding principles underlying poverty measurement in monetary terms. They also revealed, however, considerable variation in how the principles are implemented in practice. Reliable and comparable data are critical for poverty reduction policies. Much progress has already been made in improving data collection and measurement methods around the world, and this handbook seeks to add to these improvements.

1.2 Roadmap

The handbook focuses on issues confronting developing countries. It provides these countries with practical measurement options, taking regional and local specificities into consideration to the extent possible. While it does not offer new concepts or methods, the handbook's strong methodological component will serve as a foundation for empirical work conducted at the country level.

The target audience of the handbook are statisticians at government offices who possess an intermediate to strong background in statistics, with significant familiarity with common statistical modeling techniques such as regression or principal components analysis. Some chapters of the handbook require an advanced level of statistical theory whereas others are targeted to policy makers with minimal statistical literacy.

The publication is composed of nine chapters covering both theoretical and applied work. On of the fundamental addition of this Handbook to the traditional manuals on poverty statistics is its emphasis on practical issues while also addressing keys methodological issues in poverty measurements.

Chapters 2 and 3 delineate the key issues in poverty analysis based on income and consumption measures. They summarize the literature on advanced theories on poverty indices with a focus on their implications for empirical studies. Chapter 2 begins by noting the diversity of approaches to poverty measurement that are employed around the world. In seeking a basis for achieving greater uniformity, the chapter introduces issues around the setting of poverty lines and adjustments made for the age and gender composition of households. One way to achieve greater comparability of measures is to use "international poverty lines" such as the $1/day per person lines incorporated in the United Nations Millennium Development Goals. The $1/day lines have strengths and limits, but ultimately they cannot replace a country's own poverty assessments. The conclusion to chapter 2 highlights areas of concern in improving (and unifying) country-specific approaches.

Chapter 3 starts off with a basic discussion of poverty measurement for readers unfamiliar with the subject. However, readers with experience on poverty measurements or users of poverty statistics would find these sections useful for understanding some fundamentals of assessing poverty, which supports the more in depth discussions that occur in Chapters 5 and 6. The chapter describes commonly-used poverty measures such as the headcount, poverty gap, and the squared poverty gap. The first part of the chapter shows how the measures weigh different degrees of deprivation. The second part of the chapter describes a new and complementary approach to poverty measurement based on the time before exit from poverty due to steady income growth. The conclusion argues that publishing simple statistics such as the median income of the poor population can be a useful addition to traditional poverty measures.

Chapter 4 discusses current practices of measuring poverty in developing countries, summarizing the experiences of individual nations presented during the four regional workshops organized in support of the handbook. The steps involved in measuring poverty are discussed and analyzed systematically, and practical difficulties met in implementing some of the steps are pointed out. Alternative ways of solving or circumventing some of these difficulties are proposed, with particular reference to food poverty statistics. The chapter highlights the major sources of non-comparability of poverty statistics, exploring ways for harmonizing the practice of measuring poverty across countries to improve comparability of poverty statistics.

Chapters 5 and 6 study the sources of data for poverty statistics, herein referred to as survey and non-survey sources. Chapter 5 is written primarily for statisticians at national statistical offices who have the responsibility of developing standards and methods for data collection based on sampling techniques used by themselves or by other government entities such as line ministries. The chapter focuses on techniques and broad statistical considerations for generating reliable, comparable estimates of income, consumption, and other monetary and non-monetary assets. It describes methods and data for measuring poverty with cross-sectional household surveys. It starts by examining several issues that are independent of the type of survey used: cross-survey comparability, measurement error, and variance estimators for complex sample designs. It then analyzes the different types of cross-sectional surveys available, in terms of their suitability for poverty analysis. The chapter also considers the need for information on prices when measuring poverty and the difficult issues involved in assessing individual welfare and poverty from household data.

Chapter 6 is designed for a broader set of users, including non-survey statisticians and other statisticians/data analysts without a strong background in modern statistical theory. This chapter deals with certain limitations of household surveys for gathering data relating to all the dimensions of poverty and where poor people can be found. It reviews the relevance of various administrative and non-household survey sources for filling in the gaps and for amplifying existing survey data on poverty in the context of the Millennium Development Goals. The chapter also addresses the policy debate surrounding use of national account for compiling poverty levels. Conceptual and empirical differences between estimates of household consumption based on national accounts versus household surveys are examined. Adjustments necessary to reconcile the two estimates are then presented. Statisticians who compile data in line ministries and statistical assistants in community-based registries, for example, will find practical guidance on how best to utilize their data. In general, the chapter cautions on the limits of non-survey data in poverty analysis.

In targeting data analysts and policy makers, Chapter 7 discusses poverty profiling and poverty mapping and Chapter 8 focuses on poverty dynamics. Both chapters present analytical techniques with country-level illustrations on how to use poverty statistics to formulate national policy. Familiarity with interpretation of basic statistical concepts, such as ratio, rate, and bias, is required. Some initial knowledge of policy-targeting issues is also necessary to fully benefit from these two chapters' findings. The main focus of Chapter 7 is the formulation of poverty reduction policies. It shows how various statistical tools, specifically poverty profiles and mapping, can be used to strengthen the impact of government programs and spending on poverty alleviation. The chapter thus provides some country-specific examples to illustrate how poverty profiles can be constructed and how they can be utilized to design policies. The chapter also provides a review of methodology used in the construction of poverty mapping, another important tool used by many governments to target the provision of basic services, in particular education and health.

Chapter 8 continues the discussion begun in Chapter 7 by analyzing changes in poverty over time. It examines three important conceptual issues in poverty analysis: the relationship between income inequality and poverty at a single point in time and income mobility over time, the distinction between chronic and transient poverty, and the measurement of income growth among the poor. It discusses the relative merits of panel data and repeated cross-sectional data, and the problem of measurement error in income and expenditure data. It concludes by providing practical country examples of how to analyze poverty dynamics using data from Indonesia, Papua New Guinea, Russia and Vietnam.

Chapter 9 concludes the handbook by recommending some basic steps that should be followed for improving accuracy of poverty statistics while fostering a harmonized approach for collecting and comparing data across time and space.

CHAPTER II. CONCEPTS OF POVERTY

Jonathan Morduch

Introduction

Nelson Mandela came out of retirement in February 2003 to speak on behalf of the *Make Poverty History* campaign in London, an effort to renew the global commitment to eliminating poverty worldwide. "Like slavery and apartheid, poverty is not natural," Mandela intoned. "It is man-made, and it can be overcome and eradicated by the action of human beings." In imagining a world without poverty, Mandela echoed arguments first made by reformers like Paine and Condorcet in the wake of the French Revolution (Stedman Jones, 2004). Writing of an imminent effort to fight global inequality, Condorcet wrote in 1793 that "everything tells us that we are now close upon one of the great revolutions of the human race."[2] Condorcet's great revolution remains unrealized two centuries later, and advocates hope that Mandela's strong voice will spur surer action to eliminate the deprivations suffered by the world's poor.

In turning from a moral case to the practical task, the initial questions are:

- How do we go from advocacy to action?
- What are the most important constituents of poverty?

[2] Antoine-Nicolas de Condorcet, *Sketch for a Historical Picture of the Progress of the Human Mind*, 1795, as cited in Stedman-Jones (2004), p. 17.

- How can elements of deprivation be addressed that go beyond a lack of private resources?
- How, as a practical matter, should poverty be officially defined and measured in a world where technical and administrative capacities are often limited, especially where national statistical offices are already stretched thin?"

Experts have long-debated the philosophical foundations of what it means to be poor. But for all of the precision of language and concept, it is a different matter entirely to apply philosophies to data and implement concepts that appear so crystalline on paper. The world of poverty measurement in practice is one of compromise, of short-cuts and approximations. This handbook is devoted to improving the practice of compromise and approximation, to making choices more transparent, and to identifying seemingly minor methodological points that can have major implications for measured outcomes.

Compromise and approximation turn out to be critical matters. Researchers have found, for example, that changing assumptions about data collection and measurement methods can dramatically alter the poverty rate in Latin America—raising measured poverty rates from 13 percent of the region to 66 percent. In the process, 250 million people go from being counted as non-poor to poor (Székely, et al, 2000). The same researchers describe how differences in assumptions led one set of researchers to find poverty to be as low as 20 percent of the population of Mexico in 1994, while another set of researchers found poverty to be as high as 46 percent. This difference shifts 25 million people from one side of the poverty line to the other—even though both sets of researchers were analyzing the same household survey.

Governments around the world have found it useful to define and measure poverty in ways that reflect their own circumstances and aspirations. But a historical assessment suggests that, on balance, greater uniformity of practice will be a major step forward. One unintended consequence of the various indigenous methods of survey collection in practice today is the difficulty of comparing poverty measures across countries and across time. The lack of uniformity also makes it difficult to confidently integrate country-level poverty measures to gain an overall sense of regional and global poverty. At present, even basic parameters are treated very differently around the world. Lack of purchasing power is universally an important element, for example, but some statistical offices measure purchasing power as income and others measure it as expenditures. Within each definition (income or expenditures), an even greater diversity of approaches are employed. Wide differences arise in the setting of poverty lines, for example, as well as variations in the types of data collected, survey methods, and ways data are aggregated to create poverty measures.

Questions of measurement are not matters of mere description. The way that poverty is gauged affects how policy questions are conceptualized, how groups are targeted, and how countries determine progress in improving living standards. The implications go beyond any given country at any given moment; they are critical for future understandings, and for identifying how other countries consider, through comparison, their own conditions and possibilities. Transparent, consistent poverty measures based on transparent, consistent survey data are thus an international concern. However, few methodological choices are completely obvious, and the result to date has been a wide-range of practices with limited comparability.

The United Nations Statistical Division (UNSD) implemented a global survey of approaches in 2004-5 to gauge the range of ways poverty is measured. By the end of 2005, government statistical offices in 93 countries provided detailed responses to the survey. Of these countries, 62 completed a slightly longer "expanded" survey with a broader set of questions.[3] The survey was accompanied by four regional meetings also organized by the UNSD (in Latin America, Africa, Asia, and Europe). Together, the data show a broad consensus about the guiding principles underlying poverty measurement. They also reveal, however, considerable variation in how the principles are implemented in practice. As described throughout this handbook, these details matter, often to a surprising degree.

This chapter and the handbook as a whole identify and build on the areas where there is broad consensus. While identifying important variations in implementation, this book explores ways to build greater consensus in international practice by translating

[3] Responses to the longer survey were received by May 2004. The 62 countries included Albania, Armenia, Australia, Austria, Bahamas, Belarus, Burkina Faso, Cambodia, Cameroon, Canada, Croatia, Cyprus, Czech Republic, Denmark, Dominica, El Salvador, Finland, France, Gambia, Germany, Greece, Iran, Iraq, Ireland, Israel, Jordan, Kazakhstan, Kenya, Lithuania, Macedonia, Madagascar, Malawi, Maldives, Mauritius, Mexico, Moldova, Mongolia, Morocco, Nepal, Netherlands, Norway, Oman, Palestine, Paraguay, Philippines, Poland, Russian Federation, St. Kitts and Nevis, Senegal, Sierra Leone, Slovokia, Spain, Suriname, Sweden, Tajikstan, Thailand, Turkey, Uganda, United Kingdom, Ukraine, Vietnam, and Zanzibar.

principles into action. Section 2.1 discusses issues involved in establishing and updating poverty lines. Section 2.2 describes debates around the international "$1/day" poverty line, and Section 2.3 describes possibilities for harmonizing approaches.

2.1 Basic approaches

The earliest definitions of poverty centered on the inability to obtain adequate food and other basic necessities. Today, the main focus continues to be on material deprivations, i.e., the failure to command private resources. Development experts, including Sen (1987), though, have argued that this notion of economic welfare remains too narrow to reflect individual well-being, spurring active efforts over the past several decades to expand the concept of poverty.

One direction of expansion begins with recognition that even material deprivations may involve more than lack of private resources. If a village has no wiring for electricity, residents can have substantial income but no steady power source. If quality health facilities do not exist, no amount of money may be enough to purchase effective, convenient care.

One direction is thus to use household surveys and community-based questionnaires to ascertain a population's access to basic services, irrespective of household incomes. About 14 percent of respondents to the UNSD "expanded" survey collect data on such "unmet basic needs" (56 statistical offices responded to the question). Among the focuses are housing conditions, water, sanitation, electricity, education, and infrastructure. Most commonly, statisticians calculate an index that combines the degrees of access to the various components. They then describe deprivations according to cut-off points in the index. Methods here are still being developed, and there is much less uniformity of practice than around the analysis of income and spending-based poverty measures. Still, even the emerging efforts are a reminder that household budgets tell only one part of a story.

A second direction of expansion includes collecting data on household-level deprivations along dimensions other than money. Researchers, for example, have focused on social deprivations: the inability to fully participate in communities and, perhaps, in religious life. They have also focused directly on physical deprivations, such as those caused by disability, disease, and under-nutrition. And, increasingly, policy makers have recognized that one part of what it means to be poor resides in a sense of vulnerability to devastating loss--living on the edge of adequacy with its attendant uncertainties.

Not surprisingly, a single, all-encompassing measure of poverty remains beyond reach. One response is to turn to methods like "participatory rural assessments" (which can be applied as well to urban areas). The idea in this approach is to ask members of a village or neighborhood to define their own poverty standards and to identify who would be judged poor according to that notion. The appeal of this approach is that it accommodates local ideas and conditions; the disadvantage is that it could produce various, noncomparable standards. Moreover, the results typically yield only a reckoning of who is poorer than who, rather than an absolute measure of poverty against a fixed benchmark.

Recognizing the trade-offs, researchers are now seeking compromises by integrating qualitative and quantitative indicators into their analyses. While important in itself, the qualitative data can also provide a helpful check on the robustness of lessons learned from traditional quantitative analyses. The ongoing challenge faced by statisticians and researchers (no matter which techniques they employ) is how to capture important elements of poverty in transparent, reliable, and practical ways.

2.1.1 Poverty Lines

Despite the breadth of concerns, social scientists still find it useful to focus largely on poverty as a lack of money—measured either as low income or as inadequate expenditures. One reason for focusing on money is practical: inadequate income is clear, measurable, and of immediate concern for individuals. Another reason is that low incomes tend to correlate strongly with other concerns that are important but harder to measure. Those in the worst health and with the lowest social status, for example, tend also to come from the bottom of the income distribution. Lack of money serves as a rough but quantifiable proxy for a host of deprivations. Thus, narrow definitions of poverty claim particular attention throughout the handbook, even as income and expenditure are understood to determine only part of overall well-being.[4]

Even within the narrow sphere of money-based measures, substantial questions remain about how to proceed, and practices differ widely from country to country. There is no consensus, for example, on whether money-based measures should focus on income levels or on spending patterns. Poverty can be measured either by a lack of income or by a shortfall in expenditures. While they are closely related conceptually, they can sometimes be quite far apart quantitatively. The 2004-5 survey by UNSD showed that of 84 countries that responded to the question, almost half base their poverty calculations on expenditure data, about 30 percent base the calculations on income data only, and 12 percent use both.

The ability to spend is primarily determined by one's income. But spending and income are not identical since households also borrow, sell assets, or draw on savings when income is low. Conversely, households often save when times are especially favorable. Measuring poverty as a shortfall in spending takes into account these kinds of coping mechanisms and households' general abilities to "smooth consumption" over time. A second difference concerns the ease and reliability of data collection. As described in subsequent chapters, pure statistical issues reinforce the advantages to basing poverty measures on expenditure data rather than income. As noted above, one purpose

[4] The United Nations Millennium Development Goals for 2015 reflect the diversity of objectives through a broad list of primary and secondary goals focusing on deprivations, such as low levels of child and maternal health, education , and basic nutrition.

of the handbook is to clarify how these kinds of choices affect measurement—and how they affect the understanding of poverty.

The usual next step is to identify a poverty line. A poverty line typically specifies the income (or level of spending) required to purchase a bundle of essential goods (typically food, clothing, shelter, water, electricity, schooling, and reliable healthcare). Identifying the poor as those with income (or expenditures) below a given line brings clarity and focus to policy making and analysis. Having a poverty line allows experts to count the poor, target resources, and monitor progress against a clear benchmark. Communicating the extent of poverty becomes easier, and explaining the notion of deprivation simpler.

Statistical offices spend much time and effort setting and updating poverty lines. However, the place of poverty lines needs to be put in context. A recent study of 17 Latin American countries, for example, shows that many other elements of poverty measurement are more important than the choice of poverty lines. These include adjustments for adult equivalent family size and the treatment of missing data in surveys (Szekely, et al, 2000).

It is also important to bear in mind differences between concepts and reality. The fact is that a poverty line (below which one is poor and above which one is not) has little empirical correspondence in the daily lives of the poor. Researchers analyzing data on households see no clear breaks or discontinuities in the relationship of income and health or nutrition, and certainly no systematic breaks in living standards that correspond to poverty lines as the term is used. Yet, poverty measures based on poverty lines serve an important descriptive purpose and should be seen in that light.

2.1.2 Absolute versus relative poverty

A poverty line indicates deprivation in an absolute sense, i.e., the value of a set level of resources deemed necessary to maintain a minimal standard of well being. With such a definition, poverty is eliminated once all households command resources equal to or above the poverty line. The $1/day per capita poverty line is one example of an absolute poverty line, but most countries determine their own absolute poverty lines as well.

Many wealthier countries, on the other hand, set poverty lines based on relative standards. In the United Kingdom, for example, the poverty line is 60 percent of the median income level (after taxes and benefits and adjusted for household size), an approach adopted broadly in the European Union. In 2002/2003, the UK figure translated into a poverty line of £283 per week (equivalent to $28,418 per year based on 2003 exchange rates) for a household with two adults and two children, a figure considerably higher than the absolute 2003 poverty line in the United States of $18,400 per year for a similar family.[5] The relative benchmarks used in Europe reflect the belief that important deprivations are to be judged relative to the well-being of the bulk of

[5] The US standard translates to $19.46 per day per capita or $7,104 per year per capita. UK data are from http://www.poverty.org.uk/summary/key_facts.htm. US data are from http://aspe.hhs.gov/poverty/figures-fed-reg.shtml. The websites were accessed in June 2005.

society, approximated by the income level of the household at the mid-point of the income distribution. In short, inequality matters as a component of deprivation. As such, relative poverty can be reduced but never eliminated--except in the extreme (and implausible) case in which income equality is fully achieved.

When asked in the UNSD survey whether they calculated absolute poverty lines, two-thirds of statistical offices answered affirmatively. Those that favored relative approaches were mainly drawn from the OECD, including, for example, Australia, Canada, Denmark, Ireland, Norway, and the United Kingdom. Where the incidence of hunger and the inability to obtain basic essentials is more pronounced, however, the preference strongly favors absolute measures of poverty—and the \$1/day or \$2/day lines echo that choice.

2.1.3 Cost of Basic Needs approach

The way in which statistical offices set absolute poverty lines varies considerably. Most begin with a "cost of basic needs" approach (described in greater detail in Chapters 4 and 5), but the variations in the application of the approach multiply with each step.

The basic approach begins with a nutritional threshold chosen to reflect minimal needs for a healthy life, and adjustments are then made for non-food expenses (e.g., housing and clothing). To set a poverty line, statisticians typically identify a basket of foods that will deliver the minimal nutritional requirements. Assumptions about the underlying nutritional requirements vary considerably around the world, though. Of 29 statistical offices giving relevant information on the "expanded" UNSD survey of poverty measurement practices, two-thirds adopted international standards in setting the food threshold, almost all adopting nutritional standards set by the World Health Organization and Food and Agriculture Organization (WHO/FAO). The others set standards based on inputs from national experts.

Even when using the WHO/FAO standards, however, there is considerable variation. In Armenia and Vietnam, for example, the reported minimum threshold is set at 2,100 calories per person per day--with no adjustment for age, gender, or location. Statisticians in Senegal, on the other hand, report that they use a threshold of 2,400 calories per adult per day (whether man or woman, with lower thresholds for children). In Kenya, the standard is 2,250 calories for adult men, with lower thresholds for others. In Sierra Leone and the Gambia, the minimum for adult men is 2,700 calories. Differences arise in part because the WHO/FAO standards are specified by age, gender, weight, and activity level—but only age and gender are collected in typical household surveys. There is then considerable scope for variation in choices since different assumptions about the activity levels and average weights of the population will lead to different calorie standards.

An individual's weight is important to calorie requirements since it determines their basal metabolic rate (BMR). This is the amount of energy consumed merely to get through the day, before extra calories are spent for specific activities. Experts estimate that the basal metabolic rate accounts for 45 to 70 percent of total energy expenditures for a person of a given age and gender. So adjusting for weight (and thus for BMR) is a critical part of determining the minimum calorie needs of an individual (WHO/FAO/UNU, 2001, p. 35).[6]

The balance of energy expenditure is determined by the person's activity level. A WHO/FAO/UNU report estimates that a moderately-active 25 year-old man requires at least 2,550 calories per day if he weighs 50 kg. At 70 kg, his minimum requirement rises to 3,050 calories per day (WHO/FAO/UNU, 2001, Table 5.4, p. 41). However, a 70-kg man who is sedentary requires only 2,550 calories per day. So, activity level also matters greatly in defining how much food one needs and therefore in setting poverty lines.

As noted above, however, neither activity level nor weight is collected in typical household surveys. Thus, while adjustments can be made for age and gender, statisticians must make assumptions about the average activity levels and weights of individuals—and different assumptions lead to different nutritional thresholds. Given the wide use of WHO/FAO standards, an important step toward comparability of poverty approaches would be to reach a consensus on assumptions about weights and activity levels used to establish food requirements standards by age and gender. Chapter 4 provides additional details on current practice.

2.1.4 Households and individuals: adult equivalence and scale economies

[6] ftp://ftp.fao.org/docrep/fao/007/y5686e/y5686e00.pdf.

A second related area for finding consensus concerns adjustments for age and gender. At a conceptual level, poverty is most often seen as a condition specific to individuals. All members of a family may not be equally poor, however. For instance, a grandparent or a child might face deprivation within a household that has adequate resources. To capture this idea, researchers would ideally collect data on individuals, and poverty measurement would take place at the individual level.

The unit of analysis, however, is rarely the level of the individual. Doing so greatly raises logistical hurdles and survey costs. Even if all members of a household could be identified and surveyed (each in full detail), it is often too difficult to allocate particular flows of income, e.g., the value of a harvest for a farming family, to one member or another, just as it is hard to determine who consumes which part of a common pot of rice or pot of soup. In the end, the benefits of individual specificity are seldom judged to outweigh the extra costs of data collection.

Instead, researchers collect data on households as collective units (where households are often defined in surveys as those who share meals together or live under the same roof). The question then asked is: Does the household command adequate resources to provide for all members? The simplest way to proceed is to consider the per capita income of the household, calculated by simply dividing total household income by the number of household members. (The same method can be applied to total expenditures.) This approach is taken, for example, in calculating the widely-used \$1/day and \$2/day per capita poverty lines.

These per capita calculations weigh all household members identically. A forty-five year-old man is equally weighted as his seventy-five-year-old mother or his ten-year-old daughter. And a household with four adults is judged equally poor as another with identical income but with two adults and two young children. Nor are adjustments made for cost savings that might benefit larger households relative to smaller ones. The cost of a second child, for example, may not be as great as the cost of the first. And the cost of adding a fourth person to the household often exceeds the cost of adding a fifth. The $1/day approach, though, like many other approaches, fails to account for such changes.

Creating weights that reflect "adult equivalents" helps address the first problem, and adjusting for economies of scale helps respond to the second. The most common approach to establishing adult equivalence standards is to weight, for example, a 45-year-old male as "1" and to weight others in proportion to the resources they require. His teenage daughter may take a weight of 0.7 and his elderly mother takes a weight of 0.8. These weightings reflect the fact the daughter and her grandmother consume less than the man to meet their basic needs. In reality, however, it is far from clear how to set specific weights.

One method is to examine the relative consumption patterns of people of different ages and genders and to use the ratios of consumption levels as weights (or to use a similar approach based in observed consumption patterns). The approach would solve the adult versus baby problem, but it runs into limits. A particular fear is that using actual consumption patterns to determine "needs" could introduce elements of discrimination into the analysis, particularly differences in consumption by men and women of similar ages and, to a degree, children versus adults. If, say, 25 year-old men are observed to eat twice as much as 25 year-old women, can we assume that the needs of men are twice as great? Chapter 5 examines these issues in greater detail, but we can say here that the answer is surely No.[7]

The UNSD survey reveals that 35 percent of the 74 respondents answering the question make adjustments for adult equivalence in their poverty analyses. In Senegal, for example, a simple adjustment is made such that all adults are given a weight of 1, and all children under age 15 take a weight of 0.5. In Kenya, adults over the age of 15 are also given a weight of 1, but children between the ages of 5 and 14 are weighted at 0.65. Children between the ages of 0 and 4 count for 0.4 of an adult. In other countries, finer scales are employed as well as adjustments for scale economies, and gender is incorporated into the calculations following the WHO/FAO standards. Among 31 statistical offices responding to a question on the "expanded" UNSD survey about adjustments to the minimum calorie threshold, 74 percent report that they adjust for gender, and 58 percent adjust for both age and gender.

Making adjustments for children can matter particularly when comparing changes in poverty over time. If parents give birth to a baby in a given year,per capita income or

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[7] One rough check on the method chosen is to also collect health and education data on individuals (which are free of the kinds of allocation problems described above) to complement the household-level income/consumption data.

per capita expenditures will fall substantially for the family since the baby's needs would count as much as anyone else's. But with adjustments that reflect adult equivalence, the addition of the baby to the family—while adding costs—is counted in line with the baby's actual needs.

One implication of considering income on a per capita basis, instead of an adult-equivalent basis, is that a population experiencing a rapidly declining fertility rate (fewer babies born in successive years) will experience a faster decline in the short-term poverty reduction. Conversely, environments with rapid fertility increases are apt to show exaggeratedly increasing short-term poverty rates when age-adjustments are not made.

2.1.5 Adjustment for non-food needs

The food poverty line is just one part of the overall poverty threshold. There are two common approaches to making adjustments for non-food needs. Roughly half of the respondents to the UNSD survey use the "direct" method (conditional on constructing a poverty line using the "cost of basic needs" approach). The direct method parallels the way in which the food poverty line is constructed. First, necessary items are selected. In the Gambia, for example, the list includes rent, clothing, firewood, transport, education, and health costs. In Albania, by contrast, the list also includes tobacco and entertainment. After the list is determined, the goods are priced and the non-food line is formed.

The UNSD survey shows that 38 of 91 statistical offices do not make specific non-food adjustments, but of the 53 offices that reporting making adjustments, 54 percent use an indirect method and 38 percent use the direct method described above (while 8 percent use both). One advantage of the indirect method is that it is simpler and can capture a wider range of non-food needs. As an indirect method, though, it may include expenditures on alcohol, tobacco, lotteries, certain religious ceremonies, and other categories that might be deemed (rightly or wrongly) inappropriate as constituents of a poverty line designed to measure "basic needs."

The indirect procedure examines data on food consumption and total expenditures. With a food poverty line in hand, the method entails finding the level of non-food expenditure that would be typical of a household whose food consumption is just at the food poverty line. There are two main ways to do this. The first way is to begin by calculating the "Engel coefficient," the ratio of food consumption to total expenditures, and then to run a statistical regression that allows prediction of the Engel coefficient for the household whose food expenditure is at the food poverty line.[8]

A second approach is to calculate the average Engel coefficient for households whose food consumption is in the vicinity of the food poverty line (commonly above or below by 10 percent). In either case, once the appropriate Engel coefficient has been obtained, the overall poverty line can be found by multiplying the food poverty line by the inverse of the Engel coefficient.

[8] World Bank researchers have developed a robust method that involves obtaining the non-food component from the constant in a related regression approach.

2.1.6 Setting and updating prices

With the calorie thresholds in place, statisticians can identify a basket of foods that will provide those minimum needs at least cost. Here, again, there is considerable variation in practices. In the Gambia, for example, the food basket consists of 7 goods. In Kenya, on the other hand, the list contains around 100 goods. In Sierra Leone and Vietnam, the list is 40 items long, and in the Philippines, Senegal, and Armenia, the list contains around 25 items. So, while experts in the Gambia and Sierra Leone employ identical nutritional thresholds, the food baskets they construct vary considerably in size.

Size and composition of the basket affect the accuracy of the overall poverty line. The trade-off in moving to a larger food basket is mostly given by the added costs of collecting price data. Collecting a moderate-sized food basket (say, with 25 items) but obtaining high-quality price data will likely enhance accuracy over either smaller or larger food baskets, especially if the latter makes it more difficult to update prices.

The final step in constructing a food poverty line involves pricing the goods in the basket. Again, practices differ considerably, and another set of choices must be made. In the "expanded" UNSD survey, of 30 statistical offices that responded to the question, only 7 percent adjust commodity prices to account for the fact that the poor often pay higher prices than wealthier individuals since they tend to purchase lower quantities in a single purchase and may have fewer choices of retail vendors. In addition, 20 percent make adjustments for the likelihoods that poor households make purchases at different price points than richer households. Table 1 also shows that when updating the cost of the food basket from one year to the next, it is far more common to use the general consumer price index than a price index adjusted for a basket of goods more typical of the consumption patterns of the poor (a finding also in the larger survey reported in this handbook's appendix). The use of general consumer price indexes considerably reduces costs for statisticians, but it undermines the reliability of the measures. The debate around consumer price indexes is echoed in the debate around international comparisons discussed below.

Table 1: Use of prices in setting poverty lines.

	Yes (percent)	**Number of observations**
Is the general consumer price index (CPI) used to update prices for food basket?	71	34
Is a poverty-specific CPI used?	9	34
Are commodity prices adjusted for differential prices paid by the poor due to lower quantities purchased?	7	30
Are commodity prices adjusted for differential prices paid by the poor due to purchases at different price points?	20	30
Does the composition of the food basket allow for differences in regional consumption habits?	53	32

Source: Author's calculations from "expanded" UNSD international survey of statistical offices, May 2004.

Some adjustment for these concerns is implicit in setting separate poverty lines for urban and rural areas and for different regions. While 46 percent of respondents to the "expanded" UNSD survey construct only a single poverty line, 25 percent construct two lines, and 29 percent construct three lines or more. Having multiple lines can add precision, especially in geographically diverse countries, although it drives costs up.

2.2 International comparisons

It would be helpful to find a way to slash through the multiplicity of possibilities identified above. One way is to work toward the harmonization of approaches, seeking methodological consensus across countries. Another is to start from scratch with so-called international poverty lines.

Poverty measures are used both to compare progress across different countries (where the need for international comparability is paramount) and within a single country (where it is possible to customize the approach and definitions). The United Nations and World Bank have adopted \$1/day and \$2/day per capita poverty lines for international comparisons, even though national poverty lines may be more appropriate for comparisons within a specific country.

The UN $1/day line happens to roughly approximate India's poverty line in the 1980's.[9] The $1/day line was not constructed based on a notion of an international basket of goods required to achieve basic capabilities, as described by Sen (1987) for example. Instead, it was chosen as a simple, if arbitrary, threshold that could be used to set goals and monitor progress. Given the challenge of constructing a consistent poverty line for any given country, arbitrariness is not surprising when constructing a line meant to apply globally.

One limit of the international lines is that for richer countries, the $1/day line (or even the $2/day line) captures few of those considered poor by experts in the countries themselves. The poverty line in the United States is roughly ten times higher than the $1/day line, for example. The $1/day poverty line used by the United Nations and World Bank is anchored in 1993 international prices, so it is instructive to compare the data to the 1993 poverty line in the United States. In 1993, households in the United States with two adults and two children were deemed poor if their income fell below $14,654 per year—or $10.04 per day per person.[10] The per-year figure for the US is thus ten times higher than the international benchmark.

Another limit of the $1/day line involves the translation of the international line (denominated in US dollars) into country-specific poverty lines (denominated in local currency). The simplest approach would be to use official exchange rates. But many

[9] The poverty line was originally set at $1 per day per person valued at 1985 international prices but was subsequently updated to $1.08 per day in 1993 international prices. The line is still referred to as the $1/day measure, however.
10 See, http://www.census.gov/hhes/poverty/threshld/thresh93.html.

goods consumed by the poor are not traded, and official rates can also be distorted by government interventions. It is thus broadly accepted that official exchange rates cannot be relied on to give the appropriate conversion of purchasing power when welfare comparisons are made. These issues have led to a search for alternative methods of conversion.

The United Nations and World Bank use a set of exchange rates calculated as part of the International Comparisons Project. These rates are designed to be used for comparing national income in different countries, and similar to consumer price indices, these rates are calculated based on the relative prices of a set basket of goods in each country. The idea is to calculate conversion factors that aim to equalize the purchasing power of currencies in different countries (which is why they are termed "purchasing power parity"—or PPP--adjustments).

In principle, if a certain kind of man's shirt costs $10 in the United States, then $10 converted via the PPP-adjusted exchange rate should allow a person to have exactly enough money to buy the same shirt in any other country. In practice, the PPP numbers are difficult to calculate, and corrections and refinements to the method continue. A set of numbers is available for a large number of countries, however, and the UN and the World Bank rightly favor them over official exchange rates.

Differences between PPP and official exchange rates are considerable. In late 2003, for example, the ratios of official rates to PPP rates in Brazil, Nigeria, and India were 2.3, 1.4, and 3.3, respectively. This overvaluation of official rates means that the PPP-adjusted figures raise the value of $1/day poverty lines when denominated in local currencies—and thus the PPP method shows more poverty in the world than would a $1/day line translated into local currencies at official exchange rates.

While they are more accurate than official exchange rates, PPP exchange rates were not originally designed for adjusting poverty lines. In particular, they are not based on a bundle of goods typically consumed by the poor. Researchers have worried about (and demonstrated) the potential biases that result from including cars and color televisions and other goods typically consumed only by richer citizens, and ongoing work aims to create a set of PPP rates that better reflect the spending patterns of poor populations.

An alternative approach would be more painstaking but more consistent with the conceptual basis for poverty measurement described above. The idea would be to focus on a set of capabilities that people throughout the world can agree are necessary for living free from the worst deprivations. Elements would likely include having adequate nutrition, health inputs, shelter, and clothing. Each element would be specified carefully in the spirit of the "cost of basic needs" approach described above. The components would be achievable through access to different bundles of goods in different places, recognizing that eating and living patterns vary considerably the world over. The task for statisticians would be to construct locally-relevant commodity baskets that reflect the international consensus on these basic capabilities—and to price the baskets using local costs, avoiding the need to use international exchange rates of any sort.

One advantage of this approach is that region-specific poverty lines could be easily accommodated, free of reliance on PPP numbers. The project would no doubt require considerable international coordination and consultation (unlike current practice), but the reward would be the first truly global poverty approach. Setting new international poverty lines would be a critical first step.[11] As highlighted throughout this handbook, coordinating survey techniques and practices would be the second major step toward this ultimate goal.[12] For now, though, many countries will continue to rely upon the $1/day and $2/day per-person poverty lines. They have proved highly effective in focusing attention on world poverty, and they provide a rough benchmark on global trends. But at the same time, their limits should be kept in mind, particularly when completing disaggregated analyses.

2.3 Toward harmonization

A key goal of this handbook is to find common ground in approaches to poverty measurement, to better understand differences in approaches, and to sharpen assessment practices overall. While money-based measures no longer have exclusive hold on our attention, they remain central to analyses. The past two decades of experience, though,

[11] Debate around the $1/day poverty line is described in UNDP papers (2004), as well as in Reddy and Pogge (2002), Ravallion (2002), and Deaton (2001). Reddy and Pogge (2002) describe (and advocate) the alternative approach described above.
[12] In approaching the second step, there would be much to learn from initiatives like the World Bank's Living Standards Measurement Survey program and from the Luxembourg Income Studies.

reinforce the value of collecting health and education data, as well as other social indicators that describe broader conditions of poverty. Increasingly, researchers also find value in asking about subjective views of poverty and in seeking input on poverty through participatory exercises that involve participants from local communities. Direct measures of access to basic services and infrastructure also provide important inputs in the policy–making process.

Results from the 2005 United Nations Statistical Division survey on approaches to poverty measurement show a wide range of practices. The diversity partly reflects differences in national conditions and policy needs, but there remain substantial areas where greater uniformity will raise the overall quality of poverty measure and improve comparability of measures across time and location. The $1/day poverty line approach incorporated into the United Nations Millennium Development Goals demonstrates the power of uniformity, and this chapter points to ways of going further.

Several steps to consider in achieving greater comparability and transparency include decisions to:

- Base poverty measurement on expenditure data rather than income data;
- Establish standards for how poverty lines are set, including how to determine both food and non-food portions of poverty lines (where the “cost of basic needs” approach is taken);
- Select a standard set of adjustments for adult equivalence;

- Select a standard adjustment for economies of scale;
- Create shared guidelines for household survey methods used to collect important consumption items;
- Create uniform ways of handling missing data and implausibly low values of income and consumption; and
- Establish guidelines on whether and how to use data from national income accounts to adjust data from household surveys (many experts will suggest not doing so at all).

These simple steps, which are discussed further in this handbook, will bring statistical offices closer toward a common method of measuring poverty. No set of uniform rules and procedures will be superior for everyone all the time, but achieving greater uniformity will be a vast improvement over today's widely varying practices.

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CHAPTER III. POVERTY MEASURES

Jonathan Morduch[13]

Introduction

This chapter focuses on ways in which statisticians aggregate survey data to describe the condition of poverty. All governments make poverty reduction part of their policy agendas, but how exactly should poverty be measured? This chapter takes up that question with respect to money-based measures: those poverty statistics that measure the degree to which individuals and households fall below a poverty line.[14] Just as there is much diversity in how surveys are collected, the practice of calculating poverty statistics also varies widely. The past twenty years have seen a great deal of convergence in understandings, though, and this chapter draws on what has been learned.

This chapter focuses on ways in which statisticians aggregate survey data to answer questions such as:

- How many poor people are there in a region?
- How deep is their deprivation?, and

[13] I have benefited from the comments of the United Nations Expert Group on Poverty Statistics, and in particular from input from John Gibson, Christian Grootaert, and Branko Milanovic.

[14] The poverty line, as described in the previous chapter, is set to reflect the money needed to purchase those goods and services deemed necessary for living a life free of basic deprivation.

- Has poverty risen since the last survey?

Any discussion of how to form poverty measures must begin with recognition that statistics have multiple constituencies (e.g., government policy makers, NGOs, researchers, and the general public), and these scattered constituencies often have competing needs and agendas. Choosing which poverty measure is best depends in large part on the uses to which it will be put. Since no single statistic is likely to answer the needs of all, most statistical offices publish a range of statistics. Below, recommendations are made for ways to expand the data range to make comparisons easier. Even better, although not always easy, would be to also make the raw survey data available for others to analyze (after taking appropriate actions to protect the confidentiality of surveyed households).

This chapter begins by describing and comparing four commonly-used poverty measures. The discussion emphasizes interpretation, and a recently-introduced metric, "exit time," which is then defined and illustrated with examples from Bangladesh and Papua New Guinea. The chapter then moves to a discussion of measurement error and comparisons based on stochastic dominance that allow researchers to analyze trends in poverty without using explicit measures. The discussion is framed in terms of income or consumption deprivation—since this is the form of poverty usually analyzed with the measures below. But the measures can, in principle, also be used for analyzing other forms of deprivation when the underlying quantities are measured on a cardinal scale, such as under-nutrition, stunting (height for age), and wasting (weight for height). The chapter concludes with a set of recommendations on how to improve the measurement of poverty.

3.1 Desirable features of poverty measures

Poverty measures are used first and foremost to monitor social and economic conditions and to provide benchmarks of progress or failure. Here, poverty measures are indicators by which policy results are judged and by which the impact of events (e.g., runaway inflation or the introduction of a government transfer program) can be weighed. Measures used for monitoring and targeting need to be trusted and require rigorous underpinning. The measures will function well as long as everyone agrees that when poverty numbers rise, conditions have indeed worsened (and conversely, when poverty measures fall, that progress has been made). The first question in judging measures is how well does each index reflect basic properties desirable on philosophical grounds.[15]

A second important use for poverty measures is descriptive. Poverty statistics play critical roles in summarizing complex social and economic conditions that inform conversations around economic and social priorities. For this purpose, effective measures need not completely capture all (or even most) morally relevant aspects of poverty. But the limits of measures need to be understood, and transparency and ease of

[15] Transparency of method is critical in helping to achieve a consensus, and interested parties should be given enough information to understand exactly how the numbers were constructed, beginning with data collection methods and ending with aggregation techniques.

interpretation are critical here. These two notions—the need for rigor balanced against a desire for ease of interpretation—run through the discussion below.

Economists have sharpened discussions by identifying a set of desirable normative characteristics of poverty measures (often stated mathematically as axioms) around which consensus can be built. The search focuses not on identifying descriptively useful measures in the sense above; instead, the focus is on moral relevance—even if the outcome is a set of measures that yield numbers with little intuitive meaning.

If we can agree that acceptable poverty measures must satisfy a given set of axioms or must have certain characteristics, it is possible to sharply narrow the number of potential candidates for poverty measures. In the most desirable case, a single, unique measure would emerge that would be fully "characterized"—that is, there would be only one possible candidate that satisfies all of the axioms on which we agree. So far, though, the search has left a long list of possible poverty measures still on the table, and the task for analysts remains to understand the basic properties of the chief contenders.

While not succeeding at singling out a particular, universally-acclaimed poverty measure, the axiomatic approach pushes discussions forward in useful ways, and the central ideas are worth reviewing. Building blocks include concepts such as "scale invariance." This is the idea that poverty measures should be unchanged if, for example, a population doubles in size while everything else is maintained in the same proportions.

A second building block focuses on the well-being of those below the poverty line—so that changes among better-off people do not affect measured poverty This "focus axiom" rules out measures based on relative notions of poverty (i.e., where poverty is not measured by absolute deprivations relative to a fixed poverty line but instead the poor are identified relative to a shifting statistic like the median income of the whole population). Our focus here is on "absolute poverty" as measured by a fixed poverty line.

A third attribute, the "monotonicity" axiom, states that, holding all else constant, when a poor person's income falls, poverty measures must rise (or at least should not fall).

The "transfer" axiom (sometimes referred to as the Pigou-Dalton principle, after those who employed it first in their analyses) has more analytical bite. It states that, holding all else constant, taking money from a poor person and giving it to a less poor person must increase the poverty measure. Conversely, poverty falls when the very poor gain through a transfer from those less poor.

"Transfer sensitivity," a related notion, goes further. It is best seen by example. Consider a population where the poverty line is set at $1,000. Next, imagine that $10 is taken from someone earning $600 and given to a neighbor earning $500. Any poverty measure that satisfies the transfer axiom will fall. Measured poverty should also fall (for such indices) when $10 is taken from someone earning $300 and given to someone earning $200. The transfer-sensitivity axiom says that the reduction in the second case (in which a very poor person is made better off relative to her neighbor) should be greater than the reduction in the first case (in which the recipient is less poor).[16]

An additional desirable characteristic is the ability to decompose poverty measures by sub-population. Sub-populations may include, for example, residents of different regions. The critical feature for decomposition is that the sub-groups are distinct from each other (so that there is no overlap in membership) and that together they encompass the entire population. All additive indexes are decomposable, and all of the measures described below share the feature.[17]

3.2 Four common measures

The simple headcount index is the most used poverty measure, but it violates several important axioms. Of the four measures described below, the one that satisfies all of the desirable axioms above--the Watts measure--turns out to be the least used. These two facts suggest an ongoing tension between the desire for simplicity and transparency pitched against the desire for rigor. The measures below will be compared in that light.

All of the measures will be described in terms of shortfalls of "income." The focus on income keeps discussion simple, but the measures may instead may be used to gauge shortfalls in consumption and spending—following the discussion in Chapter 1.

[16] For a broader discussion of axioms, see Sen (1976), Foster (1984), and Foster, Greer, and Thorbecke (1984).
[17] Decomposability is the focus of Foster, Greer, and Thorbecke (1984).

Also note that given that nearly all surveys are household-level surveys, income (or consumption) will either be put in per capita terms or per adult equivalent.

3.2.1 Headcount measure

The headcount is the simplest and best known poverty measure. It identifies the share of a population whose income is less than the poverty line. It is, not surprisingly, the most commonly calculated poverty measure. The measure literally counts heads, allowing policymakers and researchers to track the most immediate dimension of the human scale of poverty.

The headcount is calculated by comparing the income y_i of each household to the poverty line z. (The index $i = 1 \ldots M$, where M is the total number of households in the sample.) Concretely, an indicator variable is constructed for each household, taking the value 1 when income falls below the poverty line or 0 if income is greater:

$\mathrm{I}(y, z) = 1$ if $y_i \leq z$

$\mathrm{I}(y, z) = 0$ if $y_i > z$

The headcount index is simply the sample average of the variable $\mathrm{I}(y, z)$, weighted by the number of people in each household n_i.[18] The measure is calculated by first counting the number of poor individuals, G:

$$G = \sum_{i=1}^{M} I(y, z) n_i .$$

[18] Note that total household size, n, is used even where income and the poverty lines are designated in terms of adult equivalents. This is not the case when calculating the poverty gap, as discussed below.

Total population of the sample can be calculated similarly as

$$N = \sum_{i=1}^{M} n_i ,$$

and the overall headcount is then the ratio of the two numbers:

$$H = G/N .$$

Where the sample is not representative of the underlying population (e.g., if the sampling strategy involved random stratification), population weights should also be included in the calculation (see chapter 5 for further discussion).

The headcount is an important descriptive tool. As a sole guide to allocating resources, though, the headcount can significantly mislead. There are two large tensions. First, the headcount registers no change when a very poor person becomes less poor. Nor does the headcount change when a poor person becomes even poorer. Most observers, though, following Watts (1968) and Sen (1976), argue that changes in the income distribution below the poverty line matter in a moral sense. This notion is captured by the transfer axiom above, but the headcount fails the test.

A second tension flows from the failure of the transfer axiom, combined with the focus on whether people are above or below the poverty line. If policymakers see their task as reducing poverty as measured by the headcount, their work will be made easier by focusing on improving the lot of individuals just below the poverty line. A little improvement at this level can raise the incomes of the "barely poor" above the poverty line and hence can reduce the poverty headcount fairly rapidly. Directing resources to very poor people, on the other hand, may be socially beneficial, but far larger income gains are required to take them over the poverty line and thus to make a dent in the poverty headcount. So if efforts are allocated specifically to reduce the headcount, priority will likely go to helping the least poor over helping the poorest.

The headcount remains a highly valuable measure, even if, when used on its own, it is a poor guide for resource allocation. One step to make the approach more useful is to calculate the headcount for “sub-poverty” lines at lower thresholds than the overall poverty line. These may capture, for example, the income required to purchase the food basket only, excluding non-food needs. Tracking the population under sub-poverty lines is a first, simple step—and often a powerful descriptive tool.

3.2.2 Poverty gap

This second widely-used measure has a problem similar to the headcount: it is descriptively very useful but, if used alone, would also serve as a poor guide to resource allocation. The poverty gap measures the amount of money by which each individual falls below the poverty line. It matters here whether income and the poverty line are measured on a per capita basis or whether they have been put into adult equivalent terms or adjusted for scale economies (Milanovic, 2002). The appropriate formulas are given below.

The starting point is to calculate the total shortfall in income for the poor population:

$$Shortfall = \sum_{i=1}^{M} (z - y_i)\, I(z, y_i)\; n_i\, ,$$

where the poverty line is z, income is y, $I(z,y_i)$ is a 0/1 indicator of poverty for each household, household size is n_i, the total number of households in the sample is M, and individuals are indexed by i. The calculation gives the total sum of money that would be needed to make up for the gap between the existing incomes of the poor and the official poverty line.

The calculation above is correct only if income is in per capita terms. When income is made instead in adult equivalent terms (or adjusted for scale economies), the correct calculation is:

$$Shortfall = \sum_{i=1}^{M} (z - y_i)\, I(z, y_i)\; a_i\, ,$$

where a_i gives the number of adult equivalent units in household i.

As a sum, the figure above may be helpful for budget planners, but it obscures the sense of individual deprivations. An alternative is to instead calculate the average shortfall for the population below the poverty line:

$$\frac{Shortfall}{G} \qquad (1)$$

When viewed together with the headcount, this version of the poverty gap measure shows the distance (on average) to be traveled in raising incomes. Because the figure is denominated in currency, conversion to a common international currency (e.g., euro or dollar) will aid global comparisons.

A different approach that can enhance comparability is to divide the index by the poverty line:

$$\frac{Shortfall}{Gz} \tag{2}$$

Normalization puts the average gap in terms of the percentage shortfall from the poverty threshold, freeing the measure from denomination in a particular currency. The measure is now easily comparable across countries and across time, a helpful improvement. Routinely publishing poverty lines alongside the normalized poverty gap and the headcount would allow observers to calculate for themselves all three of the poverty gap variations described above.

The three data points (headcount, poverty gap, and poverty line) can be combined to form another widely-used variant of the poverty gap:

$$\frac{Shortfall}{Nz} \tag{3}$$

Here, the resource shortfall is divided by the total population, rather than the population of the poor. The measure is often misinterpreted as giving the average income shortfall of the poor, but that is only the case for versions (1) or (2). Dividing by the total population sacrifices simple interpretations—the measure no longer gives a quick sense of deprivation of poor individuals since data on non-poor people are also included. The measure points up tensions between descriptively-useful measures and measures that can best serve as guides for monitoring and targeting.

The measure in (3) does, though, avoid a common problem with variants (1) or (2). Specifically, the poverty gap in (1) and (2) can rise—rather than fall—when individuals exit poverty. This occurs when the least poor are the ones who move above the poverty threshold (which is the typical pattern). Holding all else the same, those who exit poverty leave behind a population that is then smaller and, on average, poorer than before. Conditions would thus seem to worsen when someone exits poverty--if seen through the lens of the poverty gap as calculated following (1) or (2)--when in fact conditions have improved overall. The measure in (3) instead captures improvement due to the exit. The problem here occurs when the poverty gap in (1) or (2) is used as a *sole* indicator of progress; it performs poorly when people cross the poverty line.

Version (3) does not have that problem. But as noted, it lacks a simple interpretation and, along with all of the versions above, it fails to satisfy the transfer axiom. This failure follows from neutrality with regard to whose income goes up and down among the poor population. For the transfer axiom to be satisfied, it is not enough to be neutral: it must be that gains for the poorest are weighed more heavily than gains for the less poor. Even in version (3), no accommodation is made to weigh progress in reducing extreme poverty differently from progress in reducing moderate poverty.

In summary, version (2) can be useful as a descriptive tool, especially alongside other measures. Version (3) has some desirable properties from an analytical vantage. But as discussed below in sections 3.2.3 and 3.2.4, distributionally-sensitive measures do even better. Version (3) has gained favor by being a member of the Foster-Greer-

Thorbecke class of measures described below (specifically, the case in which $\alpha = 1$). But the attention seems misplaced. If a single poverty measure is required, version (3) of the poverty gap has less appeal than the measures described in sections 3.2.3 and 3.2.4--although it would be preferred over having, say, version (2) on its own.

All of this is rhetorical since it is seldom that only one poverty measure is calculated. When multiple poverty measures are produced and published simultaneously (say, the headcount and a few others), version (2) of the poverty gap stands as a useful part of a collection. Version (2) features a clear, simple interpretation that is relevant for policy discussions, an attribute lacking in version (3). A recommended set of basic poverty indicators would thus include the headcount, version (2) of the poverty gap, the median income of the poor, and the squared poverty gap described in section 3.2.4.

3.2.3 Watts index

A simple poverty measure that satisfies the transfer axiom was first put forward by Watts (1968), who argued for the following measure:

$$\frac{1}{N}\sum_{i=1}^{M}\left[\ln(z)-\ln(y_i)\right] I(z,y_i)\, n_i . \tag{4}$$

As above, when income is calculated in adult equivalent terms, the household size variable n_i should be replaced with the adult equivalent size a_i. The measure is "distributionally-sensitive" by virtue of its use of logarithms.[19] The way that the logarithm is used means that the Watts index is much more sensitive to changes in the lowest incomes than it is to changes for those with higher incomes. That is, transferring \$10 to a very poor person counts as a far larger contribution to poverty reduction than transferring \$10 to a richer (but still poor) neighbor.

Allocating anti-poverty resources to minimize the Watts index would thus tilt efforts toward the poorest—which is a feature that many analysts find appealing (and one also featured by the squared poverty gap and the influential (but seldom applied) measure of Sen, 1976). The Watts index also satisfies the transfer-sensitivity axiom described above, and it is decomposable into the population-weighted sum of the poverty indices of regions or groups. (The squared poverty gap of section 3.2.4 shares this feature too.) Being decomposable is useful when a population can be divided into a number of distinct groups or regions. Poverty measures can then be calculated for each group or region, and, if the poverty measure is decomposable, the individual poverty measures can be aggregated (using population shares as weights) to form the overall poverty measure for the entire population. Decomposing poverty measures in this way can help to pinpoint the groups or regions contributing most—and least--to overall poverty.

Given these appealing features, the Watts index can be a useful measure, and we return to it below in comparison to the "squared poverty gap" and the "average exit time" measures (see sections 3.2.4, 3.3, and 3.4). The comparisons in section 3.3 show that an

[19] If a given number is larger than another, then the logarithm of the first will also be larger than the logarithm of the second. But the logarithmic transformation is nonlinear, i.e., the ratio of the two numbers will be larger than the ratio of their logarithms.

important difficulty with the Watts index is that the weights on money in the hands of the "least poor" and the "moderately poor" are quite close, while the weights on the "most poor" and destitute are particularly heavy. As section 3.3 shows, the "squared poverty gap," in contrast, leads to greater differentiation across the entire distribution of incomes below the poverty line and may be preferable for that reason.

3.2.4 Squared poverty gap

One way to transform the poverty gap described above into a distributionally-sensitive measure is to raise the individual gaps to a power greater than 1. Foster, Greer, and Thorbecke (1984; henceforth, FGT) propose a class of measures built on this idea which have found their way into much of the poverty analysis published by the World Bank. With income expressed in per capita terms, the measures take the form:

$$\frac{1}{N}\sum_{i=1}^{M}\left(\frac{(z-y_i)}{z}\right)^{\alpha} I(z,y_i)\, n_i. \qquad (5)$$

When income is in adult-equivalent terms, the household size variable n_i should be replaced with the adult equivalent size a_i.

The parameter α determines the degree to which the measure is sensitive to the degree of deprivation for those below the poverty line. When α is zero, the measure collapses to the headcount measure described above, and when α is one, the measure is the normalized version of the poverty gap (equation 3 above). In neither case is the measure distributionally-sensitive. But for $\alpha > 1$, the measure is distributionally sensitive. And the particular case in which $\alpha = 2$ (often referred to as the squared poverty gap) is now the most widely-used distributionally-sensitive measure.

By squaring the poverty gap, improvements in the resources of the poorest individuals count most, since they are the ones for whom the initial resource gap is largest. The measure satisfies the transfer axiom but not the transfer-sensitivity axiom. To satisfy the latter, the poverty gap would have to be raised to a higher power—cubed rather than squared, say. Cubing adds "transfer sensitivity," a property that many find appealing. But it puts very heavy weight on the well-being of the poorest—perhaps weight that would be judged too great in a social calculus.[20] At levels of α between 1 and 2, not only is transfer sensitivity not satisfied but the reverse holds: holding all else the same, a regressive transfer among the very poor increases poverty *less* than a same-sized regressive transfer among the moderately poor—a clearly undesirable feature.

Distributional-sensitivity is achieved by weighing deprivations of the poor inversely to their base incomes. There are many ways to do this, and the weighting scheme in the squared poverty gap has the advantage of relative simplicity. The simplicity can help provide some intuition in understanding why the poverty measure moves over time. This is described below in the context of Figure 1.

3.3 Comparing the measures

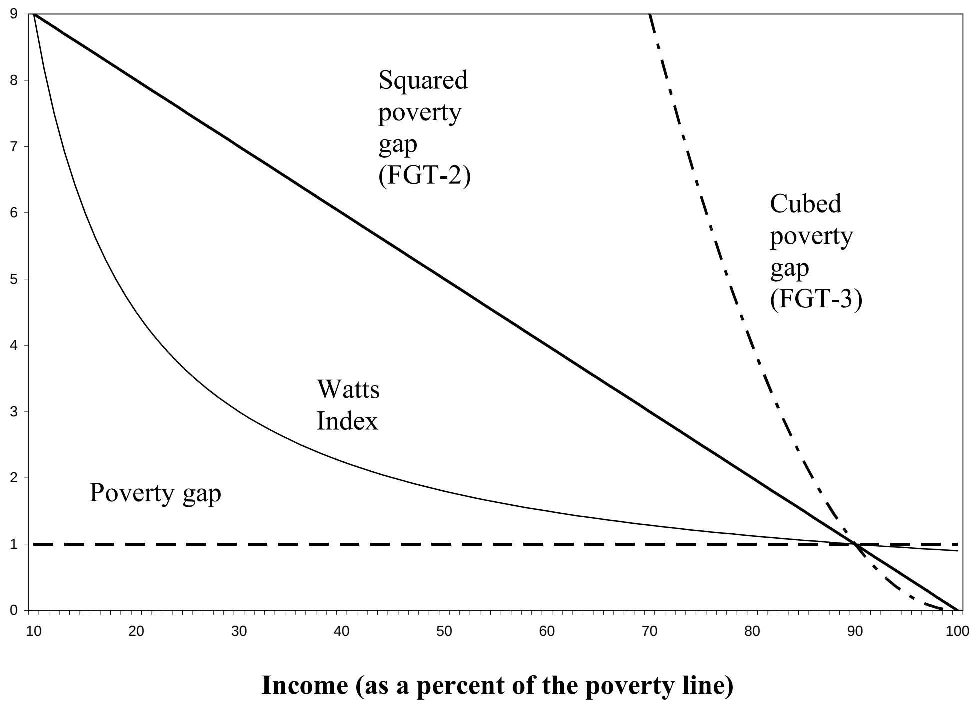
[20] Transfer sensitivity is obtained through setting α at any level larger than 2 (2.2, for example), but analyses have focused on integer values.

Neither the Watts index, nor the squared poverty gap, nor the cubed poverty gap yield particularly easy-to-interpret numbers. As noted above, we rely for interpretation on our knowledge that the indices satisfy (or do not satisfy) certain axioms, notably the transfer axiom and transfer-sensitivity axioms. Often that is enough, and at times each of the three indexes will rank income distributions identically. So the form of the poverty index may not matter when answering relevant policy questions. In other cases, though, results will depend on the choice of index, and the relatively opaque nature of the indexes hides the fact that even indexes with similar basic properties (e.g., Watts and the cubed gap) weigh income gains very differently for different people.

Figure 1 makes this explicit. The question asked in the figure is: how does giving \$1 to a person with income equivalent to, say, 50 percent of the poverty line compare to giving the \$1 to someone with income equivalent to 90 percent of the poverty line? Specifically, how does the transfer contribute to measured poverty?

The figure shows how the answer depends on the choice of poverty measure. It demonstrates the relative weight of a \$1 increase in income as implied by the four measures above—the poverty gap (equation 3 above), squared poverty gap, cubed poverty gap, and the Watts index. The horizontal axis gives a poor person's income relative to the poverty line, from 0 percent at the left to 100 percent at the right. Those on the far right are just at the poverty line (which was set at \$100 for this illustration). The \$1 increases are depicted relative to a \$1 increase for a person whose income is at 90 percent of the poverty line (i.e., an income of $90 when the poverty line is $100). By construction, all four curves thus meet at 90 on the horizontal axis.

Figure 1: Comparison of implicit weights in poverty measures.



The weight of an additional $1 of income for poor individuals at different levels, relative to the weight on an additional $1 of income for individuals with income equal to 90 percent of the poverty line.

The curve giving weights for the poverty gap is perfectly flat, showing that the measure is not sensitive to who gains the income--a dollar is a dollar no matter whether it accrues to the most poor or the least poor. The other three curves slope downward, though, indicating that a dollar earned by the most poor weighs more in these indexes.

The curve for the cubed-poverty gap arcs so sharply that it goes off the graph. Giving $1 to a person weighs 9 times more if the recipient has income of $70 than if the recipient starts with income of $90 (relative to a poverty line of $100). The weighting is thus heavily skewed to the very poor – and certainly far more skewed than is the case for the squared poverty gap.

For the squared poverty gap, the ratio of weights is proportional to base income. For example, a dollar accruing to someone with income of $70 (i.e., 30 percent below the line) is 3. At $80 (i.e., 20 percent below the line), the ratio is 2. And so forth. This property would be highlighted if the measure were renamed the "gap-weighted" index, say, since the income gap for each household (i.e., $z - y_i$) is weighted by the size of the income gap itself (which is, again, $z - y_i$).

The Watts index takes a very different form, weighing increases from very low incomes very heavily, but staying flatter for less poor individuals. The ratio in the figure only hits 2 when the added dollar accrues to individuals whose incomes are below $50. The relative weights, as seen by the ratio in the figure, are always below those of the squared gap, except for transfers made to people with incomes below $10. At that level, income is so low that (it is hoped) few if any people could survive at those levels. The weighting scheme corresponds with moral concerns that focus on the very, very poorest with extreme intensity, in contrast to the squared poverty gap which has a linear profile of relative weights. On the other hand, the Watts index exacerbates bias due to measurement error if the reported incomes at the very low end are largely the result of poor data collection and mis-reporting.

None of the weighting schemes can claim universal preference from a normative stance, but the square poverty gap is a middle ground, and this likely explains much of its continuing appeal. The Watts index, though should not be altogether dismissed. It has a useful feature through its association with the exit-time concept and value as a descriptive tool.

3.4 Exit time and the value of descriptive tools

For all of the theoretical appeal of the distributionally-sensitive measures described immediately above, the headcount remains—by far—the most common poverty measure in use. The Millennium Development Goals, for example, focus on reducing the headcount of poverty below $1/day, rather than minimizing a distributionally-sensitive measure.

One reason for the continuing use (and usefulness) of the headcount is its descriptive properties. It is a simple means for illustrating the scale of poverty. In this sense, it is an intrinsically meaningful measure.

The poverty gap is also intrinsically meaningful, taking us from counting people to counting shortfalls of income or consumption. It answers the question: how much would have to be spent to eliminate poverty through costless (and perfectly) targeted transfers. Its underlying assumptions are clearly unrealistic: in practice, transfers will never be administratively costless, nor will they ever be perfectly targeted. However, this hypothetical question still provides a helpful way to quickly gauge the scale of deprivation.

The "average exit time," introduced in Morduch (1998), is based on a similar sort of hypothetical question. The underlying assumption is as unrealistic as that under the poverty gap, but the measure nevertheless can fruitfully frame discussions of poverty. The measure is based around the number of years that it would take poor households to grow out of poverty given a hypothetical, steady growth of income. (An equivalent question could also be asked about consumption growth, rather than income.)

In practice, income growth will seldom be steady over long periods, nor will all poor households be able to grow at the same rate. But, as with the poverty gap, asking the hypothetical question provides a quick way to gauge one important aspect of the condition of poverty.

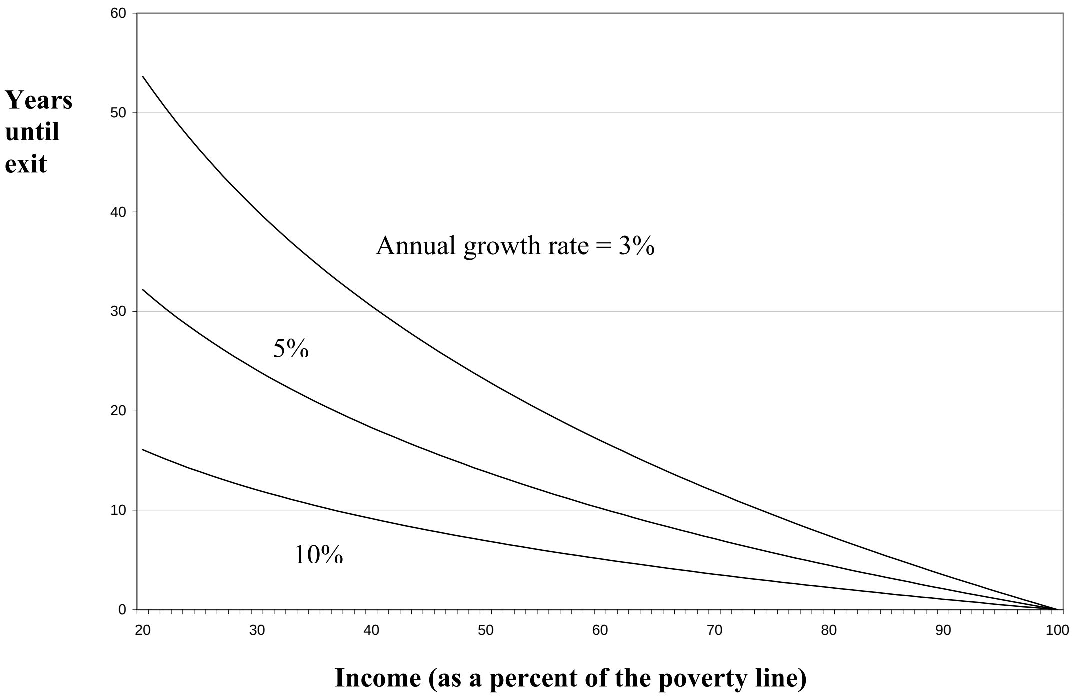
Hypothetical exit times are simple to calculate. If the assumed growth rate of income is g percent per year, an individual whose income starts at y_i will take T years to exit, where T solves this equation:

$$z = y_i(1+g)^T \tag{6}$$

The equation can be solved by taking logarithms, yielding that the number of periods of growth required before exit is $T = \ln(z/y_i) / g$. Of course, $T = 0$ for all households already above the poverty line. So, for example, if a person's income starts at 80 percent of the poverty line and his income grows at 5 percent per year (after adjusting for inflation), his exit time will be ln(100/80) / 0.05 = 4.5 years.

The calculation shows that within five years, consistent, broad-based income growth of 5 percent would be enough to push from poverty everyone whose income is 80 percent of the poverty line or higher. Exit times based on this calculation are shown in Figure 2, based on assumed growth rates of 3 percent, 5 percent, and 10 percent. Alternatively, a figure could be constructed that fixes the hypothetical growth rate and maps a profile of exit times for the entire poor population, with exit times shown according to the fraction of the population at each level of income below the poverty line.

Figure 2: Hypothetical exit times as a function of income below the poverty line



In a related calculation, Morduch (2000) focuses on the "median exit time" when illustrating the use of exit times with data from Bangladesh. The calculation is simple: $\ln(z/y_M)/g$. The only data required are the poverty line z, the assumed growth rate g, and the median income of the population below the poverty line y_M. The median poor rural household in the 1988-89 Household Expenditure Survey spent Taka 284 per month per capita relative to the poverty line of Taka 370. (In 1989, Taka 32.1 = $1.) So, if median expenditures grew steadily at 3 percent per year, it would take just under 9 years to reduce half of rural poverty through growth alone—ln(370/284)/.03.

If the hypothetical exit time , T_i, for each poor household is averaged over the population below the poverty line, the "average exit time" is:

$$A = \frac{1}{G}\sum_{i=1}^{M}\frac{\ln(z/y_i)}{g}\, I(z,y_i)\, n_i = \frac{1}{G}\sum_{i=1}^{M} T_i\, n_i \qquad (7)$$

This equation is analogous to the average poverty gap described in equation (2), and it shares similar weaknesses and strengths. Its chief strength is its simplicity and descriptive value. Its main weakness is that when a less poor household exits poverty and all else is unchanged, the average exit time, A, will fall. This makes A a poor candidate to be the sole measure of poverty. However, A can still be a very useful component of the analyst's toolkit.

One aspect that makes the average exit time potentially valuable is that it can be decomposed explicitly to show the impact of inequality below the poverty line. Start with the average income of households below the poverty income:

$$y^{avg} = \frac{1}{G}\sum_{i=1}^{M} y_i \; I(z, y_i) \; n_i .$$

If everyone below the poverty line had exactly this income (i.e., there was no inequality below the poverty line), then this hypothetical average exit time would be:

$$T^{avg} = \ln(z / y^{avg}) / g.$$

Using these relationships, the average exit time of the poor population (A in equation 7 above) can be rewritten simply as:

$$\text{A}= T^{avg} + L / g, \tag{8}$$

where *L* is the Theil-L measure of inequality--a commonly used inequality index. The decomposition shows the explicit contribution of income inequality to the average exit time.

In their survey of 1,144 households in Papua New Guinea, Gibson and Olivia (2002) found that given an assumed, hypothetical growth rate of 2 percent per year, the average exit time of the population would be 20.5 years. Their calculation helps to frame the potential importance of growth-based strategies—if growth is steady and broad. They decompose the result to show that the exit time of a person with income equal to the average income of the poor population (i.e., T^{avg}) is 17.8 years, so the explicit impact of inequality below the poverty line is an increase in the average exit time by 2.7 years.

The exit time has a useful relationship to another established measure. If exit times are calculated for the entire population of a country (with those above the poverty line having 0 exit times), the average turns out to be simply the Watts poverty index divided by *g*, the hypothetical annual growth rate.[21] This measure, the "population average exit time," naturally shares all properties of the Watts index, satisfying both the transfer axiom and the transfer-sensitivity axiom. But it has the addition of a new interpretation, akin to the interpretation of the poverty gap described by equation (3) above.

With economic growth very much a part of the poverty reduction policy agenda, tools like exit times provide ways to summarize data in a manner relevant to policy debates on growth-based poverty strategies. They complement the other measures described above, rather than substituting for measures whose appeal rests primarily on their axiomatic properties. By the same token, those theoretically-appealing measures cannot substitute for simpler tools that provide new ways of describing the data and identifying trends. And, importantly, it should be remembered that exit times describe possibilities based on simple assumptions—as used here, the exit times are not based on actual forecasts or careful predictions. These simple exit times, though, can be useful in identifying opportunities and constraints to guide policy.

[21] This measure satisfies the monotonicity transfer, and transfer-sensitivity axioms. As a result of its additively separable form, the measure is also decomposable into the population-weighted measures of sub-populations of the poor.

3.5 Broader concerns

3.5.1 Comparisons without poverty measures

For many purposes, the relevant policy question is simply: is poverty larger or smaller in one survey versus another? As noted above, the answer can depend on which poverty line and which measure is used in the analysis. But that is not always so. It may be that one survey finds a greater fraction of the population exists at *every* income level below the poverty line, relative to the fractions of the population reported by another survey.

When that is so, the first survey can be said to "stochastically dominate" the latter (Ravallion, 1994), and conclusions about poverty rates can be made irrespective of whether the poverty line is moved lower or whether the poverty measure chosen is the Watts index, headcount, or one of the poverty gap measures described in section 3.3. Formally, the condition for "first order" stochastic dominance is that with regard to two samples, A and B, if the cumulative distribution function of their income distributions is such that $D_A(y) < D_B(y)$ for all incomes y below the poverty line, then sample A stochastically dominates sample B.

When income distributions cross below the poverty line (i.e., when $D_A(y) < D_B(y)$ in some income range but $D_A(y) > D_B(y)$ in another), more restrictive notions of stochastic dominance can be applied which, nonetheless, allow broad statements that are robust to a wide range of choices of poverty lines or measures. These approaches—"second order" and "third order" stochastic dominance--are described further by Ravallion (1994). When these robust approaches can be employed, questions about the choice of method can be avoided. Their disadvantage is that they only answer a simple question—is poverty higher or lower in sample A than B? Richer descriptive tools (like the hypothetical exit times discussed above) are required to inform richer policy questions.

3.5.2 Measurement error

The chapters that follow in the handbook focus largely on methods for collecting surveys. No survey is perfect, but some collection methods are far more reliable than others. Particular problems arise when expenditures (or incomes) are either substantially over-counted or under-counted, and the biases can be exacerbated by the choice of poverty measure. Under-counting leads to exaggerations of poverty rates, and the distributionally-sensitive measures described here are particularly susceptible to the exaggeration of under-counting in the lower tail of the income distribution.

Figure 1 (above), which shows the implicit weights in several popular poverty measures, also helps to illustrate the potential problems of under-counting. The figure shows the weight given to an extra \$1 of income for households at different levels of base income, relative to the weight of an extra \$1 for an individual whose income is 10 percent below the poverty line. The figure also can be interpreted as giving the weights of \$1 of mis-measured income for different individuals. Clearly, for distributionally-sensitive measures, every dollar that is mis-measured at the low end of the distribution has a far larger impact on poverty than a dollar mis-measured closer to the poverty line.

The pattern of weights can mean that mis-measurement in just a small fraction of observations can make a large difference to results if it takes the form of severe under-counting. Many household surveys, for example, include responses from some households about spending and income patterns that, for one reason or another, are implausibly close to zero. If those observations are taken at face value, they can translate into large movements in poverty measures.

When using the Watts index, for example, adding an extra dollar for someone with measured income that is extremely low—say, their total income is no more than 5 percent of the poverty line (a level so low that long-term survival is hard to imagine if income is measured correctly and savings are unavailable)--would lead to a change in the index which is 18 times the weight of the dollar for someone with income at 90 percent of the poverty line. (This result is so extreme that it cannot be seen in Figure 1.) When using the squared poverty gap, the relative weight would be 9.5 times. It is unclear from a moral standpoint which is the "correct" weight, but in choosing a poverty measure analysts are implicitly making a choice, and it should be borne in mind. In making that choice, it matters greatly whether one believes that very low incomes are most likely a function of measurement error or whether they reflect actual conditions. Fortunately, there are very few observations in these data ranges, but the weighting accentuates their importance.

The best solution is to maintain high-quality data and to be especially vigilant about potential measurement error at the low end. The following chapters, especially Chapter 5, provide guidance on this matter. But where the quality of data is uncertain, it is important to remain alert to prevent the choice of measure that could worsen quality problems. Robustness checks become all the more helpful.

3.6 Conclusions

There is now an extensive literature on poverty measures, and statistical offices have a wide range of numbers to analyze. Focusing on the most commonly used measures promotes comparability across countries. These include the headcount index, poverty gap, and squared poverty gap. This chapter describes how to calculate and interpret these measures (in addition to the Watts index), and identifies their respective strengths and weaknesses.

When multiple poverty measures are produced and published simultaneously (say, the headcount and a few others), a recommended set of basic poverty indicators includes the headcount in section 3.2.1, version (2) of the poverty gap in section 3.2.2, and the squared poverty gap described in section 3.2.4.

Statistical offices can go further, though, by also publishing simple statistics that provide a richer picture of conditions. These statistics are seldom very costly to compute and can substantially enrich analysis. The first is the median income of the poor population. The median gives the income level below which the bottom 50 percent of the poor population lives. This simple measure indicates whether the bulk of the poor population is close to or far away from the poverty line. In section 3.5 above, it was also shown how median income can be employed in the exit-time framework.

Going further, it would be helpful to also publish the income of households at the 25th percentile and the 75th percentile of the income distribution below the poverty line. Ultimately, publishing the entire Lorenz curve (the mapping of population shares to income shares) would be most revealing and would add little extra cost. The median, though, is the natural place to start, followed by incomes at other important focal points of the distribution.

The move toward publishing headcounts of the number of people below a "hardcore" poverty line has accelerated. This is a useful step from a descriptive vantage, although there is currently little consensus on how to define hardcore poverty.

The exit-time framework was introduced in section 3.4 as an example of a simple metric that can help policy makers debate ways to promote economic growth and alleviate poverty. It is a descriptive device based on an unrealistic, best-case scenario. It asks: how quickly would households exit poverty if their incomes grew at a given, fixed rate each year? While hypothetical, the answers integrate the notion of time into poverty programs. The exit time is put forward as a complement to the poverty-gap measure of section 3.2.2, which is built on a similarly unrealistic hypothetical policy scenario, but which nonetheless offers useful insights.

Over time, new measures and approaches will continue to emerge. One of the most valuable steps that statistical offices can take is to put in place ways to make the raw data for poverty analyses available to researchers. Steps would have to be taken to secure confidentiality to households in the survey, but fortunately methods to do so are now well-established. Broadening access to data will allow analysts to better compare conditions and to develop new tools that can ultimately benefit statistical offices, policy makers, and citizens.

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CHAPTER IV. COUNTRY PRACTICES IN COMPILING POVERTY STATISTICS

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Introduction

This chapter provides a review of the poverty measurement practices in member countries of the United Nations. It is found that the large majority of developing countries follow the Cost of Basic Needs (CBN) approach in producing income or expenditure-based poverty statistics. The chapter thus concentrates on absolute poverty measures and glosses over others more popularly used metrics in developed countries, such as relative and subjective poverty measures. Practical difficulties confronted by National Statistical Offices (NSO's) in implementing the CBN method are discussed and analyzed systematically and alternative ways of solving some of these difficulties are proposed.

Absolute poverty measures are discussed in Section 4.1. Direct measures of food poverty which lead to more reliable and comparable estimates are presented in Section 4.2. Non-income measures, particularly minimum basic needs or unmet basic needs indicators, are dealt with briefly in Section 4.3. This chapter concludes with Section 4.4, which discusses the main causes of disharmony in countries' poverty monitoring programs and the sources of non-comparability of their poverty statistics. It then offers recommendations for improvement.

4.1 Income- or expenditures-based measurement approaches

The four UNSD sub-regional workshops on poverty statistics (described in Chapter 1) confirmed that the majority of the developing countries that compile poverty statistics follow the CBN approach or some variation of it. In this approach, everyone's basic needs may be thought of as falling into two categories--food and non-food. Broadly, the CBN approach involves a three-step assessment:

- Define the minimum nutritional requirements of a poor person and determine a food basket or bundle that can provide this minimum requirement. The cost of buying the food bundle is a food poverty line (fpl).
- Choose an operational definition of a poor person's basic non-food needs that will allow estimating their cost directly or indirectly. Use this non-food basic needs cost to adjust fpl upward into a total poverty line (tpl).
- Compare fpl and tpl against some metric, e.g. distribution of income or expenditure per person. The proportion of persons whose incomes (expenditures) fall below fpl is an estimate of food poverty incidence. Some countries refer to this also as core poverty incidence or extreme poverty incidence. The proportion of persons whose incomes (expenditures) fall below tpl is an estimate of absolute poverty incidence. The same procedure is followed to estimate the number of food poor or absolutely poor persons. In addition to persons, countries also routinely produce poverty estimates in terms of households.

Some countries follow more than one approach and produce multiple sets of poverty statistics. However, in the remainder of this section, the CBN approach, as practiced in many developing countries, will be discussed more thoroughly. Possibilities for harmonization and sources of non-comparability will be highlighted. Ways for improving comparability will also be delineated.

4.1.1 Specify a food poverty threshold

National food poverty lines are based on minimum nutritional requirements or thresholds. A person is counted as "food poor" if the nutritional content of the food(s) he consumes is less than the prescribed threshold. As a simplifying assumption, most countries use dietary energy as a proxy for overall nutritional status, i.e., if a person gets enough energy, then she also gets adequate protein and the other essential nutrients.

Countries are guided by FAO/WHO recommended daily allowance (RDA) for energy, defined as "the amount needed to maintain health, growth, and an 'appropriate' level of physical activity" (WHO, 1985, p. 34).[22] FAO uses 2100 kilocalories (kcal) consumption per person per day as the threshold to estimate the prevalence of undernourishment (Naiken, 2003). The results form the basis of the agency's annual assessment of the State of Food Insecurity (SOFI) for individual countries and worldwide. FAO's measure is also one of five indicators designated to monitor the first

[22] RDA is the term used for any nutrient, e.g. energy, protein, and vitamin A. For energy, the more specific term is recommended energy nutrient intake (RENI). For brevity, RDA is used generically in the chapter.

of the Millennium Development Goals – eradicate extreme poverty and hunger. Some countries have adopted the same 2100 kilocalories threshold.

Many countries rely on FAO/WHO guidelines to initially develop their age-by-sex--specific RDAs. Examples include those for the Philippines and Sri Lanka, shown in Table 1. The weighted average of these RDAs, using the corresponding age-by-sex distribution of the population from a census, is one way to arrive at or justify using a particular energy threshold. Using 1990 census data in the Philippines, the weighted average was found to be 1,956 kcal per person per day, which rounds off to the 2000 kcal official threshold (David, 2003). Similar calculations in Sri Lanka using age-by-sex population distribution derived from the 2002 Household Income and Expenditure Survey led to the official 2030 kcal threshold (Widyaratne, 2004). Thus, different RDA specifications lead to divergent energy thresholds. The tasks of developing age-by-sex RDA tables and so-called food composition tables (i.e., the nutrient contents per unit weight of individual food commodities consumed by the population) usually fall on research institutes under national health or science ministries such as the Food and Nutrition Research Institute in Philippines and the Medical Research Institute in Sri Lanka (See Table1).

Dietary energy thresholds used in most of the developing and transition countries are compiled in Table 2. The modal value is 2100. There is a second minor mode at 2400 made up of small island states in the Caribbean. The range is noticeably wide, from 2000 to 3000 kcal per person per day. These differences in the energy thresholds represent the first major source of non-comparability of (food) poverty measures among countries. Degree of non-comparability depends on the sensitivity of the results on incremental changes in the energy thresholds used, which could be considerable, as discussed in sub-Section 4.2.2 below.

Some countries, as shown in Table 2, use different thresholds for different population groups, e.g., 2100 and 2400 kcal per person per day for urban and rural areas, respectively, in India. Others use more than one threshold to arrive at different food poverty lines, e.g., 1805 and 2120 kcal for so-called lower (or core) poverty and upper poverty lines, respectively, in Bangladesh.

Table 1. Dietary energy RDAs, Philippines and Sri Lanka, in kilocalories

Age groups	Philippines		Sri Lanka	
	Male	Female	Male	Female
Under 1 year	700	700	818	818
1-3	1350	1350	1212	1212
4-6	1600	1600	1656	1656
7-9	1725	1725	1841	1841
10-12	2090	1930	2414	2238
13-15	2390	2010	2337	2300
16-19	2580	2020	2500	2200
20-39	2570	1900	2530	1900
40-49	2440	1800	2404	1805
50-59	2320	1710	2277	1710
60-69	2090	1540	2024	1520
70 & over	1880	1390	1771	1330

Sources: Food and Nutrition Research Institute, Philippines, and The Medical Research Institute of Sri Lanka.

Table 2. Dietary energy thresholds used by a sample of countries, 2000-2004

Threshold	Country

Single threshold

2000 kcal	Maldives, Philippines (but also specifies 80% of protein RDA which is equivalent of 50 milligrams.
2030	Sri Lanka
2100	Cambodia, China, Indonesia, Laos, Mongolia, Thailand, Vietnam, Fiji, Turkey, Armenia
2124	Nepal
2133	Madagascar
2138	Malawi
2207	Paraguay (all country)
2238	Oman
2282	Moldova
2250	Kenya
2283	Burkina Faso
2288	Albania
2300	Cameroon
2309	Jordan
2300	Iran
2436	Iraq
2400	Senegal, St, Kitt & Nevis, Morocco, Bahamas
2470	Belarus (all country)
2700	Sierra Leone
3000	Uganda

Multiple thresholds

1805 and 2120	Bangladesh--lower and upper poverty lines.
2100 and 2400	India--urban and rural areas.
2180 and 2220	Mexico--urban and rural areas.
2730 and 2110	Russia--able-bodied men and women.

Sources: Report of Four UNSD Sub-Regional Workshops (2003-2004) and UNSD Survey of Poverty Measurement Practices (2005).

The choice of energy threshold T directly influences fpl (as well as tpl and other functionally related poverty measures). Exploratory studies in the Philippines showed that the per capita energy consumption cumulative distribution rose by three percentage points for every 100 kcal increase in the threshold in the 1500 to 2100 kcal range (David, 2004).[23] This implies that, given other factors remaining constant, changing the country's threshold from the official 2000 kcal to 2100 kcal used by majority of the developing countries would result in a three-percentage point increase in the estimate of food poverty incidence. Higher sensitivities are exhibited by results from Vietnam (Ministry of Health, 2003). The Bangladesh Bureau of Statistics previously used a variation called direct calorie intake (DCI) method, alongside the CBN method. In the former, households and members, whose calculated per capita energy consumption fell below a predetermined threshold (2112 for urban and 2122 for rural), are considered food poor. The threshold was lowered to 1805 kcal to estimate what the country calls the hard core or extremely poor.

Results from 1983-84 to 1995-96 are summarized in Table 3. The 23.2 percent average difference in poverty incidence between the 2120 kcal and 1805 kcal thresholds imply a more than 7 percent shift per 100 kcal change in the assigned food poverty threshold. Thus, the findings from the three countries raise the possibility that differences in the countries' official energy thresholds (Table 2) could make incomparable national poverty statistics as well as sub-national estimates (e.g., rural versus urban). If further experiences from other countries support these findings, then the need for flexible or robust alternative methodologies take on added importance (see Subsection 4.1.3 and Section 4.2.

[23] This occurs when per capita energy consumption is computed using family sizes adjusted for economies of scale as divisors of the estimated total family consumption. Using unadjusted family sizes led to higher sensitivity of the per capita energy consumption distribution in the same energy range.

Table 3. Bangladesh Food Poverty Incidences from DCI Method and Two Energy Thresholds (%)

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Year	2120 kcal	1805 kcal	Difference
1983-84	62.6	36.8	25.8
1985-86	55.7	26.9	28.8
1988-89	47.8	28.4	19.4
1991-92	47.5	28.0	19.5
1995-96	47.5	25.1	22.4
Average	-	-	23.2

Note: 2120 kcal is the average urban and rural thresholds, weighted by .20 and .80 population proportions, respectively.

Source: *From Counting the Poor to Making the Poor Count*, World Bank, Bangladesh (1998).

4.1.2 Food basket construct and food poverty line (*fpl*)

The next step to computing the food poverty line is to determine a bundle of food – by item and weight, e.g., rice, 0.25kg and sugar, 0.03 kg – which provides a total (T') close to the specified threshold (say T, in kcal per person per day). The conversion is made through a so-called food composition table from FAO/WHO that is adjusted by individual countries to suit their individual situations. Basic data are obtained through a Household surveys such as Household Food Consumption Survey (HFCS) or Household Income and Expenditure Survey (HIES).

It is important that these surveys provide information for individual food items consumed--by weight and value. Chapter 5 reviews in more details household surveys used for poverty measurements. The composition of the food basket depends on the choice of reference population. Since the object is to identify and count the poor, the reference population is usually some lower percentile of households according to their per capita income distribution, e.g., lowest 20th percentile, quartile or 30th percentile as reported by some countries.[24] In many countries, the choice of the percentile cut-off point is usually guided by the most recent poverty incidence estimates, what infers that, the reference population should be similar to the poor population. Per-capita food items consumed by this reference population are listed in order of importance, such as with respect to quantity, value, or in some cases frequency of reported consumption by the households. The food bundle is comprised of the top entries in this list, stopping at the item where $\sum kcal = T^{'}$ with $T^{'} \cong T$. Since $T^{'} \neq T$ in general, the sum is rounded to T by multiplying each food item's weight consumed per capita by $\frac{T}{T^{'}}$.

Based on the returns from the UNSD global survey on poverty measurements, the number of items comprising the food baskets ranged from 7 to 205, with a median of 40 items.[25] When different energy thresholds are used, e.g., for urban and rural areas, it follows that the food baskets will vary as well. There are countries that use only one threshold, but which adopt multiple food baskets to reflect differences in food availabilities and consumption patterns for different groups of people or regions. Basic considerations here are the relative importance a country puts on sustaining a constant welfare level upon which the poverty statistics are based versus specificity of the

[24] A few countries use deciles around the median as reference population. Others use a family, e.g., of 4 or 5 members specified by age and sex. However, at the four UNSD regional workshops, a consensus started to emerge on the advantages and desirability for countries to use households occupying some lowest percentiles of per capita income distribution.

[25] The wide range can be explained partly by level of detail that countries group food items. For example, some countries may list rice and rice-based noodles separately while others count them as one (rice). Still, others may classify these items simply as cereal grains.

statistics to sub-national differences in food availability, preferences and consumption.

Let $q_1, q_2, ..., q_f$ denote the quantities of the f items in the food basket that supply $e_1, e_2, ..., e_f$ respectively such that $e_1 + e_2 + ... + e_f = T^{'}$ kilocalories. Let $p_1, p_2, ..., p_f$ be the unit prices of the f food items. The food poverty line is:

$$fpl = \frac{T}{T^{'}} \sum_{1}^{f} q_i p_i \qquad (1)$$

Ideally, the prices should be period averages (usually one year) that the poor – or those in the reference population – paid for the commodities in the food basket. In practice, countries generally do not collect prices specifically for the purpose of compiling poverty statistics. The prices used may come from varied sources, such as HIES or HFCS. Quite often, however, what are collected in these surveys are quantity and expenditure for each food commodity consumed or bought, such that the unit prices, though are not collected directly, are derived by dividing the expenditure by the quantity of each commodity.

Participants in the UNSD sub-regional workshops reported that expenditure can be accurately collected from households. However, quantity is relatively more problematic, especially when the commodity is not traded in standard units. Thus, the unit price derived from the two can at best be as reliable (or as inaccurate) as the quantity estimate.[26] Price quotes used for consumer price index (CPI) compilation are reused routinely particularly, but not exclusively, for updating poverty lines. These have the

[26] There was almost full unanimity in this opinion at the 2004 Sub-Regional Workshop of West African States wherein most of the participants were heads of national statistical offices.

advantage of providing average unit prices for the year for updating the poverty lines, since majority of the developing countries maintain monthly or quarterly CPI series.

4.1.3 Alternative approaches to costing a food basket: Price per kcalorie and household level *fpl*

Some countries avoid constructing a food basket by calculating the total expenditure and total kcal content of all the food consumed by the reference population. The ratio between the two totals is a *price per kcal* estimate. When this figure is multiplied by the energy threshold, it provides an estimate of *fpl*. Once a price-per-kcal estimate is calculated, *fpl*s for as many choices of energy thresholds are easily computed. Indonesia used this approach until 1993 with different lists for urban and rural areas (Maksum,C. 2004). Bangladesh, which as noted above uses two energy thresholds, follows this approach in its direct calorie intake (DCI) method. The approach avoids unit prices, which, as mentioned previously, are more difficult to obtain and may not even be collected in some countries. However, the approach requires as many food expenditures and conversion into energy equivalents as there are food commodities consumed by the reference population.

Some countries do not report *fpl* separately (and related statistics, such as incidence and number of food poor), since they see it merely as a necessary input in calculating the total poverty line (*tpl*) and absolute poverty measures. This is unfortunate because on their own food poverty statistics have important uses. They may also produce more comparable statistics on the local and international levels than *tpl* and other more composite poverty statistics. Two such more comparables statistics are discussed in this chapter.

Another approach that has been implemented in a number of countries (Jordan, Laos, and Thailand, as described for example, in Kakwani and Krongkaew, 1998, involves taking the sum of the age x sex-specific RDAs of the members of the sample household (∑RDA) (Kakwani, 2001). A household level food poverty line [$hfpl = (\sum_M RDA) \times P_{kc}$ where P_{ck} is the price per kcal and M the number of members in the households] is computed and compared with the estimated total income or expenditure (Y) of the household. All the members of the household are considered food-poor if $Y < hfpl$, otherwise not. Note that unlike fpl which is determined on per capita basis, $hfpl$ and Y are household totals. From the survey, the design-weighted estimate of the total of the Ms provides an estimate of the total number of food-poor in the sampled population. This approach circumvents computing per capita energy consumption and per capita income (expenditure) and the attendant problem of finding suitable adult equivalents or scale economy-adjusted household sizes as divisors. (In Section 4.2, a variation to Kakwani's proposal is presented that eschews the use of prices and currencies altogether.)

4.1.4 Computing the total poverty line (tpl)

This computation involves two steps. The first defines essential non-food basic needs and the second incorporates their cost into the food poverty line (fpl) to arrive at the total poverty line (tpl). Simply put, fpl has to be adjusted upward by an amount equal to or proportionate to the cost of procuring the essential non-food basic needs of a poor or nearly poor person. Clearly, "essential non-food basic needs" requires a definition that can be measured. Developing countries generally follow one of three operational definitions or procedures.

A. List of specified essential non-food needs

This list is created usually by a group of users and stakeholders in association with the national statistics office or the agency charged with producing the country's official poverty statistics. The list is exhaustive, covering items like clothing and footwear, shelter, fuel and light, household goods, health services, personal care, and education. Costs per person are assigned to each item. Hence, if $nfpl$ (non-food poverty line) denotes the sum of the costs, then:

$$tpl = fpl + nfpl \tag{2}$$

This was the procedure of choice by some countries during their early years of poverty statistics compilation, and some still keep it as part of their official methodology (e.g., Indonesia, see Maksum, op. cit.).

Simplicity is its main appeal. However, the outcome is very much dependent on a highly subjective list. Adding or subtracting from the list affects tpl directly in an additive fashion. It is easy for anyone to criticize why *this* item is included while *that* item is not. Changes in the list would affect the comparability of the tpl time series. Similarly, different lists for different areas or sub-populations result in non-comparable statistics, for example, bread plus rice in cities versus all rice in rural areas or physician-attended childbirth in urban regions versus midwife-assisted deliveries in rural areas.

B. Regression

This approach comes from the World Bank (see Ravallion, 1992) and is premised on a particular definition of essential non-food basic needs. A household whose total expenditure per capita (te) is equal to fpl still has to spend for items other than food, and those items must be regarded as essential by the household. The set of non-food items availed of by households for whom $te = fpl$ may then be considered to define essential non-food needs. And the average expenditure of the households for the set may be used to estimate $nfpl$ in equation (3.2). The problem is that none or few households will precisely satisfy $te = fpl$. One solution is to run a simple linear regression of the share of per capita food expenditure (fe) to total expenditure, ($S = \frac{fe}{te}$), on $\log(\frac{te}{fpl})$ using data from the reference poor population. That is: $S_i = \alpha + \beta \log(\frac{te}{fpl})_i + error_i$

where i runs through the sample households in the reference population. Let $\hat{\alpha}$ be the estimate of the intercept α. Since $\log(\frac{te}{fpl}) = 0$ when $te = fpl$, it follows that $\hat{\alpha}$ provides an estimate of the food share among households whose total expenditures match the food poverty line. Conversely, $1-\hat{\alpha}$ estimates the essential non-food share. Hence, $tpl = fpl + (1-\hat{\alpha})fpl$, or $tpl = (2-\hat{\alpha})fpl$ (3)

For example, China used this method in its 1995 Rural Household Survey and obtained food share $\hat{\alpha} = 0.83$, hence $tpl = 1.17\,fpl$ = Renminbi 557. Before 1995, China used $tpl = 1.40\,fpl$, where the 40 percent adjustment was based on what was then the experts' opinion of a 'reasonable food share' of 60 percent. The big reduction in the adjustment factor from 40 percent to 17 percent naturally led to speculations that the pre-1995 estimates are not comparable to those from 1995 onward. However, from 2003, China started recompiling a second set of poverty statistics based on the pre-1995 60 percent food share. Other countries, in particular those who received World Bank assistance to conduct living standard surveys and poverty analysis, such as Cambodia, Mongolia, and Vietnam in the Asian region, have followed the regression approach.

As a food share, α is an Engel's coefficient, albeit in a very restricted sense, i.e., when $fpl = te$. As such, the quantity $\frac{fpl}{\hat{\alpha}}$ is an estimate of the total poverty line as well. However, an Engel coefficient computed directly from the households returns may be the more appropriate divisor for this form of tpl estimate. Also, the inequality $te > fpl$ is expected to hold for most sample households in the reference population. Otherwise, $\log(\frac{te}{fpl}) < 0$. If this happens in a sizable subset of the sample, the regression equation may not provide a good fit to the data. A more attractive alternative in this case is direct estimation of Engel's coefficient.

C. Engel's coefficient

Many countries use a more pragmatic approach to determine the total poverty line. They compute Engel's coefficient $\frac{fe}{te}$ directly from the sample households with expenditures within a given (say ±d) percentage points of fpl. $d = 10$ percent is a common choice among the countries (e.g in Lao PDR and Philippines). Similarly, as in the regression method, tpl may be computed as

$$tpl = (2 - \frac{fe}{te})fpl \tag{4}$$

Why 10 percent and not 5 percent or some other per capita expenditure band around fpl? Countries often base their choice on neighboring country practice or on a consultant's recommendation. It is preferable to base the choice on empirical evidence by calculating $\frac{fe}{te}$ for several values of d. Figure 1 shows an example where $\frac{fe}{te}$ was computed from the Philippines 1994 Family Income and Expenditure Survey data with d ranging from 2 to 20 percent. The Engel coefficient seems to be robust for d in the 2 to 5 percent range. But it begins to decline continuously as d approaches 10 percent. The coefficient behaves differently for rural and urban areas, with the latter exhibiting markedly lower value, hence higher tpl. This is to be expected as urban dwellers generally pay more than rural residents for housing, transport and other essential non-food goods and services. This raises an issue whether one national tpl is all that is needed or whether separate tpl s should be computed for the urban and rural areas.

Figure 1. Ratio of Food Expenditures to Total Expenditures, 1994, Philippines

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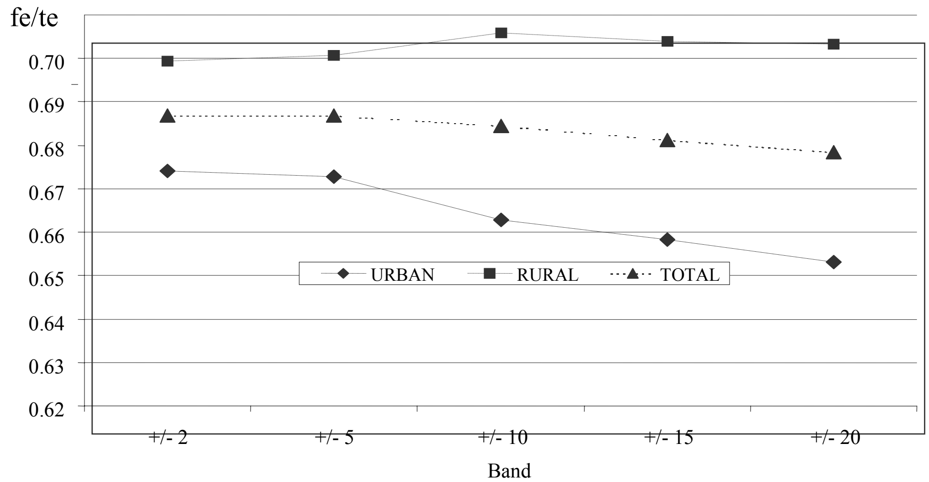

Source: David and Maligalig (2002).

D. <u>Comparative performance of the three procedures</u>

Aside from being highly subjective, a fixed list of essential non-food goods and services is unaffected by both differences in purchasing power between households and between measurement periods. And since the total cost of the list is simply added to fpl, it is easy to see that change in tpl will be slow. A list could also be susceptible to criticism and pressures to add or drop items, which would increase or decrease the incidence of poverty. As mentioned, Indonesia uses the list method. In the early 1990s, the country's $tpl = 1.10 fpl$, i.e., only 10% of fpl was allowed for essential non-food basic needs.[27] Later experiments with the regression method resulted in Engel coefficients ranging from 0.70 to 0.75, or a 20 to 25 percent adjustment. This produced

[27] At about the same time, the Philippines $tpl = 1.70 fpl$ which was based on Engel's coefficient that at the time was computed from all the sample households. The difference in the methodology for computing tpl was found to be the main reason why Indonesia's official poverty incidence was much lower than that of the Philippines (Asra, et.al., 1993).

significantly higher poverty incidence levels. These coefficients, however, have not been adopted, and the current official methodology remains based on separate lists of essential non-food goods and services for the rural and urban areas (Said and Widyanti, 2001).

Regression and direct use of Engel's coefficient can be expected to lead to similar $tpls$, particularly when the latter is computed from a sub-sample of households falling inside a narrow band, say those with per capita expenditures within ± (2 to 5) per cent of fpl. The sub-sample, however, gets smaller as the band is narrowed. Since a bigger sub-sample implies a more precise $\frac{fe}{te}$ estimate, there are instances where a band as wide as 10 percent is justified. Compared to running regressions, estimating $\frac{fe}{te}$ directly may be less taxing to the national statistics office, especially if this has to be done for every HIES. This also avoids problems resulting from a poor linear regression fit.

Instead of scaling up fpl to tpl in a linear fashion, as in equation (2), some countries opt to use the non-linear estimate:

$$tpl = \frac{fpl}{\hat{\alpha}} \qquad \text{or} \qquad tpl = \frac{fpl}{\frac{fe}{te}} \tag{5}$$

In other words, the total poverty line is the ratio of the food poverty line to Engel's coefficient. The Philippines' official poverty statistics, for example, are computed based on the second of these equations. More recently, following Ravallion (1998), the first poverty report of Bhutan (2004) made use of the first equation.

For reference populations used in poverty measurements in developing countries, empirical Engel's coefficients usually fall in the 0.50 to 0.75 range. This is certainly the case with Asian countries wherein the coefficients were observed to take on a modal value close to 0.66 (David and Maligalig, op. cit.). Thus, the use of equation (5) would result in higher tpl's than the use of (3) or (4), which can be seen from the values that $(2-\frac{fe}{te})$ and $(\frac{1}{\frac{fe}{te}})$ take for different values of $\frac{fe}{te}$:

$\frac{fe}{te}$	$(2-\frac{fe}{te})$	$\frac{1}{\frac{fe}{te}}$
-----	---------	-----
0.50	1.50	2.00
0.66	1.33	1.50
0.75	1.25	1.33
1.00	1.00	1.00

4.1.5 Updating poverty measures and estimating poverty trends

In the interest of continuity of the poverty statistics series, food baskets, energy thresholds and reference populations are seldom changed. This means that countries can and do update their food poverty lines (fpl) anytime that new unit prices of the commodities in the food basket become available. When the method of estimating the total poverty line (tpl) is the sum cost of essential non-food goods and services, new prices are required to update tpl. In countries where tpl is computed via regression or

Engel's coefficient, updating is sometimes done by using the same coefficient for the years that a HIES is not done. It is assumed implicitly that the coefficient either does not change or changes very slowly in the reference population during a one-to-two year period. Coefficients are recomputed only when there is a new HIES round.

Sometimes the CPI is used (e.g., the food CPI and non-food CPI) to update the food and non-food components of the total poverty line. It has been noted, however, that the CPI as currently constructed in most countries might not reflect the consumption pattern of the reference population used in determining the poverty lines (see discussion in Subsection 4.1.2). Another key limitation is that the basket of goods used for the CPI may vary significantly from the one used to construct the poverty lines. These limitations can be more pronounced when estimating sub-national poverty lines. Some countries address these issues by using sub-national CPIs constructed from household survey data (e.g., Sri Lanka, Vietnam and Thailand). Sticking to the same mode of updating is important for the country's poverty lines to be comparable across time. Updating the statistics on the number and proportion of poor persons or households will require new estimates of per capita income (expenditure) distributions which in turn require a new HIES round. Very few users would be willing to assume that these distributions remain constant even over a single year because doing so would nullify the need to update the poverty statistics in the first place. These updates are discussed in greater detailed in Chapters 5 and 7. As obvious as this seems, its practical implications seem to be lost to some users at times. It is not unheard of that users want annual updates on the estimates of the number and proportion of poor persons (households), which means that a HIES is conducted yearly at great cost. And sample sizes, hence human and material requirements, rise even more as users demand that the updates be done for progressively smaller sub-populations.[28]

Some of the countries that update poverty counts and incidences annually (e.g., China) simplify the methodology by having one national poverty line and releasing national level estimates only. This keeps the survey sample size relatively small. Doing otherwise, such as updating annually at sub-national levels, could quickly lead to very large surveys. For example, Indonesia's annual socio-economic survey has a sample size of 200,000 households (see Surbakti, et. al, 2001). This would delay release of results, defeating the purpose of updating yearly. If user demands are not aligned with the technical and material resources available to the national statistical system, the poverty monitoring system soon becomes unsustainable.

The frequency in which poverty incidences and counts are updated for various countries-- which coincides with the frequency of conducting household income and expenditure surveys--is shown in Table 4. The frequency ranges from one to five years for nations with a poverty monitoring program. This is not to say that countries that follow the same updating frequency of, say every three years, track the same reference years. Many countries still have no regular schedule of updating, inasmuch as a HIES is conducted only when funds become available, usually from an external donor. Of the 107 countries that responded to the UNSD 2005 Survey of Poverty Measurement Practices,

[28] What matters is little n, not n/N , where n is the sample size in the smallest domain of interest -- is a truism that needs repeating every so often.

16 have yet to initiate programs for measuring poverty. Thus, the desirable goal of synchronized poverty measurement and monitoring requires agreement among countries on the frequency and timing for the supporting household income and expenditure surveys.

Table 4. Updating frequency of poverty incidences and counts in selected countries.

Frequency	Countries
Yearly	China and Indonesia
Every 2 years	Thailand and Iran
Every 3 years	Jordan, Mongolia, and Philippines,
Every 5 years	India, Malaysia, Sri Lanka, and Vietnam
Irregular, depending on funds availability	Bangladesh, Cambodia, Laos, Fiji, and the Central Asian Republics
Not yet measuring poverty	16 of 79 countries that responded to the UNSD 2004 Survey.

Source: Preliminary tabulations from the UNSD 2005 Survey of Poverty Measurement Practices.

Sampling errors of counts, like the number of food-poor or absolutely poor, can be computed using design-based variance estimators (See Chapter 5 for a broader discussion on variance estimation). Frequent monitoring is justified when the poverty incidence is high and falling rapidly, or conversely, when it rises quickly. The former situation is exemplified by China during the last two decades of 2000. On the other hand, the Asian financial crisis that started in 1997 caused spikes in the poverty incidence among severely affected countries such as Thailand and Indonesia. This had been described as transitory poverty brought about by stagflation--economic contraction and precipitous currency devaluation. Poverty monitoring frequency was briefly increased to twice a year and then reverted to a yearly frequency in these countries. Now that the poverty incidence in Thailand has returned to pre-crisis levels of about 10 percent, monitoring has been scaled back to once every two years. As mentioned previously, China and Indonesia continue to update their poverty incidence levels annually. With China's official (rural) poverty incidence estimated under 6 percent, the amount of reduction that can be achieved in a year's time is naturally very much constrained. Hence, the chance of detecting a change through statistical means will require a very efficient and large household income survey. (Although China uses both income and expenditure, the former is the basis for the officially released poverty statistics.)

4.1.6 Relative and subjective income/expenditures based poverty lines

Income-based relative poverty lines often are simple functions of the median or mean of the per capita income distribution. These relative poverty lines are much easier to establish and are suitable for quickly finding out who are poor and where they live. When applied to small areas, they could be used to classify individuals as well as rank communities, thereby enabling sharper allocation of poverty reduction resources in a relatively short time. However, estimates are influenced by shifts in the central values as well as shape of the per capita income distribution. Therefore, they are not meant to be used to monitor the poverty situation from one period to another.

Relative poverty lines are more frequently used by developed than developing countries and it practice varies also among the countries. A number of countries in The Economic Commission for Latin America & the Caribbean (ECLAC) region for example have used 50 percent of the median per capita income (Rio Group Report, 2003). Oman instead defines as poor a person with income less than 40 percent of the population's median per capita income (UNSD-ESCWA Sub-Regional Poverty Statistics Workshop Report, November 2004) while Iran uses 50 percent of both the mean and median per capita incomes (UNSD-ESCAP Sub-Regional Poverty Statistics Workshop Report, October 2004)

Country experience in subjective poverty lines is very limited and still not well established. In the Philippines, a private market research organization asks heads of households about their income: whether they consider themselves poor, and if so, how much more income would they need not to consider themselves as poor. This 'self-assessed poverty' approach yields what are sometimes referred to as subjective poverty estimates. Like many opinion poll-type investigations, these surveys are small. They typically involve 1200 - 1500 sample households, enabling the results to be released very quickly. Egypt's national statistical system has constructed a subjective poverty line based also on minimum income that household heads believe is necessary for an adequate standard of living. The experience of Egypt showed, however, that this methodology overestimates poverty, especially in urban areas where expectations of educated household heads tend to exceed current income levels by a large margin (UNSD-ESCWA, op. cit).

4.2 Direct measures of food poverty

4.2.1 Estimating the empirical cumulative distribution function (cdf) of per capita energy consumption

As implemented by countries, the cost of basic needs (CBN) approach discussed in Section 4.1 yields one set of food poverty statistics for each specification of the energy threshold T. This means non-comparable statistics for countries and sub-national domains that adopt different Ts (see Table 2). One way out of this predicament is to estimate the entire per capita energy consumption cdf, that is, divide the calculated total energy consumption (∑kcal) of the household by some measure of the number of consuming members. This is done in some countries, but generally not in the agencies charged with producing official statistics. For example, Vietnam's General Statistics Office (GSO) uses the CBN method in compiling the official poverty statistics from its Multipurpose Household Survey and Vietnamese Living Standards Survey. The official population food poverty incidence estimates for 1998 and 2002 were 15.0% and 10.9%, respectively (Vietnam Development Report 2004). The National Institute of Nutrition of the Ministry of Health conducts a General Nutrition Survey (GNS) in which household food consumption is obtained via a different data-capture method described as a 24-hour recall combined with weighing of some of the food items .

From the 2000 GNS, which sampled 7,658 households nationwide, the institute determined the following three points about the empirical per capita energy consumption cdf (*General Nutrition Survey 2000 Report*):

Energy cut-off	< 1500 kcal	< 1800 kcal	<2100 kcal
% of population below cut-off	4.1%	17.9%	45.1%

Based on direct un-monetized dietary energy consumption, it was estimated that 45.1 percent of the population were food-poor, having consumed less than the official 2100 kcal threshold. One significant advantage of having the empirical cdf is that the proportion of persons (or households) consuming less than any chosen energy threshold is readily available. This means that for any group of countries with empirical cdfs, an agency or any user can easily interpolate estimates of food poverty incidence for any choice(s) of energy thresholds.[29] Moreover, the method eschews prices, choosing a reference population, estimating a poverty line in money terms, and estimating an income or expenditure distribution. As a consequence, the only remaining significant sources of non-comparability among countries' estimates would be RDA specifications (see Table 1), food composition or conversion tables, and the method of data collection (i.e., survey design and methodology for obtaining household food consumption). Furthermore, from a primary data point of view, improving the accuracy of the food poverty estimates is reduced to improve survey design and the method of collecting the consumption quantities of food items.

[29] This method can be applied to other nutrients such as protein. It also extends readily to joint cdfs, including energy and protein.

The 45.1 percent National Institute of Nutrition estimate of the food-poor is much higher than the 12 to 13 percent official estimate from GSO for 2000. There are two major sources of this difference: the methods of data capture and the choices of denominator for computing per capita kcal consumption. These are illustrated more clearly by a second example from the Philippines.

The Food and Nutrition Research Institute (FNRI) in the Department of Science and Technology, Philippines, conducts a National Nutrition Survey (NNS) every five years. The survey has a food consumption module that uses a one-day weighing of all food items cooked by the sample household. The sample households are randomly surveyed over the seven days of the week.[30] Left over portions fed to pets were also weighed. Family members who ate outside were asked to recall their precise meals, and estimated food consumption by guests who ate with the family was netted out.

The total energy consumption, (∑kcal), of each sample family is derived from the net amounts of food commodities consumed converted into energy using FNRI's own food composition table. Per capita values are generated by dividing (∑kcal) by some measure of family size. As discussed in the next Subsection 4.2.2, the choice of divisor is not trivial, and various choices could lead to substantially different food poverty incidence estimates.

[30] The sampling unit is the family, which differs from the household, because it excludes helpers such as maids and drivers. In the reference (poor) population, there is little difference between family and household.

Cdfs are estimated parametrically through models such as lognormal or gamma models.[31] Alternatively, model-free empirical cdfs estimates may be used. The latter are more common and almost routinely constructed by national statistical agencies during the processing and analysis of household sample surveys. This can be seen in the following representation:

Let:

$\Delta_{(a_i)} = 1$ if $a_i \geq 0$

$\Delta_{(a_i)} = 0$ if a_i π 0

$\triangle$

Let $\pi_i, i = 1,2,...,n$ be the inclusion probabilities of the sample units (households), which in practice are adjusted for non-response, non-coverage and other perturbations in the implementation of the survey. Let $x_i, i = 1,2,...,n$ be the per capita energy consumption estimate of the ith sample unit for a particular choice of denominator. A design-based Horvitz-Thompson estimator of the empirical cdf of x is given by Chambers and Dunstan (1986)

$$\hat{F}(t) = \sum_{i=1,2,..n} \pi_i^{-1} \Delta_{(t-x_i)} / \sum_{i=1,2,...n} \pi_i^{-1} \qquad (6)$$

This is a formal representation of a weighted cumulative distribution table. Cumulative frequencies and cumulative relative frequencies are computed for the upper

[31] This is behind FAO's methodology for estimating the proportion of the population consuming less than 2100 kcalories per capita per day, which is indicator number 5 of the UN Millennium Development Goals (see Naiken, 2003).

class boundaries, say t = 1200, 1500, 1800, 2100, 2400, … kilocalories. The points may be connected to "draw" the empirical cdf in its entirety.

4.2.2 Household size for per capita calculations

An obvious candidate for divisor of total household energy consumption is household size M. Since poor households tend to be bigger and with proportionately more children, the result will underestimate real per capita consumption and consequently lead to higher food poverty incidences.[32] Another candidate divisor is an *adult-equivalent* adjusted $M^* = \sum w_i$, where $\{ 0< w_i \leq 1; i = 1, \ldots, M\}$ are age- and sometimes sex-differentiated weights assigned to household members. For example, a maximum of 1 may be applied for working age males with lower weighting for adolescents, children and females. (Note that $M^* \leq M$).

Using the RDA specifications for dietary energy as basis for defining M* is an intuitively appealing idea. For example, the RDAs for the Philippines in Table 1 may each be divided by 2,570. Doing the same for Sri Lanka, with 2,530 as common divisor, leads to a different M*, which points to the desirability of herding countries towards adopting more uniform RDAs.

Other choices for divisor involve models of M* that adjust further for scale economies. For example, Palestine (UNSD-ESCWA Poverty Workshop Report, 2004)

[32] The same holds for estimates of the non-food poverty line, total poverty line and per capita income (expenditure), distributions, more so on account of economies of scale for both food and non-food needs.

uses $M^* = (A + PC)^f$, where A = number of adults, C = number of children, P = child-to-adult proportionality factor (0.46), and f = scale economy factor (0.86). In the Philippines, the double-log function between family food expenditure (F), income (Y) and size (M) had been tried on an experimental basis but not adopted in the official methodology: $\log F = \alpha + \beta \log Y + \tau \log M$

F / Y connotes levels of welfare, and it is Engel's ratio when Y is replaced by expenditure. For F / Y constant, the family elasticity of income is: $\varepsilon = (\partial \log Y) / (\partial \log N) = \tau / (1 - \beta)$

Bantilan *et al*. (1992) ran a regression of the model on the 1985 Family Income and Expenditure Survey data and obtained an elasticity estimate of 0.7. Thus, $M^* = M^{0.7}$ may be used for per capita calculations. As an illustration, the empirical cdf of family per capita energy consumption was estimated from the Metropolitan Manila sub-sample of the 2003 National Nutrition Survey (NNS) of the Food and Nutrition Research Institute described above, first using M and then $M^* = M^{0.7}$ (see Table 5).

Table 5. Per Capita Energy Consumption Distributions (% of Population) Using M and $M^{0.7}$ as Divisors, Metropolitan Manila - Philippines, 2003

Divisor/Cut-Off (kcal)	<1500	<1800	<2000	<2100
Family Size, M	48.0	74.0	83.0	88.0
$M^* = M^{0.7}$	7.9	16.0	22.5	26.3

Source: David *et al*, 2004.

Predictably, the results with M lead to very high food poverty incidence rates. At the official 2000 kcal threshold, it is an unrealistically high 83 percent. Other researchers observed this phenomenon, and it appeared in the Vietnam case mentioned above. The empirical cdf, with scale-economy-adjusted family size as divisor, leads to much lower food poverty incidence rates. One advantage of a cdf estimate is seeing the effect that a change in energy threshold will have on the incidence. For example, moving the Philippines' official 2000 kcal threshold to 2100 kcal, which is used by the majority of Asian countries, would mean about a four percentage point increase in the estimated food poverty incidence for metropolitan Manila, from 22.5 percent to 26.3 percent.

From the UNSD's regional workshops and 2005 poverty practices survey, it appears that many of the developing countries use household size (M) to compute per capita food and non-food consumption, as well as per income and expenditure. Others use some adjustment only a step or two removed from M. For example, Senegal uses only two weights: $w_1 = 0.5$ for household members below 15 years old, and $w_2 = 1.0$ for all others. Some use adult equivalents based directly on the RDA specifications. But this is usually for calculating per capita food consumption only. Very few use any adjustment in estimating per capita income or expenditure. The likely effect could be overestimated poverty incidences and counts.[33] Alternatively, in so far as food poverty is concerned, per capita food consumption, thresholds, income and expenditure may be circumvented altogether.

[33] Countries that attended the UNSD sub-regional poverty workshops expressed significant interests in technical information and assistance in implementing adult equivalent and/or economies of scale adjusted per capita methods.

4.2.3 Eschewing per capita calculations

Most countries have developed their respective per capita RDAs for dietary energy, as well as for other nutrients, for different age-by-sex groupings of their populations (see Table 1). Those that have not, have either adopted their neighboring countries' standards or the latest recommendations of FAO or WHO. Instead of resorting to a per capita threshold for the household, it is natural to regard the sum of the RDAs of a household, ∑RDA, as the energy threshold for that particular household. Thus, if ∑kcal represents the estimated daily total energy consumption of the same household, the inequality ∑kcal < ∑RDA can be used directly to classify households and persons therein as either food poor or non-food poor.

More than one set of RDAs may be considered, giving rise to as many thresholds and food poverty estimates. For example, a 1971 FAO/WHO Expert Committee on Energy and Protein Requirements accepted a 15 percent coefficient of variation of energy requirement between individuals in a population or group with similar demographics (WHO, 1985, p. 6). Hence, reducing the individual RDAs proportionately by 15 percent and by 30 percent will yield ∑RDAs that correspond approximately with minus one and minus two standard deviations from the original respectively. Similarly, increasing the individual RDAs by the same amounts will correspond with plus one and plus two standard deviations from the original ∑RDA. Six-point estimates together provide a fuller understanding of the relationship between RDA specifications and thresholds, along with poverty measures. Comparable food poverty estimates across and within a country can be interpolated easily for any given choice of household threshold within the

$(1 \pm 0.3) \sum RDA$ interval.

The weighted sum of the energy shortfall among the food poor households is a direct estimate of an energy gap:

$$\text{Energy gap} = \sum w\left\{\sum RDA - \sum kcal\right\} \quad \text{if } \{\sum RDA - \sum kcal\} > 0 \qquad (7)$$

$$= 0 \text{ otherwise}$$

where the inner summations run through the members of the household, w denotes the design weight of the sample household, and the outer summation runs through all sample households. The energy gap estimates the amount of dietary kilocalories needed to bring all the food poor families up to their respective food poverty thresholds. If desired, this can be expressed in monetary terms by multiplying by the cost per kcal (obtained from the reference population). This simple and straightforward interpretation of this statistic can have mass appeal to policy makers and lay persons alike.

4.3 Non-income measurement methods

The minimum basic needs (MBN) (also called unmet basic needs (UBN)) approach has been used in a number of countries in lieu or in addition to the income-based basic needs approach. In this approach non-monetary indicators representing different dimensions of poverty are chosen, estimated and monitored. The subset of

Millennium Development Goals [MDGs] minus the income indicators provides excellent examples:

- Proportion of underweight children to represent malnutrition;
- School enrollment, primary school completion, and youth illiteracy rates to represent basic education;
- Infant and under-five mortality rates, maternal mortality ratio, and births attended by skilled health staff to represent primary health care; and the
- Ratio of girls to boys in primary and secondary school, ratio of literate females to males, proportion of seats held by women in parliament, and share of women employed in the non-agriculture sector to represent the gender equality dimension or goal.

Many, though not all, of these indicators are long-term outcomes or output indicators. Case in point: a child being underweight is the result of years of chronic undernourishment. Also, these UBN indicators are expressed in different units of measure. This has made producing a composite index a difficult and perpetually subjective task. However, this has not prevented agencies, particularly international bodies, from constructing such indexes. These include the Human Development Index (HDI) and other indices that UNDP puts out annually for each country in *Human Development Report.* These may have added value more as devices for advocacy than as monitoring tools. Few developing countries compile composite indexes, preferring to use the indicators individually and collectively in much the same way that they will be used to monitor progress in the MDGs.

National statistical systems have also been compiling many of the UBN indicators long before the international development agencies declared poverty reduction their overriding strategic objective. Many are extracted from population and housing censuses, demographic and health surveys, civil registries and other administrative reporting systems. In fact, choice of indicators in a country's UBN information system is often determined by existing data collection systems; seldom is a new system established just to meet the additional requirements for new indicators. This is the case in Bangladesh, for example, where infant mortality is used as a proxy indicator for the primary health care system, primary school enrollment rate for basic education, and housing characteristics (access to tap water, toilet facilities, and electricity, and building materials used) for living conditions.

Nearly all countries in ECLAC have UBN poverty monitoring systems in place (Rio Group Report, May 2004). However, unlike income poverty statistics compilations, there are differences in the selection of dimensions and indicators for the basic needs, partly owing to variations in data availability. The three broad categories of basic needs often considered are dwelling characteristics, access to safe water, and access to sanitation facilities. Basic education and economic capacity (e.g., GDP growth rate) are sometimes included in an expanded UBN set of indicators. In the ECLAC, the UBN approach has a solid conceptual foundation as it measures actual satisfaction or dissatisfaction of needs rather than the capacity to satisfy them. In this light, it is complementary to the income poverty line approach. Dimensions of basic needs chosen are often those highly correlated with income, so much so that they have been used to identify households under extreme poverty.

Assessment and monitoring of poverty through the UBN approach is far from widespread in Africa. Only three of the 10 members of the Economic Community of Western African States (ECOWAS) acknowledge having a UBN system in place. The main poverty dimensions considered are basic education, primary health, and housing characteristics, such as access to safe water, toilet facilities and building materials used. UBN methods can and are being brought down to sub-national levels. For example, China monitors community level indicators, such as percent of villages accessible by roads, percent with land-line phone connections, percent with electricity, illiteracy rates, child enrollment rates, and labor migration rates.

4.4 Conclusion

National statistical information systems have evolved to a point that developing countries more or less follow similar updating frequencies for certain parts of their socioeconomic databases. Thus, censuses have a ten-year cycle, demographic and health surveys five years, nutrition surveys three to five years, and agricultural surveys one season or one year. Being relatively new, poverty statistics have not had enough time to be part of this evolution. The IMF has formalized the frequencies of statistical series in its General Data Dissemination System (GDDS) and Special Data Dissemination System

(SDDS). For example, countries that subscribe to GDDS agree to update their price indexes monthly, and those that sign up on SDDS agree to compile national accounts quarterly. However, poverty statistics are not covered adequately in these dissemination systems.

As seen in Table 4, the frequency of updating of poverty incidence and related statistics varies significantly at the national level. Individual countries have their own reasons for choosing a particular updating frequency. The choice is often a compromise between the users' desire for more frequent updating at smaller domains versus the limited resources available to fund surveys repeatedly. Ultimately, financing and the desired accuracy and timeliness of the results are the key factors determining survey frequency.

As mentioned previously, poverty lines can be updated more frequently using new price data. However, updating poverty incidences and counts require current estimates of per capita income or expenditure distributions, i.e., a new HIES round. The high cost of an HIES makes the majority of developing countries decide on a three-to-five-year poverty monitoring program. If more frequent updating is desired, one strategy that has some chance of being sustained is where this is done for national level estimates only and based on a smaller sample; sub-national estimates may be updated less frequently for which a relatively larger sample is required.

Variations in updating frequency increase when poverty information compilation and monitoring at sub-national levels done by stakeholders, other than the national statistical office, are included. Demand for sub-national poverty statistics come from local officials, central government agencies, non-government organizations (including resident missions of international bodies that focus their interventions on specific disadvantaged groups or areas), and analysts.

Central governments, analysts, and international agencies require country-level poverty statistics. Some need annual updates to feed into their global monitoring activities, including the UNDP's *Human Development Report,* World Bank's *World Development Report,* FAO's *State of Food Insecurity,* and the UN Secretary General's annual progress on the MDGs report to the General Assembly. These agencies put up internal capacities for estimating, interpolating, or projecting from past and current (but partial) information from countries. These agencies are the main sources of poverty information at the regional or global levels. They do not run into problems of inconsistency or non-comparability since countries are not involved in similar activities. It is when the international agencies also publish their own produced national estimates that non-comparability with the countries' statistics can and do arise.

In general, national statistics offices (NSOs) are able to provide some of the needed data at the level of villages, districts, ethnicity and other socio-demographic groupings during census years only. Traditional inter-census national sample surveys can provide reasonably precise statistics for only large domains, such as urban and rural regions. NSOs will have to continue these surveys to monitor poverty at these macro-levels, as well as to provide input data for monitoring at the global level.

They could not hope to have the time to muster resources required to successfully launch sample surveys with adequate sample sizes for areas below regions and domains of special interest, such as ethnic groups, the handicapped, and similar vulnerable segments of the population. However, information is needed for these smaller domains for more efficient targeting of poverty alleviation, as well as for monitoring and evaluating the impact of such interventions.

Strategies for filling these data gaps in small domains are critically needed. Specialized agencies and ministries responsible for planning and implementing sub-national poverty reduction programs will help generate needed information at these levels.

For example, Thailand's Ministry of Interior conducts an annual Basic Minimum Needs Survey to identify villages eligible for poverty alleviation assistance. There were attempts in Cambodia and Laos to construct district vulnerability indexes from village-level participatory poverty assessment censuses or surveys. A complete enumeration of households is carried out by Vietnam's Ministry of Labor, Invalids and Social Affairs (MOLISA) to identify poor households that qualify to receive subsidies. Indonesia's Central Bureau of Statistics and National Planning Board collaborate to annually measure the welfare level of each household, to identify those eligible to receive poverty subsidies, and to determine the amount of assistance (Surbakti *et al*, 2001). Moreover, administrative records of the above ministries as well as those of education, health, and civil registrations are important sources of poverty information for small domains.

It is important not to expect results from these different sources and methods to be consistent or comparable. Many update at different frequencies. And they serve different purposes. Monitoring and evaluating at aggregate levels should remain anchored in the more quantitative and replicable methods, and hence in the NSO national surveys. If these are broken down to state or regional levels, inconsistencies and inaccurate comparisons are avoided if the information from the other sources is not aggregated up to these levels. At the same time, some countries endeavor to improve comparability of data from different sources over the long term by giving NSO and research institutes the additional responsibility to promote use of similar concepts, methods and indicators, e.g., through training, provision of technical assistance, and joint implementation of certain poverty monitoring activities.

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CHAPTER V. STATISTICAL TOOLS AND ESTIMATION METHODS FOR POVERTY MEASURES BASED ON CROSS-SECTIONAL HOUSEHOLD SURVEYS

John Gibson

Introduction

Most of what is known about poverty and living standards in developing countries comes from household surveys. A household survey can provide data on many topics related to poverty, especially on some monetary indicator of welfare (expenditure on household consumption is the preferred indicator, for reasons discussed below). Advantages of a quantitative indicator are that it can be generalised from a sample to national totals; it can enable consistent comparisons of poverty through time, across a country's regions, and potentially across countries; and it is amenable to simulation and prediction, which are needed when studying the potential impact of proposed policies on poverty. Priority is placed on a monetary indicator because ultimately poverty alleviation programs have to be budgeted for, which is easier for monetary indicators than non-monetary ones.

Nevertheless, it is usual for a poverty-focused household survey to include non-monetary indicators, both of a quantitative nature (e.g., the height of young children, as an indicator of nutritional problems) and of a qualitative nature (e.g., perceptions about the adequacy of health care). Use of selected qualitative indicators raises issues of balance between survey and non-survey approaches that go beyond this chapter (see Chapter 6). But one point should be made here about these non-survey methods: while case study and participatory approaches may provide insights about poverty in a form more readily understood by policymakers it is important that they are backed up by survey evidence (see Box 1) in case they are given too much weight. Of course, these methods can also reveal the limitations of surveys by illustrating aspects of poverty that go beyond insufficient consumption and poor access to health and education – issues such as lack of safety and lack of power within families or communities. Hence, even though this chapter is only about household surveys, it should be considered in tandem with other methods for studying poverty.

Box1:The Importance of Water: Survey and Case Study Evidence from Papua New Guinea

A poverty assessment in Papua New Guinea relied on a multi-topic household survey that was backed up with various case studies (World Bank, 1999). The participatory study of health and nutrition showed that difficulties in accessing clean drinking water were a major problem for the poor. This was backed up by the education case study, which found lack of water as one of the most common reasons for the frequent closure of rural schools. These observations were supported by qualitative questions in the household survey, where improved water supply was listed as the most important priority by men and women when asked "*what in your opinion could government do to most help this household improve its living conditions?*". Finally, the quantitative component of the household survey confirmed the significant impact that poor access to water has on households: the poorest one-quarter of the population live in households where one hour per day was spent fetching drinking water. The survey also showed that this burden was borne overwhelmingly by women and girls.

This chapter is divided into four sections. The first studies several cross-cutting issues that may have to be considered--irrespective of the particular type of cross-sectional survey used--for poverty measurement. These issues are the choice between consumption and income as welfare indicators for measuring poverty, the importance of consistency of household survey methods when making poverty comparisons, methods of restoring comparability to inconsistent surveys, the effects of measurement errors, and the variance estimators that are appropriate for the complex sample designs that are used for household surveys. The second section discusses the particular types of surveys that statistical agencies and poverty analysts may have available to them. This includes discussion of different requirements of poverty-focused surveys compared to more traditional surveys that are used for gathering means and totals (e.g., expenditure weights for a Consumer Price Index). The third section discusses price data and how they can be collected and used to place a monetary value on either poverty lines or the change over time in the cost of reaching a poverty line standard of living. The final section discusses the difficult issues associated with assessing individual welfare and poverty from data that are collected on households.

5.1 Cross-cutting issues in poverty measurement

This section considers issues in poverty measurement that are largely independent of the particular type of household survey used.

5.1.1 Reasons for favoring consumption expenditure as a welfare indicator

The most common welfare indicators for poverty measurement are expenditure on household consumption and household income. The trend is for increased reliance to be placed on consumption-based measures for poverty analysis. For example, in a compilation of household surveys from 88 developing countries, which was originally constructed for establishing world poverty counts, 36 of the surveys use income as their welfare measure and 52 use expenditures (Ravallion, 2001). Similarly, the statistics offices in a majority of the developing countries providing metadata in the Statistical Addendum use either consumption expenditures solely or in combination with income as their welfare measure. The only region with a high reliance on income surveys is Latin America, although even in that region there is an increased use of expenditure surveys for poverty measurement (Deaton, 2001). Growing use of household consumption expenditure as the welfare indicator for poverty measurement reflects both conceptual and practical reasons. Conceptually, consumption expenditure is a better measure of both current and long-term welfare. Practically, income is considerably more difficult to measure.

In principle, the best measures of a household's long-term economic resources are either wealth or permanent income, which is the yield on wealth. Important components of wealth, such as the present value of expected labour earnings, are unobservable. While current income is observable, it has a transitory component, which obscures any ranking of households based on permanent income. However, consumers have some idea about their permanent income, and so are unlikely to make lasting adjustments to their spending if they believe that the changes in their income are transitory. Consequently, consumption is a function of permanent but not of current income. This reliance of consumption on permanent income also means that consumption levels are less variable over time than are income levels. In other words, because the transitory component of consumption is small, current consumption is a good measure of permanent consumption, which in turn is proportional to permanent income.

The choice of consumption rather than income indicators can affect the temporal trends in poverty rates. Because of transitory income fluctuations, income-poor households include those who have suffered temporary reductions in their incomes, while their consumption level may stay close to its long-run average (depending on the options for consumption smoothing). Such households have high ratios of consumption expenditures to income. For example, in Thailand, the expenditure to income ratio ranges from 2.0 in the poorest income decile to 0.8 in the richest decile (Deaton, 1997). Thus, if the poverty line remains fixed in real terms while the society enjoys an increase in average income, the ratio of consumption to income at the poverty line will grow over time because the poverty line is cutting at a lower and lower point in the cross-sectional income distribution. Therefore, the poor will increasingly be those with high permanent incomes who happened to suffer transitory shocks to their income during the reporting period. Because the measured consumption expenditure of this group is high relative to their income, a wedge is driven between the time-path of income-based and consumption-based poverty measures (Jorgenson, 1998). For example, the U.S. poverty rate fell by 2.5 percent per year from 1961 to 1989 when real total expenditure is used as the welfare measure. However, it declined by only 1.1 percent per year when income is used (Slesnick, 1993).

In addition to affecting the trend in poverty, transitory income fluctuations also affect the precision of the cross-sectional poverty profile. The high transitory component in measured income means that a poverty profile based on income is less likely to identify the characteristics of the long-term poor. Instead, it will mix together households with low permanent incomes and those with temporary reductions in income. For example, Slesnick found that the U.S. poverty profile shows surprisingly high homeownership rates and low food budget shares when income is used to define the poor. This goes against the expectation that the poor have few assets and devote most of their budgets to necessities like food (Slesnick, 1993).

In terms of practicalities, at least three factors make household income more difficult to measure than household consumption expenditures. These difficulties are likely to impair the accuracy of the income data gathered and are especially apparent in developing and transition countries. First, survey questions on income typically require a longer reference period than is needed for questions on expenditures because income estimates for periods less than a year will be affected by seasonal variation, especially for agricultural households. While there may be seasonal and other short-term temporal patterns in consumption expenditures, they will normally be less marked if households have access to consumption-smoothing devices such as savings, credit, storage, and exchange networks. The longer reference period needed for measuring income introduces greater problems of recall error.

Second, household income is hard to construct for self-employed households and those working in the informal sector because of the difficulty in separating out business costs and revenue. Frequently, arbitrary assumptions are needed to measure the income streams from assets such as agricultural livestock, and there can be difficulties in valuing the receipt of in-kind payments and self-produced items. These problems are less severe, although not absent, when household consumption is measured. Moreover, in developing and transition economies, the sources of household income are more diverse than the categories of household consumption so it is harder to design and implement questions for all of these sources.[34]

Third, questions about consumption are usually viewed as less sensitive than questions about income (although alcohol, tobacco and narcotics, and sexual services are usually viewed as sensitive and so expenditure on these is unlikely to be reliably measured), especially if respondents are concerned that the information will be used for tax collecting purposes or where illegal or barely legal activities provide a substantial portion of household income.

Given this preference for using consumption expenditures as the welfare indicator for poverty measurement there are a number of practical issues about how to calculate this expenditure. These include the calculation of the user cost for durable goods and what to do about expenditures on taxes and other government charges, and on financial instruments and insurance that allow a reallocation of consumption over time. A comprehensive set of recommendations on these issues is provided by Deaton and Zaidi (2002).

[34] While consumption surveys may be longer, they essentially repeat the same question on potentially hundreds of detailed consumption items. This is tedious but not conceptually difficult.

5.1.2 Consistency of household survey methods and poverty comparisons

Has poverty increased? This is one of the most important questions that household survey data should answer. It is a question that will be more commonly asked as progress toward the Millennium Development Goals is monitored and as the number of countries with nationally representative surveys in at least two different years increases. Because it is rare for household surveys to use identical methods, answers to questions about poverty changes may not be robust. Ideally, detailed experiments should assess the effect on measured poverty rates of changes in survey methods so that adjustment factors can be calculated and robust poverty trends retrieved.

Such experiments are rarely carried out as a part of poverty monitoring. However, recent methodological experiments demonstrate the tremendous sensitivity of estimates from household surveys to changes in key design features. Amongst these key features are different fieldwork methods (diaries versus recall), longer (more detailed) versus shorter (less detailed) recall questionnaires, and different reference periods over which expenditures are meant to be recalled. For example, in an experiment in Latvia, one-half of the households were given a diary for recording expenditures and in a subsequent period they were given a recall survey, while the other half had the recall first and then the diary. Reported food expenditures were 46 percent higher with the diary, regardless of whether the diary was used first or second (Scott and Okrasa, 1998).

An experiment with a recall survey in El Salvador gave a long questionnaire (75 food items and 25 non-food items) to one-quarter of a sample, with the rest given a short questionnaire (18 food items and 6 non-food items) that covered the same items but more broadly. Average per capita consumption was 31 percent higher with the long questionnaire (Jolliffe, 2001). An experiment in Ghana varied recall periods, with reported spending on a group of frequently purchased items falling by 2.9 percent for every day added to the recall period, with the recall error levelling off at about 20 percent after two weeks (Scott and Amenuvegbe, 1991).

Perhaps the most well known evidence on the sensitivity of poverty estimates to changes in survey design comes from India. Between 1989 and 1998, the National Sample Survey (NSS) in India experimented with different recall periods for measuring expenditure, replacing the previously used 30-day recall period with a 7-day recall for food and a one year recall for infrequent purchases. The shorter recall period raised reported expenditure on food by around 30 percent and on total consumption by about 17 percent. As Deaton (2005, p. 16) points out, “because there are so many Indians close to the poverty line, the 17 percent increase was enough to reduce the measured headcount ratio by a half, removing almost 200 million people from poverty.”

Because of the policy significance of this statistical artifact, both Indian and foreign economists and statisticians developed adjustment methods that attempt to restore comparability to Indian poverty estimates (see Section 5.1.3 for details on some of these methods). However, it is likely that in many poorer, smaller, and less significant countries there is neither the expertise nor the foreign interest to correct such noncomparabilities (Box 2) .This gives all the more reason for such countries to be careful when changing their survey design, ideally using controlled comparisons where random sub-samples are given either the old design or the new design, so that adjustment factors can be calculated to restore temporal comparability.

Box2: Incomparable Survey Designs and Poverty Monitoring in Cambodia in the 1990s

Three socio-economic surveys were carried out in Cambodia during the 1990s to measure living standards and monitor poverty. Despite this active investment in data gathering, all supported by international donors, each survey was inconsistent with previous and subsequent surveys so no firm evidence exists on whether poverty rose or fell. The initial 1993-94 survey had a very detailed consumption recall list (ca. 450 items) to provide weights for a national Consumer Price Index (CPI). This detail was not needed for most of the population because the CPI was only ever compiled for the capital city, and it lead to an excessively detailed basket of foods (n=155) for the poverty line. Subsequent surveys gathered data on prices for less than one-third of the items in the basket, so updating of the poverty line relied heavily on assumptions.

The second survey in 1997 used only 33 broadly defined items in the consumption recall, and was fielded at a different time of the year. Consumption estimates from this survey were adjusted upwards (and poverty rates downwards) by up to 14 percent for rural households to correct for a perceived under reporting of medical expenses. This under reporting was estimated by comparing health spending in the short questionnaire with estimates from a more detailed health expenditure module fielded with the survey. The apparent fall in the headcount poverty rate from 39 to 36 percent between 1993 and 1997 is reversed if this adjustment is not applied.

The third survey in 1999 used 36 items in the consumption recall and was in conjunction with a detailed income and employment module. It was again conducted in different months than the earlier surveys. But this time, it was randomly split into two rounds, with half the sample in each. Greater efforts to reconcile consumption and income estimates at a household level in the second round led to dramatic changes in poverty estimates. In the first round, the headcount poverty rate was 64 percent, and in the second round it was only 36 percent. The dramatic fall in the poverty rate came from higher recorded expenditures and lower inequality in the second round. No robust poverty trend for the 1990s can be calculated from these irreconcilable data (Gibson, 2000)

5.1.3 Correction methods for restoring comparability to incomparable surveys

When controlled comparisons are not available, other methods have to be considered for restoring temporal comparability to incomparable surveys. Correction methods have been developed for at least two sources of incomparability: changes in the commodity detail of an expenditure recall questionnaire, and changes in the reference period over which expenditures are meant to be recalled. While these methods have been developed because of problems in specific surveys, they could be applied more widely and so are briefly discussed here.

A frequent feature of household surveys is that the consumption aggregates differ in their composition and coverage. For example, one survey may have "rice" as an item, but this is broken down in a subsequent survey into basmati rice and plain rice. This greater detail would be expected to raise measured consumption because it prompts respondents to remember some expenditure that they would otherwise forget. Similarly, one survey may cover a wider range of foods eaten out of the home than an earlier survey, also inflating estimates of consumption growth. In cases such as this, the bundle of foods in the poverty line should be recalculated, restricting attention just to items that are common to both surveys (Lanjouw and Lanjouw, 2001).

This abbreviated food poverty line (abbreviated because it excludes items whose definition changed between surveys) is then scaled up to provide a total poverty line. The particular method of scaling which is appropriate is associated with what is sometimes called the "upper poverty line". This is an example of the Engel method, talked about more generally in Chapter 4.

The "upper poverty line" uses a non-food allowance that is calculated from the food budget share of those households whose food spending exactly meets the (abbreviated) food poverty line, w^{U}. Specifically, the food poverty line, z^{F}, is inflated upwards by this budget share: $z^{\mathrm{U}}{=}z^{\mathrm{F}}/w^{\mathrm{U}}$. In contrast, the "lower poverty line" adds to the food poverty line the typical value of non-food spending by households whose total expenditure just equals z^{F}. This is more austere because these households would displace some required food consumption, given that they don't actually spend their total budget on food (Ravallion, 1994). If the food budget share of households whose total expenditure just equals z^{F} is w^{L}, the "lower poverty line" is calculated as: $z^{\mathrm{L}} = z^{\mathrm{F}} + z^{\mathrm{F}}(1\text{-}w^{\mathrm{L}})$.

The different food shares that are needed for these two different poverty lines can be found from the following Engel curve:

$$w{=}\,\alpha + \beta \ln\left(\frac{x}{n \cdot z^{F}}\right) + \sum_{k=1}^{K} \gamma_k n_k + \varepsilon \tag{1}$$

where w is the food budget share, x is total expenditure, n is the number of persons, z^{F} is the food poverty line, and n_k is the number of people in the k^{th} demographic category. If total expenditure equals the cost of the food poverty line, $\ln\left(x/\left(n \cdot z_j^F\right)\right) = 0$, so $w^{\mathrm{L}} = \hat{\alpha} + \sum_{k=1}^{K} \hat{\gamma}_k \bar{n}_k$ where $\bar{n}_k$ is the mean of the demographic variables for the reference household used to form the poverty line basket of foods. Finding w^{U} requires a numerical solution, characterised by $n{\cdot}z^{\mathrm{F}}{=}x{\cdot}w^{\mathrm{U}}$. This can be substituted into equation (1) to give:

$$w^{\mathrm{U}} = \alpha + \beta \ln\left(w^{\mathrm{U}}\right)^{-1} + \sum_{k=1}^{K} \gamma_k n_k \tag{2}$$

Using w-1 to approximate $\ln w$, an initial solution of w_0=(α_k+β)/(1+β) can be found, where $\alpha_k = \hat{\alpha} + \sum_{k=1}^{K} \hat{\gamma}_k \bar{n}_k$ gives the combined effect of the intercept and the demographic variables for the reference household. This estimate can be improved upon by iteratively solving the following equation, t times (Ravallion, 1994):

$$w_t^{\mathrm{U}} = w_{t-1}^{\mathrm{U}} - \frac{(w_{t-1}^{\mathrm{U}} + \beta \ln w_{t-1}^{\mathrm{U}} - \alpha_k)}{1 + \beta / w_{t-1}^{\mathrm{U}}}. \quad (3)$$

This upper poverty line can yield robust comparisons between the two surveys, under the assumption that the relationship between food spending and total spending stays the same over time. The other requirement for the comparisons to be robust is that only the head count measure of poverty is used. The problem with higher order poverty measures is that the relative distance between the consumption level of the poor and the poverty line may increase as the components in the consumption aggregate become more comprehensive. Thus, moving to an increasingly broad definition of consumption could show higher poverty, even if the same households are considered poor under each definition (Lanjouw and Lanjouw, 2001).

Another way in which one survey can be incomparable with an earlier one is if there are changes in the length of the reference period over which expenditures are meant to be recalled. But if at least a subset of expenditures maintain the same reference period it may be possible to restore comparability. For example, while the National Sample Survey in India adjusted the reference period for most survey items during the 1990s, fuel and light, miscellaneous goods, and a few other items maintained a consistent 30-day reference period in all of the surveys. In total, these items with the consistent reference period, which can be called the "30-day goods," account for about 20 percent of expenditures. Deaton (2003) uses expenditures on these items in the 50th Round of the NSS (in 1993-94) to predict the probability of being poor in that round of the survey. The estimated relationship from that year is then applied to the distribution of 30-day expenditures in the 55th Round of the NSS (in 1999-2000) to predict the probability of being poor in the 55th Round. This estimated poverty rate in the 55th Round should then be comparable to that from the 50th Round, as long as there is a stable relationship between spending on the 30-day goods and total spending, and as long as the density of spending on the 30-day goods is not affected by the changes in other parts of the questionnaire.

The specifics of the approach are described by Deaton (2003, pp. 323-4) and are summarized here. Let $F(\,)$ be the cumulative distribution function of per capita expenditures. The poverty rate, *P,* is given by $F(z)$, the fraction of people living in households where per capita expenditure is below the poverty line, *z*. The probability of being poor, conditional on spending amount *m* on the 30-day goods, is $F(z \mid m)$ so that the poverty rate is: $P = \int_0^\infty F(z \mid m) g(m) dm$ where *g*(*m*) is the density function of expenditure on the 30-day goods.

Although this equation cannot be evaluated using data from the survey with the changed recall period, it is possible to use the conditional headcount function, $F(z \mid m)$

from the earlier survey in conjunction with the actual distribution of 30-day expenditures from the later survey. In particular, Deaton (2003, p. 324) uses data from the 50th Round survey to compute the headcount conditional on *m* and then estimates the poverty rate in the 55th Round according to $\hat{P}_{55} = \int_0^\infty \hat{F}_{50}(z \mid m)\hat{g}_{55}(m)dm,$ where the "hats" denote estimates and the subscripts denote either Round 55 or Round 50 on the NSS.

When this correction method is applied to the Indian data, it shows that most of the observed decline in poverty between the two incomparable surveys in the 50th and 55th Rounds appears to be a real change and not a statistical artefact of the variation in the recall period. A similar conclusion is reached by Tarozzi (2004) who uses a more flexible procedure that can be conditional on more than one auxiliary variable. This more flexible procedure may be able to do more than just re-establishing comparability over time for statistics estimated using surveys of different design. It is possible that it could be applied to the problem of combining data from a survey and census to provide precise measures of poverty for small areas (see Chapter 7 for a discussion of poverty mapping).

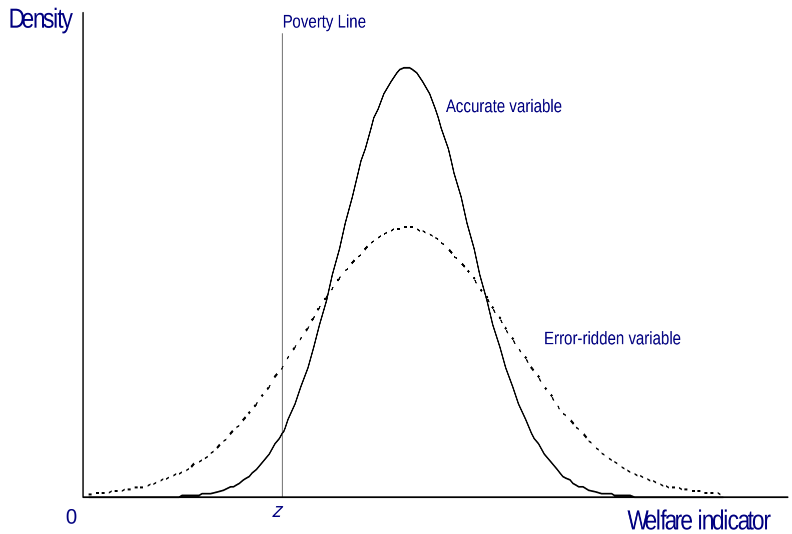
5.1.4 Measurement error in cross-sectional survey data

The sensitivity of poverty estimates to changes in household survey design discussed in Section 5.1.2 points to the problem of measurement error in cross-sectional survey data. (This issue is also addressed in the context of panel surveys in Chapter 8.) The widely different estimates of consumption and poverty resulting when two survey designs are used suggest that both estimates cannot be right and possibly neither are.

Measurement error in surveys poses a special challenge to statistical agencies when the focus is on poverty and other distributional statistics, rather than on means and totals which are the traditional statistics of interest. While random measurement error should not affect estimates of the mean or the population total if the sample is large enough, such errors will systematically bias poverty estimates.

In particular, the headcount index of poverty will be higher with a more variable welfare indicator, if the poverty line is below the mode of the welfare indicator. It will be lower if the poverty line is above the mode (Ravallion, 1988). This is illustrated in Figure 1, where an accurate welfare indicator is compared with an error-ridden indicator. The density functions of the two indicators have the same shape and same mode if the measurement error is random (that is, has a mean of zero) but there are wider tails for the error-ridden indicator. Thus, if the poverty line is located below the mode of these two distributions, there is a greater area under the density function of the error-ridden indicator (between 0 and z) than under the density function of the accurate indicator. Consequently, the value of the headcount index calculated with the error-ridden indicator will exceed that calculated with the accurate indicator. Higher order poverty statistics, such as the poverty gap index (P_1) and the poverty severity index (P_2), will also be overstated.

Figure 1: The effect of random measurement error on poverty estimates



To illustrate the possible effects of measurement error, household survey data from Papua New Guinea are used to calculate poverty statistics. In the original data, the mean consumption level is K911 per person per year, and the headcount index of poverty is 37.4 percent. A proportionate error was added to the survey data on consumption, x, so that the error-ridden indicator, x_e was $x_e = x \cdot (0.5 + v)$ where v was a uniformly distributed random number distributed between zero and one. The error-ridden indicator has the same mean level of consumption, but all poverty statistics are biased upwards, ranging from a 6.8 percent error for the headcount index to a 34.6 percent error for the poverty severity index (Table 1).

Table 1: Example of the Effect of Measurement Error on Poverty Estimates				
	Consumption (Kina/capita/year)	Headcount (P_0)	Poverty gap (P_1)	Poverty severity (P_2)
Original data	911.0	37.4	12.4	5.6
Adding measurement error	911.6	40.0	14.9	7.5
Percentage error	0.0	6.8	20.4	34.6

Note: Poverty rates are calculated from poverty lines set for five regions of Papua New Guinea and are based on baskets of locally consumed foods providing 2,200 calories per day, with an allowance for non-food spending. The (population-weighted) average value of the poverty lines is K461 per person per year.
Source: Authors calculation from Papua New Guinea Household Survey data.

5.1.5 Variance estimators for complex sample designs

Household surveys are based on samples, but interest is in the underlying population. Hence, sampling errors are needed, especially when comparing poverty estimates between two groups or two time periods because these errors affect the confidence with which we can claim that poverty is higher in region *A* rather than region *B*, or in year 1 compared with year 2.

There are three essential features of complex sample designs:

- Weights, where some sampled observations represent more members of the population than do others,
- Two-stage sampling, where Primary Sampling Units (PSU) are first selected and then certain households within those PSUs are surveyed, and
- Stratification of the sample.

Weights may be needed either by design, to get larger samples for sub-groups of particular interest (e.g. a capital city), or to restore the representative nature of the sample if there is non-response (e.g., up-weighting the remaining observations from the group with high non-response rates). Two-stage sampling occurs because it is a cost effective way of carrying out fieldwork; it is cheaper to get a sample of 100 by visiting just 10 villages and selecting 10 households from each rather than visiting 100 villages and selecting just one household in each village. Stratification occurs because survey designers find that if they use prior information on factors that are likely to be associated with poverty (e.g., geographical remoteness) they can draw a sample in closer accordance with the proportions in the population rather than leaving this to chance.

Two-stage sampling is less efficient than simple random sampling in statistical terms (which causes larger standard errors). This is because the households within a PSU tend to have similar characteristics, so a sample drawn from them reflects less of the population's diversity than would a simple random sample with the same number of households. At the same time, stratification reduces sampling errors because it reduces the chance that a relevant part of the sampling frame will go unrepresented. Ignoring these complex design features can considerably bias estimates of sampling error. Howes and Lanjouw (1998) find the standard error of the headcount poverty rate in Ghana is 45 percent higher when clustering and stratification are accounted for compared with wrongly assuming simple random sampling.

Techniques for calculating sampling variance and standard errors from complex sample designs fall into two general categories: Taylor series linearization and replication techniques. A Taylor series expansion is a linear approximation to a nonlinear function, and this is relevant because many estimates of interest in sample surveys are nonlinear.

Formally, $f(x) = f(x_0) + f'(x_0)(x - x_0) + f''(x_0)(x - x_0)^2 / 2! + \ldots$ which says that the function $f(x)$ can be approximated at one point, *x*, by taking its value $(f(x_0))$ at a nearby point, x_0, and using the slope at that point, $f'(x_0)$, to extrapolate to the point where we want to evaluate the function.

An improvement in the approximation comes from the second order term $f''(x_0)(x - x_0)^2 / 2!$ (f'' is the second derivative and ! is the factorial, so 2! is $1 \times 2 = 2$ and 3! is $1 \times 2 \times 3 = 6$) and the higher order terms. Variance estimators used with survey data assume that the second and higher order terms are of negligible size, leaving only the first-order, linear, portion of the expansion, $\text{var}(f(x)) \approx \text{var}[f(x_0) + f'(x_0)(x - x_0)]$. In other words, the variance estimate for a linear approximation to the estimator is used to estimate the variance of the estimate itself.

A wide range of software is available to calculate the variance of survey estimates using this linearization technique. For example, CENVAR within the IMPS package provided by the US Census Bureau and CSAMPLE within the EPI-INFO package provided by the US Center for Disease Control use linearization. This is also the main method used in the survey analysis procedures for general purpose econometric software like SAS and STATA. Two features of this estimation approach are relevant. First, a separate formula for the linearized estimate must be developed for each type of statistical estimator (such as a mean or a ratio). This is not a binding constraint because all of the widely used poverty measures can be expressed as the mean of a suitably transformed variable. For example, the poverty severity index (P_2) is just the mean of the squared proportionate poverty gaps, $\left[(z-y)/z\right]^2$ where z is the poverty line, y is the welfare indicator, and the squared proportionate gap is zero if $y \geq z$.[35] The second feature is that these estimators require at least two PSUs per stratum, which will usually be achieved by the sample design although it can be violated when examining narrow sub-populations.

Replication techniques take repeated sub-samples, or replicates, from the data. These replicates are then used to recompute the weighted survey estimates. For example, 50 replicate samples might be drawn from the original sample, and the poverty rate is calculated from each of these 50 replicates. The variance is then computed in terms of the deviations of these replicate estimates from the whole-sample estimate. The two main replication methods are Balanced Repeated Replication and Jackknife Repeated Replication. The basic idea of jackknife replication can be illustrated for the sample variance of the mean in a simple random sample. Suppose n=5 and sample values of y are 6, 10, 4, 2, and 8. The sample mean $\overline{y}=6,$ and its sampling variance is $\text{var}(\overline{y})=\left(1/n\right)\sum(y_i-\overline{y})^2\big/(n-1)=2.$ As an alternative to this analytical formula for the variance, the jackknife variance of the mean is obtained as follows:

1. Compute a pseudo sample mean by deleting the first sample value, which results in $\overline{y}_{(1)}=(10+4+2+8)/4=6.$ By deleting the second sample value instead, the second pseudo mean is $\overline{y}_{(2)}=(6+4+2+8)/4=5;$ and similarly, $\overline{y}_{(3)}=6.5,$ $\overline{y}_{(4)}=7,$ and $\overline{y}_{(5)}=5.5.$

[35] Variations in household size and in household sampling weights may require a weighted mean to be used.

2. Compute the mean of the five pseudo-values $\bar{\bar{y}} = \sum \bar{y}_{(i)} \big/ n = 30/5 = 6,$ which is the same as the sample mean, and
3. Estimate the variance from the variability among the five pseudo-values, $\text{var}(\bar{\bar{y}}) = [(n-1)/n] \sum (\bar{y}_{(i)} - \bar{\bar{y}})^2 = 2,$ which gives the same result as the analytical formula above.

Obviously there is no need to use jackknife replication for the variance of the mean of a simple random sample because an analytical formula is available. But the same idea can be extended to clustered samples. Specifically, a replicate can be formed by removing one PSU from a stratum and weighting the remaining PSUs in that stratum to retain the stratum's share of the total sample, and a pseudo-value can be estimated from each replicate. With the Balanced Repeated Replication, the replicates are formed by dividing each stratum into two PSUs and randomly selecting one of the two PSUs in each stratum to represent the entire stratum. Clearly, both replication techniques require at least two PSUs in each stratum.

Fewer software packages appear to use replication techniques compared with those using the linearization approach. Among those that do are VPLX which is supplied free by the US Census Bureau and WesVar, while a replication add-on has recently been made available for STATA.[36] The difference in availability of software for the two methods is unlikely to reflect any belief that one method for dealing with complex sample

[36] The linearization method has been available in Stata since version 5 (ca. 1996) under the command prefix svy, while a freely available add-on for the replication methods under the command prefix svr is available at http://econpapers.repec.org/software/bocbocode/s427502.htm

date is superior to the other. According to Korn and Graubard (1999), estimators based on smooth functions of the sample data (e.g., totals, means, proportions, and differences between proportions) have comparable variance estimates under both replication and linearization methods.

Regardless of the method used to calculate the sampling variability for complex samples, obtaining correct variances is especially important in the context of poverty monitoring. In monitoring, the main interest is the change in poverty levels--if any--between measurement periods, say t_1 and t_2. If Y_{t1} and Y_{t2} are the poverty statistics, we would like to know whether the observed difference, $Y_{t2} - Y_{t1}$, is indicative of a real change in the population rather than just reflecting sampling variability. Thus what is required is an estimate of the variance of the difference: $V(Y_{t2} - Y_{t1}) = V(Y_{t2}) + V(Y_{t1}) - 2\,Cov(Y_{t2},Y_{t1})$. The terms on the right-hand side can be estimated as design-based variance estimates of means or of ratio estimates. Let the square root of the resulting estimate be $se(Y_{t2}-Y_{t1})$, i.e., the standard error of the difference. The interval, $Y_{t2} - Y_{t1} \pm 1.96\, se(Y_{t2} - Y_{t1})$ defines a 95 percent confidence interval about the true difference (it would be 90 percent if 1.64 were used instead of 1.96). A confidence interval that is to the left of zero is indicative of an increased poverty rate. One that captures zero supports a "no change" hypothesis. An interval to the right of zero provides empirical evidence for a reduced poverty rate.

Under normal conditions wherein the poverty situation changes slowly, the real difference in poverty incidence narrows as the interval between t_2 and t_1 is shortened. This means a commensurately very small standard error is required to detect a small change in the poverty incidence for the population. Thus, more frequent monitoring does not mean a smaller sample size for each survey round. On the contrary, a more efficient sampling design and bigger sample are needed to reduce the noise (sampling error) to a level that would provide a good chance of detecting a weak signal (change in poverty incidence). Otherwise, there would be no point in the monitoring exercise if it were known *a priori* that the computed confidence interval will most likely straddle zero. It is to be noted also that all these considerations, including sample size, pertain equally if not more to sub-national domains of interest, e.g., urban-rural and regions, rather than to national level estimates.

5.2 Types of surveys

Several different types of household survey can be used to measure and analyze poverty. Very few of these surveys have poverty measurement as their primary objective. Thus statistical agencies have to carefully evaluate whether surveys that have other (or multiple) objectives can provide reliable data for measuring poverty.

5.2.1 Income and expenditure (or budget) surveys

Almost all countries have either a Household Income and Expenditure Survey (HIES) or a Household Budget Survey (HBS). Methods used to measure consumption expenditures in these surveys vary widely, in terms of data collection (recall, family diaries, and individual diaries), reference periods over which consumption is observed, and whether households are observed only once or revisited during a year. But one common feature is that in almost all cases the HIES and HBS are designed mainly to provide expenditure weights for a Consumer Price Index (CPI) and to assist in the calculation of National Accounts. For these tasks a survey only needs to provide estimates of means and totals. But there are important differences between the needs of CPI-focused and poverty-focused surveys, involving topical coverage, reference periods, and the need for revisits. Consequently, if statistical agencies are to place more weight on the objective of improving poverty measurement, certain changes to the design of these surveys may be warranted. An immediate problem in using HIES and HBS for poverty analysis is that because of the burden of remembering expenditures on so many items, respondents are typically asked about few other topics. Thus, there are often few variables available from the survey that can either help explain the poverty status of the household or assist in the more general objective of modelling household behaviour.

In contrast, poverty-focused surveys typically obtain measures of total consumption that do not have the level of commodity detail sought in an HIES or HBS. The reduced effort spent gathering the consumption data allows more attention to be paid to a broader array of topics that can assist in modelling the effect of various anti-poverty interventions. One key topic needed for poverty-focussed surveys is local prices which are rarely collected by HIES and HBS. Section 5.3 discusses this fully.

Although poverty-focused surveys do not need a lot of commodity detail, they do have to provide an accurate estimate of long-run welfare for each household in the sample. Such accurate estimation at the household level is not required for surveys that focus only on population means and totals because the effects of random errors can be expected to cancel each other out in the estimation of the mean. But for poverty rates and other variance-based statistics, the effect of random errors accumulates so errors in measuring household level welfare will be reflected in inaccurate estimates of aggregate poverty rates.

While the limited topical coverage of HIES and HBS restricts poverty analysis, the major problem with these surveys is the short period over which consumption is observed. Because respondents find it hard to remember spending on frequent purchases, HIES and HBS typically use a very short reference period (e.g., a one-week recall or a two-week diary), which may be atypical of the household's usual standard of living. This short observation period is sufficient if the goal is just to measure the average shares of household expenditure devoted to each good and service, which is all that CPI expenditure weights are. Specifically, if the sample is spread evenly over the months in the year, it is possible to get an annual average for a synthetic "representative household" without accurately estimating the annual expenditures of each household. In contrast, poverty measurement requires accurate estimates of long-run welfare for each household.

Such long-run measures appear to be provided by some surveys that report expenditures and poverty on an annual basis. But many of these surveys simply observe households for a week, fortnight, or month, with consumption from these periods annualised by multiplying by 52, 26, or 12. The length of the reference period may vary with the category of consumption, being longer for costly and/or infrequently consumed items and shorter for frequently consumed and minor items that would be easily forgotten. While the scaling factors that convert these short duration observations into annual figures vary, the principle in all cases is the same: an estimate of annual expenditures can be made by simple extrapolation from shorter observation periods.

What is the problem with these annualised estimates and also with estimates that are collected and reported for shorter periods like a fortnight or a month? Random shocks, which occur during the observation period and are subsequently evened out over the rest of the year, get included along with the genuine between-household inequality in annual expenditures. Consequently, estimates of annual inequality are overstated. In any setting where the poverty line is below the modal value of per capita expenditure, the overstated dispersion will also lead to an overstatement of the poverty head-count and other measures of poverty.

The degree to which measured annual inequality and poverty are overstated when short reference periods are used can be seen in urban China (Table 2). China is of interest in this regard because respondents in the HIES in China keep a daily expenditure diary for a full 12-month period, which provides a benchmark to evaluate estimates that are based on extrapolations from shorter periods. For example, if expenditures for each household were only observed for one month (but the sample is spread over the year) and multiplied by 12 to give an annualised estimate, inequality in annual expenditures would be overstated by over 60 percent, annual headcount poverty by over 50 percent, and the poverty gap index by 150 percent.

The upward bias is roughly halved if expenditures are annualised from two months of data (collected six months apart) and declines further if the survey collects either four or six months of expenditure data. It is notable that there is no overstatement in estimates of mean annual expenditure when any of the short-period data are extrapolated to annual totals. This emphasises the fact that a survey design that does a good job of estimating the mean will not necessarily be accurate for variance-based measures like poverty and inequality.

Table 2: Percentage Overstatement in Inequality and Poverty Measures for Urban China when Annual Expenditures are Obtained by Extrapolating from Monthly Data

	Extrapolation based on observations in:					Corrected extrapolation
	1 month	2 months	4 months	6 months		
Mean annual expenditure	0.1	0.1	0.1	0.1		0.1
Gini index of inequality	64.6	36.4	17.7	11.6		6.4
Head-count poverty rate	53.1	32.2	14.0	15.0		0.1
Poverty gap index	149.8	77.8	34.2	19.4		5.0

Note: Corrected extrapolation uses correlation from a single revisit (i.e., two months of data).
Source: Gibson, Huang and Rozelle (2003).

One response to exaggerated poverty estimates that come from extrapolated annual expenditures is to only report poverty for shorter periods, corresponding to the reference period used by the HIES. For example, if a survey observes most household consumption for only a week, the poverty estimates would also be reported on a weekly basis. However, such short-period estimates may be dominated by transitory fluctuations.

Cross-country comparisons will also be difficult unless a standard reference period is agreed to, although this problem already exists because extrapolated annual estimates are not comparable to proper annual data like those available from China. Annual reporting periods are likely to continue to be used while agriculture remains an important source of household income because of the resulting seasonality in consumption and poverty.

5.2.2 Correcting overstated annual poverty from short reference period HIES and HBS data

One method that may combine the practicality of short observation periods with the need for annual estimates of expenditures and poverty is to revisit some surveyed households at least once during a year. Rather than simply adding the two estimates of the household's expenditure and naively extrapolating to an annual total (as was done in Table 2), Scott (1992) suggests a "corrected extrapolation" based on correlations between the same household's expenditures in different periods of the year – correlations implicitly assumed to be 1.0 by simple extrapolation.

For example, consider a survey that gathers all expenditure data using a one-month reference period (as the National Sample Survey in India did until recently). Let $\bar{x}_m$ refer to the average, and $V(x_m)$ the variance, of monthly expenditures across all i households and t months in the year. Extrapolating to annual expenditure totals by multiplying monthly expenditures by 12 gives an estimated variance of annual expenditures of $144 \cdot V(x_m)$. As indicated in Table 2, this extrapolation overstates the variance in the annual expenditures that would be recorded if each household was observed for a full 12-month period:

$$V(x_a) = \frac{1}{N}\sum_{i=1}^{N}\left(x_{i,a} - \overline{x}_a\right)^2 \tag{4}$$

where $x_{i,a}$ is annual expenditure by the i^{th} household and $\overline{x}_a$ is average annual expenditures. Equation (4) can be expressed as:

$$V(x_a) = \sum_{t,t'=1}^{12} r_{t,t'}\sigma_t\sigma_{t'} \tag{5}$$

where $r_{t,t'}$ is the correlation between expenditures in month t and month t' and σ_t is the standard deviation across households in month t. This follows because $x_{i,a} - \overline{x}_a$ in equation (4) can be expressed as the sum of the deviations of each household's monthly expenditure from the mean for that month, $d_{it} = x_{it} - \overline{x}_t$ and the d_{it} terms are components of the correlation coefficient:

$$r_{t,t'} = \frac{1}{N}\sum_{i=1}^{N} d_{it}d_{it'} \Big/ \sigma_t\sigma_{t'} \,. \tag{6}$$

Assuming that the dispersion across households does not vary from month to month, i.e., $\sigma_t = \sigma_{t'}$ equation (5) can be expressed as:

$$V(x_a) = \left[12 + 132\cdot\overline{r}\right]V(x_m)\,. \tag{7}$$

where $\overline{r}$ is the average correlation between the same household's expenditures in all pairs of months in the year. Equation (7) shows that the variance from simple extrapolation to annual totals, $144\cdot V(x_m)$, equals $V(x_a)$ only in the special case of $\overline{r} = 1$.

The corrected extrapolation uses estimates of $\bar{r}$ to scale the i^{th} household's deviation from the overall monthly average $(x_{it} - \bar{x}_m)$, up to an annual value. Adding this to the annual average across all households, $\bar{x}_a = 12 \cdot \bar{x}_m$, gives:

$$x_{i,A} = (x_{it} - \bar{x}_m)\sqrt{12 + 132 \cdot \bar{r}} + 12 \cdot \bar{x}_m . \tag{8}$$

For example, if $\bar{r} = 0.5$, the scaling factor is only 8.8 (=√78), rather than the scaling factor of 12 implied by simple extrapolation. Thus, the deviation of a household's one-month expenditures from $\bar{x}_m$ has a smaller effect than under simple extrapolation, leading to a less dispersed distribution of annual expenditures and a lower poverty estimate (if the poverty line is below the mode of the expenditure distribution).

While the most reliable estimate of $\bar{r}$ would use the 66 correlation coefficients $r_{t,t'}$ between all $i \neq j$ pairs of months, this provides no practical advantage because it requires observing each household in every month in the year, as is done, for example, by the HIES in China. However, even getting an estimate of $\bar{r}$ from just two, non-adjacent months may be sufficient.

The final column of Table 2 shows that this method gives estimates that are quite close to those obtained from observing each household's expenditure for all 12 months of the year. In urban China, the errors from this corrected extrapolation method never exceed 6 percent and are much smaller than the errors generated by multiplying monthly data by 12, as was done in the first column of Table 2. Using revisits in more months to form a more reliable estimate of $\bar{r}$ does not significantly improve estimates (Gibson et al., 2003).

Thus, a single revisit about six months after the first survey of the household's expenditure may give a good estimate of $\bar{r}$ so that equation (8) can be used to improve estimates of annual poverty, even when a HIES or HBS uses short observation periods. This economical approach to estimating $\bar{r}$ will be valid if the correlations among non-adjacent periods vary little as the gap between observations increases, as was found by the 1993-94 Household Budget Survey in Zambia where $r_{t,t'}$ fell by just 0.0078 for each month that the gap between t and t' increased (CSO, 1995).

Further savings may be made by restricting the repeated observations to a random subset of the sampled households to lessen the cost of getting the parameter $\bar{r}$. This random sub-sample should be large enough to allow $\bar{r}$ to be calculated separately for major groups of the population (e.g., rural and urban, and rich and poor) because the extent to which expenditures fluctuate within the year may differ between these groups. For example, in a survey in Papua New Guinea, households in 20 percent of the primary sampling units in the sample were revisited about six months after the initial survey to estimate $\bar{r}$, and this only added about 10 percent to the cost of the survey (compared with just using a cross-section) while substantially improving poverty estimates (Gibson, 2001).

5.2.3 Living Standards Measurement Study surveys

In contrast to the HIES and HBS, both of whose main objective is to measure means and totals, the Living Standards Measurement Study (LSMS) surveys of the World Bank have a primary focus on measuring the distribution of living standards.

Consequently, the design of the LSMS has been dictated by the need to have accurate measures of monetary living standards for each household in the sample, not just for a representative household. Even though the LSMS surveys collect information on both income and consumption, poverty measurements from these surveys have always used consumption data. In contrast, some analysts choose to measure poverty using income data from HIES, even when consumption expenditure data may be available.

A further difference is that the LSMS surveys are explicitly multi-topic surveys. In addition to income and consumption, they collect detailed data on education, health and anthropometry, employment, migration, agriculture, non-farm enterprises, savings and credit, and community-level data on public services and local prices. This more extensive coverage is achieved by reducing the commodity detail required in the consumption module.

Besides providing alternative indicators of poverty (such as lack of education, poor access to water, and malnutrition of children), the broader topic coverage of LSMS surveys enables household behaviour to be modelled. This can help in the formation of policies to break the intergenerational cycle of poverty (Box 3). For example, households where adults have low levels of education tend to be poor. Hence, LSMS surveys include considerable detail on educational expenses, distance to schools, and quality of school materials for current students. These data can help explain factors that limit enrollment of certain groups of students (e.g., girls, and students from particular regions or income groups). Once those factors are identified, interventions can be designed to improve current enrollments and reduce the likelihood of future poverty.

Box3: Mother's Education, Child Stunting, and Intergenerational Poverty in Papua New Guinea.

Analyses of LSMS survey data from Papua New Guinea have identified one mechanism through which poverty and ill-health are transmitted across generations and suggests an intervention that could break this cycle (Gibson, 1999). The low levels of education of mothers compared with fathers (a gap of two school years, on average) contributes to the stunted growth of children (i.e., children are shorter for their age). Parental education affects stunting by improving knowledge of health and nutrition, as well as by increasing incomes. In fact, an additional year of schooling for mothers is three times more effective at reducing stunting than is a year of schooling for the father (with or without controls for income). Stunting matters to poverty because stunted children have higher risk of sickness and death and poorer mental development. In addition, stunted girls grow up to be stunted mothers, who are more likely to give birth to underweight babies that have a greater risk of being stunted (UNICEF, 1998). Hence, the vicious circle, caused partially by gender bias in schooling, continues across generations.

A very detailed description of all modules in the LSMS surveys is available in Grosh and Glewwe (2000). The most important module from the point of view of poverty measurement is the consumption module, fully described by Deaton and Grosh (2000). Only two aspects of LSMS surveys are considered here: use of bounded recall and use of recall questions designed to provide information for an annual reference period.

To prevent telescoping errors, which are a mis-dating of expenditures, some LSMS surveys used a bounded recall where interviewers first visited respondents to administer modules of the survey other than the consumption recall. A subsequent visit was then made one or two weeks later and respondents were asked about consumption since the previous visit. The expectation was that the initial visit would clearly mark the beginning of the recall period and reduce the mis-dating of consumption. There does not appear to have been an evaluation of this design, although it was consistent with findings in the literature on telescoping (Neter and Waksberg, 1964), and it was not used in all LSMS surveys, creating some non-comparability.

In addition to either a bounded or unbounded recall of consumption over an immediately previous period like a month, some LSMS surveys attempted a longer term recall. Following a screening question on whether the household consumed the particular item during the past year, respondents who had were asked about the number of months they purchased the item, the number of times per month they purchased the item, and the usual quantity and value of this usual purchase. A similar set of questions was asked about own-production and other non-purchases (such as gifts received). The product of usual purchase value, times per month usually purchased, and months per year purchased may give an estimate of annual expenditure on the item.

If these questions are answered accurately they solve the problem of overstated inequality and poverty when annualizing consumption estimates from short reference periods. Deaton and Grosh (2000) present evidence that suggests this form of annual recall provides similar data to recall over the previous month. However, this is not a firm verification because the two types of data are gathered in the same interview and are likely influenced by each other. This is an area where statistical agencies could usefully carry out further experiments.

5.2.4 Core and module designs

While multi-topic surveys are useful for poverty measurement and distributional analysis, they are hard to conduct. Therefore, data are normally available only at low frequency and for small samples, making them less useful for poverty monitoring. Some statistical agencies deal with this problem by using a core-module design. A simple core survey is fielded frequently and a variety of rotating modules are appended to the core survey. For example, the Indonesian SUSENAS has an annual core with questions on demography, education, labour market activity, and an abbreviated consumption recall that covers 23 broad categories. This is supplemented with a detailed consumption module, using 320 detailed categories, that is given to a subset of respondents every third year. In the intervening years, modules on other topics are used.

Although the core-module design is popular, it has at least two drawbacks that can cause inconsistent poverty comparisons. First, estimates from detailed consumption modules are often inconsistent with the results from abbreviated consumption questions in a core. For example, in SUSENAS the consumption estimates in the core appear to be understated, particularly for households with higher true consumption (mean reverting error) and for larger households (Pradhan, 2001). It is therefore not possible to create a consistent annual series of consumption and poverty estimates by using results from the core survey in two years and from the module survey in the third year. Second, contents of rotating modules can affect the core so even core-to-core temporal comparisons may be inconsistent. For example, in the Cambodia Socio-Economic Survey (CSES) of 1999, the addition of a detailed income module affected the consumption data in the core because of a desire by either respondents or interviewers to reconcile consumption and income at the household level (see Box 2).

The behaviour of poverty analysts can also be affected by the contents of a module. A detailed social sector module in the 1997 CSES had estimates of health expenditures that were much higher than the health spending recorded in the core, so the estimate of total expenditure for the core survey was adjusted higher (by up to 14 percent) because of the presumed undercount. This destroyed the comparability with consumption and poverty estimates from previous and subsequent core surveys where this adjustment had not been made (Gibson, 2000). These examples suggest that care is needed in the use of core-module surveys.

5.2.5 Demographic and Health Surveys

Demographic and Health Surveys (DHS) now cover more than 170 surveys in 70 countries throughout the developing world. Country-specific details of these surveys can be found at www.measuredhs.com. A somewhat similar, though less well known set of surveys, are the Multiple Indicator Cluster Surveys (MICS) that are carried out by UNICEF. These surveys have three potential advantages over more traditional sources of household data for poverty analysis.

- They are available for a wider range of countries, especially in Africa;
- In many countries they are available at two or more points in time, allowing temporal comparisons; and

- Key survey instruments are standardized for all countries so cross-country comparability is much greater than in any other type of household survey.

Offsetting these potential advantages, a very major drawback of DHS and MICS is that, except for a few experimental modules, they do not collect information on either incomes or consumption. Consequently it is not possible to use this rich source of data for conventional poverty measurements. However, recent research suggests that the information collected by these surveys on dwelling facilities (e.g., presence of piped drinking water) and asset ownership (e.g., radios and bicycles) may provide a measure of household economic status that may be useful for distributional and poverty analysis.

There are two lines of this research, only one of which has proceeded directly to poverty measurement. The most well known statistical method for using these surveys in place of consumption data is based on research by Filmer and Pritchett (2001). These authors use both household consumption expenditure and an "asset index" to see which is better at explaining patterns of children's school enrollments in Nepal, Indonesia, Pakistan, and states of India (using the National Family Health Survey for India, which is similar to the DHS). They find that the asset index is a proxy for economic status that is at least as reliable as conventionally measured consumption expenditures. This asset index uses the method of principal components, which is a mathematical technique for transforming several correlated variables (on household asset ownership and dwelling facilities in this case) into a smaller number of uncorrelated variables. Only the first principal component, which accounts for as much of the variability in the data as possible, is used by Filmer and Pritchett (2001) and others who follow their approach. Typically this component accounts for about 25 percent of the variation in asset ownership and facilities in a DHS. There are no units for interpreting this asset index, so it is used only for ordinal comparisons. One common use has been to compare educational attainment of the richest 20 percent of households and the poorest 40 percent (see http://www.worldbank.org/research/projects/edattain/edattain.htm).

While the asset index approach of Filmer and Pritchett (2001) has not been used to directly study poverty, a related method has been developed by Sahn and Stifel (2000) to make poverty comparisons across time and space for 11 African countries. In this method, DHS data from all 11 countries are pooled and an asset index is formed using the method of factor analysis. Unlike the method of principal components, which uses all the variability in an item, factor analysis allows some variability to be unique, with only the variability that is common with the other items used to form the asset index.

Relative "poverty lines" are created from the asset index, based on the values of the index at the 25th and 40th percentile of the pooled sample. Poverty comparisons are made across countries, and especially over time for each of these countries by seeing what proportion of the population in a subsequent DHS have an asset index that is below the values that were at the 25th and 40th percentiles in the first survey. The change in poverty over time is also calculated with the poverty gap and squared poverty gap measures, and this change is decomposed by sector.

There would need to be a validation of this method to see whether the results closely mimic those calculated with more typical consumption data before any recommendations could be made about its wider use. Even in the absence of such a validation, there are at least three concerns with the approach:

- An index based on the principal components approach (and presumably also the factor analysis approach) appears to put higher weights on durable goods that are easier to own which is not the pattern that occurs for an index based on a more explicit model for the ownership of durables (Mukherjee, 2005);
- The link between assets and expenditures is likely to be non-linear, so the ability of an asset index to serve as a proxy for unmeasured consumption is likely to vary over the income distribution and through time; and
- The very simplicity of the questions that underlie the asset index could also prove to be a weakness because yes/no questions on ownership of an asset do not distinguish between the wide variations in quality of these assets.

5.3 Pricing and updating the value of poverty lines

Information on the prices that households pay for items they consume is crucial for poverty measurement. Most obviously these prices are needed to place a monetary value on the food basket for a Cost of Basic Needs (CBN) poverty line. Prices are also needed to calculate the change over time in the cost of reaching a poverty line standard of living. Even methods for constructing a poverty line that seem to rule out the need for prices, such as the Food Energy Intake (FEI) method, prove on further examination to require information on prices.[37] In fact, measurement of local prices is needed for some or all of the following three tasks:

1. pricing the food basket for the Cost of Basic Needs (CBN) poverty line,
2. forming spatial deflators, so that any ranking of household consumption expenditures is in real rather than nominal terms, and
3. imputing values either when the survey only collects quantities or when checking the sensitivity of the consumption estimates to the use of respondent-reported values.

The methods used to calculate a CBN poverty line are discussed in Chapter 4 so attention here is restricted to the calculation of spatial price deflators and the use of price data for imputing values when only quantities are collected.

5.3.1 Spatial price deflators

Spatial price deflators are needed because price differences between regions may make between-household comparisons of nominal consumption expenditures misleading.[38] For example, in the CBN method of setting poverty lines it is typical to base the poverty line basket of foods on the actual consumption pattern of a group of poor

[37] The FEI method relies on a regression of calorie intakes on a welfare indicator like per capita expenditures. Once a calorie target is set (say, 2000 calories per person per day) the regression is inverted to solve for the required expenditure to meet the calorie target. However there will be a measurement error in this regression if it is carried out in terms of nominal expenditures when there are large price differences between regions. This error will tend to reduce the magnitude of the regression coefficient, causing an overstatement in the level of expenditures required to reach the calorie threshold and hence an overstatement in the value of the poverty line. This error could be reduced if price data were available to calculate real expenditures that reflect regional differences in the cost of living.

[38] Temporal price deflators may also be needed. It is typically assumed that prices do not vary over time within a cross-section but in inflationary environments even a few months between the time of the first and last household being surveyed could cause a difference between nominal and real expenditures.

households.[39] But in order to identify this group of poor households, some ranking must be used and this needs to control for spatial price variation. Otherwise poor households from regions where prices are high are less likely to be included in the reference group than are poor households in regions where prices are low because those from the higher priced region will have higher nominal expenditures.

The ideal way to control for spatial differences in the prices facing households is to calculate a "true cost-of-living index". This true cost-of-living index is based on the *expenditure function*, $c = c(\bar{u}, \mathbf{p})$, which gives the minimum cost, c for a household to reach utility level $\bar{u}$ when facing the set of prices represented by the vector $\mathbf{p}$. For two, otherwise identical households, one living in the base region and facing prices $\mathbf{p^0}$, and the other living in another region facing prices $\mathbf{p^1}$, the true cost-of-living index is:

$$\text{True cost-of-living index} = \frac{c(\bar{u}, \mathbf{p}^1)}{c(\bar{u}, \mathbf{p}^0)}$$

which can be interpreted as the relative price in each region of a fixed level of utility. Although this is the ideal spatial price index, it is not commonly calculated, even in developed countries.

Instead the usual approach to controlling for spatial price differences is to use a price index formula that approximates the true cost-of-living index. A common choice is

[39] Exactly how many households should be in this group depends on prior notions of the poverty rate. For example, if it was believed that the poverty rate was 0.25 it would be likely that an analyst would use the food consumption patterns of the poorest quarter of households for obtaining the poverty line basket of foods. If this prior estimate of the poverty rate turns out to be quite different than the subsequently calculated one, it may be necessary to revise the calculations, using a different definition of the starting group (Pradhan, Suryahadi, Sumarto and Pritchett, 2001).

the Laspeyre's index, which calculates the relative cost in each region of buying the base region's basket of goods:

$$L = \frac{\sum_{j=1}^{J} Q_{kj} P_{ij}}{\sum_{j=1}^{J} Q_{kj} P_{kj}},$$

where k is the base region, i indexes every other region, j indexes each item in the consumption basket, and Q and P are quantities and prices.

The Laspeyre's index overstates the cost-of-living in high price regions. It does not let households make economising substitutions away from items that are more expensive in their home region than they are in the base region. For example, ocean fish are usually more expensive in the interior of a country than on the coast, so the quantity of fish consumed would typically be lower in the interior than on the coast. But if a coastal region is the base region, the Laspeyre's index calculates the cost of purchasing the coastal level of fish consumption at the high prices prevailing in the interior. Instead, a true cost-of-living index would calculate the cost of obtaining the coastal level of utility when facing the high prices for fish that prevail in the interior, letting the household rearrange its consumption bundle to minimise cost.

Another commonly used price index, the Paasche index understates the cost of living in high price regions because it evaluates relative prices using a basket of goods that varies for each of the i regions:

$$P = \frac{\sum_{j=1}^{J} Q_{ij} P_{ij}}{\sum_{j=1}^{J} Q_{ij} P_{kj}}.$$

In other words, the Paasche index takes a weighted average of relative prices, where the weights reflect prior economising substitutions by households. Continuing the above example, the Paasche index weights the high price of fish in the interior with the (low) quantity of fish consumed by interior households. This understates the cost of living disadvantage in the interior compared with the coast because it puts a smaller weight on the items with the highest prices relative to other regions.

A geometric average of the Laspeyre's and Paasche indexes gives a Fisher index: $F = (L \times P)^{1/2}$. This is a superlative price index which will closely approximate a true cost-of-living index. Another superlative price index that is sometimes used is the Törnqvist index:

$$T = \exp\left[\sum_{j=1}^{J}\left(\frac{w_{kj} + w_{ij}}{2}\right)\ln\left(\frac{P_{ij}}{P_{kj}}\right)\right]$$

where w_{ij} is the average share that item j has in the consumption basket in region i, and region k is the base region.

One practical difficulty with all of these price index formulae is that they require a full set of prices for all items in the consumption basket. Household surveys are typically not able to collect prices for all consumption items (for example, prices for services are hard to measure) so assumptions are needed about the regional pattern of prices for the items that are not observed. One solution to this problem is to derive the spatial price index from the regional poverty lines because poverty lines can be calculated when there are missing non-food prices (see equation (1)). But even for consumption items where it is conceptually possible to gather price data, there are often practical difficulties that result in very many missing prices. For example, a 1999 survey in Cambodia tried to obtain prices for 50 food items in 600 villages but data were obtained on less than half of the price-village combinations because of items missing from markets (Gibson, 2000).

5.3.2 Whose cost of living?

The possibility of deriving a spatial price index from regional poverty lines raises the important issue of whose cost of living is being measured by the price index. A price index derived from poverty lines would typically measure regional differences in the cost of living amongst the poorest x percent of the population, where x is either the fraction of the population below the poverty line or the fraction whose food budgets were used to create the poverty line food basket. The regional pattern of cost of living differences for this group could be quite different to the pattern shown by a price index that places greatest weight on households who are either in the middle or the upper parts of the income distribution.

There are three sources of possible difference between a price index for the poor (such as one derived from a set of regional poverty lines) and a more general purpose price index that reflects the cost of living for the middle or upper parts of the income distribution:

1. the composition of household budgets changes when moving up the income distribution, so a price index for the poor would put more weight on basic necessities,
2. for a given category of consumption (say, rice) the particular brands, grades, varieties and outlets where rich and poor purchase may differ and also may have different prices, and
3. various formulae that combine price data with information on the importance of each commodity in household budgets can place more weight on either rich households or poorer households.

This question of weighting matters because, as shown above, a price index is essentially a weighted average of relative prices where the weights reflect the average importance of the commodity in household budgets. One way to calculate this average importance for a commodity would be to add up expenditure on that item across all households, and then calculate the ratio of the total expenditure on that item to the total expenditure on all items. This is the approach used in the calculation of Consumer Price Indexes around the world. One feature of this method is that it gives more weight to the rich, because they have more total spending. Consequently the resulting price index is sometimes called a "plutocratic price index" (Prais, 1958).

Rather than taking ratios of total spending, another method of calculating the average importance of a commodity would be to first calculate budget shares for each household. In the second step these budget shares would be averaged across all households. This average of shares approach gives every household the same weight (except for any variation due to household size and sampling weights). Thus it can be considered a democratic price index because a rich household has no more impact on the finally calculated average than does a poor household.

A hypothetical example showing the difference between these two types of averages is presented in Table 3. There are two households, with one having three times the total spending of the other. Only two commodities are available to consume: cassava, which is a necessity and ice cream, which is a luxury. If the average importance of each commodity is calculated in terms of the shares of total expenditure, the resulting price index would put 25 percent of the weight on the price of cassava and 75 percent on the price of ice cream. This is much closer to the consumption pattern of the rich household than the poor household. But if the average of shares approach was used, the weights would be 30 percent on cassava and 70 percent on ice cream which is halfway between the consumption patterns of the two households.

Table 3: Example of Two Different Weighting Methods for a Price Index

	Cassava	Ice Cream	Total Spending	Cassava Share	Ice Cream Share
Poor household	$40	$60	$100	0.40	0.60
Rich household	$60	$240	$300	0.20	0.80
Total	$100	$300			
Share of total	0.25	0.75			
Average of shares				0.30	0.70

Source: Author’s example.

There is one other implication of the result that a typical Consumer Price Index uses weights that are closer to the consumption patterns of rich households. To the extent that the price trends for items consumed by the rich differ from the trends of those consumed by the poor, a CPI may be a poor choice for updating poverty lines to account for price changes over time.

5.3.3 Using prices to impute the value of consumption

Self-produced items, and especially food, are a major component of consumption in rural areas of many developing countries. The monetary values placed on these self-produced items in surveys are often the values that respondents themselves suggest. There are grounds for questioning the reliability of these respondent-reported values. Many households who produce a food do not buy that same food, so they may not be well informed about prices when they assign a value to their own food production. Moreover, the items available for sale in markets may be of a different quality than their own production so even if they are aware of prices in the market they may not be able to accurately impute a value for their own production.

There are two concerns about relying on respondent-reported values for self-production. First, they introduce an additional, and extraneous, source of inequality into measured consumption. If the poverty line is below the mode of the welfare indicator, this increase in measured inequality will raise the measured poverty rate (see Figure 1). For example, it may seem unreasonable that two households, who produce the same quantity of a food in the same location, can value that production differently. A household might fall below the poverty line just by being too pessimistic when valuing their own food production because they think prices are lower than they truly are.

Second, the values applied to self-produced food items could differ, systematically, from market prices. Such discrepancies could drive a wedge between the market prices used to form a Cost of Basic Needs food poverty line and the values used to form estimates of consumption. If respondents tend to report values for their self-produced foods that are lower than market prices, estimates of the incidence of poverty could be inflated, especially in rural areas where subsistence food production is important.

There are two alternatives to respondent-reported values, as measures of the value of self-produced food items. The first is to value self-produced foods with the average of the implicit unit values used by other households in the same cluster (that is, Primary Sampling Unit) as the respondent. These implicit unit values are the ratio of value to quantity reported by each respondent, and are similar to a price except that they may reflect quality variation and also measurement error. Replacing respondent-reported values with a cluster average removes the within-cluster variability in valuations. However, it does not address any discrepancy between these average unit values and market prices which may drive a wedge between the prices used for the poverty line and the implicit prices used when valuing consumption.

The second alternative is feasible only if a survey has collected prices from local markets. In this case it is possible to value self-produced foods with the average price that was observed during the survey in the market closest to the respondent. It is notable that both of these alternative ways of valuing self-produced foods switch the cornerstone of consumption measurements from the respondent reports of values to the survey estimates of food production quantities. This does place a lot of faith in quantity measurements, and these measurements are not necessarily the ones where statistical offices have the greatest expertise, compared to, say, agriculture ministries and others who do crop surveys. But unless statistical offices collect prices in local markets it is impossible to know how sensitive the estimates of consumption and poverty are to the various assumptions made when valuing self-produced items.

5.3.4 Practical issues in collecting price data

Once a decision has been made to obtain price data, either for setting the food poverty line, calculating a spatial price deflator or placing a value on non-purchased consumption, there are three practical questions that a statistical agency must consider:

1. How many prices to collect, in terms of the number of items and the number of individual price observations per item,
2. Where to collect prices, and at what geographical scale to calculate and report any resulting price indexes, and
3. How to collect the price information, in terms of the following four choices:

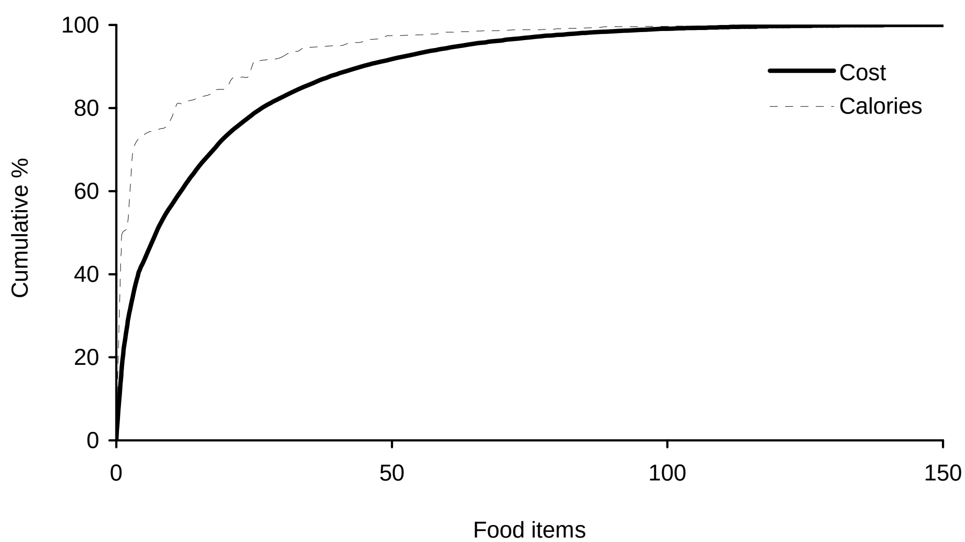
a. Unit values (that is, the ratio of expenditure to quantity) coming typically from a consumption recall but potentially also from individual transaction records in expenditure diaries,
b. Price surveys in community markets, such as those typically done by LSMS surveys,
c. Surveys of opinions about prices from either sampled households or community leaders, and
d. Existing price collection efforts, as might already be occurring for a Consumer Price Index.

In terms of the number of items to collect prices for, ideally there should be full coverage of all of items in the poverty line (if it is a CBN line with a specified basket of food) and all of the items specified in the consumption recall (if diaries are not used). The prices of key non-foods should also be collected even if an Engel method is used to scale the food poverty line up to the total poverty line (see equation (1)) without using any non-food prices.

This recommendation for the number of items to collect prices for switches attention to the issue of how many items to specify in a food poverty line (and the related issue of how disaggregated are the commodities in the expenditure questionnaire). One useful tool in this regard is the concentration curve for the foods in the poverty line basket. This curve starts with the most important food and plots the cumulative contribution to either the total cost or the total calorie content of the poverty line basket.

Figure 2 presents an example from Cambodia, where the poverty line calculated from a 1993/94 survey had 155 separate food items. This detailed food basket was never fully priced in subsequent surveys, which only gathered data on the prices of about 30 foods. In fact this more abbreviated level of price collection would have been an appropriate level of detail for the poverty line food basket. According to Figure 2, a basket with just the 20 most important items would give 73 percent of the total cost and 85 percent of the total calories in the food poverty line. A basket with 45 items would give 90 percent of the total cost and 96 percent of the calories. In other countries there may need to be more foods in a poverty line basket, depending on the importance of the basic staples, but constructing curves like Figure 2 would be a sensible first step for designing both the poverty line basket and the level of detail required in food price surveys.

Figure 2: Concentration curves for poverty line food basket



In terms of how many observations to make on the price of each item, the standard in most LSMS surveys is three observations per village (that is, per cluster). It is not clear if a fixed number of observations per item is the best approach, although it does have the advantage of simplicity. A CBN food poverty line is a statistic (essentially a weighted average of a set of average prices) although it is rare to see standard errors reported for poverty lines. This statistic would be more precisely estimated if the prices for the items contributing the most weight were based on larger samples than the samples used to measure the price for minor items.

The variability across time and space should also be considered when deciding how many observations to take on the price of each item. Some items may be subject to price controls (for example, fuels) so the same price might be observed over all outlets and across short time spans. Other items, and particularly informally marketed foods, may have prices that vary from day to day and from seller to seller, so more observations are required to precisely measure the prices for such items.

In terms of where to collect prices, the aim should be to observe prices in the markets actually used by the households in the sample. Thus it is a valuable addition to a household questionnaire to enquire of respondents where they actually buy the items they consume. Otherwise an approach of just visiting markets and asking vendors the price of particular goods (as was done by the LSMS surveys) can be subject to certain criticisms. In particular, the prices that are gathered may be from the wrong market, or for the wrong specification of goods, or the prices quoted may not be the prices actually paid by local residents because of bargaining (Deaton and Grosh, 2000).

In terms of the geographical scale at which to calculate average prices (as an input to the poverty lines), most surveys report these for only a few major regions despite prices being collected from a far larger number of communities. Consequently these regional average prices will overstate the cost of buying the poverty line basket of foods in some communities within each region, while understating it for others. Measured poverty will be too high in the communities where regional average prices overstate the cost of the basket of foods because these same (high) prices are not used for valuing food consumption. Hence, the value of some households' consumption will be above the poverty line if that line is priced using local (i.e., cluster-level) prices, but below the poverty line if regional average prices are used. Bias in the opposite direction (measured poverty too low) will occur in clusters where regional average prices understate the local cost of the poverty line basket of foods.

It would seem that there is no net effect of using regional average prices because the overstatement of poverty in some communities within the region is cancelled out by the understatement in others. This would only be true if the distribution of food prices within each region is symmetric, with the mean equalling the median (e.g., a Normal distribution). However, if the within-region distribution of prices is positively skewed, with the mean exceeding the median, there will be fewer communities with prices above the regional average than below the regional average. Consequently there will be more communities where poverty is overstated than understated. Hence it is important to examine the within-region distribution of prices. It would also be a useful sensitivity analysis to calculate poverty lines and poverty rates using cluster level prices to see how they differ from the estimates based on regional average prices.

Surprisingly little is known about the last practical question, of what is the best way of collecting price information. The available choices are community price surveys, unit values, price opinions and relying on existing price collection efforts. Unit values are often used in poverty studies because very few HIES and HBS collect local prices when gathering household expenditure data. Many of these surveys do collect food quantities in addition to expenditures so that unit values can be calculated. But unlike prices, unit values are available only for purchasers. Furthermore, they are subject to quality effects if some households buy better varieties within a commodity category. The final problem with unit values is that they reflect measurement errors in quantities, expenditures, or both. There is no consensus about the use of unit values in poverty studies. Deaton (1997) reports evidence from India that indicates that unit values are a reasonable proxy for prices whereas Capéau and Dercon (1998) find that the poverty rate in Ethiopia is overstated by 20 percent when unit values are used instead of prices.

One detailed experiment compared both unit values and price opinions against a standard of prices gathered by surveying local stores and markets (Gibson and Rozelle, 2005). These market surveys were argued to provide a good standard in their setting (Papua New Guinea) because there is no haggling, local markets are well defined and geographically separated, and there is not much quality variation amongst goods across the various markets. The price opinions were obtained by showing respondents in the sampled households photographs of a variety of different items and asking them their opinion about the price of the same items in local markets. Other surveys, such as the IFLS in Indonesia, obtain data in a somewhat similar way but only ask key informants (such as the head of the local women's group) rather than all sampled households and don't necessarily use photographs to aid the recall.

The results of this experiment show that estimated poverty rates are considerably overstated when unit values are used to construct the poverty lines. For example, when unit values are used the head-count index is estimated to be 28 percent rather than the actual figure (based on market prices) of 22 percent (Table 4). This difference is statistically significant. In contrast, when the price opinions are used, there is only a slight overstatement of the poverty rates. The price opinions in this experiment took about two hours per cluster to collect, which was somewhat shorter than the time taken to gather the prices from local stores and markets. Thus, relying on informed opinions about prices may be an economical and reasonably accurate way of obtaining local prices, although more experiments would be needed to establish this.

Table 4: Poverty measures with different method of collecting prices, Papua New Guinea, 1996

Cost of poverty line food basket calculated from:	Headcount index	Poverty gap Index	Poverty severity index
Market prices	22.0	5.9	2.4
	(2.4)	(0.9)	(0.4)
Unit values	28.0	8.0	3.4
	(2.6)	(1.0)	(0.6)
Price opinions	23.8	6.8	2.8
	(2.5)	(1.0)	(0.5)

Source: Gibson and Rozelle (2005).
Note: The poverty estimates are in terms of adult-equivalents. The unit values have been purged of quality effects using a regression. Standard errors in ( ) are corrected for the effect of clustering, sampling weights and stratification.

The final choice, of relying on existing price collection efforts, is unlikely to work in many settings. The Consumer Price Index in many countries relies almost solely on urban prices, so these would not be applicable for calculating either poverty lines or spatial deflators and for imputing the value of consumption for rural households. Moreover, as explained above, the commodity weighting in a CPI is much more towards the consumption pattern of richer households, so the index values are unlikely to be relevant to poverty-related analysis.

Given the need for price data and the concerns about both unit values and relying on existing price collection efforts, it would be worthwhile for statistical agencies to invest more effort in gathering prices from local stores and markets and opinions about prices when their household surveys are fielded.

5.4 Assessing individual welfare and poverty from household data

Poverty is experienced by individuals, but information on total consumption can only be collected from households. While individual income data are regularly collected, they are not useful for poverty measurement until further assumptions are made about sharing within households. Thus the usual method of measuring poverty is to count the number of (or sum the poverty gaps for) people whose collective household consumption expenditure (or income) is below the poverty line. Results may be presented on an individual basis by weighting by household size. But the calculations are still fundamentally household-based. The disconnect between the level at which data are collected compared with the level at which analysis is desired raises two questions:

- Are there reliable methods of observing whether some types of individuals within households, such as women or the elderly, are poorer than others in the same household?
- How should adjustments be made for differences in household size and composition when determing individual welfare and poverty status based on household data?

The literature on intra-household inequality addresses the first issue. This literature has yet to make much impact on the activities of statistical offices, partly because of the practical difficulties involved. The second issue, which is addressed by the literature on equivalence scales, is more widely recognised by statistical offices. Indeed, approximately 30 of the countries providing metadata in the Statistical Addendum make some allowance for equivalence scales when setting poverty lines and measuring poverty. Because of this wider use by survey agencies, and also because equivalence scales have a longer history, they are discussed first.

5.4.1 Equivalence scales

A common method of taking account of households of differing size and composition is to convert each household into a number of equivalent adults, N_e, using a formula like:

$$N_e = (A + \varphi C)^{\theta} \qquad \varphi \le 1,\ \theta \le 1 \tag{9}$$

where the household is comprised of A adults and C children. The parameter φ is the adult-equivalence of a child, and the parameter θ reflects possible economies of scale favoring larger households due to the allocation of fixed costs (such as heat and light) over a greater number of people. For example, the Luxemburg Income Study calculates adult equivalents by taking the square root of household size, so φ=1 and θ=0.5. In developing countries, per capita consumption (or income) is widely used as the welfare measure, so φ=1 and θ=1. This implicitly assumes that it is as costly to provide for a child as an adult, and that the cost of living for, say, ten people is ten times the cost for one person. Both assumptions are likely to be contentious.

It would be desirable to have simple and reliable methods for estimating φ and θ. However, empirical data alone cannot reveal equivalence scales. For example, knowing the consumption patterns for households with different numbers of children is not enough information for estimating child costs, φ. As Pollak and Wales (1979, p.216) note:

> "The expenditure level to make a three-child family as well off as it would be with two children and $12,000 depends on how the family feels about children. Observed differences in the consumption patterns of two- and

> three-child families cannot even tell us whether the third child is regarded as a blessing or a curse."

More formally, the problem is one of under-identification. It is possible to construct two different cost functions that a household faces to reach a given utility level and derive the same demand function from each one (Deaton, 1997). These different cost functions can embody different attitudes of parents toward their children and different elasticities of cost with respect to household size. Accordingly, observed demands do not provide sufficient information to identify either the costs of children or their related economies of scale.

Additional assumptions are needed to identify equivalence scales from observed data on household consumption patterns. One approach is based on what is sometimes called Engel's second law, the assertion that the food share is an inverse indicator of welfare across households of different sizes and compositions. There is no theoretical justification for this Engel approach. Moreover, its empirical results are highly sensitive to the measurement errors associated with certain data collection methods (Gibson, 2002). Thus, even though the approach is sketched below, it is not recommended.

Another approach is known as the Rothbarth method, where identification is obtained from the assumption that adults' standard of living is indicated by the value of expenditure on "adult goods" (goods not consumed by children). This approach can measure the costs of children but not economies of scale. The equivalence scales from this method are typically smaller than those calculated from the Engel method, which is known to overstate the costs of children (Nicholson, 1976).

A third method compares the recommended daily allowances of nutrients, and especially calories, for different age and gender groups to determine the adult equivalence of a child. This assumes that relative food needs for children are the same as relative non-food needs, which seems unlikely. Moreover, some controversy surrounds the definition and use of nutrient requirements because it is not clear whether the lower requirements for, say, women reflect lower needs or just the adaptation to receiving less by a historically discriminated-against group (Sen, 1984).

Given these limitations, an appropriate goal for many statistical agencies may simply be to use equation (9) to carry out sensitivity analyses, trying different values of φ and θ to see whether any conclusions reached previously using per capita consumption are overturned. This approach has highlighted, for example, that people in widow-headed households in India are more likely than people in other households to be poor only if economies of scale are important (Dreze and Srinivasan, 1997). Thus, conclusions about gender and poverty may have to be conditioned on assumptions about economies of scale.

An important detail when using equivalence scales, either for sensitivity analysis or for the main poverty calculations, is that the scales should be applied symmetrically to both the poverty line and the welfare indicator. This follows from the fact that the poverty line is just a point (or a threshold) on the distribution of the welfare indicator, and thus should be subject to the same measurement definitions. An example of this point is provided in Table 5, based on results for Papua New Guinea where the main analysis was based on equivalence scales with φ=0.5 and θ=1, and with children being defined as those aged from 0-6 years.[40]

Table 5: Effect of Assumptions about Adult Equivalence and Scale Economies on Calculated Poverty Rates in Papua New Guinea

Adult equivalence	Scale economies	Mean expenditure[a]	Poverty Line[a]	Headcount Poverty Rate		
				National	Urban[b]	Rural[b]
With no adjustment to poverty line						
φ=0.5	θ=1.0	911	399	30.2	11.4 (5.7)	33.5 (94.3)
φ=0.5	θ=0.5	2173	399	3.7	0.4 (1.7)	4.3 (98.3)
Adjusting the poverty line						
φ=0.5	θ=0.5	2173	1016	30.2	6.5 (1.3)	34.4 (6.7)

Note:
[a] In Kina per year per adult equivalent (or *effective* adult equivalent) when scale economies are assumed.
[b] Shares of national poverty in ( ).
Source: Authors calculation from Papua New Guinea Household Survey data.

If scale economies are introduced by just dividing household expenditure by $n^{0.5}$ -- the effective number of adult equivalents – the estimated poverty rate falls dramatically from 30.2 to 3.7 percent. The reason is that the effective size of all households with more than one member (99.5 percent of the population) falls, giving apparently higher living standards to almost everyone. This approach is flawed. The poverty lines are based on the consumption patterns of households with an average of almost six members. The poverty

[40] The estimate of φ=0.5 was the (rounded) average of the results from using the Engel and Rothbarth methods and the Recommended Daily Allowance of calories for children and adults (World Bank, 1999).

lines would be higher if they were just based on single-person households because of the diseconomies of living alone.

Ideally, all calculations used to derive the poverty line should rely on the same equivalence scale applied to the welfare indicator. But in the absence of this comprehensive approach, the poverty line may be adjusted in the following manner:

(i) find a household of average size and composition whose per capita expenditure is equal to the poverty line, and

(ii) set the adjusted poverty line equal to whatever value their per-effective-adult-equivalent expenditure becomes after the introduction of the equivalence scale.

This rule ensures that a household of average size and composition remains above or below the poverty line irrespective of the choice of equivalence scales (Dreze and and Srinivasan, 1997). In the example in Table 5, this adjustment raises the poverty line from K399 to K1016, and the national poverty rate returns to the previously calculated level of 30.2 percent.

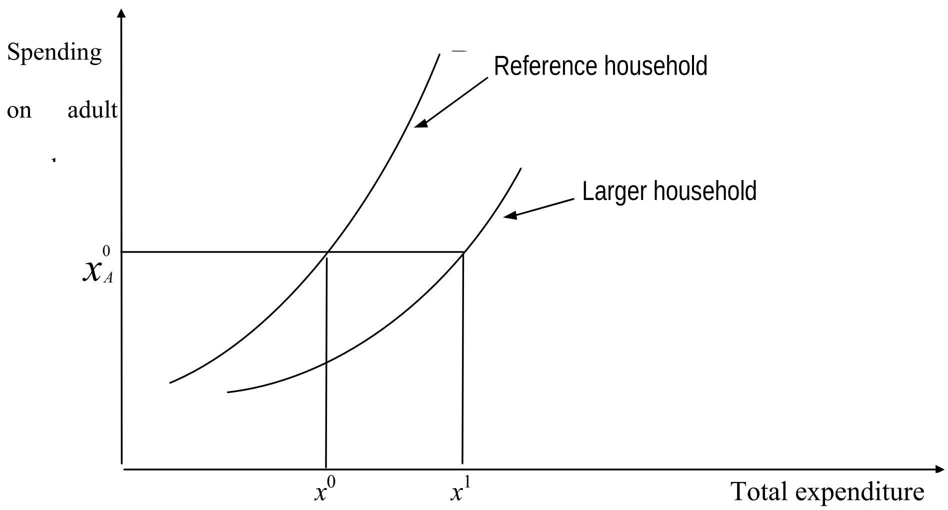
Once a similar equivalence scale is applied to both the welfare indicator and the poverty line, the main effect of assumptions about child costs and scale economies should be to alter the poverty profile, rather than the aggregate poverty measurements. The poverty profile for any characteristics associated with differences in household composition and size, such as sector of residence, and the age and marital status of the household head are likely to be sensitive to assumptions about equivalence scales. Thus, in the example in Table 5, the introduction of scale economies reduces the share of poverty in urban areas from 5.7 percent to 3.3 percent because urban households are larger than rural households (7.0 versus 5.7 residents).

5.4.2 The Rothbarth method of measuring child costs

The Rothbarth method of measuring child costs starts, somewhat paradoxically, with expenditures on goods that are not consumed by children--for example alcohol, gambling, and tobacco. Expenditures on these goods should fall when children are added to the household. Children bring additional consumption needs without any offsetting increase in income so there is effectively less income available for the adults to spend on these "adult goods". Moreover, unlike other goods such as food, it is possible to rule out a direct demand effect causing increased spending on these goods since child don't gamble, smoke, and drink alcohol. Therefore, the cost of a child can be measured by calculating the amount of compensation that would have to be paid to parents to restore expenditure on adult goods to the former level before the child was added to the family.

The Rothbarth method is illustrated in Figure 3, showing the relationship between total household expenditure and expenditure on adult goods. Spending on adult goods rises as total household expenditure increases, according to the schedule AB. For a reference household composed of two adults, total expenditure is x^0 and adult goods expenditure is x_A^0. In comparison, a two-adult and one-child household spends less on adult goods at the same level of total outlay because of the competing needs of the child. The household would require total outlay of x^1 to restore adult goods spending to its previous level. Thus, x^1-x^0 is the cost of the child and its adult-equivalence is $(x^1-x^0)/(x^0/2)$.

Figure 3: Rothbarth method for measuring child costs



A major difficulty in implementing this method is finding a set of valid adult goods. It is essential to first specify the appropriate consumption categories when designing surveys. This means, for example, separating adult clothing from children's rather than men's from women's. But even with a good number of candidate adult goods, it is necessary to test that they meet the appropriate statistical requirements.

One test uses the insight that because the child acts like a reduction in income, the reduced expenditure on each individual adult good ought to be in proportion to the marginal propensities to spend on each good (Deaton, 1997). This test can be implemented using the concept of an "outlay equivalent ratio" (also used below in the discussion of intra-household inequality), which can be obtained from an estimated regression of the budget share equation for a good:

$$w_i = \frac{p_i q_i}{x} = \alpha_i + \beta_i \ln(x/n) + \eta_i \ln n + \sum_{j=1}^{J-1} \gamma_{ij} (n_j/n) + u_i \tag{10}$$

where the product (of price and quantity) $p_i q_i$ is the expenditure on good i, w_i is its budget share, x is the value of total household consumption expenditure, n is total household size, n_j is the number of people in the j^{th} demographic group, and u_i is a residual. Coefficients from equation (10) can be used to calculate outlay equivalent ratios for each good:

$$\pi_{ir} = \frac{(\eta_i - \beta_i) + \gamma_{ir} - \sum_{j=1}^{J} \gamma_{ij} (n_j/n)}{\beta_i + w_i} \tag{11}$$

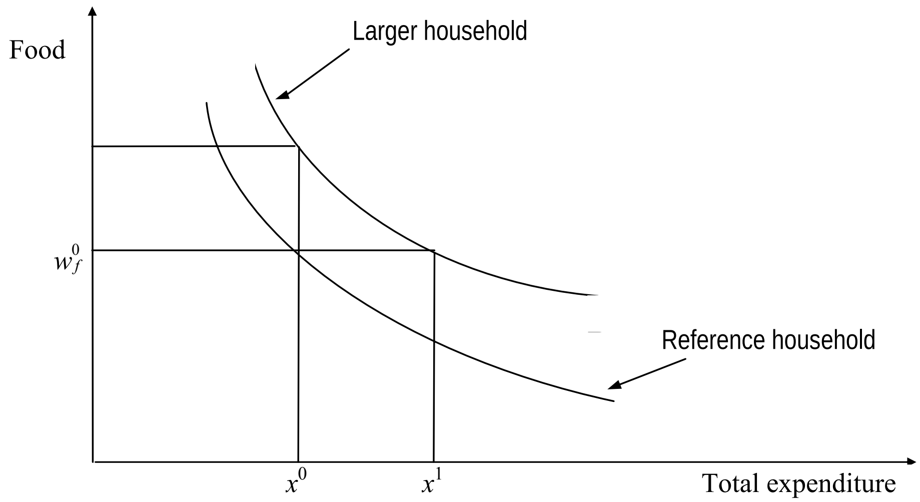
(sample means can be used for the w_i and the n_j/n ratios). The ratio, π_{ir} measures the effect of an additional person of type r on the demand for good i in terms of the percentage change in outlay (expenditure) per person that would have been necessary to produce the same effect on demand. For any particular type of child group (say, 0-6 year-old boys) the outlay equivalent ratios should be the same across a set of valid adult goods (subject to sampling variability).

Once a set of adult goods have been identified, equation (10) can be used to find the budget share and expenditure on an adult good for a reference household. In principle, this can be calculated with a single adult good. But improved statistical precision may occur if all of the valid adult goods are aggregated into a combined category. The equation is then used to recalculate the adult goods expenditure after a child is added to the reference household. The final step is to calculate how much household total expenditure would have to increase to restore adult goods expenditure to its initial level. For example, a poverty assessment in Papua New Guinea used this approach and found that adding an older child (7-14 years of age) to a 2-adult household would require a 31 percent increase in total expenditures to restore adult goods expenditure to their previous level (World Bank, 1999). Thus, the adult-equivalence of an older child was approximately 0.6 of an adult.

5.4.3 The Engel method of measuring child costs

Figure 4 shows how the Engel method works. The food share is plotted against total household expenditure for a reference household with two adults and for a household that also has a child. At any given level of total expenditures, for example x^0, the household with children has a larger food share than does the reference household. Assuming that the food share is an inverse welfare measure across household types, individuals in the household with children appear worse off. The household with children would need total expenditures of x^1 to have the same food budget share, and thus the same welfare level as the reference household. Therefore, x^1-x^0 is a measure of child costs and the adult-equivalence of a child is $(x^1-x^0)/(x^0/2)$. This can be worked out from the parameters of a food Engel curve like equation (10).

Figure 4: Engel's method for measuring child costs



The Engel method overstates the cost of children. The family's food budget share will rise even if the parents are given the exact amount of money needed to provide for the child while maintaining their own consumption. The rise in the food share occurs because the child's consumption is concentrated more on food than is the consumption of the parents. But under the logic of the Engel method, this rise in food share indicates a need for further compensation, which amounts to an over-compensation (Nicholson, 1976).

5.4.4 The Engel method of measuring scale economies

Larger households devote more of their budgets to food than do smaller ones, holding total outlay constant. In this respect, they are like households that have children (whose consumption is concentrated more on food than is the consumption by adults), so the Engel method of measuring child costs is readily adapted to the measurement of scale economies. For example, the approach illustrated in Figure 4 could be extended by plotting a family of Engel curves and calculating the extra expenditure (x^k-x^0) needed for households of size n^0+k (where k=1,2,3,…).

The regression approach in equation (10) can also be adapted, using n^θ instead of n as the measure of household size. Thus, if x^0 is the outlay of a one-person household, an n-person household of the same composition needs a total outlay of $x^0 n^\theta$ to have the same food share (and the same welfare level, by assumption). For example, Lanjouw and Ravallion (1995) estimate θ to be 0.6 in Pakistan, so if 10 individuals formed a 10-person household, their per-capita food spending could decline by 60 percent and according to the Engel method they would still have the same level of welfare ($10^{0.6}$=3.98). These large estimates of scale economies have attracted some criticism because they imply improbably large reductions in food spending by consumers in a poor country with considerable under-nutrition (Deaton, 1997).

Unfortunately, the Engel method makes no more sense for measuring scale economies than it does for measuring child costs. Consider a larger household with the same per capita expenditures as a smaller household. If there are scale economies, the larger household is better off. Thus, according to Engel's second law, the larger household should have a lower food share. But a decline in the food share with constant per capita expenditures can occur only if there is a decline in food spending per person. It is very unlikely that people who are better off would spend less on food, especially in poor countries where nutritional needs are not being met.

In addition to this conceptual problem, the Engel method does not give robust empirical estimates of scale economies. In an experiment in Port Moresby, the capital city of Papua New Guinea, the Engel estimate of θ was 0.76 (and not statistically significantly different from 1.0, implying no scale economies) for a half sample whose expenditures were surveyed with diaries. However, in the other half-sample, where a recall survey was used, the Engel estimate of θ was 0.41, implying large economies of scale (Gibson, 2002). This evidence is problematic because estimates of scale economies should not depend on the method used to gather expenditure data. The conceptual and empirical problems with the Engel method suggest that it is a statistical tool that should not be used for poverty measurement.

5.4.5 Adjusting poverty statistics when adult equivalents are units

Poverty gap measures may need modifying when the welfare indicator and poverty line are measured in adult equivalent rather than per capita terms. The standard FGT formula uses the number of people, N, and the number of poor people, Q: $P_1 = \frac{1}{N}\sum_{i=1}^{Q}\left((z-y_i)/z\right)$. The monetary poverty gap can be calculated as: $P_1 \times N \times z$, but this will exaggerate the cost of closing the gap when adult equivalents are used.

For example, consider a two-adult and two-child household with total annual expenditure of $1,200. The poverty line is set at $500 per adult equivalent, and children count as 0.5 adults. Comparing expenditure per adult equivalent ($400) with the poverty line indicates an average gap of $100 and a P_1 measure of 0.2. If P_1 is multiplied by $N \times z$, the aggregate value of the poverty gap will appear to be $400. But in fact it is only $300. One way to prevent this overstatement is to estimate all poverty measures using adult equivalent numbers rather than person numbers, even though these may not be the most familiar units for communicating the results. An alternative is to use correction formulae suggested by Milanovic (2002).

5.4.6 Methods for estimating the intra-household allocation of consumption

Several procedures have been suggested for using household data to see if some types of individuals are poorer than others within the same household. There has been limited success with these procedures, and it is likely to be several years before statistical offices would consider routinely applying them. Nevertheless, greater awareness of these procedures may be helpful, especially if it leads to the collection of data that are better suited to the needs of these methods.

In the Rothbarth method of measuring child costs discussed above, children exert negative income effects on the demand for adult goods. If some types of children have larger income effects than others, it may provide evidence of a gender bias within the household. For example, if outlay equivalent ratios (see equation (11)) are more negative for boys than for girls, this suggests that parents cut back their own consumption more when a boy is added to the household than when a girl is added (Deaton, 1989).

Unfortunately, most applications of the adult goods method have produced puzzling results, sometimes finding bias against girls in locations where it is not expected and no bias in places where other evidence strongly suggests that boys are favoured (Deaton, 1997). It is possible that part of this failure reflects the coarseness of the data collected in many household surveys, which have rather few adult goods disaggregated. In one of the few applications where the method worked as expected, the questionnaire had contained a set of well-defined categories for adult goods because the test for gender bias had been planned when the data were collected (Gibson and Rozelle, 2004).

It is harder to study unequal allocations between adults because differences in demand – even if observed at an individual level – may just reflect differences in preferences. These differences in preferences can be ignored when the adult-goods method is applied to children who exert only income effects (because they don't consume the goods themselves). Some headway in identifying "sharing rules" for the allocation of consumption between adults in the same household has been made by Bourguignon and Chiappori (1992). They identify the sharing rule using either "assignable goods" or "exclusive goods". An assignable good is a private good (that is, a good where the consumption by one person subtracts from the consumption of another) whose consumption by each member of the household can be observed. An exclusive good is a private good used by only one member of the household. Progress in applying these methods may be aided by household surveys that use diaries for each adult, rather than household level reporting, and that also collect information on whether purchases are destined to be consumed by the purchaser (the diary-keeper) or someone else (Browning et al, 2003).

5.4.7 Collecting non-monetary data on individuals to estimate gender-specific measures of poverty

Most household surveys collect information on non-monetary welfare indicators such as education and, less frequently, health. These data are usually collected for each individual in the household and offer the possibility of assessing individual poverty, at least in a non-monetary sense. Comparisons of educational attainment and participation for women relative to men are regularly made with such data. Comparisons of health status can also be made, especially using anthropometric data. It has also been claimed by Case and Deaton (2002) that self-reported data on health can prove useful.

In these surveys of self-reported health, respondents are asked to rate their overall health status on a 5-point scale, ranging from “excellent” to “poor.” There can be a considerable amount of adaptation to poor living conditions, which hampers comparisons of self-rated health across communities and countries. But within individual communities, comparisons are not affected by this adaptation, and these comparisons suggest that women’s self-rated health is worse than men’s (Case and Deaton, 2002). At least in the short-run, there may be more success at understanding the gender dimensions of poverty using broader health and education measures than there is from attempting to untangle consumption of individuals within the household.

5.5 Conclusion

This chapter described some of the methods and data available for measuring poverty with cross-sectional household surveys. These surveys are the workhorse of poverty analysis, in part because all countries have at least one cross-sectional household survey of one type or other. Many of these surveys were not originally designed with poverty measurement as a key aim and have certain features, such as short reference periods and limited topical coverage, that limit their usefulness as a source of data for understanding poverty. However, some modest modifications of survey practice that are suggested in this chapter could improve the quality of poverty measurements coming from these surveys.

Another theme of the chapter is the need for consistent survey methods so that poverty comparisons uncover real changes in the population rather than artifacts that are due to variation in survey design. Examples from India and Cambodia show how large the effects seemingly minor variations in survey design can have on poverty estimates. It would be a welcome addition to current practice if all statistical agencies carried out detailed experiments to assess the effect on measured poverty rates when they change survey methods, so that adjustment factors can be calculated and robust poverty trends retrieved.

Sensitivity of poverty estimates to variations in survey design also highlights the importance of measurement error. A previous emphasis on means and totals as the statistics of interest may have lulled some survey agencies into a belief that random measurement errors do not matter so long as they cancel out. However this is not true in the context of poverty and inequality measurement. Accordingly, statistical agencies should increase the efforts made to improve the accuracy of their household survey data.

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CHAPTER VI. STATISTICAL ISSUES IN MEASURING POVERTY FROM NON-HOUSEHOLD SURVEYS SOURCES

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Introduction

This chapter provides an overview of the wide range of non-household survey and administrative data sources often on hand to amplify a broader understanding of poverty and the poor. This information can help describe the social context and type of society that preserves such conditions among low-income households. It highlights the multi-dimensional nature of poverty and the different situations people encounter as they try to escape poverty. The discussion explores the possibility of supplementing the deductive analysis permitted by a scientifically-designed household sample survey, where conditions observed are formally extrapolated to a predefined universe, to provide a greater understanding of the population under investigation. Such household survey information can then be complemented with related official indicators and less conventional data drawn from less rigorous and formal inductive survey procedures.

Household-based surveys, both cross-sectional and longitudinal, provide important economic and social information about the human condition. Cross-sectional surveys tend to inform on the nature and status of individuals and the households they belong to. Longitudinal surveys reveal how people are affected by, and adjust to, changing circumstances over time. But such surveys are imperfect instruments of inquiry because they suffer from varying and often indeterminate item expenditure non-response as well as household unit non-response. The data collected in household surveys are also subject to observation and measurement errors. Most importantly, they sometimes fail to pick up key information at the extremes of spending lifestyles because their scope misses out certain consumption behaviour of very poor and very rich households. Data compiled from conventional household surveys thus need to be supplemented by information collected about individuals from additional and, in some cases, with more comprehensive and extensive coverage but less detailed questions.

Researchers are willing to relinquish some of the benefits of a standard survey (based on recognized probability sampling methods that generate known means and standard errors of the estimates) because they can trade them off against a more qualitative approach that tries to touch on relationships and identify the purposes behind individual activities. Adoption of qualitative survey methods offers the opportunity for more penetrating insight into how certain groups of people behave and respond to different socioeconomic stimuli and policy initiatives. With inductive approaches of this nature, the primary problem is to identify the appropriate universe to which the observed characteristics of the selected sample apply. The procedure recognizes the advantages of advancing non-scientific methods to reduce the non-sampling errors (at the expense of introducing an unknown sampling error) and to amplify the underlying picture and provide greater in-depth knowledge about a given situation.

6.1 Prospects for expanding the poverty Database

Apart from improving household survey methodology and significantly extending data coverage, the primary means of expanding the Database is to amplify and strengthen survey findings with routine administrative data collection procedures and to bring in alternative survey sources. Expanding already complex multi-topic household surveys is proving to be increasingly expensive, and extending these surveys involves, in many instances, implementation of an even wider multi-facetted approach.

Administrative information is required to provide a comprehensive perspective and to give specified contextual population relevance to the more detailed survey findings. Combining administrative records and survey sources can throw clearer light on a problem and its multiple dimensions. Introduction of official data from regular reports provides analysts with the ability to monitor more consistently what is transpiring on an annual basis. In the case of poverty analysis, this may be especially relevant if the characteristics of the poorest households, such as their size, age and sex composition, as well as the nature of their habitation and where they live and, indeed, how they use this asset, is markedly different from the majority of households covered in a traditional survey.

It is increasingly accepted, though not yet common, to supplement the results from national household surveys with other useful information, mostly of an official nature, that is currently available ‘off-the peg’ from existing files and documents and from special searches of other sources. Administrative files provide a first line of potentially useful information in this connection, especially in those instances where attention is paid by policy-makers to disadvantaged groups and where officials are required to monitor conditions and report on actions taken in this area. Importantly, from a statistical perspective, the sample for a general household survey will usually have been designed with objectives that do not focus specifically on obtaining, in an optimal way, key information about the poorest households in the community. Most surveys of this nature would require a higher sampling fraction for poor households [or, more precisely, of the areas in which such households are most likely to be found]. And this would have to be greater the lower the expected level of incidence or frequency of poor households. All this raises costs because it is rarely possible to lower the sampling fraction for the rest of the survey to compensate for the need to sample poor households more intensively.

If compromises are not made, like reducing topic coverage, then it is quite possible the authorities may decide to conduct such large-scale surveys less frequently and to rely increasingly on other sources of information. The same governments, however, will probably continue to demand annual updates of key national and, possibly, urban-rural data. They may also demand data on a more politically sensitive regional basis. For this, more comprehensive national data series, such as the national accounts and related indicators, will be required.

6.2 Limitations of Household Surveys for Poverty Assessment

Intangible institutional factors and cultural influences underline some of the difficulties that limit complete reliance on conventional household survey data to understand the extent and nature of poverty. Such surveys are also expensive and difficult to manage. They cannot be conducted every year in most developing countries, especially without substantial and continued outside support, and the continuity of monitoring is often lost.

Some observers have also questioned whether the unitary household, as initially defined by the census, and thus applied in all associated surveys, is entirely appropriate for all kinds of poverty research. For some purposes, the extended family may be more relevant, particularly when interpreting the production, consumption, and social protection activities of nuclear units and how each functions. Understanding the nature of the unit is important to understand intra-household transfers and different sharing mechanisms. In other circumstances, it is the individual who should be the main focus of attention. In the OECD, for example, there is considerable policy concern about child poverty. Low-wage employment and the relationship of household well-being to the unemployment or disability, whether permanent or transitory, of the head of the household are equally important social policy concerns.

An important limitation of the standard approach in connection with poverty inquiries is that a survey is not a very refined instrument for analyzing regional variations within households. If, with given resources and an expected error acceptance/tolerance level, the size of the survey has been predetermined and optimally designed to serve some more general purpose, and if the number of households thought to be poor represents, say, 20 percent of the total population, then the survey will not generate meaningful estimates of poverty characteristics. Nor will it provide, detailed, representative data covering different areas of inquiry and locations.

As indicated above, a significant limitation of the standard household survey is that it usually provides only a single (albeit important) snapshot of poverty as it pertains to a well-defined survey period. Policy analysts, however, are more interested in how poverty changes over time, particularly in response to various policy initiatives and the general increase (or decrease) in household incomes. Tracking changes implies a dependence on more regular reporting methods that arise as a by-product of routine administrative processes. The problem is then one of choosing the most relevant official indicators as proxies for changes in the substantive variable under investigation.

Some researchers have suggested use of a master sample with a defined frame that permits a number of related inquiries to be undertaken simultaneously or sequentially addresses the issue of multi-dimensionality. It would allow large surveys to be supplemented between years by much smaller surveys that are more specifically focused on poverty issues. While this is an alternative way of circumventing the difficulty of handling the above issues, the approach retains the overall integrity of the survey methodology and master sample framework, preserving the inherent consistency and comparability of the estimates. But it also poses its own set of problems. In particular, it is complex from an organizational standpoint, and it tends to ignore the practical difficulties of maintaining a comprehensive listing and of correctly and efficiently updating the required frame on a regular basis to achieve the desired level of coherence and sequential consistency.

From an international policy perspective, it is clearly desirable to have comparable data on poverty across countries to obtain a common overview of the problem and its characteristics. Although there are standard survey methods for computing difficult values like imputed income from self-production and income from home ownership, the absence, in practice, of a common international treatment of these issues and of a harmonized questionnaire and associated data collection procedures, hampers comparability. From a procedural standpoint, the pattern of non-response from responding households and their specific response ranges/levels on different issues varies between countries.

6.3 Integrating Different Data Techniques and Sources

For the above technical and practical reasons, delving into other official sources that concentrate on the conditions and status of individuals [instead of the households to which they belong] and bringing in other ‘topic specific’ survey approaches is clearly important.

Closer integration of quantitative and qualitative approaches through the selective combination of survey methods and administrative data sources is intended to provide a better and more comprehensive perspective on the scope of poverty. While no specific course of action is advocated, the potential of matching in-depth analysis and results offered by small well-focused samples and mapping the findings on to larger scientifically designed surveys and benchmark reference databases together offer one of the more promising ways to strengthen existing knowledge. Information gathered to enhance the policy-makers’ understanding of the varied and wide ranging issues involved in tackling poverty should allow them to refine the analysis and to place the required emphasis of action on specific regions and target groups at risk.

Adoption of mixed-method techniques usually means having to resort to different institutional sources and quite independent non-official inquiry methods. It implies a reliance on a wide variety of perhaps questionable data sources when bringing relevant information to bear on the poverty problem. Because they observe different mandates and have other defined objectives, many organizations may not focus primarily on poverty. Furthermore, because of the difficulties of balancing the conflicting demands of sample size, survey costs, and information requirements--and because they are not basically statistical agencies--some sources do not compile quality data. Nevertheless, provided care is taken to identify potential biases, researchers should not pass up the opportunity of making selective use of any readily available related information that cannot be gleaned from official sources.

Household survey results tend to be generated at rather infrequent [and usually irregular] intervals, whereas much of the administrative data on official files is reported annually and (like wages and prices) may be compiled at more frequent intervals. An important part of the survey story will relate to the non-market activities of the household sector. These activities are invariably less easy to quantify at the individual and household "use" level and need to be complemented with official data on facilities, service supply, and effective delivery.

Ability to draw together the micro and macro factors that impact poverty and to blend the material and non-material elements that comprise the market and non-market aspects of household behavior forms the basis of a more holistic perspective of the poverty problem. A comprehensive database can yield insights into intangible issues, such as differential access of households at different income levels to the opportunities, entitlements, and various forms of official service support open to the public.

The logical starting point is to review the miscellaneous kinds of information resources already available and make an assessment of how they can be used to give greater depth and background to the core household survey information. Practical experience in the use of such material will offer hints and suggest guidelines about how existing reporting procedures can be modified to make them more relevant and reliable. The main non-survey (administrative) sources and non-household survey methods that may be employed to broaden the approach and their limitations are described in more detail in the sections below.

In addition to the more variegated picture related data sources lend to any status evaluation, establishment of acknowledged benchmarks linked to the decennial census [and to any embedded sample census module], or that can be supported in the interim by data from a quinquennial partial census, enable analysts to obtain a reasonable idea about overall trends in poverty related to social and demographic change.

6.4 Multi-dimensional Nature of Poverty

Universal political consensus was achieved in 2000 on the core Millennium Development Goals [MDGs], together with the joint agreement between countries on a set of standard indicators and targets. These indicators were correspondingly established to assess progress towards the accomplishment of the eight major articles of international development policy. And there was national agreement to monitor them regularly. This consensus has given common direction to poverty inquiries, and greater global recognition to the diverse and multi-dimensional nature of poverty. The higher political profile given to poverty eradication has concentrated popular attention on relative deprivation and its possible causes. The MDGs underline the importance of looking more comprehensively at the combination of both material and non-material goods and services available for use by households to raise their general living standards. These commodities originate from market and non-market sources, and their consumption represents both the outcome of sovereign choice and the government's own contribution to well-being by supplying public goods and services designed to satisfy both individual and collective needs. In the developing world, this crucial provision of "free" non-market goods and services that are clearly valued and used by households, is also undertaken by NGOs. The MDGs have helped direct public attention to the imbalances between various sections of the population with respect to the disparities in lifestyles they experience, their comparative ease of access to public facilities, and their ability to gain a ready command over the range of public goods and services potentially available to them.

This section thus explores what respective data sources, beyond those of household surveys with an alleged national coverage and those utilized in the broadly based national accounts, should be sought to help expand knowledge about poverty--its incidence, severity, and extent. Relevance and reliability of additional data sources and their limitations, and the techniques adopted to exploit them, are discussed below. This appeal to the broader concept of data mining reflects a rapidly developing interest in this area of statistical analysis. It acknowledges that it is generally cheaper to review and take what is already available than to launch an entirely new survey, *ab initio*. However, changes in these formal sources may be similarly taking place as governments redefine administrative directives and departmental responsibilities in line with new policy objectives.

Detailed analysis of public sector accounts supplied by government for direct use by the population that identifies expenditures on goods and services – though it does not effectively assess how fairly these are delivered to intended recipients - is a prerequisite for understanding what the government spends and how well it has been able to respond to the needs of the people. The pattern and allocation of official spending may not necessarily correspond to the officially perceived needs of people. Given the existing scope of inequality, the ability of any government to carry out a poverty reduction policy, especially strategies that combine conventional economic growth and marginal income redistribution through taxation, can only be tested by seeing how far the extra resources generated in the economy are spent on improving those health and educational services available to the poorest households and regions.

The MDGs and their associated targets are shown in the annex of this Handbook. This listing begins the process of identifying and distinguishing between,

- those parts of the compact that are susceptible to direct action by the resident agencies with direct responsibility for such issues, and,
- those that depend on the national government to implement appropriate pro-poor macroeconomic policy or on international action that brings benefits.

6.5 Poverty Measures and the Millennium Development Goals

There are only two poverty measures that are directly defined in the MDGs. One is concerned with the scope of poverty (total number of poor people), the other focuses on the extent and severity of poverty. The depth of poverty reflects the degree to which poor people's incomes fall short, on average, of an officially recognized minimum threshold level. Even this measure does not identify all those households and families that societies normally regard as "living in the depths of poverty" or "on the edge of existence." So other classifications may be needed to distinguish, "the poorest of the poor." Traditionally, certain single measures--such as the extent of malnutrition or degree of unemployment among unskilled workers--have been regarded as key indicators of poverty. Selected indicators used to determine which groups go hungry are seen by many as defining whether someone can be regarded as poor or not.

6.5.1 Relevance of the MDGs

By drawing attention to the general aspects of deprivation, MDGs have underscored the wider multi-dimensional and inter-connected nature of poverty. Even the most casual empirical analysis cannot fail to notice that malnutrition, inadequate shelter, unsanitary living conditions, lack of clean water, poor solid waste disposal, low educational achievement combined with the absence of proper schooling, chronic ill health and widespread crime are salient features of poverty. Each of these facets needs to be quantified to determine the degree of poverty and assess the strength of poverty's inter-relationships with other characteristics that appear to sustain it.

A key problem is that independent statistical information on such matters--where it exists--is generally available only at the national level mostly from official administrative sources. To enhance their relevance, national data also need to be disaggregated by socio-economic category or, at the very least, by distinct locations small enough to assist in the identification of those belonging to constituent population groups. This will make it easier to see the problems poor people face and help investigate their specific levels of existence and patterns of living and thus help policy initiatives target needs.

Small area sampling procedures that can help examine these issues pose a complex range of technical, methodological, and practical questions, especially in relation to the frame and universe to which the studies refer. For the most part, smaller and specifically targeted socio-economic surveys are rarely conducted directly by national statistical offices [although some official studies may be outsourced]. This makes it difficult to fully integrate a small sample survey's results into an established national benchmark.

6.5.2 Significance of non-market goods and services

It is desirable to compile data not only about material living standards (where these can be seen primarily as the outcome of consumption preferences as revealed by the actual choices people make in the market), but also about how non-material goods and services are distributed among households. In the absence of suitable available files, such details have to be picked up from a variety of public and private sources of information. Compilation of indirect and partial data, collected mostly to serve miscellaneous bureaucratic purposes and record administrative actions and decisions, is important for building a more comprehensive picture of people's living conditions.

This information extends beyond simple calibration of an individual household's sovereignty over the market supply of consumption goods and services; it touches on the total supply of commodities on which value is placed by the community. To this should be added, in any overall assessment of poverty, data about the value of social benefits to which some households may be entitled and on social transfers they receive voluntarily on a fairly regular basis.

6.6 Problem of determining Causes and Effects

Are the identifiable features of poor living conditions and social deprivation the causes or effects of persistent poverty--or both? In the past, it was common for politicians to refer to “the vicious circle of poverty” because it was difficult to disentangle the endogenous from exogenous factors affecting the condition and thus to distinguish the initial cause and effect. But, it is widely assumed that general economic and fiscal policy [i.e., tax, subsidy and transfer actions as well as ministerial spending decisions] can together play a crucial role in this equation. A coherent fiscal strategy may be more relevant and probably more sustainable than a difficult-to-define ‘pro-poor’ growth policy. In other words, if it is the government’s intent to conduct a fair and equitable social policy that will pay special attention to the needs of the poor over the longer term, then it may not be necessary to distort the core thrust of economic policy and upset the basic quest for overall real income growth.

But, by the same token, government must maintain consistent oversight of where the progressive incidence of its taxes fall and monitor the socio-economic distribution of government expenditures destined for collective and individual household consumption.

This requires national statistical offices to prepare, in the interests of distributive social justice, beneficiary accounts that detail the allocation of government current expenditures, as well as the value of subsidies and transfers, that go to different groups of the society and how these benefits are paid for.

The logic of developing new approaches to data compilation to guide policy initiatives and that helps officials to gain access to information to explain the broader dynamics of poverty is self-evident. Most poor households possess few personal assets and enjoy only minimal and irregular income receipts. Continued low-income status of poor households can be viewed as the direct outcome of social and cultural factors, along with technological change that impinges on their employment conditions over which they have little control. This results in the casual and uncertain engagement of poor people in the economy. Their employment often generates only sporadic and variable income that is of limited value and typically not very fungible. Receipts can rarely fund more than the most immediate personal needs. And for other needs, households invariably have to resort to borrowing. Because of these tenuous and ill-defined links between consumption patterns, social status, and economic engagement of poor households, a fuller understanding of such issues as the scope and nature of unpaid farm work, and low-paid economic activity in informal ‘gray’ sectors, remains a primary objective of most statistical offices.

6.7 Data Mining from Additional Sources of Information

Conventional household surveys do not always provide all the appropriate information to set up comprehensive “scorecards” for households and scoreboards to help define priorities. Main administrative and non-official sources of data survey organizers and government officials can tap into amplify the socio-economic issues identified by household surveys and give suitable contextual relevance to survey findings described briefly in the following paragraphs. Trawling for any relevant information in each of these categories that can be meaningfully related to the common concern for better poverty measurement, nevertheless, raises some of its own data problems and issues

6.7.1 Quantitative sources

The majority of alternative and additional information, of a quantitative nature, tends to comes from official data sources. The following are the main categories:

A. Censuses, sample censuses, and partial censuses

Censuses of population and housing as well as of agriculture, industry and employment are regularly conducted by most governments, but usually at only ten-year intervals. A population census, in particular, can provide the most basic information on well-being and, for this reason, it has been chosen as the preferred data source for the unmet basic needs (UBN) approach to poverty measurement (see Chapter 4). With recent analytical advances, it has been possible to overcome the limited geographical coverage of household surveys by using census data in the construction of poverty maps and selected small area estimation techniques (See Chapter 7 for more discussion on poverty mapping techniques).

Census data can be disaggregated at very low geographical levels, unlike those estimated from household surveys where the limitations of coverage and sample size prohibit estimation of relevant population characteristics at this level. The degree in which geographical disaggregation is possible in data generated from administrative records is also limited by the initial records design and the way the bureaucracy is structured.). Most official files refer only to highly aggregated levels of population concentration such as provinces or districts that are politically determined or to even broader urban and rural regional definitions. In addition, given the broad topic coverage of the population census and the high sensitivity of social outcome measures (such as infant or maternal mortality and school enrollment) to specific government interventions and policy changes, population census data can (and should) be used to gauge the overall effectiveness of poverty-alleviating programs. The demographic and economic geography of poverty can be related to the availability and distribution of human and physical resources, evidence of which can often be found in reports of the heath and education sectors. (See, country examples from Latin America in Chapter 4).

Censuses and the technically imbedded in-depth sample census modules (which generate more detailed information) provide a rich source of benchmark data. However, the nature of the census organization and the coverage and timeliness with which the results are disseminated can seriously limit the usefulness of the results for detailed socio-economic analysis whatever the primary focus and subject of the inquiry. In these circumstances, the term ”partial census,” (while generally applicable to most industrial and agricultural censuses where the proportional selection of homogeneous smaller units is common) is used here to refer to interim national inquiries that are more limited in scope than the complete census and covers only certain core components of a conventional survey. For example, a quinquennial population census held between decennial benchmarks will tend to concentrate on the total population count and on the core demographic characteristics of indigenous citizens. For such broad enquiries, a 10 or 20 percent sample may be all that is required.

Population and housing censuses invariably serve as the primary source of basic reference information about a country’s population, its age and sex composition, family size, migration characteristics, locations where people live, and the nature of the dwelling units they inhabit. Similarly, enterprise-based industry and employment censuses [or, more usually, combined census and survey inquiries] provide evidence of job characteristics, skill and occupational levels, and main sources of family income.

However, total wage information in itself may be of limited value because what is really needed for poverty analysis is an individual profile of how wages are distributed to employees. More specific data relating to average weekly wage rates, wage earnings, and hours worked in different occupations—tracked by enterprise surveys--can go a long way to filling in knowledge gaps about households with a defined source of economic support. Subsequent analysis can go into how many might be living at or near the breadline, that is on the edge of subsistence, or close to some other officially defined poverty level. This source of information exposes the threats reliance on a unique local source of employment might pose to a household's sustainability.

Both farm- and land-holding-based agricultural censuses produce primary information about the sources of income in cash and kind that support rural households. They also provide other useful insights into the pattern of cultivation, occupations, and family characteristics, but not necessarily information about the actual engagement of family members in non-farm work within the household. Information about how household living standards are affected by off-farm employment of family members and how a household's status is also related to land ownership and tenure conditions is usually collected in an agricultural census.

As in most comprehensive studies of these kinds, the devil lies in the detail of a census and in the capacity of analysts to utilize the massive amount of detailed micro data on hand for linking the same households across areas of interest or in identically matching them. Such sources provide useful information about the characteristics of each household, the nature of their economic activity in a particular location, and how these socio-economic features differ both from place to place and over time.

All censuses are essentially area-based surveys. They are linked, one way or another, within a defined overall survey frame to geographically distinct enumeration areas that are identified in terms of population numbers, area size and housing density. The frame is designed to facilitate administrative management and organization of census operations, including enumeration tasks and actual physical collection of data. The listing of areas and households is thus not purposely defined with any specific survey objective in mind. Within this frame, housing units or farms can be identified as the basic units of inquiry and these lead the visiting enumerators to the identification of the separate households living in these units. Each household is comprised of individuals who are linked to each other in a more or less permanent social contract and in a formal economic way. Households are not necessarily families, and several households may inhabit the same housing unit. Sometimes, in a socially supportive environment, this may confuse and complicate the analysis of poverty and its incidence.

Information on the quality of the housing shelter and about the available living space is usually collected independently. In the past, this task was generally performed as much for the specific identification of housing units as to better understand why people were living in such conditions. Primary listing of units provides a first indication of the level of living of those inhabiting specific forms of shelter. Conditions of different households and their housing situations can be compared across the same enumeration area and also with other areas where households of the same size and with a similar age and sex composition live. Some researchers have attempted to link different types of households to a particular housing unit type.

Problems can arise, however, where some sections of the population do not belong to a defined housing unit or are periodically confined to institutions, such as hospitals, nursing homes, asylums and prisons. Others not listed may not have any fixed abode and thus regularly sleep [or 'doss down'] on the streets and in common public areas like parks and railways stations. Even countries like the USA have encountered these problems in census inquiries, and census officials around the world continue to face difficulties in correctly enumerating sub-groups like the homeless and illegal immigrants. This problem invariably results in the significant undercount not only of the population but also of the housing space problem. In many instances, these conditions are closely related to issues of poverty, access rights, and other forms of individual deprivation.

Population censuses will sometimes contain information about educational status (such as enrollment, qualifications gained, and level of schooling attained) and the number of years of education completed by different members of the household. Historically, some censuses have included individual questions about health status--physical and mental. But this is now much less common because the results have never been considered reliable. There is generally no way for a census enumerator untrained in health matters to check on the validity of the information provided about health status and medical conditions, even if the questions relate only to current health status and are directed to the nature of an evident complaint or permanent physical disability.

Population censuses or, more usually, the sample censuses imbedded concurrently with them, may also compile information on a person's declared occupation. This is not the same as his or her employment status, which is clearly relevant to a poverty assessment. And it does not provide an unambiguous indication of the industry in which the subject is engaged. The known existence of a particular industry or factory in that area, however, may afford some greater insight into a family's social standing and economic vulnerability. Additional data to amplify their situation can be collected from the industry directly if the rules of anonymity and confidentiality are properly observed.

Analysts can also resort to the more specific enterprise-based employment and wage censuses and regular surveys to provide information at the local level on income receipts and comparative economic well-being. Cross-matching such (grouped) data relating to individuals to monthly cost of living measures is straightforward. However, matching wage information to the customary housing unit-based census data is less easy, especially where, at the micro data level, a common link through occupational designation and employment status is not available from either source.

B. Ministerial reports and administrative records

A wealth of information on social welfare is available from administrative sources, but such data are primarily used for administrative budgeting and program implementation purposes. Use of administrative records for poverty estimation and analysis of the conditions of the poor is generally not done in the majority of poor countries. There are few exceptions, mostly in developed countries, where poverty is estimated from a register-based information system. For example, Denmark and the Netherlands measure poverty and its characteristics based on various administrative data relating to income (gross and net) from tax records, security benefits, disposable income, education, costs of living, housing situation, net housing cost, demographic, family and household characteristics, economic and social status. Administrative data is also used to identify expected sources of poverty, such as short- or long-term illness or disability, or long-term unemployment. (See: Rudolf Teekens, Bernard van Praag (1990) for more detail on these two examples.)

A common use of administrative records in poverty-related studies is to provide cross-checks of survey-based analysis. Administrative records from line ministries and related agricultural, community services, educational and health departments, usually contain relevant data for poverty analysis. Such sources can provide benchmark statistics to assess the plausibility of poverty estimates and changes in poverty levels through time.

An instructive example of validating poverty estimates using administrative data is given in Ravallion and Sen (1996) using data from Bangladesh. Applying agriculture yields and prices collected by the ministry of agriculture to assess the likelihood of change in household farm income, the authors found it was possible to identify conflicting results of poverty levels for various years through the 1980s. Key to the validation was consistency of the estimated changes in poverty with observed movements in real agricultural wages, with the latter having been seen as an important determinant of welfare for the rural poor.

Centrality of human capital in the fight against poverty has been researched extensively. It is widely recognized that indicators of human capability achievements, such as access to public health and education services, are poorly reflected in the traditional per capita income poverty measure. Non-income indicators, notably life expectancy, infant mortality, and primary school enrollments should be used to compensate for the limitation of relying solely on the income metric as an indicator of relative deprivation

Administrative records of health and education can provide useful proxies for constructing preferred indicators of social progress. Service records of health units, for example, contain relevant information on the general health status of individuals. More relevant to the characteristics of poverty are data on birth weights, the nutritional and immunization status of children under-five years old, all of which are customarily collected by midwifes and local nurses. Major support for these programs in different areas comes from agencies like UNICEF, UNESCO, WHO, the World Food Program, and FAO. Involvement of several of these agencies in other survey activities, such as the

MICS and DHS inquiries, helps ensure more comprehensive and reliable data are collated on the ground.

There has also been increasing advocacy for using health outcomes to more broadly gauge the success of economic development policy. It has been argued, for example, that mortality data have distinctive features for understanding the relationship between the economic and “capabilities” dimensions of poverty. Sen (1998) examined life expectancy in relation to GDP and income in selected countries and concluded that the links between GDP and life expectancy most likely work through the provision of public health care and poverty alleviation. (See also Anand and Ravallion, 1993 for similar findings.)

Sen’s analysis also provided support for claims that mortality statistics most adequately depict socioeconomic inequalities, including the gender and geographical differentials in poverty outcomes. While the link between economic and social aspects of poverty remains an observable feature in mortality data, inferential analysis based on mortality data is not straight forward. For example, both income and the availability and utilization of health care facilities are important determinants of life expectancy. Mortality data are established from both civil registration data and population censuses. Using these sources to identify poverty spots might only be possible if a lower level of geographical disaggregation can be obtained.

Similarly, education has long been an important component of development policy, and there is solid evidence that the lack of a critical mass of knowledge, skill, and collective education is almost universally implicated in persistent poverty. The highest level of education achieved by the head of the household is the single education indicator most often used in household survey-based poverty assessments and in socioeconomic profiling. This indicator does not tell analysts much about the overall education status of other members of the household or anything about the intra-household bias in access to education. Data on school drop-outs, teacher/pupil ratios, and expenditures per child are readily available from the ministry, but sometimes not by gender at lower level administrative localities such as districts. Linking such data to household-level data poses a major challenge to data analysts. This handbook highlights this point when discussing in the subsequent sections of this chapter the problems of reconciling aggregate macro data and micro indicators.

Policy-related data on the education and health of the population are compiled by the state through its responsible line ministries. Such information is collected in the performance of the standard routine administrative and supervisory functions of all bureaucracies and forms part of a regular reporting system. This official responsibility extends to the supervisory oversight of both public and private educational and health institutions and is designed to demonstrate that the ministries concerned are carrying out their duties responsibly in accordance with their defined mandate.

Apart from their specific reporting responsibilities, ministries and their departments are also subject to routine audits. These audits review how official funds are spent and consider "defined activity" or "performance" criteria. Such measures will usually include indicators like "number of students enrolled," "number of people registered on a doctors list," and "outpatients treated in hospitals." What is reported often does not line up with the data collected in the census because of matters of coverage, timing, scope and content.

Questions posed in these respective inquiries generally relate to different objectives, issues, and conditions. The number of pupils officially reported by the education ministry as being currently enrolled in a country or region at the beginning of a particular school year or term will not tally with the numbers declared to be "receiving education" at the time of the census, even when allowing for cohort adjustments. There is a large number of practical, psychological, social, and even economic reasons for this. The numbers will also rarely correspond with the scope and coverage of education data obtained from household surveys. Similar problems exist in administrative files relating to such matters as crime, particularly where data are separately reported by the police and by households. In the same way, information relating to public health, water supplies,[41] solid waste disposal and refuse collection, telephone connections, and electricity supply is usually generated by the providers .Information on use is less comprehensive.

[41] For example, the number of water connections does not imply that piped water is always available.

It is frequently difficult to account for all discrepancies in data drawn from different sources, and this may have something to do with the essentially unquantifiable "motivational" and "incentive" factors that affect how institutions report their information.

C. Civil registration systems and electoral registers

Civil registration lists can complement population census records and are often used to compile the annual updates of census records. Some systems go well beyond the customary continuous recording of births and deaths by nationality of the parents and location of the event. This information can be supplemented with the vital records of health departments and by migration, naturalization and visitor data that is usually compiled by one or more different agencies. Use of such data to give more detailed small area population estimates is limited to the extent that international and internal migration movements are poorly reported and information about permanent place of abode remains unreliable. Nevertheless, basic systems are widely used to compile the age-specific mortality rates, fertility and reproduction rates, and life expectancy estimates that are crucial to understanding vital events and population dynamics. These data are essential for the effective planning of national and regional health and education programs, many of which will be targeted towards the more disadvantaged groups in society.

In many developing countries, however, the International Association of Official Statisticians [IAOS, a branch of the ISI] has made note of complaints that registration data are incomplete and regularly reveal evidence of significant under-reporting, especially of vital events in the rural areas and remoter regions. Where countries maintain national identity systems, the quality of recorded data may be more current and reliable. But it may also be incomplete as a register of the total population if non-indigenous and recent migrant groups are treated separately. Other common civil registration systems include electoral registers that provide location specific listings of all adult citizens eligible to vote. Some of the persons listed may no longer be present in the area, and certain residents will not be included because their residency does not permit them to vote. While providing accurate address information, the list will clearly exclude all those under the voting age.

Perhaps more relevant and useful databanks are the various tax registration systems, the most important of which is the inland revenue income tax data pertaining to individuals. The most obvious problem here is that these lists--even if they were to be made publicly available--would leave out the vast majority of poor individuals and their households. In a consolidated form --which is the most likely format in which such personal data might be published--the information might be useful only in reflecting the broad shape of the overall income inequality in the community and in showing up income disparities by location.

However, it is unlikely to reveal much about poverty status. Information collected by the tax authorities is notoriously defective and respondents invariably try to conceal the true extent of their income. This is especially the case where there are many self-employed persons among the economically active population and many others working on the land. Furthermore, where there is a thriving level of informal cash-based economic activity in urban areas, there will also be significant under-recording of incomes. Users are thus aware of the lack of useful registers for dealing with certain more acute social issues, and many know that those which are available are frequently incomplete and unreliable data sources. More important, proliferation of official lists may reflect the lack of co-ordination between the statistical system and administrative management.

D. Core Welfare Indicators Questionnaire [CWIQ]

The "Core Welfare Indicators Questionnaire" (CWIQ), developed in the World Bank, is a good example of a well-established standard survey procedure that began with listing characteristics and classifying attributes rather than measuring variables. The methodology is a cross between quantitative and qualitative survey techniques that recognizes the significant link between household asset "ownership" [in an inclusive sense to incorporate access to public facilities and services] and levels of living. The approach uses electronic scanning techniques to capture information not only on the assets and background living conditions of households but also, in recent surveys, on the current availability of community services.

The CWIQ was designed initially to provide a reasonably cheap, quick, and comprehensive method for capturing the status and main characteristics of households and to determine their access to personal assets and physical facilities that could help raise their basic living standards. The approach has obvious relevance to features of social exclusion. The latest surveys have begun to draw attention to the significance of "civil society" to the maintenance of household well-being within the community. The CWIQ uniquely combines micro characteristics at the household level with the virtues of a simple "contextual" survey, helping to provide details on matters that distinguish one community and its household living standards from another. The procedure has been progressively developed so that it now has the capacity, in the shape of the CWIQ "Plus", to capture not only the different attributes of households but also certain quantitative characteristics, including some of their principal expenditures.

In Tanzania and, as currently planned, in Sudan, the CWIQ approach has been also applied to a wider community context. A version has also been used in Uganda to evaluate and monitor development programs. Users are recognizing that implementing a large national survey (that offers extensive coverage of local communities) with a complementary household module is an effective way to identify household poverty in various locations. The approach can also reveal the potential vulnerability of other households and their risk of becoming poor.

There are several reasons why the above broader based CWIQ approach may prove valuable and evoke wider interest, especially in poorer countries. First, the greater amount of relevant information relating to communities has strengthened the capacity of the decision-makers to allocate social funds to various community projects and to do so on a more meaningful and effective basis. Although, in many instances, both advantaged and disadvantaged households will stand to benefit, a number of projects can be designed specifically to help distinct population sub-groups such as women or youth groups.

Second, the CWIQ can help develop policy that recognizes various local needs, including an ante-natal clinic, secondary educational services, and agricultural extension services,, and identifies substandard services. On the surface, the CWIQ may not be able to say too much about individual entitlements and the varying degree of access of different households to different public facilities and services, often due to intangible institutional and social reasons. But the use and frequency of utilization of these community assets can serve both as a proxy for satisfaction, such as in the case of a library, and as a way to assess need, as in the example of a health clinic or playschool.

Developed as community level studies, the CWIQs are able to identify the various features found in particular societies, communities, and village groups that reveal differences in income and poverty levels. As with household studies of the same genre, it is assumed these differences are related to the possession of useful socio-economic assets valued both by households and the community--such as a hall to meet, a market place, a school, a church, a wharf, and warehouse. Assets held by the households themselves, such as bicycles, cooking pots, radios and TVs [to receive information], and telephones, help improve household living standards and access to the community. This expanded focus of interest has coincided with an emerging belief in the importance of "civil society" in raising the overall living standards of people and enhancing their development prospects.

The CWIQ "Plus" initiative collects data on more quantifiable aspects of household behavior, including consumption and the explicit expenditure patterns of households. In the beginning, adoption of a simple electronic scanning process as the technical root of the CWIQ's evaluation procedures meant the collection of actual numbers was not possible. But as appropriate software has become available, it is now possible to collate summary quantitative data. These can be compiled to provide reasonably accurate information on outlays and values. This facilitates relevant analysis of the community context of poverty as related to consumption patterns of households and individuals. In this broader approach, some useful "explanatory" information may be obtained. As a survey instrument, the CWIQ Plus is not able to offer everything collected by a standard household survey. But it has the potential of gathering data more quickly and providing a broader perspective and coverage for less cost, and the means to replicate similar studies.

Moreover, information collected in a community enhanced CWIQ may reflect the overall quality of comparative local and national governance and say something about households' sense of belonging and feeling of security across various parts of the country. Although the links are often intangible, the satisfaction of core needs is undoubtedly related in part to the presence of social capital. Careful development of this survey 'model' can clearly help in the planning of public operations and in improving the delivery of government services. This augurs well for the progressive strengthening of "civil society" and the underpinning of mutually supportive social mechanisms.

E. Special enquiries and official commissions

From time to time a government may set up a special commission to investigate some identified problem in society such as the employment of child labor, prevalence of AIDS, double payment of teacher salaries, and misuse of health funds. These inquiries invariably call for specific evidence to be compiled to enable a commission to deliberate better on the matter under investigation.

Commissions of inquiry may also be established when there is a natural disaster or collapse of a major industrial or agricultural activity on which many people depend. Wage boards and judicial reviews of contractual arrangements involving payment between peasant farmers and agro-processing companies or mineworkers and their employers, for example, also fall into this category. In a number of instances, statutory obligations to provide basic rations to people or to distribute certain social entitlements will lead to the compilation of relevant and useful data about poverty. All these studies can serve as relevant sources of primary income data and may provide some indication of the main means of support available to families and basic information about their customary household expenditure outlays.

In evaluating programs and projects and in monitoring their progress, international agencies (e.g., The World Bank and the separate international branches and specialized agencies of the United Nations) will frequently conduct their own follow-up surveys. Since 1999, both quantitative and qualitative participatory methods have been increasingly utilized by The World Bank to assess the impact of its sector specific development projects on poverty. Both household and community questionnaires have become key instruments of inquiry. Some of these surveys, especially those that identify the core control groups and define the "acceptable" standards against which a basic judgement about progress can be made, provide information directly useful to the wider quest for poverty data.

6.7.2 Qualitative Studies and Participatory Assessments

A. Understanding the story behind the numbers

A better understanding of how people survive living under adverse conditions can be obtained from in-depth qualitative studies. These inquiries are usually non-official and often of a one-off nature. For the most part, their value depends on expert assessment and analysis of fieldwork. These studies may be subjective, reflecting a consensus of personal views and assessments of respondents themselves [whom, it might be argued, are best placed to describe their own condition]. Or they may represent the unique testimony of an individual key informant.

The qualitative approach covers such important issues as identification of perceived and actual constraints and obstacles that impede the betterment of peoples' lives. Resorting to qualitative and subjective perspectives, including participatory assessments by the poor themselves, helps to identify many of the undisclosed features of poverty. It allows analysts to relate these factors to the social and cultural environment and observed conditions in which poor households survive. Subjective surveys, in particular, permit researchers to reach out and take note of the "silent voices" that can give them a better insight into why certain households engage in various activities, how household members behave, what their overall coping strategies might be, and how households and their members arrange their specific mechanisms to ensure their daily survival. Observed responses of poor people to given economic situations and strategic initiatives, or the lack of them, can be used to guide future policy and to identify groups at most risk of not making progress.

Qualitative assessments are very useful survey instruments for identifying the characteristics of the poor and the extent of their deprivation. In contrast with the quantitative methods and conventional monetary approaches favored by officials and used in most household based surveys, qualitative methods are less concerned with mathematical precision. The crucial issue, however, is not whether quantification is possible but whether the problems faced by poor people and the level of an individual's or household's standard of living can be reduced to a simple quantitative dimension and still remain significant (Shaffer,1996).

Theoretical underpinnings of qualitative methods rest with a belief that they can shed more light on the diverse manifestations and dynamics of poverty, enabling analysts to explore the various possible links between the different factors assumed to influence actual as opposed to expected poverty outcomes. Key factors include intra-household transfers and gifts in kind, commonly linked to cultural, religious and behavioral attributes that are not comprehensively captured through conventional household inquiries.

B. Participatory Assessments

Rapid rural appraisal (RRA) methods, participatory rural appraisals (PRA), and participatory poverty assessments (PPA) have helped pioneer a wider acceptability of qualitative techniques by officials. They are described as a family of methods to "enable *rural* people to share, enhance, and analyze their knowledge of life and conditions, to plan and to act" (Chambers, 1994). The fundamental distinction between these methods is that RRA is a form of data collection by outsiders who then take the data away and analyze it, whereas PRA and PPA approaches have a more active participatory and empowering component, "meaning that outsiders are conveners, catalysts and facilitators who enable people to undertake and share their own investigations and analysis." (See, Chambers 1994 for a review of participatory methodologies and tools.)

Participatory methods were designed initially as small-scale studies in various fields of social and economic development, and their application in poverty research has covered topics such as credit needs, seasonal fluctuations, service targeting for the poor, non-agricultural income-earning opportunities for farm households, women and gender, and adult literacy. Participatory poverty assessments (PPA) were first undertaken in 1993 as part of the World Bank-supported country poverty assessments in Ghana and Zambia. Subsequently, they gained greater prominence in poverty research not only for conceptual reasons but also on empirical grounds.

Key distinctions between PPA and conventional approaches to poverty measurements, such as the monetary or the capability methods, can be found in the broader socio-economic definition of poverty exhibited in the former. In PPA studies the constituents of well-being are seen to be contextual-specific. They use less formal and more investigative data collection tools that permits a broader understanding of poverty within the local, economic, and political environment. In contrast with monetary measures of poverty, PPAs enable analysts to characterize poverty differently for specifically vulnerable socio-economic classes, such as women, AIDS orphans, single-crop farmers, and minority ethnic groups, whereas the social groupings are conventionally distinguished by poverty profiles obtained using traditional survey methods.

Self perception of poverty, which is a central element in PPA, however is undermined by its technical imprecision and unsuitability for comparative analysis. The question--whether a quantitative inquiry or a PPA is more reliable as an indicator of poverty and/or real living standards--has commanded serious attention in the literature. But the empirical evidence is not conclusive. As in the case of official survey methods, there are a number of challenges to making the results operational, including overcoming problems related to the small size and specific focus group covered in the sample, its unrepresentative nature, and thus the ability to generalize findings to a wider universe.

Drawing meaningful conclusions is perhaps easier where common relationships and linkages need to be identified than when it is endorsing the accuracy of quantified survey findings and their comparability. Further, subjectivity inherent in "own" perceptions of poverty intrinsically weakens the essential feature of the PPA method. People's personal assessments of their own condition will inevitably be biased by a lack of objectivity and may provide only limited information about the poor (Laderchi et al. 2003). More meaningful analysis, however, has been achieved by combining quantitative and qualitative methods rather than from comparing and contrasting their results.

C. Qualitative methods

Despite wide recognition of the relevance and usefulness of data obtained from qualitative methods for assessing individual welfare, and more broadly, for identifying aspects of welfare omitted in the standard poverty measure, qualitative techniques are still not widely accepted by officials. Moreover, they are not fully integrated with the conventional income-based poverty assessments. Because qualitative techniques rely on group interviews and approach subjects in a non-specific way and make widespread use of less formal methods of questioning, many question their results.

In contrast, quantitative approaches place more emphasis on objective data collection through household interviews and written questionnaires. The latter demand, however, a certain minimal level of literacy and numeracy as well as formal and informal record keeping skills some poor respondents may not possess. The method of enumeration by officials also frightens some respondents. Participatory techniques, while giving a particular emphasis to personal subjective perceptions, are often claimed by those social anthropologists and other analysts who conduct them to be incompatible with more traditional poverty assessments, whether these are qualitative or quantitative. However, they do reflect what people really feel and experience.

Given the scarcity of resources, qualitative and quantitative poverty studies frequently compete with one another for funds, failing to complement each other's investigative value. There are a few examples, however, where official comparisons of poverty profiles combining both subjective and objective findings have been successfully undertaken, Other studies have also been able to incorporate PPA results into traditional poverty assessments (World Bank, 1994, 1995a, 1995b) and, increasingly, World Bank poverty assessments now include a participatory component within a traditional survey-based poverty enquiry to amplify more intangible issues.

There may be broader advantages to combining the two methods in the earlier interview phase, for example, by asking subjective and qualitative question in the same survey (as has been recently implemented in Senegal). Not only will the traditional poverty assessments be stronger, but also new facets of the problem could be opened up by in-depth probing using direct inquiry. A multi-dimensional approach to poverty analysis comprising a review of expenditures on market goods--along with non-income measures of access to non-markets goods and indicators of intra-household distribution--would be informative. (See Ravallion, 1994, and Carvalho and White, 1996 for a review of methods for combining qualitative and quantitative data.)

Qualitative surveys are usually undertaken to explain, rather than to simply describe, human behavior,--identifying what issues matter to people. These surveys tend to be based on prescribed and pre-selected [sometimes with defined quotas] non-probability samples of particular population groups. Survey outcomes may then be employed to highlight those questions considered important and worthy of further investigation in a subsequent national survey. The nature of the responses can also be used to determine the appropriate strata for refining the operational conduct of a more comprehensive inquiry.

From a statistical perspective, such techniques can reduce overall sampling error and identify cost-saving strategies in planning larger surveys. Primarily, however, qualitative methods are used to examine a more limited number of subjects in depth. They explore relational patterns and identities, examining the existence of various attributes rather than determining exact measurement of variables. A wide variety of survey techniques, consequently, can fall under the general description of qualitative.

Users can then approach relevant focus groups to guide the direction of studies towards the gathering of data about certain disadvantaged sections of the population. People who are "engaged" in an issue are usually better informed about its nature. It is often possible to get a closer consensus of the problems encountered by asking people directly rather than surveying a randomly selected section of the population. All these approaches tend to draw attention to the broad common relationships rather than measuring the magnitude of any assumed effects.

One of the main advantages of qualitative surveys arises from their in-depth and often open probing into issues that observers do not notice at first sight, but which respondents believe are important. When carried out by well-trained and qualified analysts who understand the objectives of the study and identify with the purpose of the inquiry, the process can prove quite valuable. Enumeration methods may well be unstructured, but the range of topics covered and questions to be raised should conform to a predetermined list of all the key concerns on which information must be elicited. The smaller non-sampling error achieved by this approach has to be balanced against the unknown and incalculable sampling error involved in the employment of higher quality investigative techniques at the respondent level.

This matters little if there is no variable that needs to be quantified. The survey then simply records the presence or absence of a characteristic. But sometimes it is desirable to have a sense of magnitude and to know if a problem is growing [and at what rate], and how important it is to those affected. Then there is a need for a calibrated scale or marker against which to classify the interview outcomes. In general, survey technicians rarely resort to qualitative methods to find out about actual outlays and incomes. Further, they are reluctant to adopt them in inquiries that require quantification of variables and a precise comparison of magnitudes because of the potential for confusion and ambiguity of responses.

D. Other non-quantitative methods

A number of other related approaches, distinguished below, can be adopted to gain further insight into how people themselves perceive their state of poverty.

i. Sensory techniques

Sensory approaches go beyond customary subjective assessments and aim is to get some idea of the strength of feeling people have about their circumstances. Sensory studies may not always portray exactly what the poor themselves think. This is because, in most cases, a translator interprets respondents' declared thoughts about prevailing conditions and opportunities. These survey specialists are responsible for recording respondent voices and sentiments, and they may not always capture the nuances of the views expressed as precisely as are obtained from grass roots interviews. More often than not, survey intermediaries may be more concerned about testing and justifying preset hypotheses, showing conditions of poverty in a particular light , to provoke direct action, official or otherwise, and alleviate suffering.

More formal investigators are people with specialized knowledge trained to know what they should be looking for when questioning respondents. Often, the people who interview focus groups are familiar with local problems (i.e., disadvantage, access, poverty and vulnerability) and know which families or groups are especially involved or at risk. In regions where it is difficult and expensive to conduct a scientific survey, or where the potential respondents are vocal but otherwise illiterate, agencies have sometimes engaged trained enumerators and surveyors to give voice to the unheard concerns of the poor. In some cases, this might mean meeting with local volunteer associations, women's groups, smallholders and non-tenured farmers. and casual laborers.

A classic study of this kind was the World Bank Report compiled by Deepa Narayan entitled “Voices of the Poor.” Using a similar method, the UN Intellectual History Project came up with a different type of study. “UN Voices” interviewed leaders, decision-makers, and opinion formers. It relied on the observations and personal experiences of leading UN civil servants and consultants to define the nature of social and economic development and the international decisions made to influence it.
This “touchy-feely” method of inquiry, as it has sometimes been irreverently referred to, is not popular with most statisticians simply because it is not robust and cannot be readily replicated to generate similar results. It is, by their assessment, too loose and subjective and too exposed to the varying intensity of feeling of respondents. This may be aggravated if all respondents belong to the same group and are interviewed together at the same time because, in this situation, there will be a distinct tendency to reinforce or reiterate what others have already said, which emphasizes their solidarity.

ii. Rapid appraisals and expert assessments

Rapid rural appraisals and participatory rural appraisals are closely associated with the name of Professor Robert Chambers and his colleagues at the Institute of Development Studies, such as Professor Mick Moore [see above]. In the mid-1970s, their research methods went beyond simple arms-length studies with those deemed to be poor to involve the poor directly in assessments. Initially, these researchers were primarily concerned with identifying local land use problems, land tenure issues, agricultural production, and marketing conditions. They wanted to identify the constraints facing farmers anxious to raise their levels of output and to improve their families' daily living conditions.

Their studies introduced more direct questions about what smallholders believed made people chronically poor. They also focused on security and crop storage, water rights, casual labor conditions, agricultural laborers' pay, and the extent of unpaid family employment on the farm. All of these issues could be connected to the varying states of poverty households experienced at different times in the year, as they themselves reported and as was manifested in the observed low-income living conditions of these households.

Their inquiry methods produced quick assessments and were validated by the large number of poor rural dwellers known to be in similar situations. But they rarely attempted to use the procedure to compile exact measures. [Chambers and others conducted their research extensively throughout South Asia.]

Although heavily criticized by statistical purists, such unstructured, informal and sometimes *ad hoc* methods of inquiry were adopted because this approach is both cheap and quick. Elsewhere, the value of procedures that bring the main actors into the evaluation process was given a particular boost by the work of Casley, Lury and Verma. These survey specialists discovered, from a separate study of cash crop output which farmers themselves reported, that most were usually perfectly capable of predicting quite accurately the harvest outcome of their crops, despite their limited numeracy and literacy.

The validity of this method was proved in the case where farmers were cultivating single cash crops on separate plots of land. Indeed, much to the chagrin of the FAO, the results of usable harvested output obtained from this direct inquiry approach were found to be, when tested against the actually harvested crop cuts, more accurate than the recommended conventional, often more expensive and statistically sophisticated crop cutting methods employed in sample plot surveys by FAO and other agencies. In other words, their study underlined the point that farmers could be trusted to identify those obstacles that prevented them from raising their income levels and gaining a better standard of living.

iii. Related Indicator Series

In the mid-1990s, the World Bank, in a policy shift away from growth that accorded greater emphasis to poverty reduction, launched several initiatives aimed at gaining a better understanding of the nature of poverty and why it remained a problem in so many areas. Among several studies, it began regular publication of the Social Indicators of Development report, followed by the annual World Development Indicators.

The former took a long-term perspective of social change which, it was assumed, occurred quite slowly. Three separate periods of review for the same selected indicators pertaining to social conditions were compiled:

- an historical long-term view that looked at circumstances as they were 15-25 years ago;
- a medium-term view with a more recent 5-15 year past perspective; and
- the "present," covering the most recently reported data from within the past 5 years.

Indicator methods in general have been likened to the approach taken by a doctor who examines a child for signs of a disease like chicken pox. The doctor knows what to look for and is aware of the common characteristics of chicken pox. By thoroughly examining the child to see whether the symptoms are present or not, he or she can then discern whether the child is suffering from the disease and assess the possibility that others may contact it. The progress and pattern of the disease can also be predicted.

iv. <u>Community-level studies</u>

Studies that look at communities are varied and selective. But they tend to be mostly directed to specific issues and are invariably micro in nature. Some will be carried out by the local community itself or by local authorities anxious to introduce improvements and changes. Such studies may be conducted in connection with questions of re-housing or the construction of a new road. Other inquiries may have as their core focus a definite social, communal or anthropological phenomenon. A significant number will be carried out, not by officials, but by non-government organizations [NGOs] and academics.

In some surveys, a complete listing of a community's assets and range of services will be compiled. But for many non-official agencies the main concern will be to gather only data relevant to their given organizational and operational mandate. This may entail exploring the relationships that exists between different groups in a society and noting the dependency of families on specific activities and services, like a bus or ferry service. In the ultimate analysis, as with government agencies, the objective of NGO groups in compiling such data is to meet obligations to report on the outcome of their work. This is usually to reassure sponsors and supporters that the funds allocated to the agency have been well spent on appropriate actions and have facilitated distribution of goods and services at the community level to targeted groups and households

v. Other survey approaches and subjective methods

From time to time, topical inquiries covered by so-called "barometric" studies, such as the "social weather stations'" approach followed in the Philippines, may be found useful in an advocacy and policy context. In a similar vein, pyschometric studies using pre-defined [ordinal] scaling techniques may measure the intensity of feelings of people affected by a particular situation, such as poor housing and public sanitation or some other state of deprivation in a given locality. This would help set social priorities. The approach is sometimes used to ascertain some idea about the amount of income poor people perceive as sufficient to lift them out of their poverty or state of homelessness.

6.7.3 National Accounts

This section reviews conceptual and empirical differences between household data sources and the national accounts to help determine adjustments that are necessary to encourage countries to reconcile statistical variances. It is recommended, however, that sound practices in national accounts should take the consumption data from household survey as point of departure for estimating household final consumption.

National accounts provide the detailed and integrated framework for collating disparate data, testing their validity against accepted standards and definitions (concepts) and against other related information (empirical evidence). Many survey and non-survey sources of information identified above are used selectively to compile a country's national accounts. Methodology, standards, and classification guidelines are derived from the 1993 System of National Accounts (SNA93) adopted by all countries.

While data collection and statistical collation procedures may differ among countries, the SNA sets the criteria for inter-temporal consistency and international comparability. This enables analysts to take a wider perspective on the nature of poverty in relation to all household sector activities most relevant in a national context and most comparable in an international setting. In addition, having estimates of some of the core parameters embodied in the national accounts is important for relating the prevalence of poverty to the fundamental issues of national and global inequality (Dikhanov and Ward, 1999 and 2001).

International debate on poverty measurement has raised the question of whether the metric should be based either on national accounts or household surveys, given the differences in assessments of household expenditures. Here, the question about making a choice between the sources is misplaced, failing to acknowledge adjustments necessary to address the differences between national accounts and household surveys.

Key differences in the concepts, definitions, and coverage indicates that data from the two sources would not be in sync even if all errors and omissions were removed. Karshenas thinks "national accounts-based estimates appear to be more plausible [than] other non-monetary indicators of poverty." Ravallion (2003 a), in contrast, argues that whereas household surveys may underestimate consumption due to the underreporting or non-response of the high-income households, their results may produce a relatively more accurate measure of poverty [than do national accounts]. And Deaton (2003 b) argues that national accounts are not designed to measure the individual welfare; their role is to track money and not people. He believes surveys produce more accurate direct measures of the living standards of the poor. Still, "if two data sources disagree, and we have no reason to favor one over the other," Deaton concludes that "we should combine them to make a better estimate."

Neither household consumption nor household income data derived from a household survey are the same as the corresponding household aggregates in the national accounts. Their conceptual and empirical differences should be considered carefully and interpreted properly. Need to harmonize these two main data sources recognizes the objective to enrich national and international poverty analysis with poverty dynamics in a macroeconomic context. National accounts reflect the level and change in the relationships of households with other entities in the global economy, i.e., government and enterprises. Comparability between household surveys and national accounts for household-consumption expenditures is discussed. The focus is on estimates of household-consumption expenditure and the implications for poverty measurement as indicators of well-being. The types of adjustments that need to be undertaken to reconcile the conceptual and empirical differences between household surveys and national accounts based estimates of household-consumption expenditures are then presented.

A. Comparability between national accounts and household survey estimate of final household consumption and the concept of household actual final consumption

The system of National Accounts 1993 (SNA93), a global statistical standard for the compilation of national accounts, measures macroeconomic performance and development of an economic territory (e.g., country) in an internationally comparable manner. Important components of the accounts reported by a large number of countries include household- consumption expenditure and household income aggregates. Long-time series of national accounts aggregates, such as gross domestic product (GDP), gross national income (GNI), and household-consumption expenditure and their per capita equivalents.

The 1993 SNA measures household activities by their expenditures on goods and services and acquisition of fixed assets in the form of dwellings and valuables. Quantitatively, household final consumption expenditure is one of the main components of GDP, calculated by the expenditure approach. It may take place in the domestic territory or abroad and it consists of the expenditure, including imputed expenditure of goods and services, including those sold at prices that are not economically significant.

Household final consumption expenditure includes the following main items:

- Purchase of goods and services;
- Goods produced for own final consumption;
- Goods and services acquired in barter transactions;
- Financial intermediation services indirectly measured (FISIM);
- Insurance and pension fund services;
- Services of owner-occupied dwellings; and
- Goods and services received as income in kind.

Independent, comprehensive estimates of household final consumption expenditures are particularly important for the compilation of sound national accounts and are a useful tool for purposes of social policy. However, the international review of national accounts practices indicates that in many developing countries, due to unavailability of appropriate data sources, the aggregate household-consumption expenditure is derived as a residual between the gross domestic product (calculated from the production approach) and other estimated expenditure aggregates, such as government final consumption, gross fixed capital formation and exports, and imports of goods and services. This residual method of estimating household final consumption expenditure incorporates consumption expenditure of non-profit institutions and usual stock changes, as well as errors and inaccuracies in the other measures. Household-consumption expenditures estimated in this way cannot provide comprehensive information either on the total or the pattern of individual household consumption.

In many countries of limited statistical capacity, apart from the reason advanced above, there is no separate recording of the activities of Non-Profit Institutions Serving Households (NPISHs). Their final consumption expenditure is bundled together with household final consumption expenditure in one single consumption expenditure aggregate. Services provided by the NPISHs are deemed to be individual like all consumption expenditures of households. Separate recording of NPISHs, a particularly important sector in low-income countries, is recommended by the 1993 SNA for methodological, comparability, and policy reasons.

Reconciliation between the two measurements of household-consumption expenditure should take consumption data of a household survey as a point of departure. Subsequently, adjustments should be introduced to transform household survey data on household- consumption expenditure to a national accounts basis. Categorized as conceptual and empirical adjustments, they are presented in Subsections B and C below.

Final consumption takes place in three institutional sectors: – the household sector, the NPISHs sector, and the general government sector. National accounts look at the final consumption from two perspectives – that of consumption expenditure and that of actual consumption. The first perspective refers to the units that incur the expenditures, while the second perspective shows who benefits by the consumption.

The concept of *actual household final consumption* measures both household final consumption expenditure and individual consumption paid for by the government and NPISHs – the so-called social transfers in kind (see endnotes for a specific discussion). Consumption expenditures by government and NPISHs are divided into two categories: those benefiting individual households (individual consumption) and those benefiting the community as a whole or large sections of the community (collective consumption) (SNA, para.9.80-9.86). All services provided by NPISHs are treated as individual, even though some of them may have a collective nature and serve institutions other than households.

By convention, NPISHs have no actual final consumption. Actual consumption of general government is measured by the value of government collective consumption only (see Table 1). Estimation methods of individual consumption provided by government and NPISHs, and collective consumption provided by government, correspond with the estimation methods used to measure their output. In other words, they are based on the reported cost of government units and the NPISHs of providing and delivering the goods and services in question to households.

Table 1: Relationship between final consumption expenditure and actual final consumption of households [42]

	Sector making expenditure			Actual final consumption
	General Government	NPISHs	Households	
Individual consumption	X (= Social transfers in kind)	X (= Social transfers in kind)	X	Households actual individual final consumption
Collective consumption	X	Always 0	Always 0	Government actual collective final consumption
Total final consumption	Government final consumption expenditure	NPISHs final consumption expenditure	Households final consumption expenditure	Actual final consumption = Total final consumption expenditure

The first perspective refers to the units that incur the expenditures, while the second perspective shows who benefits by the consumption.

Actual final consumption concept captures better what is consumed by a given household and reflects the activities of non-profit institutions serving households and different social mechanisms and policies of governments functioning in countries. The arrangements about how many health or educational services are provided by government may change over time and are certainly different between countries.

Inclusion of social transfers in kind clearly contributes to enhancement of

[42] European System of Accounts, 1995

international comparability of household final consumption measures across countries and over different time periods. However, it poses problems for integrating such aggregate estimates of non-market goods and services with poverty measures obtained from household surveys where the equivalent cost or value of such benefits cannot be readily determined at the individual household level.

Table 2 presents the concept of actual household final consumption based on a harmonized approach to household surveys. It indicates the type of information that should be collected from a household survey and the adjustments necessary to make data compatible with actual household final consumption in national accounts.

Table 2: National accounts concept of actual household final consumption within a harmonized approach to household survey

	Components of actual household final consumption	**Estimation method**
+	Goods and services purchased for final consumption	Should be surveyed
+	Goods and services bartered for consumption	Should be surveyed
+	Current transfers in kind other than social transfers in kind	Should be surveyed
+	Goods produced for own final consumption	Should be surveyed along with household production through unincorporated enterprises
+	Services of owner-occupied dwellings and imputed rent	Should be surveyed and adjusted through NA
+	Goods and services provided by employers as income in kind	Should be surveyed and adjusted through NA
=	Household Final Consumption Expenditures (from HBS)	
+	Financial intermediation services indirectly measured (FISIM)	Adjusted through NA
+	Insurance and pension funds service charges	Adjusted through NA
=	**Household Final Consumption Expenditures (in NA)**	
+	Social transfers in kind from government and NPISHs	Adjusted through NA from information on government and NPISHs data
=	**Actual household final consumption**	

B. Conceptual adjustments of household final consumption expenditure between household budget survey and national accounts

Conventional form of household budget survey (HBS) conducted by national statistical offices is an important source for national accounts as it provides information on household consumption at the lowest detailed level. This type of survey, as well as the other varieties of household surveys like Living Standard Measurement Survey, can furnish data on almost all the items listed above, except FISIM and insurance service charges. Compilation of a comprehensive estimate of household consumption requires a combination of different data sources and methods to obtain the "best estimate" for each consumption item. Simple aggregates from HBS data cannot be directly used for national accounts estimates of household final consumption expenditure even after verification of the quality of those data. It is necessary to make adjustments to transform HBS data into corresponding estimates for national accounts purposes. These conceptual adjustments are accomplished mainly through the commodity flow approach as described and schematically presented in Diagram 1 below.

i. Adjustments for differences in definitions and concepts

Besides monetary expenditures of households, the comprehensive estimate of household consumption requires some adjustments to account for certain imputed expenditures on goods or services that households produce for themselves. These are treated as expenditures because households incur costs in their production. Listed below are imputed household expenditures recognized in the 1993 SNA.

- Household production for own final consumption - According to the 1993 SNA recommendations, the production boundary includes goods and services created for own final consumption (see endnotes for a specific discussion), except domestic and personal services produced by members of households for consumption by themselves or other members of the same household. The 1993 SNA further stipulates (SNA, para. 6.25) that when the amount of a good produced within households is believed to be quantitatively important in relation to the total supply of that good in a country, its production should be recorded. For example, processed and consumed agricultural products by the households could account for a significant part of the household production for own final consumption. Processed products are classified as both output of unincorporated activities of households and household final consumption expenditure.

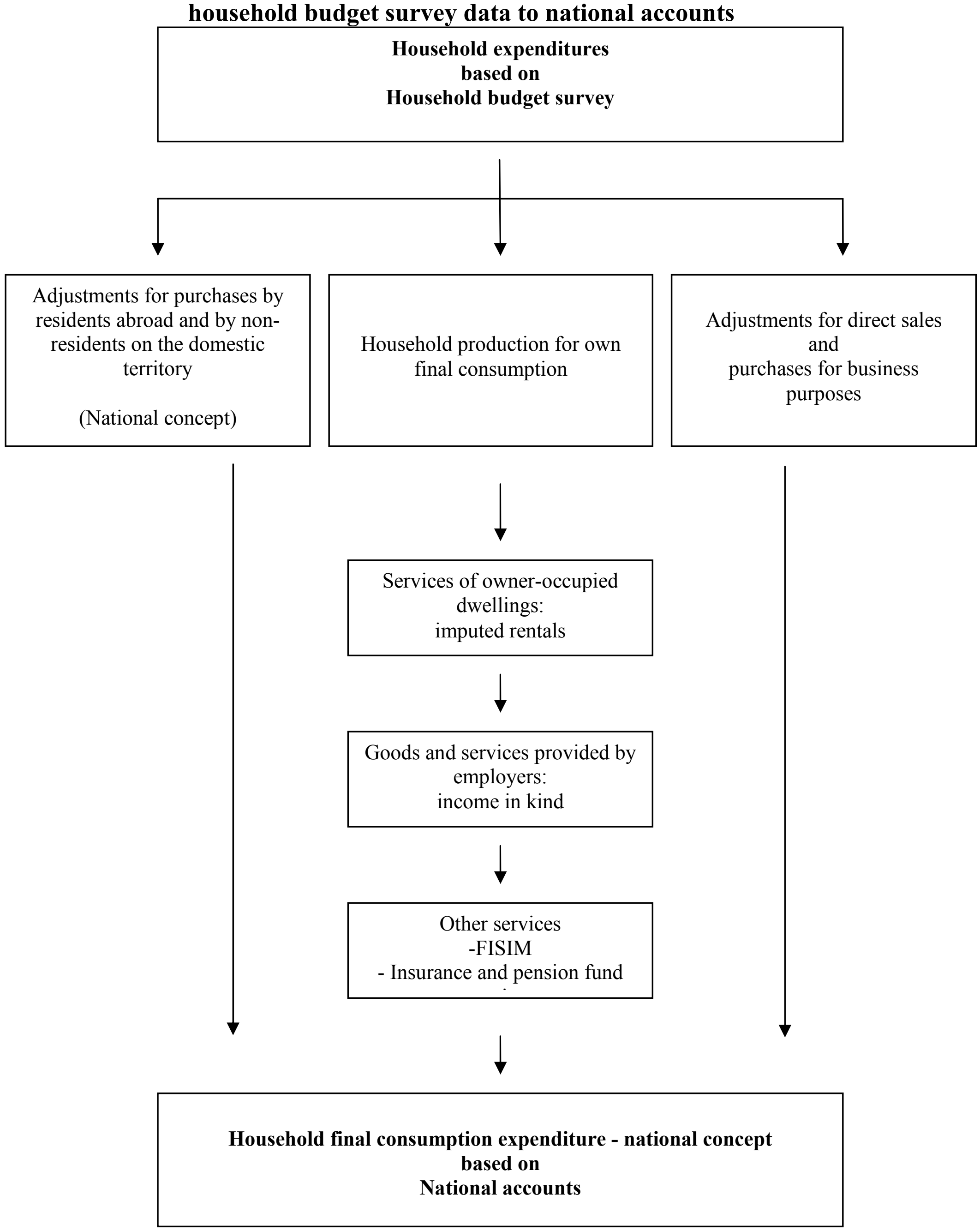
- Services of owner-occupied dwellings **-** Persons who own the dwelling in which they live are treated as owning unincorporated enterprises that produce housing services consumed by the households to which the owner belongs. Housing services produced are deemed to be equal in value to the rentals that would be paid on the market for accommodations of the same size, type and quality.

- Income in kind - This includes goods and services received by households as wages and salaries in kind from employers, such as free food, clothes, dwellings, and medical attention.

- Financial intermediation services - Indirectly measured (FISIM), these should include only the imputed service charges on the household uses of financial intermediation services provided by banks, not the amount of interests paid or received. Financial intermediaries provide services for which no explicit charges are made. But they apply different rates of interest to borrowers and depositors. The value of FISIM is equal to the difference between interest received and interest paid by the financial intermediaries. In principal, FISIM should be allocated among all institutional sectors, using these services.

- Insurance and pension fund services - For each type of insurance considered, the gross premium consists of a service charge element and a residual element, which is a transfer to the technical reserves. This implicit service charge is the only part which should be recorded as a household final consumption expenditure. However, it can only be estimated from insurance companies' accounts. HBS can only record gross premiums at the individual level and categorize them in an analytically-useful manner.

Diagram 1: Conceptual adjustments of household final consumption from household budget survey data to national accounts



Besides these adjustments to the basic data of HBS to meet the household-consumption expenditure concept of national accounts, some additional conceptual issues requiring special treatment are worth mentioning.

- Hire purchases are recorded as purchases made by the households for the full value of the goods at the moment they take place.
- Lottery services are valued net of lottery winnings.
- Imported second-hand goods are treated in the way the newly purchased goods are treated. In case of trading between households, no transaction is recorded.
- Subscriptions, contributions, and dues paid by households to NPISHs (like trade unions and professional societies) are treated as other current transfers.

ii. Adjustment for direct sales and purchases for business purposes

The HBS has certain limitations as a comprehensive data source for estimating household expenditures. This does not imply that household surveys are not an appropriate tool for national accounts measurement of household consumption. But since the survey sample is usually small and the recall period short, the representativeness of the data may be questionable. It may not properly cover expenditures on some seasonally consumed items or on infrequently purchased durable goods. Evidence suggests that on these latter items, a short recall period provides more robust estimates. Furthermore, some household survey designs, gather information that does not separate expenditures related to unincorporated activities of households. Thus, the household expenditure may include not only spending for direct satisfaction of individual needs and wants, but also intermediate and capital expenditures on non-durables and durables incurred for business purposes.

The large share of goods (mainly agricultural) produced on own account and consumed within the same household (after some minor processing or used fresh) typically forms part of the consumption pattern of low-income households, especially in rural areas. When estimating private household-consumption expenditure, home-produced agricultural output for own consumption should be adjusted for both intermediate use (if they are used for feeding animals or seeds for future crops production) and for the share sold directly on the market or bartered between households. National accountants accord particular attention to these goods since they could be equally used for final or intermediate consumption. Costs of producing them are borne by the households themselves and might not be shown explicitly in the surveys. But they should be estimated and deducted so that the private household-consumption expenditure and the corresponding poverty measure will not be affected.

iii. Adjustments for purchases by residents abroad and non-residents residing in domestic territory

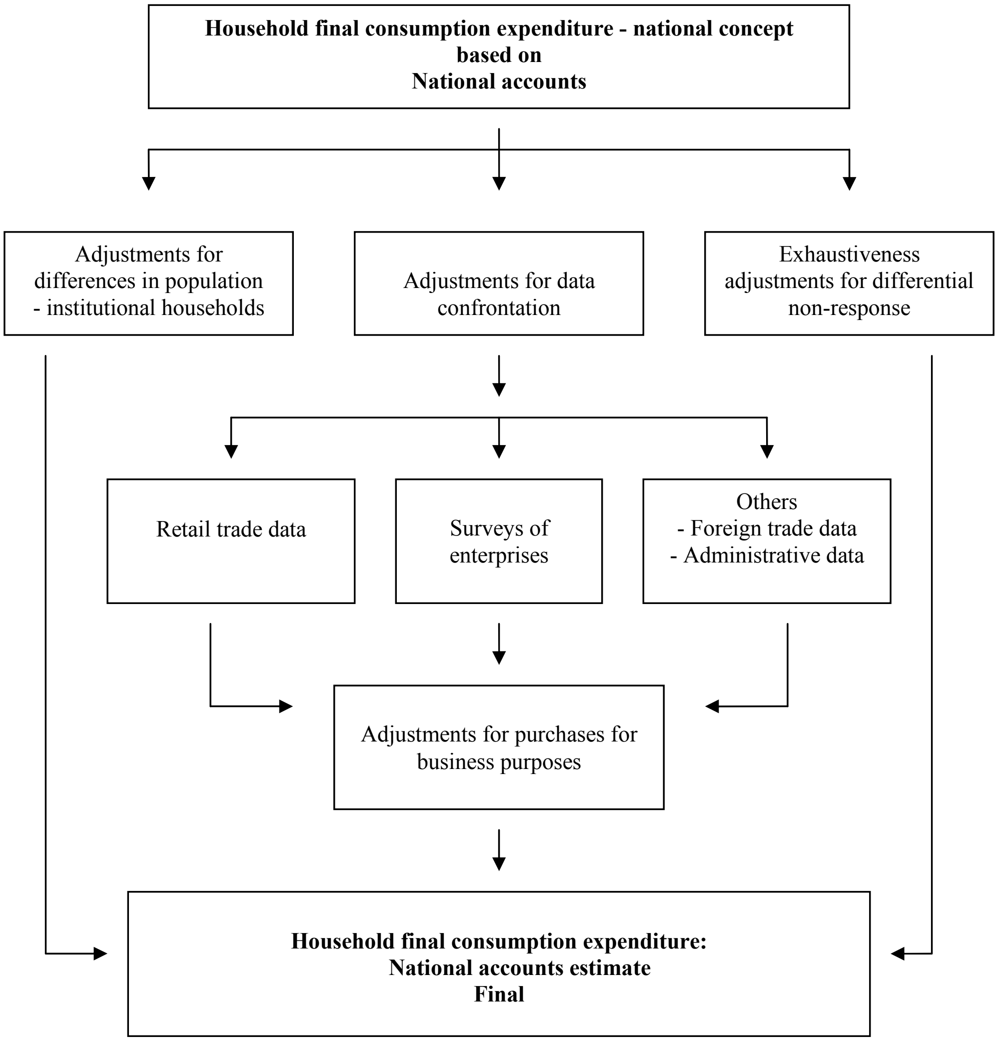
Household final consumption expenditure in the 1993 SNA refers to expenditures incurred by resident households within the economic territory and abroad. This approach means household final consumption expenditure should be adjusted to meet the recommended national concept of its recording, i.e., expenditures of resident households made abroad should be included while expenditures of non-resident households in the domestic territory should be excluded from the estimate. Monetary expenditures of non-residents are recorded as exports of goods and services on the revenue side of the Balance of Payments. Monetary expenditures of residents abroad are recorded on its expenditure side as imports of goods and services.

In this context, persons going abroad for short periods (less than one year) and foreign students, patients, and diplomats and their dependants (irrespective of their duration of stay) are considered residents of their home countries; their consumption expenditures are part of their home economies. Implication of this rule is that where a low-income country is a tourist destination, extra care has to be taken in the national accounts to ensure foreign visitors' expenditures are not incorporated within the aggregate consumption estimates. This issue does not arise in household survey measures.

C. Empirical adjustments of household-consumption expenditure between household budget surveys and national accounts

In addition to the conceptual adjustments mentioned above, empirical adjustments are needed with respect to use of additional source data and adjustment for non-observed household activities, described in Diagram 2 below.

Diagram 2: Empirical adjustments of household-consumption expenditure between household budget surveys and national accounts



i. Adjustments for differences in population

Private household-consumption expenditure estimates are based on the *average annual population*, which includes persons residing in institutional households and residents living temporarily abroad. HBS results do not include consumption of institutional households. National accounts usually provide supplementary estimates on consumption of persons living in institutions on the basis of information from additional data sources, by using administrative records of the institutions or, more implicitly, by using retail trade statistics used for adjusting the HBS data. This concerns mainly the consumption of individuals residing in old people's homes, institutions for the disabled and mentally ill, hospices, and inmates of prisons.

ii. Exhaustiveness adjustments and differential non-response rates

HBS data has certain weaknesses, including low representation of high-income households. Affluent households often refuse to participate in the survey. As a result, this leads to underestimates of household final consumption expenditure. Appropriate adjustments, relying on *grossing up* techniques, are undertaken to reflect higher-income household expenditures and to improve HBS results. Although this adjustment will not affect the consumption of the poor households, it will affect the distribution of consumption and the survey mean if the adjustments are imputed back into the survey data. Otherwise, if this adjustment is only made in the national accounts, significant differences between the survey and national accounts means in consumption will occur.

iii. Additional data sources used for measuring household final consumption expenditure

Data confrontation and reconciliation are at the core of national accounts compilation practice. They are not specific only to the estimation of private household consumption expenditure. In national accounts practice, HBS results are not used for estimation of every single item of expenditure. Rather, they are used selectively, based on their quality and the availability of alternative data sources. HBS results tend to underestimate expenditures on certain items, like alcohol, tobacco, and some personal services. For these reasons, in addition to HBS data, national accounts draw on retail trade data and other statistics based primarily on tax, output, and import information when estimating these items. No one source can be considered entirely adequate. Final data for household final consumption expenditure are derived through the commodity-flow approach within a supply and use framework, i.e., detailed and specific adjustments are made at the lowest possible level of commodity use and aggregation. See Endnotes for further discussion of Retail Trade data and Surveys of Enterprises.

iv. Additional adjustments and considerations for exhaustiveness in using HBS data for national accounts purposes

Activities in the non-observed economy may play a very important role in determining both income and expenditure data of HBS and household final consumption expenditure estimates in the national accounts. Non-observed activities may give rise to imbalances in the basic data and resulting estimates, but conversely, such data imbalances may provide evidence of non-observed activities and the significance of the grey economy.

Households that are especially active in the informal economy and not fully reporting their incomes for tax or statistical purposes might form a disproportionate share of those who refuse to participate in the survey. Although it is impossible to determine the precise extent to which non-observed activities could affect consumption expenditures, many statistical offices are constantly making efforts to obtain better and more exhaustive estimates by applying the different approaches recommended in the OECD handbook, "Measuring the Non-Observed Economy."

Frequency and timelines with which household surveys are carried out can have an important impact on the quality of HBS data. Continuous surveys provide time series for individual items of expenditure and significantly enhance the quality of estimates. Timeliness means that HBS data can potentially be used as a prime source for national accounts purposes. Timeliness also increases the frequency in which data can be validated against other sources. These two characteristics are simultaneously required.

Unfortunately, many developing countries carry out a HBS at infrequent intervals, some that exceed five years. This necessitates implementation of extrapolation techniques and interpolation for the estimation of household final consumption expenditure for the years in between surveys. Considerations regarding the relatively short recall period of the household surveys and lengthy time for data processing play an important role in the quality and reliability of national accounts estimates.

In the absence of external support, financial constraints and real resource difficulties faced by many developing countries often compel them to adopt relatively small samples or to restrict a HBS to urban areas. Omission of rural household expenditures, which may reveal a different consumption pattern over a more limited set of goods and services, distort the ability of HBS data to represent the national condition, especially pertaining to consumption items. Generalization of sample data over the total population without any adjustments for coverage may result in misrepresentation of household final consumption expenditure.

6.8 Mapping Poverty Characteristics

6.8.1 Piecing the puzzle together

After gathering all forms of data from different sources and establishing a variety of definitions and classifications, it remains a challenge to overlay the various pieces of information using both proximate and exact matching techniques related to households. The socio-economic groups to which households belong and their links to specific places of habitation and location are rarely clear, This makes it difficult to meaningfully order all geographically-related data required to paint the more comprehensive picture decision-makers seek.

Researchers are increasingly attempting to link micro household or product data obtained from surveys and small area studies with a comprehensive database developed from a census. Compilation of this "map" requires "bootstrapping" and other data mining techniques. "Sound procedures" for interpolating and extrapolating figures and for generating retrospective estimates of benchmark data have to be put in place. Their validity will depend on the availability of relevant proxy series and other related indicators that are available. These indicators would normally include appropriate price, output, wage and employment series, and sales measures that suitably reflect the options and boundaries that constrain household decisions. Use of any series to move estimates in different directions from a given observation will suffer, however, from adoption of the structural fixity embedded in the benchmark reference. Accordingly, they may not be able to capture the effect relative price changes have on product substitution and emerging consumption patterns as new products and services enter the market.

Pioneering work in this area of social mapping was conducted by the North West Regional Health Authority in England when it linked graphically where people lived [urban industrial locations and rural agricultural areas] with their assumed socio-economic status, individual occupational category, industry of employment and the incidence of various diseases and health indications. Apart from the intention to say something about social class, a pattern emerged showing clear relationships between different social groups and their exposure to environmental hazards. This highlighted individuals' risk of contracting certain medical ailments based on his or her occupation and living conditions, such as having open hearth coal fires in the house and type of diet.

A similar post-enumeration study in China linked income data from the latest household survey with data from the household-based First Agricultural Census of China [1997-1999] to determine levels of well-being across provinces. The aim was to see how income levels could be related to the type of economic and farming activity in those areas. The results showed that the traditional grain producers found mostly in the north and north-western provinces were especially vulnerable to low and fluctuating incomes, and that they had the fewest opportunities to bring in additional income from non-farm activities located in nearby urban areas. This adversely affected educational opportunities, diet of their children, and overall household nutrition.

Ideally, the data used to compile these more complete pictures should be based on the respective benchmark and survey information relating to the same households. But this approach would probably yield too few matches and result in significant bias. Thus, the characteristics of similar households engaged in different surveys or in different rounds of the same survey are usually combined to produce a more complete picture.

Problems of area sampling and following through in this process to achieve lower levels of disaggregation have been described in Chapters 5 and 7 in this handbook. Panel studies that track the activities and characteristics of the same households over a long period of time suffer from individual attrition and aging which alters the nature and composition of households (See Chapter 8 for more discussion on data). Surveys are compromised by their inability to sustain "like with like" comparison and to hold certain factors constant. To extract and uproot more detailed micro information embedded in national and other statistical aggregates (e.g., final household consumption expenditures and rural subsistence output) demands prior data about target groups and those at risk - and where these people can usually be found. But the results can cast new light on old problems.

6.8.2 Drawing on appropriate indicators

Different indicators exist in the public domain that can approximate information about the comparative status and economic level of households. Related structural indicators can help monitor changes in those levels. Synthetic and composite indices that measure national well-being [e.g., the UNDP Human Development Index] use common data and adopt recognized statistical procedures across each country to provide a wider perspective of the relative standing of various socio-economic groups and their progress.

Such index measures are not precise nor independently verifiable. They are best employed in making ordinal rather than cardinal assessments. Although appealing to no underlying social logic relevant to the scale transformations and aggregations carried out, there is a high correlation between many individual component indices depicting growth, levels of living and social progress. However, composite index numbers, while useful as broad indicators of overall well-being, do not rest on any inherent conceptual basis. They are therefore limited and not very robust for comparative inter-country and inter-temporal purposes.

Many composite measures, while superficially relating to the multiplicity of dimensions implicit in the inherent individual indices, have little relevant appeal to an intrinsic social or economic body of thought. There is little rationale, other than arithmetic transparency, to support the simple weighting procedures adopted for aggregating component indices. Some carefully constructed synthetic or composite measures may provide, nevertheless, a reasonable indication as to the overall competence of governments and reflect the basic quality of governance and the efficacy of their social delivery mechanisms.

6.9 Conclusion

This chapter has looked at different data collection techniques and reviewed the possibility of combining various types of information from alternative sources to provide more insightful poverty assessments. Emphasis is on the need to fuse qualitative and subjective methods with the more traditional official baseline data collections. As part of a more comprehensive probability-based survey design, such approaches can be very informative in amplifying the raw numbers. Relying on data compiled for different purposes to paint a broader canvas, however, does not necessarily provide the specific information required for the range of poverty analysis many policy makers need. This is especially so when there is a desire to break down the information by provinces and regions. A better approach might be to devise a grand survey design that incorporates the potential to carry out planned studies based on evolving small area statistical estimation techniques.

Quite apart from the difficulty of linking and cross-validating information of various qualities from different sources, the proper choice of what data to bring to bear on an issue poses questions of specificity versus consistency and representation versus comparability. These issues affect the choice of data necessary to monitor and evaluate the nature of poverty in a uniform and consistent manner. In this respect, when comparing values, price differences according to location and various types of outlet assume considerable significance. Such pricing questions must also be taken into account when considering how best to preserve the temporal and spatial consistency of poverty estimates and whether a special exercise is necessary to determine whether the poor are paying prices that are markedly different than those paid by the broader community.

Several general themes run through the above discussion.

- A large sample size for a household survey--necessary for a more detailed level of disaggregation and the simultaneous study of multiple topics--adds significantly to survey costs. It also leads to potentially large non-sampling errors. Survey managers are thus under pressure to find alternative and cheaper means 'to fill in the gaps.' If such methods also expand the knowledge about poverty and track changes in household and individual levels of living as they occur over time, so much the better.

- A more complete understanding of the complexity of poverty requirers researchers to go beyond mere collection of income and expenditure numbers obtained in a conventional household survey, regardless of how representative it might be of the total population.

- It is important to strive for consistency across regions to allow for comparisons between different communities within each country. This is not only a matter of following the same data collection methodology but also ensuring that the measures themselves are relevant and consistent. In assessing living conditions of poor households, it's essential to know the actual physical quantities obtained (such as how much food they get) as well as the value of outlays they have made. Here again, this is not easy if prices for specific items vary significantly over time, as well as between different locations and outlets within a country.

Many country- and community-based poverty evaluation and monitoring systems lack consistency because they are launched by donors and external agencies possessing the necessary seed funds but lacking concern for a coordinated focus. They do not usually fit together in terms of their scope, timing and coverage. Many will have been implemented as one-off exercises or prove unsustainable for either technical or financial reasons.

The aims and methods of such surveys are quite different from the procedures observed by the national statistical office. Desire for basic coherence also requires the complete methodological consistency between countries. Achieving this standard is one of the main purposes of the present handbook.

Furthermore, long-term trend analysis within a given country requires adherence to the original benchmark and survey design wherever possible. This implies using the same array of indicators for updating trends, even if the procedure is less than optimal and if new methods are subsequently found. These can always be updated with the next round of benchmark studies. While clearly challenging, it is critical for researchers to find the appropriate balance between these competing ends and undertake a robust temporal and spatial analysis.

There are, nonetheless, certain questions that still evade quick and easy resolution. For one, a distinction cannot be readily drawn, simply from a standard cross section study, between chronic and transient poverty even with access to an array of supplementary data. While basic conditions of poverty are a legacy handed down from one generation to the next, many households will pass through various phases of being poor during their lifetime.

Availability of sequential data from longitudinal studies and time-related indicators may suggest solutions to policy makers about how poor households escape from poverty over time. Such time series data can reveal how changes in the circumstances of individual households and changes in the actual size and composition of the household, particularly its age and sex profile, can affect the daily living standards of its members.

Another key issue is that the record of expenditures compiled in a household survey implicitly assumes that the relative importance of any item is dependent on the simple share of the weekly or monthly budget that households spend on it. These surveys rarely take into account the question of priorities and the need for people to meet certain mandatory obligations when making their regular outlays. Importance of food, paradoxically, is frequently subsumed to that of shelter. Regular outlays on both have to give way to community charges and other unavoidable local fees, trade credit obligations, and protection payments. The occasional need to pay certain national statutory ‘poll’ taxes and repay personal debts to friends and relations are additional priorities.

The virtue of engaging different methods of inquiry to present a broad holistic picture that can simultaneously draw attention to details having a distinct bearing on the question under review (but which might otherwise have been overlooked), is indisputable. The actual act of researchers and officials in applying these methods and imputation techniques may have important and desirable feedback implications for the re-design of selected administrative records. It can also influence the choice of the qualitative survey approaches that could contribute to the creation of a more complete picture of poverty and its relationship to other social problems.

If carefully assessed and evaluated, the availability of more rather than less information will invariably contribute to a better understanding of poverty's multi-dimension character. The key is selecting and integrating the appropriate sources and series to match available data that address the essential broad issues.

Direct estimation of household final consumption expenditure (in contrast with its derivation as a residual) using several completely independent data sources has clear preference over single-source estimates. Having more than one estimate for the different expenditure items allows for comparative analysis and evaluation of quality and reliability. Comparative evaluation of conceptual and empirical differences and subsequent adjustments would improve the quality and reliability of the national accounts estimate for household final consumption expenditures as compared with a single-source estimate obtained from HBS expenditure data. Therefore, countries should be encouraged to apply statistical reconciliation (adjustment) techniques in deriving harmonized consumption expenditure averages for national accounts and HBS data in the broader contextual analysis of poverty. Furthermore, conceptual and empirical differences and adjustments between household surveys and national accounts data should explicitly consider the impact of these adjustments on income/consumption distribution across households for which the household survey is the only tool that can provide this information for the purpose of measuring poverty.

Household surveys need to be improved in many countries. They must make use of the extensive experience accumulated over the past decades in such areas as,

- Representative sample design,
- Consistency of forms and methods of data collection over time,
- Formulation of questions and coverage of data items, and
- Proper training of interviewers to reduce unit and item non-response and other non-sampling errors.

Notwithstanding, international agencies and other organizations should give high priority to developing global household survey standards to generate reliable poverty estimates consistent with the national accounts across countries and across time. As such, harmonized household surveys would encourage counties to adopt a direct measure of household consumption in national accounts.

ENDNOTES

E.1. Social transfers in kind (SNA, para. 9.72)

Social transfers in kind include:

- Individual goods or services produced or purchased by the government and NPISHs and distributed free or below market cost to individuals, such as education, health, social security and welfare, sports and recreation, culture, part of provision of housing, collection of household refuse, and operation of transport;
- Social benefits in kind include reimbursements from government's social security funds to households on specified goods and services bought by households on the market;
- Other social security benefits in kind are also counted, except reimbursement which are *not produced* by the government sector but bought and distributed free or almost free to households under the social security funds; and
- Social assistance benefits in kind, including the free distribution of food and clothing

E.2. Household production for own final consumption

It includes:
- Agricultural products and their subsequent storage;
- Gathering of berries or other uncultivated crops;

- Forestry;
- Wood-cutting and the collection of firewood; hunting and fishing;
- Production of other primary products such as mining salt, cutting peat, and water;
- Processing of agricultural products;
- Other kinds of processed goods, such as weaving cloth, dress making, and tailoring; and
- Own account fixed capital formation.

Other household production of services like cleaning, cooking, transportation, and the caring for children, and sick and old household members are outside the production boundary with two exceptions – services of paid domestic staff and imputed rent of owner-occupied dwellings. (SNA, para. 6.24)

E.3. Additional data for measuring household final consumption

Retail trade data constitute a more reliable source of information concerning consumption of alcohol, tobacco, and durables compared with the HBS results. If available at a detailed level, they are an important tool for verifying HBS data for many groups of non-food commodities. Retail surveys also cover consumption of institutional households and consumption of non-residents [but usually without distinction] on domestic territory, i.e., retail trade surveys present results in accordance with the domestic concept in national accounts.

The major problem with retail trade data is that they include sales to units other than households, i.e., purchases for business purposes, which should be excluded to achieve the 1993 SNA compliant estimate of household final consumption expenditure. If retail trade data are used independently and not constrained by other available sources for estimation of household consumption, they may underestimate expenditures of some commodities as households also purchase goods directly from producers or other households. At the same time, they may overestimate consumption of other households because purchases for intermediate consumption have not been excluded.

Surveys of enterprises are the other important data source providing information on the value of electricity and water purchased by households as well as transport, communication, and personal services provided. The main practical difficulty with enterprise data is the same as with retail trade data – they include business consumption, which should be excluded.

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CHAPTER VII. POVERTY ANALYSIS FOR POLICY USE: POVERTY PROFILES AND MAPPING

Nanak Kakwani and Hyun H. Son[43]

Introduction

This chapter focuses on the formulation of poverty reduction policies. It shows how various poverty tools can be of considerable value to policy makers in strengthening the poverty alleviation impact of government spending. Poverty profiles can play an important role in understanding poverty and formulating poverty reduction policies. In this chapter, we provide some country specific examples to illustrate how poverty profiles can be constructed and how they can be utilized to design policies.

The primary step in determining the degree of poverty is establishing a poverty line that specifies in monetary terms a society's judgment regarding the minimum standard of living to which everybody should be entitled. Once the poverty line is determined, one can construct poverty profiles, which provide overall estimates of poverty, distribution of poverty across sectors, geographical regions and socioeconomic groups, and a comparison of key characteristics of the poor versus non-poor.

[43]We are thankful to Fabio Soares for his helpful comments.

The method of setting the poverty line can greatly influence poverty profiles, which are the key to the formulation of poverty reduction policies. Unfortunately, setting a poverty line is not a straightforward exercise; indeed, it is often a very contentious exercise. Setting a poverty line involves many conceptual and practical problems. These are critical from the point of view of policy development, but they are often ignored due to their complexity. This matter has been dealt with in great detail in Chapters 3 and 5.

Once researchers define the poverty line, then they can calculate the number and percentage of poor in the country. These are estimates of incidence of poverty, which are obtained under the assumption that if a household is identified as poor, then all its members are also poor. These poverty estimates provide no information about the depth of poverty. One index of poverty that does take account for the depth of poverty is the poverty gap ratio. This index captures the depth of poverty by contrasting the mean income (or consumption shortfall) relative to the poverty line, averaged across the whole population[44]. Thus, this measure gives us an idea about the total resources required to bring all the poor up to the poverty line.

Finally, there is another index of poverty called the severity of poverty, which takes into account not only the depth of poverty but also inequality of income or consumption among the poor. This index helps officials focus policies on eliminating

[44] When establishing this mean, the non-poor are assigned a poverty gap of zero.

extreme or ultra poverty by giving greater weight to the income or consumption shortfalls of the very poor[45].

Geographical targeting is also becoming an important means for channeling public resources to the poor. Many governments use it to target programs, such as food aid, public works, and delivery of health care and education. This approach is commonly referred to as “poverty mapping.” This chapter provides a brief review of methodology used in the construction of poverty maps. It also points out the effectiveness and limitations of poverty mapping.

7.1 Poverty monitoring and poverty profiles

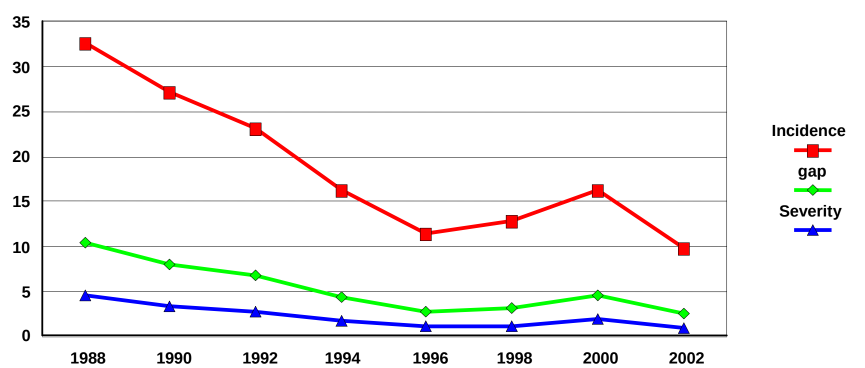
The three poverty indices discussed in the previous section are often used as a tool to monitor poverty over time at the aggregate level. Needless to say that monitoring poverty at the aggregate level is important because policy makers want to know if the government policies are helping the poor. Thailand has been monitoring poverty for more than a decade. It has a nutrition-based official poverty line, which can be used to calculate the three poverty measures. Figure 1 presents these estimates covering the period from 1988 to 2002. All three poverty measures show a parallel decline in poverty from 1988 to 1996, followed by a sharp increase through 2000 and then a sharp decrease until 2002.

[45] There is a huge range of literature on poverty measures. The most important papers among them are those by Sen (1976), Kakwani (1980), and Foster, Greer and Thorbecke (1984). The three poverty measures discussed above are the particular members of the Foster, Greer and Thorbecke’s poverty measures, which are most widely used.

During Thailand's rapid growth period (1988-96), when the incidence of poverty declined very rapidly, poverty decreased at a much slower rate when measured by the poverty gap ratio and severity of poverty. This implies that the benefits of growth accruing to ultra-poor were lower than those to the poor.

During the stagnation crisis between 1996 and 2000 the headcount measure showed a much higher rate of poverty increase than the poverty gap ratio and severity of poverty index. This means that the ultra poor suffered relatively less than the poor during the crisis. During the recovery period, the ultra poor benefited relatively less than the poor.

Figure 1: Poverty in Thailand: 1988-2002



Source: Authors' calculations based on Thailand's Socio-Economic Surveys.

Poverty profiles show how poverty varies by geography and subgroups across society. Study divisions include regions, communities, sector of employment, and household size and composition. Profiles can also show how rates of economic growth in different sectors and regions affect aggregate poverty. Accordingly, poverty profiles are extremely useful in formulating the most effective economic and social policies to combat poverty. They identify regional location, employment, age, gender and other characteristics of the poor. This information can be used to formulate poverty alleviation policies. Profiles can also help answer a wide range of questions such as:

- Who are the poor?
- Where do they live?
- What do they do?
- On what sectors do they depend for their livelihood?
- Do they have access to economic infrastructure and support services such as social services and safety nets? And,
- How can the government target resources to them?

The three poverty measures--incidence of poverty, poverty gap ratio and severity of poverty--are constituents of the Foster, Greer and Thorbecke poverty indices, which have an attractive property of being additively decomposable poverty measures (see Chapter 3). This property can be quite useful in analyzing poverty profiles. For example, suppose that the population is divided into K mutually exclusive groups, and let a_k be the population share of the k^{th} group. Any FGT poverty measure, denoted by FGT_α is additively group decomposable because one can write it as:

$$FGT_\alpha = \sum_{k=1}^{K} a_k \, FGT_{\alpha,k} \qquad (1)$$

where $FGT_{\alpha,k}$ is the poverty measure for the k^{th} group (Foster, Greer and Thorbecke, 1984). This implies that total poverty is a weighted average of poverty levels in all groups--the weights being proportional to the groups' share of the population.

Additively decomposable poverty measures allow one to assess the effects of changes in group poverty on total poverty. When incomes in a given group change, then group and total poverty move in the same direction. Increased poverty in a group will increase total poverty at a rate given by the group's population share a_{i} ., The larger the population share of the group, the greater the impact will be. Equation (1) shows that $a_k FGT_{\alpha,k}$ multiplied by 100 identifies the percentage contribution of the k^{th} group to total poverty. This suggests that complete elimination of poverty within the k^{th} group would lower total poverty by this percentage. This property is desirable for evaluating anti-poverty policies.

Table 1 presents a spatial profile of poverty in Thailand in 2000. Poverty in the country varies rather dramatically by region. All three poverty measures indicate that the Northeast is the poorest region, followed by the Northern, Southern, and Central regions, and then by Bangkok. However, there is a huge regional concentration of poverty in Thailand. The Northeast region, with one-third of the country's population, accounts for more than 61 percent of the country's poor. When we measure poverty by the severity index, the contribution of Northeast to the total poverty is even higher--nearly 65 percent. This is in stark contrast with the capital region, the Bangkok metropolitan area, where the country's poverty is lowest.

Table 1: Spatial Profile of Poverty in Thailand, 2000

Regions in Thailand	Population share	Poverty incidence		Poverty gap ratio		Severity of poverty	
		Index	% contribution	Index	% contribution	Index	% contribution
Bangkok	12.26	0.36	0.27	0.09	0.24	0.04	0.26
Central	22.44	5.13	7.08	1.26	6.1	0.47	5.58
Northern	18.11	18.04	20.1	4.7	18.38	1.83	17.41
Northeast	33.82	29.48	61.34	8.77	64	3.66	64.86
Southern	13.38	13.61	11.2	3.91	11.29	1.69	11.89
Whole Kingdom	100	16.25	100	4.63	100	1.91	100

Source: Authors' calculations based on Thailand's Socio-Economic Surveys.

Contribution of each region to total poverty can be used as a yardstick for allocating public assistance to each region. Since most of the poverty is found in the Northeast, government spending to reduce poverty should be concentrated in that region. There is some evidence that globalization enhances economic growth[46]. But there is no consensus about the distribution of economic growth across various socioeconomic and demographic groups. Household survey data can be used to investigate how economic growth affects poverty among various groups. This effect may be captured by the following index of poverty concentration:

$$CP = \frac{1}{2P} \sum_{k=1}^{K} a_k \mid P_k - P \mid \qquad (2)$$

where P_k and a_k are the poverty measure and population share of the k^{th} group, respectively, and P is poverty at the national level. This index will be zero if all groups

[46] See Dollar and Kraay (2000).

have same poverty. The higher the value of *CP*, the greater is the concentration of poverty. A value of 1 for *CP* implies extreme concentration of all poverty in a single group when the number of groups goes to infinity.

Table 2: Concentration of Poverty in Thailand

Period	Poverty Incidence	Poverty Gap ratio	Severity of poverty
1996	0.22	0.22	0.23
1998	0.15	0.20	0.24
2000	0.27	0.29	0.29
2002	0.26	0.26	0.27

Source: Authors' calculations based on Thailand's Socio-Economic Surveys

Table 2 shows that the concentration of poverty in Thailand declined sharply during the period between 1996 and 1998 (with exception of severity of poverty, which affects the ultra-poor more than the poor.) This is consistent with the fact that the initial impact of the 1997-98 economic crisis was most severe in Bangkok.[47] In the subsequent period of 1998-2000, the impact of the economic crisis reverberated across the country, triggering a greater increase in poverty in poorer regions. Thus, there was a huge increase in the concentration of poverty. Concentration of poverty continued to be high during the recovery period between 2000 and 2002; the country's poorer regions did not benefit from recovery as well as the richer regions.

These poverty profiles capture the regional inequities in Thailand. Division of the population into groups need not be done only in terms of geographical regions. Groups

[47] Since the Bangkok Metropolitan is the richest region, any increase in poverty in the region will reduce the concentration of poverty.

can be constructed, for example, according to gender, age, urban and rural, racial, or ethnic characteristics, and employment sector. To illustrate this point, we can look at the Philippines where groups were constructed by the work status and sectors of employment of household head. As can be seen from Table 3, the highest incidence of poverty is found among agricultural workers. Workers in industry and in trade and services suffer less than half the incidence of poverty than in agriculture. This profile suggests a need for institutional reforms, including faster land reform, more investment in infrastructure, and additional productivity improvements to increase the returns to agricultural labor.

Poverty incidence varies widely among classes of workers. Self-employed and those working in private households are more likely to be poor than other classes of labor. These findings indicate that the poor are under-represented in the formal sector, implying further that mechanisms (policies governing the welfare of workers) administered through the formal sector, such as social insurance, have a limited capacity in poverty reduction.

Table 3: Incidence of poverty by sector and class of worker in the Philippines, 1998

Sectors	Agriculture	Industry	Trade & Services	All sectors
Private households	77.6	48.7	35.3	46.9
Private establishment	59.4	25.6	20.3	31.4
Government	19.6	21.4	8.2	8.8
Self employed	63.6	40.2	23.3	51.3
Employed in own family farm or business	47.1	11.8	8.8	37.2
All classes of workers	60.5	27.9	18.9	39.2

Source: Authors' calculations based on Philippine's Annual Poverty Indicator Survey

Although poverty profiles are very useful in understanding the nature of poverty, they are limited to showing bivariate associations between various socioeconomic groups and poverty measures. In other words, they do not control for other omitted variables, which also have an impact on poverty. In many instances, this profiling approach can generate misdirected policies. To illustrate this point, it may be useful to mention Pyatt's (2000) example of Malaysia, where the data confirmed that poverty was associated with ethnicity so the main strategy of the government to reduce poverty was to redistribute wealth to Malays. However, the data also suggested a rural/urban correlation to living standards and educational attainment within the household. When all three typologies were analysed simultaneously, the ethnic dimensions were no longer significant. This suggested that ethnic differences could be explained by differences in access to educational opportunities, which significantly correspond to where people lived.

Alternatively, we may construct poverty profiles by simple transformation of logit or probit models, regressing the probability of being poor on a large number of relevant household characteristics that are generally used in poverty profiles. From these models, one can estimate the marginal effects, or elasticity, of probability of being poor with respect to any explanatory variable included in the model. The main attraction of these models is that we can isolate the effect of a single variable by controlling for all other variables included in the model.[48] Note that probit or logit models are merely descriptive from which no inference of causation can be made. Transformed coefficients should be seen as estimates of partial correlations with the probability of being poor. Still, they can

[48] As an alternative to probit or logit models, many studies use logarithm of underlying per capita income or expenditure as the dependent variable. Such a model can be statistically more efficient than the logit or probit models because it utilizes more available information on income or expenditures.

be useful in simulating alternative policies. For example, Kakwani, Soares and Son (2005) used a probit model to simulate the impact of conditional cash transfers to families with children on school attendance.

7.1.1 Capability deprivation

The income-poverty line, which identifies the poor from the non-poor, can never perfectly distinguish between individuals who are able and unable to enjoy a minimum set of capabilities (Sen 1985).[49] Thus, it is important to investigate whether the poor suffer greater capability deprivation than the non-poor. If they do, more effective policies can be devised to raise their living standards, such as providing cash or in-kind transfers or greater access to government services. This section investigates whether the poor (defined in income terms) actually suffer greater capability deprivation.

Table 4 presents indicators of educational progress among the poor and non-poor, for those between the ages of 20 and 59, living in Thailand's urban and rural areas. There is a clear link between lack of education and poverty. As of 1994, the non-poor in urban areas had an average of 6.2 years of schooling versus only 3.8 years for the urban poor. Educational attainment in rural areas was much lower, 4.0 years for the non-poor and 3.1 years for the poor. Thus, educational attainment varies substantially not only between the poor and the non-poor but also between urban and rural areas.

[49] Poverty, viewed in terms of capability deprivation, encompasses not only material deprivation (measured by income or consumption) but unemployment, ill health, lack of education, vulnerability, powerlessness, and social exclusion. Thus, this broad notion of poverty opens up to a broader range of policies that governments can follow to reduce poverty.

These gaps are even wider when one examines the percentage of the population that has completed secondary education. Only 1.3 per cent of the poor population in the age group 20-59 years had completed the secondary education in rural areas. Clearly, rural poor have a low level of educational attainment. Although the government is the major provider of education, the benefits of education are not fully flowing to the poor. These results indicate how crucial secondary education is, in both rural and urban areas, to help escape poverty.

Table 4. Educational achievements of poor and non-poor in Thailand, 1994

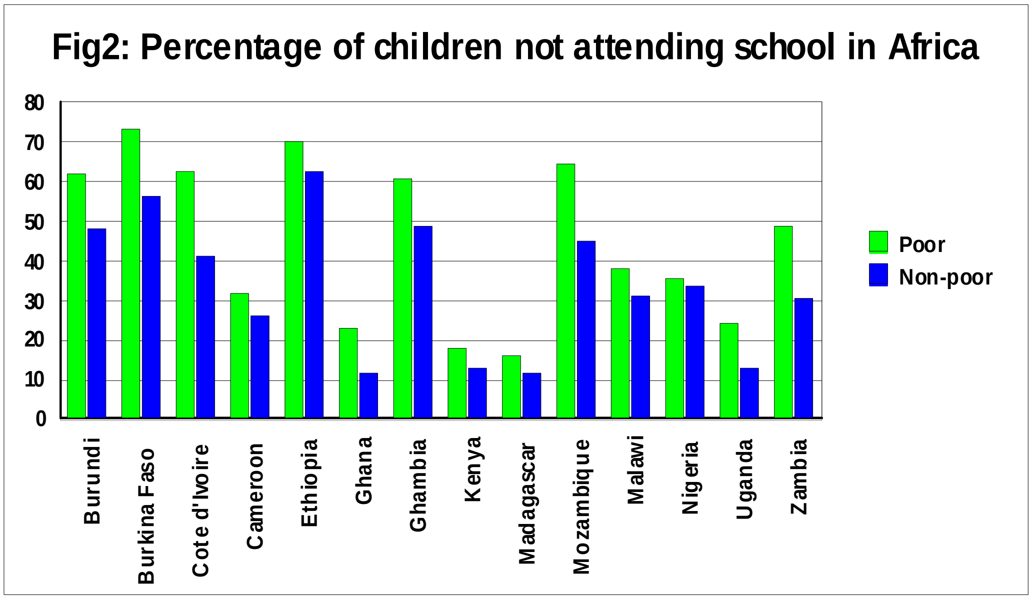
Indicators of education	**Urban areas**		**Rural areas**	
(for persons from 20 to 59 years old)	Poor	Non-poor	Poor	Non-poor
Average schooling in years	3.8	6.2	3.1	4
Percentage of literate population	71.5	78.9	64.1	73.5
Percentage with secondary education	3.3	22.0	1.3	6.2

Source: Authors' calculations based on Thailand's Socio-Economic Survey

Figure 2 shows the percentage of children, between the ages of 5 to 16 years, that are not attending school in 15 countries in Sub-Sahara Africa.[50] More than 40 percent of children (about 45 million) do not attend any type of school. Among the children living in poor families, more than 45 percent do not attend the school. The situation is extremely dismal in Burundi, Burkina Faso, Cote, d'Ivoire, Ethiopia, Ghambia, and Mozambique. The worst educational conditions for children were found in Burkina Faso where more than 70 percent of poor children do not attend school. Human capital is an important determinant of poverty. Poor children, who are unable to attend school, cannot acquire

[50] See Kakwani, Soares and Son (2005) for a detailed discussion of household income and expenditure surveys used in the construction of Figure 2.

human capital and, therefore, have little chance of escaping poverty. These results speak of the urgency for action in the Sub Sahara African countries.



Source: Kakwani,Soares, and Son (2005).

The living conditions of the poor and non-poor in Thailand are measured by a variety of indicators derived from the country's 1994 Socio-Economic Survey and delineated in Table 5.

- *Drinking Water*—This index measures the quality of drinking water--the larger the value, the cleaner is the water. Data reveals that the population living in urban areas has access to much higher quality of drinking water than households living in rural areas. The poor in each of the areas have much lower value of the index than the non-poor.

The difference in access to potable water, between the poor and the non-poor, is much larger in urban areas than in rural areas.

- *Toilet Facilities*—Sanitary human waste disposal is another important factor related to people's capability to live a healthy life. Unhygienic toilet facilities can spread infectious diseases. Such toilet facilities are also unpleasant, implying a lower standard of living. The index of toilet facilities measures quality of toilets available to a household. Toilet facility access appears not to vary significantly between the poor and the non-poor and between urban and rural areas across Thailand. This probably reflects the government's has long-term commitment to provide sewer facilities in the rural villages across the country.

Table 5. Living Conditions of the Poor and Non-poor in Thailand, 1994

	Urban areas		**Rural areas**	
Indicator of living condition	Poor	Non-poor	Poor	Non-poor
Index of drinking water	28.4	60.5	15.3	19.3
Index of water use	39.6	63.0	28.5	33.6
Toilet facility	56.8	61.5	52.2	58.0
Cooking fuel	44.5	77.5	34.5	54.8
Rooms per 100 people	48.1	71.5	46.3	65.8
Sleeping rooms per 100 people	34.8	52.0	32.4	44.4
Electricity in dwelling	96.5	99.0	89.0	94.8
Telephone in structure	2.8	32.0	1.1	3.3
Air conditioner in household	0.6	13.9	0.2	1.0
Bicycle in household	58.5	39.3	58.6	57.2
Electric Fan in household	84.2	95.5	65.6	83.9
Electric Iron in household	56.3	87.4	30.3	60.3
Motorcycle in household	42.4	49.3	31.8	56.1

Radio in household	62.1	82.8	55.1	71.0
Refrigerator in household	36.3	76.2	17.8	47.3
Color TV in household	47.7	83.0	30.4	58.0
Black and white TV in household	28.0	10.0	32.0	26.3
Video in household	4.8	34.0	1.0	7.8
Washing machine in household	4.9	28.5	0.7	6.0

Source: Authors' calculations based on Thailand's Socio-Economic Survey 1994

- *Cooking Fuel*--Gas and electricity are the cleanest and most convenient fuels for cooking. But they can be expensive, and they may not even be available in the areas where poor people live. There are many types of cooking fuel used in Thailand. The index of cooking fuel reflects its cleanliness and convenience. Empirical results show that value of index is much higher for the non-poor than the poor, especially in urban areas. Thus, non-poor households utilize much cleaner cooking fuel than poor ones.
- *Availability of Electricity*--Percentage of the population with access to electricity is very high in Thailand. About 99 percent of the non-poor population in urban areas has electricity. This figure for the urban poor is almost as high, at 96.5 percent. Even in rural areas electricity is available to 89 per cent of the poor population, which is a remarkable achievement. Thailand has clearly made enormous progress in providing electricity to almost the entire population, both poor and non-poor. Despite electricity being available in most urban and rural dwellings, the poor do not use it for cooking, indicated by the low

index value for cooking fuel. This may be due to cost of using electricity for cooking purposes.

- *Housing Condition*--SES provides data on the number of rooms (and the number of sleeping rooms) in each dwelling. The data were used to calculate the rooms (and sleeping room) available per 100 persons. This index of overcrowding shows that poor people are living in more crowded houses than non-poor people. Crowding is higher in rural areas than in urban areas. This might be surprising because urban areas, particularly Bangkok, seem so overcrowded.
- *Access to household consumer durables*--The remaining indicators in Table 5 show a wide gap between poor and non-poor access to various household consumer durables such as televisions, radios and videos. Use of telephones, air conditions, and washing machines are concentrated heavily in non-poor households located in the urban areas. For instance, in urban areas, 32 per cent of the non-poor population has an access to telephone, compared to only 2.8 per cent of the poor population. In rural areas, 3.3 of non-poor have access to phones versus 1.1 per cent of all rural poor. Similar results emerge in the case of air conditions and washing machines. Not surprisingly, poor households on average have more bicycles and black-and-white televisions than non-poor households.

The above results suggest that the poor have a much lower standard of living than the non-poor, occupying more crowded houses, with far lower access to drinking water, and ownership of fewer durable goods. And the poor are less educated. It seems from this analysis that identification of poor on the basis of income or consumption does capture to a large extent the capability deprivation aspects of poverty. This suggests that if policy focuses on increasing poor people's income, it may reduce deprivation in many other areas of capability deprivation. Alternately, governments may focus on policies and projects that would directly deal with specific kinds of deprivation, such as the lack of education or health. A more effective approach may be a combination of policies that enhance people's income and as well as reduce specific deprivations. However, from the analysis presented here, it will be difficult to make an informed judgment about specific policy prescriptions. More in depth policy analysis should be done.

7.1.2 Productive assets held by poor and non-poor

One of the important reasons why poverty persists is that the poor do not possess productive assets. And the productivity of the assets they do own may be low. This is evident from Tables 6 and 7, which review asset holdings and productivity of poor and non-poor households in China. In rural China in 1996, the per capita value of productive assets of poor households is 596 yuan versus 940 yuan for non-poor households. Poor households owned 1.6 mu of arable land compared to 2.1 mu held by the non-poor. Further, average grain production per mu was 165 for the poor households compared to 347 for non-poor households.

Table 7 shows large differences in asset holdings between the poor and non-poor households in China in 1995. These empirical results suggest that asset holdings are important determinants of household poverty status. To alleviate poverty, policies need to enhance asset holdings of the poor and increase productivity of assets held by the poor.

Table 6. Productive assets and productivity: Rural households in China, 1998

	Poor	Non-poor
Per capita productive assets (yuan)	596	940
Per capita grain production (Kilo)	406	714
Per capita housing area (square meters)	14.1	24.2
Per capita household productive expenditure (yuan)	289	668
Per capita arable land (mu)*	1.6	2.1
Average grain production per mu	165	347

* 1mu=1/6 acre

Source: Monitoring Report of China's Rural Poverty (NSB 2000).

Table 7. Productive assets and debt: Urban households in China, 1995

	Poor	Non-poor
Productive fixed assets	89.85	154.08
Financial assets	1080.46	3979.98
Housing	2784.62	5366.65
Other assets	202.8	583.35
Debt	210.59	263.36

Source: Zhao, Li and Riskin, 1999.

Many developing countries use microcredit to help the poor acquire productive assets. There are many other policy options, such as marketing training to help the poor get better prices for their produce and services. However, the more challenging issue is devising policies that would be targeted to the poor. Poverty mapping that helps identify the poor is an increasingly important tool to better target anti-poverty programs. The next section defines this technique.

7.2 Poverty mapping

Geographic targeting is becoming an important tool for allocating public resources to the poor. It is increasingly regarded as a more efficient way to reduce poverty than untargeted, universal programs. Many governments in developing countries are giving greater importance to decentralization, whereby the district or provincial government plays an important role in poverty reduction policies. To implement such policies, it is important to know the spatial distribution of poverty. Poverty mapping is the spatial analysis of poverty. It maps the incidence of poverty within each region and sub-region of a given country. A number of methods have been devised to measure spatial distribution of poverty. There is not enough space in this chapter to present all the methods that have been used in practice, so only the most widely used widely method, small-area estimation, is discussed.

Household surveys are the most important data source for measuring poverty. However, their sample sizes are too small to provide precise estimates of poverty for small geographical units, such as provinces and districts. An alternative data source are population censuses, which do not suffer from small sample problems, but typically provide very limited information from each household. For instance, censuses do not offer information on households' consumption expenditures or incomes, preventing income poverty from being measured directly. However, small-area estimation is a statistical technique that combines household survey and census data to estimate income poverty at small geographical units. It has been used by the U.S. government for planning and targeting. And recently, the World Bank staff have refined this technique and applied it to many developing countries. The technique has also been applied to Lao PDR (Kakwani (2002), a brief discussion of which is presented below.

The first step in making a small-area estimation is to formulate a model that uses regression methods to forecasts households' consumption expenditures, based on household survey data. For example, let household welfare be measured by the ratio of household consumption per capita over the per capita household poverty line (expressed in percentage terms):

$$w_i = 100\, c_i / z_i \tag{3}$$

where c_i is the i^{th} household's per capita consumption and z_i is the household's per capita poverty line. A household is poor if its welfare index in (3) is less than 100; otherwise, it's non-poor. Since the poverty line takes account of regional differences in costs of living, w_i is an index of household's real per capita consumption.[51] Each household i can be characterized by the row vector of X_i, which consists of k observable household characteristics, such as the age, sex, occupation and educational attainment of household head, household size, location of household, access to utilities, and ownership of consumer durables. Assume the welfare w_i of household i is generated by a stochastic model, defined as:

$$\text{Ln}\,(w_i) = \mathbf{X_i \beta} + \varepsilon_i, \tag{4}$$

[51] Note that poverty lines differ across households because of differences in regional costs of living. Thus, this model attempts to explain variations in real per capita consumption that takes account of differences in regional costs of living.

where **β** is the column vector of *k* parameters. The vector X_i consists only of variables that are found in both the household survey and the population census. The error term ε_i is the idiosyncratic shock that the household will experience in the future. Assume that ε_i normally distributed with zero mean and a variance σ_i^2 depends on observable household characteristics according to simple functional form:

$$\sigma_i^2 = X_i \delta \tag{5}$$

δ is the column vector of *k* parameters.

Suppose that $\hat{\beta}$ and $\hat{\delta}$ are the consistent estimators [estimates?] of β and δ, respectively. For large sample sizes, we can say that *Ln* (w_i) is normally distributed with mean $X_i\hat{\beta}$ and variance $X_i\ \hat{\delta}$, which implies that:

$$\varsigma_i = \frac{\log w_i - X_i\hat{\beta}}{\sqrt{X_i\hat{\delta}}} \tag{6}$$

is distributed as asymptotically normal with zero mean and unit variance. The probability of the i^{th} household being poor, denoted by p_i, can be written as

$$p_i = \Pr[\ w_i < 100\ ] = \Pr[\ Ln(w_i) < Ln(100)\ ] \tag{7}$$

which in view of (6) and (7) provides an estimate of p_i as:

$$\hat{p}_i = \Pr[\zeta_i < \eta_i] = \Phi(\eta_i)^{52} \tag{8}$$

where

$$\eta_i = \frac{\log(100) - X_i\hat{\beta}}{\sqrt{X_i}\hat{\delta}}$$

and $\Phi(.)$ is the cumulative density of the standard normal distribution. Thus $\Phi(\eta_i)$ is the estimated probability of a household with characteristics X_i being poor.

The objective of small-area estimation is to estimate this probability for each household in the census. Let the i^{th} household in the census be characterized by the row vector X_i^*. Then the estimated probability of this household being poor can be obtained by replacing X_i in (8) by X_i^* and is given as:

$$\hat{p}_i^{\hat{*}} = \Phi(\eta_i^*) \tag{9}$$

where

$$\eta_i^* = \frac{\log(100) - X_i^*\hat{\beta}}{\sqrt{X_i^*}\hat{\delta}}.$$

Equation (9) estimates the probability of being poor for each census household. It is reasonable to assume that the probability of being poor is the same for each household member. This gives the probability of being poor for every individual in the census.

[52] See Hentschel, Lanjouw, Lanjouw and Poggi, 2000.

Accordingly, we can then find the average probability of being poor for any group or regions (provinces or districts), which is an estimate of the head-count ratio for that group or region.

Suppose there are N census households in the target population, which has the total population equal to P, given by P = $\sum_{i=1}^{N} s_i$, where s_i is the size of the i[th] household in the census. Thus, the estimated headcount ratio for the target population is given by:

$$H = \frac{1}{P}\sum_{i=1}^{N} s_i\, \Phi(\eta_i^*) \qquad (10)$$

The estimated head count ratio H given in (10) is the function of two stochastic vectors: $\hat{\beta}$ and $\hat{\delta}$. So if we know the variance and covariance matrices of these vectors, V ($\hat{\beta}$) and V ($\hat{\delta}$), respectively, then we can compute the variance of H, the square root of which gives its standard error. The derivation of the standard errors is given in the Appendix.

7.3 Some limitations in poverty mapping and alternative without census data

The most attractive feature of the technique discussed above is that it provides the standard errors of poverty estimates so that we can readily check the precision of poverty estimates. The size of the standard errors depend on two factors: (i) the explanatory power of the model estimated at the first stage from the household survey data, and (ii) the level of disaggregation sought. Empirical analysis by Hentschel, Lanjouw, Lanjouw, and Poggi (2000) shows that the precision of poverty estimates declines rapidly as the degree of disaggregation increases. Thus, one cannot achieve too much fine-tuning that might be required to achieve greater efficiency in targeting.

Household surveys generally provide information about the clusters to which the sample households belong. This information can be exploited to obtain more efficient estimators of the regression model. Elbers, Lanjouw, and Lanjouw (2001) have given a detailed discussion of the econometric issues relating to the problems of heteroskedasticity and spatial autocorrelation. These refinements will of course improve the efficiency of estimated coefficients because they do make use of all available information.

Construction of poverty maps requires having access to census data at the household level. Statistical offices of many countries do not allow, for reasons of confidentiality, such detailed information be made available to individual researchers. Some statistical authorities, however, make available aggregated census data, which unfortunately, leads to loss of precision of poverty map estimates, particularly at the lower level of disaggregation. A further requirement of poverty mapping is that the household surveys have a large subset of variables that are also in census, which may not always be the case. Variables that are available in both household survey and census may not be sufficiently correlated with the household consumption. In this case, the regression model will not be able to predict poverty maps accurately. Finally, poverty mapping assumes that the explanatory variables X in the household survey are produced from the same data-generating process as the census data. This assumption, however, can be statistically tested. The minimum requirement for this assumption to hold is that both household and census surveys should correspond to the same period. The maximum allowable time difference will depend on the rate of economic change that is taking place in the country. Many countries do not have census and household surveys for the same period.

In most developing counties, the census is conducted every ten years. Household surveys, however, are conducted more frequently. The ten-year period is too infrequent, leading to the creation of poverty maps that are outdated long before the next poverty mapping exercise is undertaken. Outdated poverty maps can lead to misallocation of scarce public resources. Given so many problems in combining household survey and census, an alternative method of constructing partial poverty maps is proposed below. This approach does not require the use of census data. The approach has been applied to identify the poor districts in the Lao PDR.

Box 1: Partial Poverty Mapping in Lao PDR

There are 18 provinces in Lao PDR, each of which has many districts. The sample size can be very small at the district level, and thus the poverty estimates at the district level may not be very accurate. For the purpose of formulating a poverty reduction policy, one wants to know which districts are poor so that policymakers can target policies to them. The first task is to define a poor district. Since the poverty rate at the national level was 38.6 percent in 1997-98, it is reasonable to assume a district to be poor if more than 50 percent of its population is living in poverty. The null hypothesis is that the percentage of poor people in a district is 50 percent or less. The alternative hypothesis will obviously involve districts where more than 50 percent of the population is poor. Thus, one can identify a district as poor if one rejects the null hypothesis at the 5 percent significance level.

If p_i is an estimate of the percentage of poor in the i^{th} district based on a sample of size n_i, then its standard error under the null hypothesis will be $100\times\sqrt{\frac{0.5\times 0.5}{n_i}}$. Using a one-tailed test, the hypothesis will be rejected at the 5 percent significance level if :

$$p_i > 50 + 1.67\times 100\times\sqrt{\frac{0.5\times 0.5}{n_i}}$$

If on the basis of a district sample one rejects the null hypothesis using this decision rule, the probability will be less than 0.05 that the district will be non-poor. Alternatively, if a district is identified as poor, then it will be poor with more than a 95 percent probability. This procedure helps policymakers to accurately identify a poor district. However, there is one problem with this approach. If for a district the null hypothesis is not rejected, it does not imply that the district will always be non-poor. This situation can occur when the sample for that district is very small. This is one reason to call this as a partial approach.

Empirical estimates show that of 18 provinces, the null hypothesis was rejected for 3 provinces and 128 districts; the hypothesis of being non-poor was rejected for 28 districts. Thus this partial approach found that there are 28 districts for which over 50 percent of the population is poor. The main drawback of the approach is that one cannot conclude how many districts are poor or non-poor in the remaining 100 districts.

7.4 Practical issues of implementing geographical targeting

Geographical targeting can be an effective means of channeling public resources to the poor if there is a large concentration of poverty by regions. The basic idea of geographical targeting is that the government runs the program only in the poorest regions. If the incidence of poverty is distributed uniformly across the regions, geographical targeting will not be very effective in reducing the national poverty. There will be a large reduction in poverty in the targeted regions. In untargeted regions, a large proportion of the poor will be completely left out. Thus, there will be large under-coverage rates.

The Philippines is one of the most diverse countries in the world, making it a revealing test of geographical targeting's efficacy. The country can be divided into 16 regions. The second and third columns in Table 8 provide the population shares and poverty rates in each region. The largest region is the National Capital Region (NCR) with a population share of 14.21 percent. This is also the country's least poor region, with only 11.32 percent of its population considered poor. In contrast, Bicol, Caraga, and

ARMM are among the country's poorest regions, with 54.06, 55.43, and 56.71 percent of their respective populations deemed poor.

Suppose the Philippines government has a budget of 26 billion pesos to spend on poverty alleviation in the country. If it spends all this money on a universal program, then every citizen in the Philippines will receive 30 pesos per month. Consequently, 5.09 percentage of the total population will escape poverty. Table 5's column 4 shows the degree in which a universal program effects poverty reduction from one region to another. The largest percentage reduction would occur in the country's richest region of NCR. Although the ARMM is the poorest region, poverty reduction achieved would only be 3.58 percent. Since poverty is very deep in this region, the percentage of poor that would cross the poverty line as a result of universal assistance would be small. The story, however, changes if the poverty gap and severity of poverty indices are used to assess the effectiveness of the program by region.

Table 8. Geographical targeting in the Philippines, 1998

Regions	Population shares	% of poor	% reduction in poverty: Universal program	% reduction in poverty: Targeted program
Ilocos region	5.46	38.68	4.51	5.25
Cagayan Valley	3.88	38.97	7.25	4.10
Central Luzan	10.25	20.98	7.20	3.42
Southern Luzan	13.38	24.95	5.51	4.07
Bicol region	7.04	54.06	5.20	8.32
Western Visayas	8.50	43.69	6.83	7.98
Central Visayas	7.28	50.16	3.23	6.04
Eastern Visayas	5.09	49.75	4.64	6.81
Western Mindanao	3.94	52.41	4.00	5.63

Northern Mindanao	3.88	47.63	4.58	5.03
Southern Mindanao	6.28	44.37	5.15	6.39
Central Mindanao	3.28	49.86	4.08	4.45
NCR	14.21	11.32	8.55	2.30
CAR	1.89	39.49	2.86	2.03
ARMM	2.80	56.71	3.58	4.33
Caraga	2.84	55.43	2.75	4.29
Philippines	100.00	36.67	5.09	

Source: Authors' calculations based on Philippines Annual Poverty Indicator Survey

Assume the government targets the same amount of money (26 billion pesos) into specific regions, instead of dispensing it uniformly across the country. To assess this impact, we would need to perform distinct regional calculations (see 5th column). It can be seen that if we spend all 26 billion pesos in Bicol region, the national poverty would decline by 8.32 percent, whereas untargeted universal program with the same resources could reduce the national poverty by 5.09 percent. Thus, compared to untargeted programs, geographical targeting is more effective. Moreover, geographical targeting can be further improved if it is combined with means testing within the targeted regions. The percentage reduction in poverty will be 4.33 percent if the entire money is spent in ARMM region. Because of this minimum level of improvement, the poorest region may not be targeted for the poverty alleviation. Thus, many poor persons would be left out of the program.

To achieve the greatest gains from geographical targeting, we need to fine-tune targeting to smaller geographical units--such as municipalities and districts over states and provinces. As noted, the precision of poverty estimates declines rapidly as the degree of disaggregation increases. Thus, such fine tuning may be hard to achieve. Prior to targeting a region, policy makers also need to have a clear idea about which poverty measure they are attempting to reduce. It is obvious that targeted regions should deliver a maximum reduction in national poverty. If the poverty gap is used as a poverty measure instead of the headcount ratio, the region or regions that would be selected would be different. The principle of horizontal equity requires that those gauged to be poor should receive the same benefits from the government programs. Geographical targeting requires that only those regions that can generate the largest reduction in national poverty should be selected. This means that the poor persons in regions not selected will not receive any benefits from the government programs.

To satisfy the principle of horizontal equity, one should use perfect targeting when the poor get all the benefits in proportion to the income shortfall from the poverty line (Kakwani and Son 2005). However, in practice, it is not possible to attain perfect targeting because it is difficult to accurately determine people's income or consumption. Accordingly, we generally resort to proxy targeting, such as by geographical regions or other socioeconomic characteristics of households. This leads to a violation of horizontal equity. Thus, there is a clear-cut need for further research on targeting so that there is a minimum violation of the principle of horizontal equity.

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Appendix

To calculate the standard errors mentioned in Section 6, we first need to find the variance of $\Phi(\eta_i^*)$ for each census household, which is given by

$$V(\Phi(\eta_i^*)) = [\frac{\partial \Phi}{\partial \beta}]' \, V(\hat{\beta})[\frac{\partial \Phi}{\partial \beta}] + [\frac{\partial \Phi}{\partial \delta}]' \, V(\hat{\delta}) \, [\frac{\partial \Phi}{\partial \delta}] + [\frac{\partial \Phi}{\partial \beta}]' \, \mathrm{Cov}\,(\hat{\beta}, \hat{\delta})[\frac{\partial \Phi}{\partial \delta}]$$

(A-1)

where Cov $(\hat{\beta}, \hat{\delta})$ is the covariance between $\hat{\beta}$ and $\hat{\delta}$, which can be shown to be equal to zero. Thus, the third term in the right hand side of (A-1) will be zero. One can also show that:

$$\frac{\partial \Phi}{\partial \delta} = -\frac{\phi(\eta_i^*) X_i^{'*}}{\sqrt{X_i^* \hat{\delta}}} \quad \text{and} \quad \frac{\partial \Phi}{\partial \delta} \frac{\partial \Phi}{\partial \delta} = -\frac{\phi(\eta_i^*) \eta_i^* X_i^{'*}}{\sqrt{X_i^* \hat{\delta}}} \qquad \text{(A-2)}$$

where $\phi(\eta_i^*)$ is the standard normal density function. Inserting into (A-1) gives

$$V(\Phi(\eta_i^*)) = \frac{(\phi(\eta_i^*))^2}{X_i^* \hat{\delta}} \, [X_i^* V(\hat{\beta}) X_i^{'*} + \eta_i^{*2} \, X_i^* V(\hat{\delta}) X_i^{'*}] \qquad \text{(A-3)}$$

This gives the variance of the estimated head count ratio defined in (A-1) as

$$V\,(H) = \frac{1}{P^2} \sum_{i=1}^{N} m_i^2 \, V\,(\Phi(\eta_i^*)) \qquad \text{(A-4)}$$

the square root of which provides the standard error of the estimated head count ratio for the target population.

CHAPTER VIII. ANALYSIS OF POVERTY DYNAMICS

Paul Glewwe and John Gibson

Introduction

Chapter 7 focused almost exclusively on analysis of poverty at a single point in time. Yet, in a given time period, people may be poor either because they've always been poor or because they have suffered a negative shock that temporarily pushed them below the poverty line. With a single cross-sectional survey, it is difficult to separate these two types of poverty even though each may require different policy prescriptions. Therefore, this chapter extends the analysis of Chapter 7 to many time periods, and thus it, it is concerned with the dynamics of poverty.

Examining changes in poverty over time raises difficult issues. But it also provides a richer and more realistic portrait of the nature of poverty. Individuals and households typically live for many decades, which implies that a person's poverty status may change over time. If it does not change over time, it would be trivial to extend static analysis to dynamic settings. As will be seen below, the poverty status of many individuals and households appears to change a great deal over time, a finding that is surprising to both researchers and policymakers.

This chapter assumes that "income" is an effective variable for measuring welfare. While this assumption may narrow the scope of poverty analysis, it is needed to keep the size of this chapter manageable. Even with a single–variable study, many important issues can arise in dynamic analysis that are not simple to resolve. Thus, despite the increased interest in poverty dynamics[53] collecting and analyzing survey data on poverty dynamics is a difficult task for any statistical agency. The chapter starts by examining three important conceptual issues in poverty analysis in Section 8.1:

- Relationship between income inequality and poverty at a single point in time and income mobility over time,
- Distinction between chronic and transient poverty, and
- Issues concerning the measurement of income growth among the poor.

Section 8.2 then examines two key practical issues: the relative merits of panel data and repeated cross-sectional data, and the problem of measurement error in income and expenditure data. Examples of how to analyze poverty dynamics are then presented in Section 8.3. Section 8.4 concludes the chapter by summarizing its findings and proposing several recommendations that would improve the analysis of poverty dynamics.

8.1 Conceptual issues

The possibility that people's poverty status can change over time raises several conceptual issues. This section discusses three of the most important:

[53] For examples, *see Journal of Development Studies*, August 2000 and *World Development*, March 2003,

- Understanding the relationship between income inequality and income mobility at a single point in time (which has direct implications for the relationship between income mobility and the dynamics of poverty),
- Distinguishing between chronic (long-run) and transient (short-run) poverty, and
- Measuring income growth of the poor.

8.1.1 Relationship between inequality and mobility

Assuming that income, or some other measurable variable, is a reasonably good indicator of welfare, poverty can be defined by a person's income relative to some poverty line. One's income determines one's poverty status, and changes in one's income effects changes in one's poverty status. Therefore, it is useful to begin by examining the distribution of income, and changes in the distribution of income before discussing poverty and changes in poverty.

First consider the relationship between income inequality at a single point in time and income mobility over time. For simplicity, consider a scenario with only two time periods. Let y_1 and y_2 be income in time periods 1 and 2, respectively. If people's incomes were unchanged in both time periods, then the distribution of y_1 would be the same as the distribution of y_2. The extent of poverty (measured by comparing the distribution of income to some poverty line) would be unchanged over time (and the poverty status of all individuals would be the same in both time periods). But the converse does not hold; the finding that the distribution of income has not changed over time, and thus that the extent of poverty is the same in both time periods, does *not* imply that everyone's income (and poverty status) is unchanged. It is also possible that some people who were poor in the first period escaped from poverty in the second period, while an equal number of people who were not poor in the first time period fell into poverty in the second period.

If it were the case that everyone's incomes had remained unchanged over time, then the correlation coefficient between y_1 and y_2 would equal one: $\rho(y_1, y_2) = 1$. On the other hand, if some people's incomes had increased between the two time periods so that they escaped poverty, and they were replaced by an equal number of people who fell into poverty over time, then the correlation between y_1 and y_2 would be less than one: $\rho(y_1, y_2) < 1$. Another way of expressing this phenomenon is to say that there is a certain amount of income mobility. Indeed, a common measure of income mobility, which can be denoted by $m(y_1, y_2)$, is one minus the correlation coefficient:

$$m(y_1, y_2) = 1 - \rho(y_1, y_2) \tag{1}$$

where $\rho(\ln(y), \ln(x))$ is the correlation coefficient. For a more detailed exposition on mobility, see Glewwe (2005).

In general, for a given level of short-run inequality (inequality measured at one point in time), higher mobility implies a more equal distribution of long-run or "life cycle" income. For example, one commonly used measure of income inequality is the variance of the (natural) logarithm of income: Var[ln(y)]. In the simplest case, with only two time periods, long-run income can be calculated as the sum of income in the two time periods: $y_1 + y_2$. A common measure of income mobility across two time periods is based on the correlation of the log of income:

$$(y_1, y_2) = 1 - \rho(\ln(y_1), \ln(y_2))^{54} \tag{1a}$$

If the degree of inequality in the two time periods is similar, then long-run income inequality is approximately equal to short-run inequality multiplied by one minus the mobility index:

$$\mathrm{Var}[\ln(y_1+y_2)] \approx \mathrm{Var}[\ln(y_1)](1 - m(y_1, y_2)) \tag{2}$$

where $m(y_1, y_2)$ is defined as $1 - \rho(\ln(y_1), \ln(y_2))$. In other words, higher income mobility leads to lower long-run inequality for a given level of short-run inequality.

8.1.2 Chronic vs. transient poverty

If poverty is defined as having an income below some poverty line in any given year, greater mobility reduces the chance that a person who is poor in one time period is poor in another time period (for a given rate of poverty). In fact, if the logarithm of income (or any other monotonic transformation of income) is normally distributed in both years, the probability that a person is poor in both years decreases as the correlation

[54] In practice, it usually makes little difference whether mobility is defined as $1 - \rho(y_1, y_2)$ or $1 - \rho(\ln(y_1), \ln(y_2))$. Both of these mobility indices satisfy virtually all axioms that a reasonable measure of mobility should have (see, Glewwe, 2005).

coefficient of y_1 and y_2 decreases. Put another way, greater income or expenditure mobility implies that poverty is more of a temporary than a permanent phenomenon, and thus that poverty is more equally distributed across the population over an individual's lifetimes.

The degree of income mobility, and thus the difference between short-run and long-run inequality and the nature of poverty dynamics, is an empirical question. With adequate data, one can measure income mobility and its consequences for long-run inequality and the dynamics of poverty. Yet, this immediately leads to the question: How should one measure long-run poverty at both the individual and the aggregate level? In practice, two approaches are used to measure long-run poverty and to decompose poverty at one point in time into a long-run, chronic component, and a short-run transient component.

The first approach is the *Spells* approach, which focuses on the number of spells of poverty experienced over a given number of time periods. This approach classifies as chronically poor all those whose welfare is below the poverty line in all time periods. At any point in time, the poor can be divided into the chronically poor and the transient poor, the latter of which are poor at that time period but are not poor in one or more of the other time periods. For multiple time periods, one can calculate the population that is chronically poor ("always poor") and the average population that is transient poor. The chronically poor divided by the sum of the chronically poor and the average of the transient poor can be used to indicate the relative contribution of chronic poverty to overall poverty. The Spells approach tends to find that transient poverty is much more common than chronic poverty. In a review of 13 studies, 11 found that the chronically poor were a smaller proportion of the overall population than the transient poor (Baulch and Hoddinott, 2000).

There are several disadvantages of using the Spells approach to divide overall poverty into chronic and transient poverty. First, it is sensitive to measurement error, which leads to overestimation of the proportion of the population that is poor in some time periods but not in others. Second, it focuses attention on the headcount measure of poverty. In contrast, the poverty gap and distributionally-sensitive poverty measures (see Chapter 7) may record greater amounts of chronic poverty (as a proportion of overall poverty) because at a single point in time the chronic poor are most likely to be further below the poverty line. Third, the results are very likely to be sensitive to how many survey waves are available. It is harder for a household to be recorded as always poor in ten successive surveys than in just two of them. Similarly, when there are, say, ten survey waves, "sometimes poor" includes those who are poor once in ten periods and those who are poor in nine times out of ten, which is probably too broad a group to be meaningful. For example, across eight waves of data in the Russian Longitudinal Monitoring Survey (RLMS), gathered between 1994 and 2003, only four percent of urban households were always poor, while 81 percent were sometimes poor. But if only two waves of data are used (averaging over all possible combinations), 19 percent appear to be always poor and 36 percent appear to be sometimes poor. The ratio of always-to-sometimes poor, which can indicate chronic poverty, is thus not easily compared across surveys where households are observed across a different number of time periods.

An alternative method to the Spells approach is to divide poverty into the permanent component of a household's income (or consumption expenditures) and the remaining poverty due to transitory changes in income (Jalan and Ravallion, 1998). Under this C*omponents* approach, the chronically poor are those whose mean welfare across time is below the poverty line. The extent of chronic poverty is a function of that household's mean income, $C_i = P(\overline{y}_i, \overline{y}_i, \ldots, \overline{y}_i)$, where $\overline{y}_i$ is the mean welfare for household *i* over the T time periods spanned by the survey, and P is a poverty measure, such as the headcount or poverty gap. Transient poverty is the remainder, when C_i is subtracted from the total poverty measure at each point in time:

$$T_i = P(y_{i1}, y_{i2}, \ldots, y_{iK}) - P(\overline{y}_i, \overline{y}_i, \ldots, \overline{y}_i).$$

A simple example can help distinguish between the Spells and Components approaches. Consider four individuals, whose two-period consumption vectors are: A={450, 450}, B={400, 550}, C={530, 460}, and D={600, 550}. The poverty line is set at 500 in both periods. It is clear that person A is always poor, while B and C are sometimes poor, and D is never poor. Using the Spells approach to measure chronic poverty, one might conclude that the chronic poverty share of total poverty is one-third. However, persons A, B, and C are all chronically poor under the Components approach because their average consumption over time is below the poverty line.

The Components approach measures poverty in each period, using the period-specific consumption, and subtracts from this the poverty measure at the person's average consumption. For example, using the poverty gap index, the total poverty measures are:

- [((500-450)/500)+ ((500-450)/500)]/2=0.10, for person A
- [((500-400)/500)+ 0]/2=0.10, for person B, and
- [0+ ((500-460)/500)]/2=0.04, for person C.

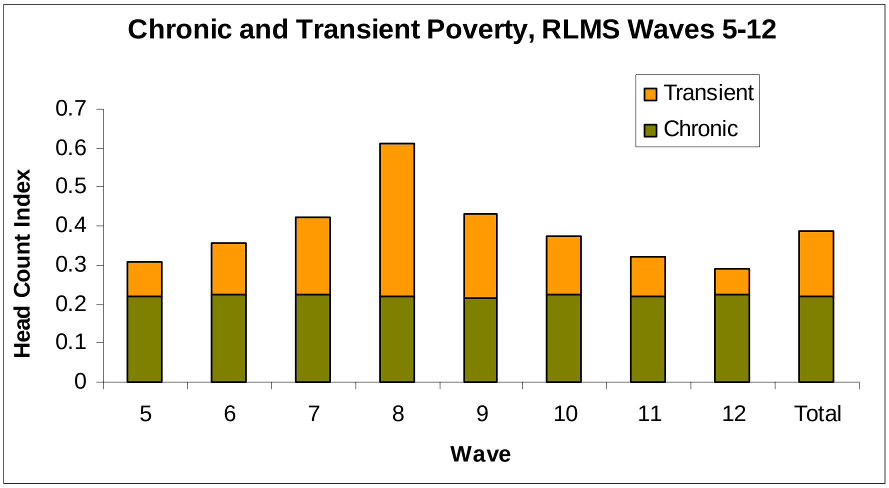
The chronic poverty measures are:

- (500-450)/500)=0.10, for person A
- (500-475)/500)=0.05, for person B, and
- (500-495)/500)=0.01, for person C.

Therefore, the transient components are 0, 0.05 and 0.03, respectively. Aggregating over the whole population of three people, the total poverty gap index is 0.06, the chronic poverty index is 0.04, and the transient poverty index is 0.02. In contrast to the Spells approach, two-thirds of the poverty appears to be chronic and only one-third transient.

This example highlights the impact various methodological approaches have on conclusions drawn about chronic and transient poverty. A further example comes from the RLMS data referred to above. According to the Components approach, chronic poverty makes up 57 percent of the total amount of poverty, and it is only during Wave 8 (in 1998 during the Russian financial crisis) that the contribution from transient poverty exceeds that from chronic poverty (Figure 1).

Figure 1: Chronic and Transient Poverty in Russia, 1994-2003



Source: Authors' calculations using the RLMS data.

8.1.3 <u>Comparing Income Growth among Poor and Non-Poor Households</u>

A major debate in economics is the extent to which a country's overall economic growth reaches all income groups, and especially if it raises the income of the poor as much as it does the incomes of more affluent groups. At first glance, the issue appears to be a relatively simple one. Yet, the rate of income growth among the poor depends on whose incomes are compared over time. Should one compare the incomes of the people who were poor in the first time period to the same people in the later time period (some of whom may no longer be poor), or should they be compared to the people who are poor in the later time period (some of whom were not poor in the first time period)? As long as some mobility exists, the first type of comparison will show a greater rate of economic growth among the poor than the second type of comparison. Which comparison is correct? Both are informative, and both need to be considered when asking whether economic growth has been "pro-poor."

8.2 Data issues

All the issues discussed in the previous section assume that once the conceptual issues are settled, data will be available to measure poverty and changes in poverty in accordance with the concepts deemed to be most correct. Yet, data from both developed and developing countries often fall short of the needs of researchers and policymakers who are interested in poverty issues. This section focuses on two important issues: the strengths and weaknesses of panel data and repeated cross-sectional data, and the problem of measurement error in the data.

8.2.1 Panel Data versus Repeated Cross-Sectional Data

Poverty dynamics is almost always measured by examining household survey data collected at two or more time periods. A very important characteristic of a household survey is whether the data are collected from the same households and individuals over time (called panel data) or if the data are collected from different households each time the survey is conducted (known as a repeated cross-sectional survey). In general, panel data provide much more information on poverty dynamics than do repeated cross-sectional data. But panel data are somewhat more complicated to collect.

To see the benefit of panel data, first consider the persistence of poverty over time, which, as explained above, is closely related to income mobility. Neither income mobility nor persistence of poverty can be measured using repeated cross-sectional data. Only panel data track the same people and households over time and thus reveal the extent to which people's incomes change over time, and the extent to which poverty is either permanent or temporary. Thus, panel data are required to separate overall poverty into its chronic and transient components. Second, consider the impact of economic growth on the poor. Both cross-sectional and panel data can be used to measure income growth among the poor if the poor are defined in terms of the current status (e.g., the poorest 20 percent of the population in each year). However, only panel data allow one to examine income growth among the poor when it is defined as following the same people over time (and thus who may not be in the poorest 20 percent of the population in later years). Again, the reason for this is that panel data track the same people and households over time, while cross-sectional data collect data from different people over time.

While panel data have the above-mentioned advantages, they also have three potential disadvantages. First, under even the best circumstances some households and individuals that are part of the original data are lost--they refuse to participate or cannot be found in later interviews. This phenomenon is known as sample attrition, and if the individuals and households that cannot be reinterviewed are systematically different from those that remain, the latter are not a random sample of the population and thus may yield biased estimates. Second, as new people are born and new households are formed, there is often a tendency to exclude them from the sample because those people and households did not exist when the sample was originally collected. While this potential source of bias, known as selection bias, can be overcome in principal by following households that "split off" from the original households in the survey, doing so is difficult and in practice is often not done. The third disadvantage of collecting data is that it may be somewhat more expensive to collect than implementing a series of repeated cross-sectional surveys.

While these limitations of panel data must be taken seriously, such data still provide much more information on poverty dynamics over time than does a series of cross-sectional surveys that interview different households at each point in time. Because the effect of these disadvantages can be mitigated (see Glewwe and Jacoby, 2000), this chapter recommends that panel data be collected if one wants to analyze poverty dynamics. This is not a simple task, but it is feasible in many developing countries. Further analysis and recommendations for how to collect panel data can be found in Glewwe and Jacoby (2000).

8.2.2 Measurement Error

A second key issue is measurement error in the income (or expenditure) data. Empirical studies of poverty dynamics, and more generally of income mobility, typically use income and/or expenditure data collected from household surveys. Anyone who has seen how such data are collected understands that these variables are likely to be measured with a large amount of error, and many empirical studies (e.g., Bound and Krueger, 1991 and Pischke, 1995) have verified this.

Measurement error in the income variable will cause virtually any measure of mobility to overestimate true mobility because all fluctuations in measured income due to measurement error are mistakenly treated as actual income fluctuations. A similar finding holds with respect to poverty dynamics: random measurement error in the income or expenditure variable will overestimate movements into and out of poverty. This can be demonstrated formally for income mobility using correlation-based mobility measures. The objective is to estimate $m(y_1^*, y_2^*) = 1 - \rho(f(y_1^*), f(y_2^*))$, where asterisks denote "true" income, measured without error. For simplicity, set $f(y^*) = y^*$. (This analysis generalizes to any function $f(y^*)$ for which measurement error in y^* causes measured $f(y^*)$ to equal $f(y^*)$ plus an additive error term). Consider income in two time periods for a set of individuals or households. The correlation coefficient is:

$$\rho(y_1^*, y_2^*) = \frac{\sigma_{y_1^*, y_2^*}}{\sqrt{\sigma^2_{y_1^*}\sigma^2_{y_2^*}}} = \frac{\sigma_{y_1^*, y_2^*}}{\sigma_{y_1^*}\sigma_{y_2^*}} \qquad (3)$$

where $\sigma_{y1^*,y2^*}$ denotes covariance and σ_{y1^*} and σ_{y2^*} denote standard deviations.

If the measurement errors in both time periods are uncorrelated with y_1^* and y_2^*, and with each other, calculations based on observed income will underestimate $\rho(y_1^*, y_2^*)$ in (3) and thus overestimate mobility, $m(y_1^*, y_2^*) = 1 - \rho(y_1^*, y_2^*)$. The same is true even if the measurement errors are correlated over time, as long as the correlation of y_1^*

and y_2* is greater than the correlation of their respective measurement errors. Formally, denote observed incomes as $y_1 = y_1* + u + e_1$ and $y_2 = y_2* + u + e_2$, where e_1 and e_2 are random errors and u is a random component that persists over time and thus introduces correlation between the overall measurement errors. Assume that e_1, e_2 and u are uncorrelated with each other and with y_1* and y_2*. Consider the correlation of y_1 and y_2:

$$\rho(y_1, y_2) = \frac{\sigma_{y_1*,y_2*} + \sigma_u^2}{\sqrt{(\sigma_{y_1*}^2 + \sigma_u^2 + \sigma_{e_1}^2)(\sigma_{y_2*}^2 + \sigma_u^2 + \sigma_{e_2}^2)}} \approx \frac{\sigma_{y_1*,y_2*} + \sigma_u^2}{(\sigma_{y_1*}^2 + \sigma_u^2 + \sigma_{e_1}^2)} \tag{4}$$

where $\rho(y_1, y_2)$ is the correlation of *observed* income in the two time periods. If the error terms are not correlated over time, then $\sigma_u^2 = 0$ and the second term in (4) is clearly greater than $\rho(y_1*, y_2*)$, as can be seen by comparison with (3). Intuitively, e_1 and e_2 add "noise" to y_1* and y_2*, which reduces the observed correlation of the two income variables and thus increases observed mobility.

Overall, there are serious problems with using panel data to measure income and poverty dynamics because of measurement error in the income (or expenditure) data. In general, measurement error will exaggerate the extent of income mobility and thus will exaggerate movements into and out of poverty. The appropriate statistical procedure to evaluate measurement errors depends on the data available. When there are panel data for three or more points in time, it is possible to evaluate measurement error using simple correlations and a minimum of assumptions, following an approach developed by Heise (1969). But when data are available at only two points in time, evaluating measurement error for fluctuating variables like income and consumption requires more sophisticated instrumental variables regression modelling methods (Glewwe, 2005). The simple correlation method is described in this section, while results from the regression approach, which is needed with two period panels, are described in Section 3.0.

Many statistical agencies are familiar with the "reliability index," which shows the share of the standard deviation of an observed variable that is due to the true phenomenon. For example, the actual years of education for a household head is s*. But a survey measures school years as s, which may include an error, so the reliability index is defined as $\lambda = \sigma_{s*}/\sigma_s$. The reliability index can be estimated if two observations are made on the same variable, even when each observation is potentially unreliable. Let $s_1 = s^* + u_1$ be the first observation on the household head's education and $s_2 = s^* + u_2$ a repeated observation some months later, where u_1 and u_2 are measurement errors. If these errors are uncorrelated with each other and with true values, the empirical correlation between the two reports on the household head's education is:

$$\rho(s_1, s_2) = \frac{\operatorname{cov}\left(s^* + u_1, s^* + u_2\right)}{\sqrt{\operatorname{var}\left(s^* + u_1\right) \times \operatorname{var}\left(s^* + u_2\right)}} = \frac{\operatorname{var}\left(s^*\right)}{\sqrt{\operatorname{var}(s_1) \times \operatorname{var}(s_2)}} = \lambda^2 \qquad (5)$$

In other words, the correlation coefficient between two observations on the same variable gives the ratio of the variance in the true variable to the (geometric) average variance of the repeatedly observed variables, which equals the square of the reliability index. These correlations can often be obtained from re-visit or post-enumeration surveys.

The reliability index cannot be directly applied to longitudinal data on income or consumption, because unlike years of education in the above example, the true values of income and consumption fluctuate over time. Thus a correlation of less than one for the consumption of the same household in two periods does not necessarily indicate measurement error and instead may reflect an inability to smooth consumption over time. However, if there are at least three waves in a longitudinal survey, it is possible to separate real dynamics from measurement error with minimal assumptions (Heise, 1969). Intuition suggests that the estimated correlation between a mis-measured variable, like household consumption in one period, and a realization of that variable in a subsequent period will be less than it would be in the absence of measurement error (as explained above). And this attenuation is proportional to the reliability index of the variable.

As an example, consider the reliability index for household consumption in the Russian Longitudinal Monitoring Survey. Let Y_{1994}, Y_{1995}, and Y_{1996} be the observed consumption for the 2,195 urban households in the survey in each of 1994, 1995 and 1996. The true but unknown consumption is X_{1994}, X_{1995}, and X_{1996}, which differs from the observed values due to measurement errors that are independent of each other, of time, and of the underlying variable: $Y_t = X_t + u_t \;\; \forall t$. If the reliability of measuring consumption does not vary over time, the correlation between observed consumption in two years is: $\rho(Y_t, Y_{t+1}) = \lambda_{Yt}\lambda_{Yt+1}\rho(X_t, X_{t+1}) = (\lambda_Y)^2\rho(X_t, X_{t+1})$. So for example, the correlation of 0.42 between observed expenditures in 1994 and 1995 understates the correlation in actual consumption by a factor of $(\lambda_Y)^2$. These assumptions also imply that

$\rho(Y_{t-1}, Y_{t+1}) = (\lambda_Y)^2\rho(X_{t-1}, X_{t+1})$. If realizations of the true values of consumption come from a first-order autoregressive model (that is, if $X_t = a + bX_{t-1} + e_t$), then the relationship between correlation coefficients is: $\rho(X_{t-1}, X_t)\times\rho(X_t, X_{t+1})/\rho(X_{t-1}, X_{t+1}) = 1$. Substituting in the results [Not clear] for the correlation in observed consumption, the reliability index is estimated as: $\lambda_Y = \sqrt{\frac{\rho(Y_{t-1}, Y_t)\rho(Y_t, Y_{t+1})}{\rho(Y_{t-1}, Y_{t+1})}}$. Applying this formula to the Russian data, $\lambda_y = \sqrt{\frac{\rho(Y_{1994}, Y_{1995})\rho(Y_{1995}, Y_{1996})}{\rho(Y_{1994}, Y_{1996})}} = \sqrt{\frac{0.42\times 0.51}{0.29}} = 0.86$.

In other words, the standard deviation of observed household consumption in the Russian data can be decomposed into a true component, which contributes 86 percent, and an error component, which contributes 14 percent. It is because of this error, which attenuates correlations, that the product of the two one-year apart correlations, $0.42\times 0.51\ (=0.22)$, is less than the two-year apart correlation, 0.29.

A further example of this reliability index calculation comes from the Indonesian Family Life Survey, which observed a panel of households in 1993, 1997 and 2000. The correlations between the logarithm of annualized expenditures in each of these three years are reported in Table 1. It is apparent that there was a closer relationship between expenditures in 1997 and in 2000 than between 1993 and 1997, which may reflect some changes in the questionnaire.[55] The measure of mobility for 1997-2000, $1 - \rho(\ln(y_1), \ln(y_2))$ gives values of 0.32-0.40 similar to those reported for Vietnam in Table 5 below. However, this measure of mobility is based on attenuated correlation coefficients, where

[55] Correlations between other variables, like age of the household head, which should be measured with less error, also show this pattern. Researchers should use such correlations to check that they have correctly identified panel households.

the attenuation is given by λ_Y^2. The estimates of λ_Y^2 vary from 0.68-0.73 by sector and once these are used to correct the correlations for the effect of measurement error, the mobility measures fall substantially to only 0.06-0.12.

Table 1: Correlations Between Annualized Expenditures and Mobility of Households in Indonesia, With Correction for Measurement Error

Correlations	Indonesia	Urban	Rural
1993_2000	0.4288	0.4362	0.3322
1993_1997	0.4684	0.4656	0.3785
1997_2000	0.6717	0.6775	0.6
Reliability ratio	0.73	0.72	0.68
Reliability index	0.86	0.85	0.83
Mobility index (1997-2000)	0.33	0.32	0.40
Corrected correlation (1997-2000)	0.92	0.94	0.88
Corrected mobility index	0.08	0.06	0.12

Source: Authors' calculations using Indonesian Family Life Survey (IFLS) data

8.3 Recommendations for Data Collection

Evidence of measurement error in the expenditure data from the Russian and Indonesian panels, which are two of the better regarded surveys from developing countries, illustrates the need to address this issue. Fortunately, panel data allow one to use methods that assess and correct for measurement error, methods that cannot be used with cross-sectional data. If statistical agencies in developing countries are interested in measuring poverty dynamics, they will need to collect panel data. This subsection provides some recommendations for doing so.

First, it is important that the sample involve households (or even more thoroughly, of individuals) rather than dwellings. Otherwise, replacing an old household with a new one in a sampled dwelling may create spurious evidence of changes in economic status. More specifically, any panel sample that returns to the same dwellings over time must collect sufficient data to ascertain whether the dwelling's inhabitants are the same household or a new household. (Methods for doing so are provided in Glewwe and Jacoby, 2000.) A better approach would be for the survey to follow households that move and those that split and re-form (e.g., following marriage and divorce) because the poverty status of movers is often different from that of people who maintain stable addresses and family circumstances.

Second, consideration must be given to sample attrition, which may lead to selective samples of stayers that yield misleading inferences about the population. Fortunately, for some purposes, sample attrition may not be a serious problem. For example, Falaris (2003) studied attrition in several LSMS surveys. Stayers were 31 percent of the initial sample for Peru between 1991 and 1994, 55 percent for Lima between 1985 and 1990, 82 percent for Côte d'Ivoire between 1985 and 1988, and 84 percent for Vietnam between 1993 and 1998. Despite this wide variation in attrition rates, regression relationships for schooling attainment, wages and other socio-economic outcomes do not seem to vary between "attritors" and stayers in these samples. Lack of attrition bias suggests that results from just the sample of stayers are also likely to apply to attritors. Similar conclusions have been reached for regression studies on longitudinal data in developed countries (Fitzgerald, Gottschalk and Moffitt, 1998).

Yet, it is not clear whether the relatively minor affects of attrition on the conditional mean in regression studies also holds for poverty studies, which focus on the lower tail of the distribution. There is surprisingly little evidence on the effects of attrition on observed poverty dynamics in developing countries. However, at least in developed countries, it seems that attrition creates a bias. Cappellari and Jenkins (2002) use the British Household Panel Survey and find that a sample that excludes attritors would disproportionately exclude the poor and cause an overestimation of poverty persistence.

One way to reduce the potential for attrition bias is for statistical agencies to change the way in which they implement longitudinal surveys. Many surveys in developing countries attempt to re-interview respondents only if they live in the same dwelling in which they were previously interviewed. Failure to track movers presumably reflects concerns about cost and feasibility. Nevertheless, the experience of the Indonesian Family Life Survey shows that many movers can be successfully tracked, even when they move to a new province. In that survey, households who moved locally have initial characteristics that are more like those who stay in the same dwelling, whereas those who move longer distances are more like attritors. So there is considerable information gained by making the effort to track the movers (Thomas, Frankenberg and Smith, 2001).

8.4 Analytical methods with examples

8.4.1 Repeated cross-sectional data (including poverty monitoring)

If one has two or more cross-sectional data sets, one can use them to measure the extent, characteristics, and distribution of poverty across population groups, and how all of these things change over time. In addition, one can measure the average income of the poorest 10 percent, 20 percent, or 30 percent (or any percentage that is of interest) and see how the income of these groups changes over time. These percentile-specific comparisons provide one way of considering how the effect of growth at different points in income distribution might affect poverty.

An alternative method, which also requires only repeated cross-sections, is to decompose the change in poverty between two surveys into a “distribution” component and a “growth” component. The distribution component reflects the hypothetical effect of changes in inequality while holding mean (real) income constant. In contrast, the growth effect allows (real) mean to change at the rate of economic growth while (counterfactually) holding the distribution of income (as measured by the Lorenz curve) constant. This decomposition is of interest because the appropriate policies for reducing poverty will depend on whether recent changes in poverty are due mainly to growth effects or to inequality effects.

This subsection presents examples of all of these, mainly using household survey data from Vietnam and Papua New Guinea. Vietnam is an interesting example because its high rate of economic growth led to a large decline in poverty, from about 58 percent in 1992-93 to about 37 percent in 1997-98 (World Bank, 1999). In such circumstances, it is usually clear that the growth component of the poverty change is dominant. In contrast, poverty in Papua New Guinea has been much more persistent (Gibson, 2000). Therefore, to provide an example where it is less clear whether it is the growth or the inequality component that is likely to dominate, this subsection illustrates decomposition methods using data from urban Papua New Guinea.

Table 2 shows the extent of poverty in Vietnam in 1992-93 and 1997-98 using two common poverty indices: the headcount index (proportion of the people who are poor) and the poverty gap index (see Chapter 7 for an explanation).[56] Figures are shown separately for urban and rural areas, as well as for the entire country. The incidence of poverty in Vietnam dropped from 58.1 percent in 1992-93 to 37.4 percent in 1997-98. The drop in the poverty gap is even more dramatic, cut almost in half from 0.185 to 0.095. Using either index of poverty, it is clear that poverty dropped much more rapidly in urban areas than in rural areas. For example, in urban areas the incidence of poverty declined by more than half, from 25.1 percent to 9.0 percent, while in rural areas the poverty rate dropped from 66.4 percent to 44.9 percent.

Table 2: Poverty in Vietnam in 1992-93 and 1997-98

[56] For more information on the 1992-93 and 1997-98 Vietnam Living Standards Survey, see World Bank (2001).

	Urban		Rural		All Vietnam	
	Headcount	*Pov. Gap*	*Headcount*	*Pov. Gap*	*Headcount*	*Pov. Gap*
1992-93	0.251	0.064	0.664	0.215	0.581	0.185
1997-98	0.090	0.017	0.449	0.116	0.374	0.095

Source: Authors' calculations using Vietnam Living Standards Survey (VLSS) data.

Table 3 shows how the distribution of poverty has changed over time. In 1992-93, the share of poverty in the Northern Uplands was only slightly higher than its share of the total population (21 percent versus 18 percent, respectively). However, by 1997-98, its share of poverty had increased to almost 28 percent. In contrast, the share of poverty in the Red River Delta in 1992-93 was higher than its population share (23 percent versus 20 percent, respectively). But by 1997-98, the share of poverty in that region had dropped to 15 percent. This region contains the capital city of Hanoi, which experienced very high economic growth during the 1990s. The positive impact of urban economic growth on poverty is also apparent in the Southeast region, which includes Ho Chi Minh City . The share of poverty in that area was already lower than its population share in 1992-93 (7 percent versus 13 percent, respectively). And by 1997-98, its share of poverty had declined even further to only 3 percent.

Table 3: Distribution of Poverty in Vietnam, by Region

	Share of Poverty (Headcount Index)		**Share of Population**
Region	**1992-93**	**1997-98**	
Northern Uplands	21%	28%	18%
Red River Delta	23	15	20

North Central	16	18	14
Central Coast	10	10	11
Central Highlands	4	5	4
Southeast	7	3	13
Mekong Delta	18	21	21
All Vietnam	100%	100%	100%

Source: Authors' calculations using VLSS data.

Another use of repeated cross-sectional data is to examine the income growth among the poorest 20 percent (or any percent) of the population, focusing on who is currently poor, not who was poor during the initial time period. This is shown in Table 4. The annual growth rate of per capita expenditures of the poorest 20 percent of the population from 1992-93 to 1997-98 was 6.5 percent, slightly below the national average rate of 7.1 percent. The annual growth rate of the wealthiest 20 percent was somewhat higher, at 7.7 percent, while the rates for the rest of the population was remarkably consistent, averaging between 6.7 and 6.9 percent.

Table 4. Growth Rates in Observed Expenditures

	Population Distribution in 1992-93 (percent)	Mean Per Capita Expenditures 1992-93	Mean Per Capita Expenditures 1997-98	Growth over 5 Years (percent)	Average Annual Growth Rate (percent)
All Vietnam	100	1876	2648	41.2	7.1
By current quintile					
Poorest 20%	20	800	1095	36.9	6.5
Next 20%	20	1169	1617	38.3	6.7
Middle 20%	20	1516	2093	38.1	6.7
Next 20%	20	2030	2840	39.9	6.9
Richest 20%	20	3867	5601	44.8	7.7

Source: Authors' calculations using VLSS data.

Decomposition of a change in poverty rates into growth and distribution components relies on the fact that the FGT poverty measures (see Chapter 3) can be fully characterized in terms of the poverty line, the mean income of the distribution, and the Lorenz curve, which represents the distribution of income (Datt and Ravallion, 1992):

$$P_t = P\left(z/\mu_t, L_t\right) \tag{6}$$

where z is the poverty line, μ_t is the mean income, and L_t is a vector of parameters fully describing the Lorenz curve. The growth component of a change in poverty between date t and date t + n is computed as the change in poverty due to a change in the mean while holding the Lorenz curve constant at some reference level L_r:

$$G\left(t, t+n; r\right) = P\left(z/\mu_{t+n}, L_r\right) - P\left(z/\mu_t, L_r\right) \tag{7}$$

Often, the reference period r will be the starting date for the decomposition so that r = t. The distribution component is computed as the change in poverty between dates t and t + n due to a change in the Lorenz curve while keeping the mean income constant at the reference level μ_r:

$$D\left(t, t+n; r\right) = P\left(z/\mu_r, L_{t+n}\right) - P\left(z/\mu_r, L_t\right) \tag{8}$$

A convenient way of holding the Lorenz curve constant so as to obtain the growth component (equation (7)) is to use a statistical program such as POVCAL,[57] which allows experiments with different mean expenditure levels and poverty lines. For example, Table 5 shows a decomposition of poverty in Papua New Guinea used data from surveys in 1986 and 1996. In the first step of the decomposition, the Lorenz curve was estimated from data collected from the first year (1986) of the study. If the parameters of this estimated curve are combined with the 1996 mean expenditure level (K2451) and poverty line (K956), counterfactual estimates of poverty rates in 1996 are derived. These counterfactual estimates show what would have happened to poverty rates if the observed real growth in consumption had occurred, but there had been no change in inequality (the Lorenz curve is held constant). Comparison of this counterfactual with the estimated poverty rate in the first survey gives the growth component of the poverty change.

To derive the inequality component, a Lorenz curve was estimated on the data for the second year (1996) and then combined with the 1986 mean expenditure level (K1093) and poverty line (K484). This gives a counterfactual of what the poverty rate would have been in the second year if there had been a change in inequality with no change in real mean consumption. A comparison of this counterfactual with the estimated poverty rate in the first survey gives the distribution component of the poverty change.

Table 5. Example of the decomposition of change in poverty in Papua New Guinea, from 1986 to 1996

[57] This program can be downloaded from http://www.worldbank.org/lsms/tools/povcal/. A more general tool for this purpose is SimSip, which is also freely available from the World Bank, and can do cross-sectional, temporal decompositions, and incidence analysis.

Measures	1986	1996	Change	Growth	Distribution	Residual
P_0	19.64	18.93	-0.71	-6.12	3.00	2.41
P_1	3.73	7.64	3.91	-1.74	5.47	0.18
P_2	0.94	4.28	3.34	-0.55	4.27	-0.38
μ	1093.1	2450.7	..	..	..	..
Gini	0.379	0.403	..	..	..	..
Z	484	956	..	..	..	..

Source: Authors' calculations using household survey data from Papua New Guinea.

The growth and distribution components will often not add up exactly to the amount by which the actual poverty rate changes between two surveys. This residual is apparent for the headcount poverty rate (P_1) in the example, which was largely unchanged between the two surveys, but is not very important for the other two poverty measures which did exhibit much larger increases.

In terms of the policy uses of this decomposition, it appears that the major source of the rise in the poverty gap (P_1) and squared poverty gap (P_2) between 1986 and 1996 in Papua New Guinea was the increased inequality in the income distribution. Knowing this may be helpful for the design of appropriate poverty reduction policies.

8.4.2 Panel data for two points in time

This subsection relies on data from Vietnam to demonstrate how household survey data can be used to study poverty dynamics when one has panel data for two time periods. As in the previous subsection, the data used are from the 1992-93 and the 1997-98 Vietnam Living Standards Surveys. This data set is of particular interest because 4,300 of the 4,800 households in the 1992-93 survey were re-interviewed in 1997-98 survey, providing a large, national representative panel data set. (In the previous subsection these data sets were treated as repeated cross-sections.)

For simplicity, this examination of mobility and the dynamics of poverty will use household expenditures per capita as the indicator of poverty. The poverty line used is defined as the amount of money needed to purchase a basket of goods (both food and nonfood) that follows typical Vietnamese expenditure patterns and provides 2,100 calories per person per day. (For further details, see, World Bank, 1999.) The panel data reveal a poverty rate of 56.2 percent in 1992-93 and 33.5 percent in 1997-98.

Section 8.1 emphasized the key role that income (or expenditure) mobility plays in determining poverty dynamics. Thus, the first step is to examine expenditure mobility across the two years in Vietnam. Table 6 provides information on *observed* expenditure mobility, which (as explained in Section 8.1) is likely to exaggerate the true level of expenditure mobility. The top part of Table 6 shows a "transition matrix" that indicates, for each of the two years, households' position across five quintiles, ranging from the poorest 20 percent of the population (quintile 1) through the wealthiest 20 percent (quintile 5).

This transition matrix reveals a large amount of apparent mobility. For example, almost half of the households that were in the poorest 20 percent of the population in 1992-93 were no longer in the poorest 20 percent in 1997-98. About 40 percent of the population that was in the highest quintile in 1992-93 was no longer in that quintile in 1997-98. More generally, only 40 percent of the population remained in the same quintile during both survey years. Another 40% percent moved up or down one quintile, while the other 20 percent moved up or down two quintiles. Overall, it appears that there is a substantial amount of mobility. Of course, measurement errors exaggerate this mobility. Figures that are based on attempts to remove measurement error are presented below.

Table 6: Per capita Expenditure Mobility in Vietnam from 1992-93 to 1997-98 (observed values)

A. Mobility Matrix, by Quintiles

		1997-98 Quintile					
		1	2	3	4	5	Row Total
1992-93 Quintile	1	445 (10.4%)	229 (5.5%)	124 (2.9%)	51 (1.2%)	8 (0.2%)	857 (20.0%)
	2	239 (5.6%)	255 (6.0%)	215 (5.0%)	113 (2.6%)	34 (0.8%)	856 (20.0%)
	3	111 (2.6%)	208 (4.9%)	217 (5.1%)	229 (5.4%)	91 (2.1%)	856 (20.0%)
	4	46 (1.1%)	126 (2.9%)	211 (4.9%)	280 (6.5%)	193 (4.5%)	856 (20.0%)
	5	16 (0.4%)	38 (0.9%)	90 (2.1%)	182 (4.3%)	530 (12.4%)	856 (20.0%)
	Column Total	857 (20.0%)	856 (20.0%)	857 (20.0%)	855 (20.0%)	856 (20.0%)	4281 (100.0%)

Remained in same quintile in both years: 40.3%

Moved up or down by one quintile: 39.9%
Moved up or down by two or more quintiles: 19.8%

B. Summary Measures of Mobility

$m(x, y) = 1 - \rho(x,y)$:	0.309
$m(x, y) = 1 - \rho(\ln(x), \ln(y))$	0.298
$m(x, y) = 1 - \rho(\text{rank}(x), \text{rank}(y))$	0.332

SOURCE: Authors' calculations using VLSS data.

The bottom half of Table 6 presents summary measures of expenditure mobility based on correlation between per capita expenditures in 1992-93 and 1997-98. Three different versions are presented, based on correlations of expenditures, the natural log of expenditures, and the rank of expenditures. The results are quite similar, showing mobility ranging from 0.298 to 0.332. Note that no mobility at all would give a value of zero and "full" mobility, in the sense of no correlation of expenditure over time, would give a mobility index of 1. While these figures are closer to "no mobility" than to "full mobility," the transition matrix indicates that, intuitively, this is still a substantial amount of mobility.

Using the poverty lines developed by the World Bank, the dynamics of poverty are shown in Table 7-A. Of the households that were poor in 1992-93, almost half (27.4 percent, relative to 56.2 percent) were no longer poor in 1997-98. Of the households that were not poor in 1992-93, slightly more than one tenth appear to have become poor in

1997-98 (4.7 percent out of 43.8 percent). This implies that 28.8 percent of the population was poor in both time periods.

Table 7-B also presents figures on decomposition of poverty into its chronic and transient components using the two methods described above. The spells method, which is based on the head count index, indicates that about half of overall poverty is chronic (poor in both time periods), while half is transient (poor in only one of the two time periods). This same pattern is found in rural areas where 80 percent of Vietnamese live. But in urban areas, only about one fourth of overall poverty is chronic, which reflects that most people in urban areas in the first time period were no longer poor in the second time period. The last set of figures in Table 7-C decomposes poverty into its chronic and transient components using the components method, which can be used not only for the headcount index but also for indices that are sensitive to the depth of poverty. For Vietnam as whole, they show that most of the poverty is chronic, which means that most

Table 7: Poverty Dynamics in Vietnam from 1992-93 to 1997-98
(based on observed values of per capita expenditures)

A. Poverty Transition Matrix

		Poverty Status in 1997-98		
		Poor	Non-poor	Row Total
Poverty Status in 1992-93	Poor	1233 (28.8%)	1172 (27.4%)	2405 (56.2%)
	Non-poor	200 (4.7%)	1676 (39.2%)	1856 (43.8%)
	Column Total	1433 (33.5%)	2848 (66.5%)	4281 (100.0%)

B. Decomposition into Chronic and Transient Poverty (Spells Method)

Proportion of the Population that is:	*All Vietnam*	*Urban*	*Rural*
Never Poor	39.2%	74.0%	31.1%
Poor in 1 period (transient poverty)	32.1%	19.5%	34.9%
Poor in both periods (chronic poverty)	28.8%	6.5%	34.0%
Proportion of Poverty that is Chronic	47.3%	25.0%	49.3%

C. Decomposition into Chronic and Transient Poverty (Components Method)

	Headcount	*Poverty Gap*	*Squared Poverty Gap*
Overall Poverty	0.448	0.128	0.051
Transient poverty	0.031	0.024	0.015
Chronic poverty	0.417	0.104	0.037
Proportion of Poverty that is Chronic	93.1%	81.0%	71.7%

Source: Authors' calculations using VLSS data.

of the poverty is due to individuals whose average expenditures over the two years fall below the poverty line. This proportion declines (although it is still large) as the poverty measure becomes more sensitive to the depth of poverty. This is intuitively plausible because the more sensitive an index is to the depth of poverty, the more weight the transient component gives to a household that is very poor in one year but not poor in the other year (relative to the chronic component, which considers just the average income over the two years).

As explained above, it is almost certain that household expenditures are measured with a large amount of error and thus exaggerate mobility and thus movements in and out of poverty. Glewwe (2005) presents evidence that at least 15 percent of estimated mobility is measurement error. Tables 8 and 9 use simulation methods to estimate mobility under two different assumptions. The portion of measured mobility attributable to measurement error in one case is 15 percent ("lower estimate") and 25 percent ("higher estimate") in the other. These simulations are based on the assumption that the logarithm of per capita expenditures is normally distributed. (See Glewwe and Dang (2005) for evidence of the reasonableness of this assumption.)

The top part of Table 8 reproduces the transition matrix under the two assumptions about the contribution of measurement error to observed mobility of per capita expenditures. Turning to the higher estimate of the contribution of measurement error, there is still a lot of movement across the expenditure quintiles over time, but not as much as in Table 6. Recall that in Table 6 about one half of the households that were poor in 1992-93 were no longer poor in 1997-98. When the higher estimate of measurement error is assumed, about 38 percent of the poor in 1992-93 are no longer poor in 1997-98. More generally, while the observed data shown in Table 6 suggests that only 40 percent of the population remains in the same quintile in both years (and 20 percent move up or down by two or more quintiles), this number increases to about 45 percent

Table 8: Per capita Expenditure Mobility in Vietnam from 1992-93 to 1997-98 (simulated values that correct for measurement error)

A. Mobility Matrix, by Quintiles (percent distribution of 50,000 simulated observations)

Lower bound estimate of measurement error

		1997-98 Quintile					
		1	2	3	4	5	Row Total
	1	12.0	5.1	2.2	0.6	0.1	20.0
1992-93	2	5.1	6.5	5.1	2.7	0.7	20.0
Quintile	3	2.2	5.0	5.8	4.8	2.3	20.0
	4	0.7	2.7	5.0	6.6	5.0	20.0
	5	0.1	0.7	2.0	5.3	11.9	20.0
	Column Total	20.0	20.0	20.0	20.0	20.0	100.0

Remained in same quintile in both years:	42.8%
Moved up or down by one quintile:	40.3%
Moved up or down by two or more quintiles:	16.9%

Higher estimate of measurement error

		1997-98 Quintile					
		1	2	3	4	5	Row Total
	1	12.5	5.0	2.0	0.5	0.1	20.0
1992-93	2	5.0	6.9	5.2	2.5	0.5	20.0
Quintile	3	2.0	5.0	6.1	4.9	2.0	20.0
	4	0.5	2.6	5.0	6.9	5.0	20.0
	5	0.1	0.5	1.8	5.2	12.4	20.0
	Column Total	20.0	20.0	20.0	20.0	20.0	100.0

Remained in same quintile in both years:	44.8%
Moved up or down by one quintile:	40.2%
Moved up or down by two or more quintiles:	15.0%

B. Summary Measures of Mobility

Estimate of Measurement Error	*Lower bound Estimate*	*Higher*
m(x, y) = 1 – ρ(x,y):	0.284	0.250
m(x, y) = 1 – ρ(ln(x), ln(y))	0.254	0.225
m(x, y) = 1 – ρ(rank(x), rank(y))	0.271	0.240

SOURCE: Authors' calculations using VLSS data.

(decreases to 15 percent) when measurement error is assumed to account for 25% of mobility. Of course, when actual measurement error is assumed to by smaller (the "lower bound estimate"), the differences with Table 6 are smaller. Thus, the observed data do overestimate income mobility but adjusting for measurement error still leaves a substantial amount of mobility in Vietnam.

Turning to the bottom of Table 8, the summary measures of mobility show that the percent of mobility that is due to measurement error under the "lower bound assumption" ranges from 8 to 18 percent, depending on the mobility index used. This range increases to between 19 and 28 percent when the "higher assumption" is used. (By definition, these figures are nearly 15 and 25 percent for the log variance measure, since the simulations are based on the assumption that the log of per capita expenditures is normally distributed.)

Table 9 presents simulation results for poverty dynamics similar to those presented in Table 7. However, Table 9 presents simulations that exclude measurement error. Turning to the poverty transition matrix, the proportion of households that are poor in both time periods is almost identical to the proportions shown in Table 5. However, the proportion of people who are poor in both time periods increases slightly from 28.8 to 30.4 percent (using the lower bound assumption on measurement error) or 30.6 percent (using the higher assumption on measurement error). Thus, accounting for measurement error does not change the general finding that there is substantial movement in and out of poverty over time. Table 9 also presents figures that decompose poverty into its chronic and transient components, using the two methods described above on the simulated data. The spells method, which is based on the head count index, indicates that slightly more than one half of overall poverty is chronic (poor in both time periods) while slightly less than half is transient (poor in only one of the two time periods).

Table 9: Poverty Dynamics in Vietnam from 1992-93 to 1997-98 (based on simulated values of per capita expend. that correct for measurement error)

A. Poverty Transition Matrix

Lower estimate of measurement error

		Poverty Status in 1997-98		
		Poor	Non-poor	Row Total
Poverty Status	Poor	30.4	25.7	56.1
in 1992-93	Non-poor	3.5	40.4	43.9
	Column Total	33.9	66.1	100.0

Higher estimate of measurement error

		Poverty Status in 1997-98		
		Poor	Non-poor	Row Total
Poverty Status	Poor	30.6	25.6	56.1
in 1992-93	Non-poor	2.9	40.9	43.9
	Column Total	33.5	66.5	100.0

B. Decomposition into Chronic and Transient Poverty (Spells Method)

Proportion of the Population that is:	*All Vietnam* *Lower Bound of Measurement Error*	*Upper Bound of Measurement Error*
Never Poor	40.3	40.8%
Poor in 1 period (transient poverty)	29.2	28.7%
Poor in both periods (chronic poverty)	30.6	30.6%
Proportion of Poverty that is Chronic	51.2%	51.6%

C. Decomposition into Chronic and Transient Poverty (Components Method)

	Lower Bound of Measurement Error			*Upper Bound of Measurement Error*		
	Headcount	*Poverty Gap*	*Squared Poverty Gap*	*Headcount*	*Poverty Gap*	*Squared Poverty Gap*
Overall Poverty	0.451	0.144	0.064	0.449	0.141	0.061
Transient poverty	0.027	0.021	0.014	0.026	0.021	0.013
Chronic poverty	0.425	0.123	0.050	0.423	0.120	0.048
Proportion of Pov. that is Chronic	94.1%	85.3%	78.5%	94.2%	85.2%	78.6%

SOURCE: Authors' calculations using VLSS data.

This decomposition attributes about four percentage points more to chronic poverty than does the figure for Vietnam as a whole (47.3 percent) cited in Table 7. Thus measurement error in Table 7 underestimates the extent to which poverty is chronic, although the extent of underestimation is not very large. Note also that the higher the measurement error, the greater the extent of underestimation (the difference compared to the 47.3% figure in Table 7 is 3.9% for the lower bound and 4.3% for the upper bound), although this difference is very small. The last set of figures in Table 9 decomposes poverty into its chronic and transient components using the components method, again using the simulated data. For the headcount measure there is not much difference with the poverty rate figures in Table 7. Since poverty is close to 50 percent, measurement error is equally likely to misclassify a non-poor person as poor as it is to classify a poor person as non-poor. However, the proportion of poverty that is chronic increases slightly, which is consistent with the fact that measurement error tends to underestimate chronic poverty. This underestimation of the contribution of chronic poverty to overall poverty is even more pronounced for the measures that are sensitive to the depth of poverty.

The last issue this chapter examines using the panel data from Vietnam is if the country's economic growth has been "pro-poor." This can be seen be examining growth rates over time for each expenditure quintile. Table 10 shows this information using the data from the 4,300 panel households. For Vietnam as a whole, per capita expenditures rose by 41.2 percent over five years, which implies an annual rate of increase of about 7.1 percent. The remaining rows of Table 10 examine growth rates for each quintile. One way of examining economic growth among the different expenditure quintiles is to compare the expenditure levels of a given quintile in 1992-93 with the expenditure level of the corresponding quintile in 1997-98, which does not necessarily compare the same households. This can be done using both cross-sectional and panel

Table 10. Growth Rates in Observed Expenditures, Using Actual Data

	Population Distribution in 1992-93 (percent)	Mean Per Capita Expenditures 1992-93	Distribution of Per Capita Expenditures 1992-93 (percent)	Mean Per Capita Expenditures 1997-98	Distribution of Per Capita Expenditures 1997-98 (percent)	Growth over 5 Years (percent)	Average Annual Growth Rate (percent)
All Vietnam	100	1876		2648		41.2	7.1
By current quintile							
Poorest 20%	20	800	8.5	1095	8.3	36.9	6.5
Next 20%	20	1169	12.5	1617	12.2	38.3	6.7
Middle 20%	20	1516	16.2	2093	15.8	38.1	6.7
Next 20%	20	2030	21.6	2840	37.1	39.9	6.9
Richest 20%	20	3867	41.2	5601	42.3	44.8	7.7
By 1992-93 quintile							
Poorest 20%	20	800	8.5	1470	11.1	83.8	12.9
Next 20%	20	1169	12.5	1855	14.0	58.7	9.7
Middle 20%	20	1516	16.2	2328	27.4	53.6	9.0
Next 20%	20	2030	21.6	2848	21.5	40.3	7.0
Richest 20%	20	3867	41.2	4735	35.8	22.4	4.1

SOURCE: Authors' calculations using VLSS data.

data. (These results were shown in Table 4 and are given again in the top half of Table 10.) Recall that these results suggest that economic growth has been fairly equitable, with four of the five quintiles having annual growth rates of 6.5 to 6.9 percent. Only the wealthiest quintile has a somewhat higher growth rate--7.7 percent.

Growth rates are much more strongly pro-poor if the same households are compared over time, which is shown in the bottom half of Table 10. The poorest 20 percent of households in Vietnam surveyed between 1992-93 experienced an annual growth rate of 12.9 percent, which is almost double the national average of 7.1 percent and nearly three times as high as the growth rate experienced by the wealthiest quintile

(4.1%). Yet, the results in Table 10 may exaggerate the extent to which economic growth in Vietnam has been “pro-poor” in the second sense of examining the same households over time. As explained above, some of the movement of households across quintiles over time may reflect measurement error.

Tables 11 and 12 examine this by showing simulated growth rates after removing measurement error. Table 11 assumes a relatively low level of measurement error--about 15 percent of measured mobility--while Table 12 assumes that 25 percent of observed mobility is due to measurement error. The overall conclusion is that the patterns found in Table 10 do not change very much. More precisely, economic growth in Vietnam has been relatively pro-poor, especially when one compares the same households over time.

Table 11: Growth Rates in "True" (Unobserved) Expenditures, Using Simulated Data
(assuming that 15% of observed mobility is measurement error)

	Population Distribution in 1992-93 (percent)	Mean Per Capita Expenditures 1992-93	Distribution of Per Capita Expenditures 1992-93 (percent)	Mean Per Capita Expenditures 1997-98	Distribution of Per Capita Expenditures 1997-98 (percent)	Growth over 5 Years (percent)	Average Annual Growth Rate (percent)
All Vietnam	100	1956		2770		41.6	7.2
By current quintile							
Poorest 20%	20	758	7.8	1102	8.0	45.4	7.8
Next 20%	20	1226	12.5	1745	12.6	42.3	7.3
Middle 20%	20	1667	17.0	2353	17.0	41.2	7.1
Next 20%	20	2257	23.1	3183	38.0	41.0	7.1
Richest 20%	20	3871	39.6	5470	39.5	41.3	7.2
By 1992-93 quintile							
Poorest 20%	20	758	7.8	1508	10.9	98.9	14.7
Next 20%	20	1226	12.5	2056	14.8	67.7	10.9
Middle 20%	20	1667	17.0	2558	27.5	53.4	8.9
Next 20%	20	2257	23.1	3180	23.0	40.9	7.1
Richest 20%	20	3871	39.6	4551	32.9	17.6	3.3

SOURCE: Authors’ calculations using VLSS data

Table 12: Growth Rates in "True" (Unobserved) Expenditures, Using Simulated Data (assuming that 25% of observed mobility is measurement error)

	Population Distribution in 1992-93 (percent)	Mean Per Capita Expenditures 1992-93	Distribution of Per Capita Expenditures 1992-93 (percent)	Mean Per Capita Expenditures 1997-98	Distribution of Per Capita Expenditures 1997-98 (percent)	Growth over 5 Years (percent)	Average Annual Growth Rate (percent)
All Vietnam	100	1956		2770		41.6	7.2
By current quintile							
Poorest 20%	20	763	7.8	1089	7.9	42.7	7.4
Next 20%	20	1224	12.5	1741	12.6	42.2	7.3
Middle 20%	20	1660	17.0	2368	17.1	42.7	7.4
Next 20%	20	2256	23.1	3214	38.2	42.5	7.3
Richest 20%	20	3858	39.5	5455	39.3	41.4	7.2
By 1992-93 quintile							
Poorest 20%	20	763	7.8	1488	10.7	95.0	14.3
Next 20%	20	1224	12.5	2071	14.9	69.2	11.1
Middle 20%	20	1660	17.0	2557	27.5	54.0	9.0
Next 20%	20	2256	23.1	3183	23.0	41.1	7.1
Richest 20%	20	3858	39.5	4567	32.9	18.4	3.4

SOURCE: Authors' calculations using VLSS data

8.5 Conclusion

This chapter has described methods for analyzing changes in poverty over time. Some methods can be used with repeated cross-sectional data, while a richer set of methods can be used if panel data are available. Comparisons over time are prone to bias due to measurement error, so the chapter has also described some methods for observing and dealing with measurement error in income and expenditure data.

There are many factors that statisticians, economists and other researchers must consider when measuring poverty at a single point in time, and additional complications arise when examining how poverty changes over time. This paper has reviewed three important conceptual issues:

- Relationship between poverty dynamics and income mobility,
- Chronic poverty vs. transient poverty, and
- How to measure the impact of economic growth on the poor.

Two important data issues were also addressed:

- Relative merits of cross-sectional and panel data, and
- Problems due to measurement error.

This chapter provides lessons for statistical agencies in developed and developing countries on how to collect data that are useful for understanding the dynamics of poverty. Because poverty and poverty dynamics may vary significantly from country to country, and because most poor nations have only limited data – in particular, most lack panel data – it is not possible to draw general policy conclusions or even general conclusions about the nature of poverty dynamics. However, if this chapter's survey recommendations are followed, then each country will have the data necessary to understand poverty dynamics and to formulate poverty-reducing policies.

Perhaps the most important data collection recommendation is that all countries should attempt to collect nationally representative panel data. It may not be necessary to visit households every year; every two or three years may yield sufficiently useful data. (For detailed recommendations on collecting panel data, see Glewwe and Jacoby, 2000.)

The second key lesson is that measurement error is a serious problem that can lead to biased results. National statistical agencies should undertake comprehensive efforts to improve the accuracy of their household survey data, such as increasing supervision of field work and conducting validation studies. A third lesson is that there are methods that can be used to minimize bias due to measurement error when analyzing poverty data.

Study of poverty dynamics in both developed and developing countries is a relatively new area of research. Much more thinking is needed to refine underlying theoretical concepts, and to improve data collection and analysis. Statisticians, economists, and other researchers need to work together with statistical agencies to learn more about poverty dynamics in both developed and developing countries. This will lead to more effective poverty policies and, ultimately, to less poverty.

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CHAPTER IX. CONCLUSION

Gisele Kamanou

Anecdotal evidence is critical for understanding the human side of poverty. However, sound statistical data and analysis are essential for accurately assessing the full dimension of poverty and to gauge the impact of anti-poverty programs

As this handbook has extensively revealed, measuring poverty is not a simple matter. Even within a single nation's borders, the metrics of poverty can vary significantly between city and country, between single and multi-person households, and in grey markets where individuals may be reticent to disclose their full income. In the most extreme cases, it may be impossible for country's to find and survey its poorest because of a lack of permanent residence or respondents' inability to clearly answer questions.

9.1 Summary

A key goal of this handbook has been to find common ground in the ways countries measure poverty and to make recommendations that increase harmonization of these practices. The handbook has identified aspects in poverty measurement where improvements are essential. Monetary measurements, for example, should base the measurement of welfare on expenditures data as opposed to income data. They should follow the same standards in establishing poverty lines, in adjusting for adult equivalent, and in conducting poverty-focused household surveys (including collecting price data and handling missing data and implausibly low values of income and consumption).

The handbook encourages similar improvements in adopting a broad set of guidelines for poverty analysis to achieve more consistent and reliable interpretation of raw data. For example, as a practical recommendation, it is suggested to focus on producing the most commonly used poverty measures (i.e., the headcount index, poverty gap, and squared poverty gap) to promote comparability across countries. Other measures, such as the median income of the poor population, that are simple to compute and provide a richer picture of conditions of poverty, should also be computed more frequently than is currently the practice.

There has been considerable improvement in poverty measurement over the recent decades. However, countries should make effort in following some basic steps to further improve the reliability and comparability of the basic poverty data, for example, using multiple thresholds that include a common value, e.g. 2,100 kcalories. The choice of divisor for calculating per capita poverty figures can also significantly affect the results. Developing countries need technical assistance in applying scale economy-adjusted methods for estimating per capita household food consumption and income (expenditure) distributions. More specifically, further empirical work is needed that lead to evidence-based recommendations on the use of the age-by-sex RDA in estimating food-poverty lines and on the use of models to incorporate scale economies in deriving divisors for computing per capita non-food poverty lines and income/expenditures.

Another theme of this handbook is the need for consistent survey methods so that poverty comparisons uncover real changes in the population rather than statistical distortions caused by variations in survey design. The method of data capture employed in the poverty surveys varies greatly among countries, from one-year, six month or one month recall of income and expenditures to a daily diary method supplemented by weekly recall. Overall, sensitivity of poverty estimates to variations in survey design also underscores the importance of measurement error. Comparisons over time are particularly prone to bias due to measurement error. Furthermore, many country- and community-based poverty evaluation and monitoring systems lack consistency because they are launched by donors and external agencies possessing the necessary seed funds but lacking concern for a coordinated focus. They do not usually fit together in terms of their scope, timing, and coverage. Many will have been implemented as one-off exercises or prove unsustainable for either technical or financial reasons.

National statistical agencies should undertake comprehensive efforts to improve the accuracy of their household survey data, such as increasing supervision of field work and conducting validation studies. Along the same line, converging data-capture methods used by developing countries, supported by empirical evidence from experiments imbedded in the poverty surveys themselves, should be a high priority in national and international programs. As part of a more comprehensive probability-based survey design, alternative sources (including qualitative and subjective methods and national accounts) can provide more insightful poverty assessments. International agencies and other organizations should give high priority to developing global household survey standards to generate reliable poverty estimates consistent with the national accounts across countries and across time. Further, it is crucially important that all countries attempt to collect nationally representative panel data, even if this means revisiting households only every two or three years.

9.2 Statistical addendum: The UN Global survey on poverty measurement practices

A number of nations have problems aggregating basic poverty data – including data from different regions--to produce an accurate picture of its own poverty. Such difficulties grow exponentially when trying to assess poverty across borders. Only by identifying similarities and differences in the ways in which nations collect data, can we begin to understand the accuracy of poverty studies. This is the purpose of the statistical addendum presented in the Annex 3. Data collection methods and poverty statistics presented are the product of a year-long study that sought to enhance the understanding of both the character of poverty and the ways in which nations measure it. In gaining a clearer understanding of how poverty is measured, this report will help identify the strengths and weaknesses in the current data collection processes.

The genesis of this survey started in May 2004 in Rio de Janeiro, Brazil with the first United Nations workshop on poverty measurements. Subsequent workshops were held in July 2004 in Abuja, Nigeria, in October 2004 in Manila, Philippines, and then in November 2004 in Amman, Jordan that refined the questionnaire, paving the way for the first global survey of how nations measure poverty. The survey had two primary purposes: discover regional perspectives in how nations gauge poverty and identify means in which poverty measurement could be improved.

After being translated into English, Spanish, French and Russian, the questionnaire was sent out in February 2005 to national statistical offices in nearly 189 countries around the world. To help obtain a greater response rate, the UN prepared an abridged version of the questionnaire which was sent out to countries in October 2005. All together, Government statistical offices in 106 countries replied to the global survey. Statistical offices in 15 countries indicated that they are not currently collecting poverty data at all.

Survey responses were subsequently consolidated in the statistical addendum highlight the substantial areas where greater uniformity will raise the overall quality of poverty measure and improve comparability of measures across time and location. If nations embrace this report’s survey recommendations, it may ensure a more accurate understanding of poverty and help produce more comparable national statistics. If these goals can be achieved, they will ultimately help nations more effectively target spending and ameliorate poverty.

ANNEXES

A.1 List of the United Nations Steering Committee on Poverty Statistics

Patricia Alexander, Regional Advisor on Poverty Statistics
Statistics Division, Economic and Social Commission for Asia and Pacific,
United Nations, Bangkok, Thailand

Isidoro P. David, Consultant
16 Whitefield White Plains Subdivision Quezon City,
Metro-Manila, Philippines

Martin Balepa, Directeur General
AFRISTAT,
Bamako, Mali

Christian N. Grootaert
International development Consultant for The World Bank and IRIS Center
McLean, USA

Ivo C. Havinga, Chief, Economic Statistics Branch
United Nations Statistics Division, United Nations, New York, USA

Pali Lehohla, Statistician-General
Statistics South Africa
Pretoria, South Africa

Choiril Maksumo, Director General
BPS – Statistics Indonesia
Jakarta, Indonesia

Jonathan Morduch (Chair of the Steering Committee), Professor of Public Policy and Economics, NYU Wagner School
New York, USA

Eduardo Pereira Nunes, President
Fundaçao I B G E
Rio de Janeiro, Brazil

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New York, USA

Pedro Sainz , CEPAL

Casilla 179-D
Santiago, CHILE

Michael Ward
2a, Waddelow Road, Waterbeach
Cambridge, United Kingdom

A.2 <u>List of the countries who participated in the regional workshops on poverty measurement</u>

<u>Economic Commission for Latin America and the Caribbean (ECLAC) Region</u>
Argentina, Brazil, Bahamas, Barbados, Bolivia, Chile, Colombia, Dominica, Ecuador, Grenada, Peru, St. Lucia, Jamaica, Mexico, Paraguay, Uruguay

<u>Economic and Social Commission for Asia and the Pacific (ESCAP) Region</u>
Bangladesh, Cambodia, Canada, China, Fiji, Indonesia, Islamic Republic of Iran, Republic of Korea, Lao PDR, Macao China, Maldives, Mongolia, Papua New Guinea, , Philippines, Sri Lanka, Thailand, Vietnam

<u>Economic Commission for Western Asia Region</u>
Egypt, Iraq, Lebanon, Jordan, Oman, Palestine, Syria

<u>Economic Community of West African States (ECOWAS) Region and few countries from other parts of Africa</u>
Benin, Burkina Faso, Cape Verde, Cote d'Ivoire, Ghana, Guinea Bissau, Liberia, Niger, Senegal, Sierra Leone, Togo, and Angola, Cameroon, Gabon Rwanda, Tanzania

A.3 Questionnaire of the UN Global Survey of poverty measurement practices and Statistical addendum

UNITED NATIONS QUESTIONNAIRE ON
POVERTY MEASUREMENT

UNITED NATIONS STATISTICS DIVISION
2 UN Plaza, Office DC2-1676
NY 10017, NEW YORK

Contact: Gisele KAMANOU: kamanou@un.org, Tel + 1 (212) 963 43 28
Christof PAPARELLA: paparellac@un.org, Tel. +1 (212) 963 45 71

INSTRUCTIONS

Please fill in the **green cells** of each worksheet and email the file back to : paparellac@un.org **by February 28th, 2005**

The column on the right side ("*How to answer*") guides your answers to each question, most of which have to be answered with YES or NO.

In addition, two columns provide some **sample responses** given by countries during the workshops, as **examples** for filling the questionnaire.

The questionnaire comprises **5 parts** (i.e. 5 separate worksheets).

Part A. POVERTY LINE

Respond to this part if a monetary poverty line has been estimated.

Part B. UNMET BASIC NEEDS (UBN) APPROACH

Respond to this part if the Unmet Basic Needs approach is used, whether in addition or instead of the Poverty line approach.

Part C. SURVEYING TECHNIQUES USED IN DATA COLLECTION TO ESTIMATE THE LEVEL OF POVERTY

This part discusses the surveying method of the latest household survey conducted in your country for the purpose of poverty estimations.

Part D. FURTHER EXPLANATIONS ON MEASURES OR METHODS USED

a) Describe the specificities of your measurement techniques if they are not adequately reflected in the questionnaire.
b) Describe methods used for poverty measurements other than or in addition to the Poverty Line and the Unmet Basic Needs approaches.

Part E. POVERTY DATA

Enter data for the available measurement categories and the latest available years of the given time scope.
Provide the latest data for the available categories (if available provide the latest 3 figures).

PART A. POVERTY LINE

METADATA			Your Answer	How to answer?
1. Is there a poverty line?	Has the country estimated a poverty line?			Yes/No - **if NO goto Worksheet B**.
	How often has the poverty line been re-assessed?			indicate periodicity (e.g. every five years, every 10 years)
	Is there a national agreement on how poverty should be measured?			YES/NO
2. Which types of poverty line have been estimated?		ABSOLUTE		Yes/No
		RELATIVE		Yes/No
3. How many poverty lines have been constructed?	a. Only ONE poverty line?	national		Yes/No
		urban		Yes/No
		rural		Yes/No
	b. TWO Poverty Lines	national		Yes/No
		urban		Yes/No
		rural		Yes/No
	c. 3-5 Poverty lines			Yes/No
	d. More than 5 Poverty lines			Yes/No
	e. Per capita poverty line specified for each household; i.e. adjustments (e.g. adult equivalent scale, economies of scale, geographic location, etc.) are specified for each household			Yes/No
4. Do you estimate the Poverty Line by the Cost of Basic Needs (CBN) method?				Yes/No (**if NO goto question 23**)
5. What are the components of the CBN based poverty line?	food PL			Yes/No (**if NO goto question 14**)
	non-food PL			Yes/No
	no separation of food & non-food PL			Yes/No
6. Food Poverty Line: How are the nutritional thresholds set?	What is the number of calorie thresholds used?			indicate number
	Indicate the level of the calorie thresholds:			e.g. 2309
	Are any other nutritional criteria in addition to calorie requirements referred to when constructing the poverty line?			e.g. protein or micronutrient requirements
7. Has a standard been followed to construct the national recommended daily allowance RDA?		national		YES/NO
		international		YES/NO (if yes, name the standard)

PART A. POVERTY LINE

METADATA		Your Answer	How to answer?
8. Does the required minimum calorie threshold for an individual take age, gender, location or other criteria into account?	Age		Yes/No
	Gender		Yes/No
	Place of residence		Yes/No
	Economic activity		Yes/No
	Provide the adult equivalence scales used		e.g. Male: age 0 <2:791 2-5:1618 6-9:1924 10-15:1990 16-29:3216 30-59:3167, 60+:2710. Female: 0 <2:740 2-5:1480 6-9:1689 ...
9. The composition of the food basket or basket of goods that provide the minimum calorie threshold reflects the consumption pattern of:	a. A share of the population at the lowest end of the income or consumption distribution (e.g. lowest 20% of total HH expenditure)		Yes/No (specify fraction)
	b. A share of the population between the lowest x% and y% of the income or consumption distribution.		Yes/No (specify fraction)
	c. Within a range (e.g. +/- 10%) around the previous poverty line.		Yes/No (specify fraction)
	d. Within a range (e.g. +/- 10%) around the previous food poverty line.		Yes/No (specify fraction)
	e. Within a range (e.g. +/- 10%) around the median of the income or consumption distribution.		Yes/No (specify fraction)
	e. other reference group		Yes/No (specify fraction)
10. Does the composition of the food basket allow for regional differences in consumption habits?			Yes/No
11. On average, how many items are in the food basket(s)?			state number of items
12. For how many of these items do you collect price data (through CPI, Community survey, etc.)?			state number of items

PART A. POVERTY LINE

METADATA			Your Answer	How to answer?
13. Price data to estimate the cost of the food basket or a calorie is obtained through:	**a. CPI**	**i. General CPI**		Yes/No
		ii. Poverty specific CPI		Yes/No
		iii. Which commodities receive greater weight in the poverty specific CPI?		roughly indicate items
		iv. How often is the CPI measured?		indicate periodicity
	b. Community Price Questionnaire of Household Survey	i. Are commodity prices adjusted for **differential prices** paid by the poor due to lower **quantities** purchased?		Yes/No
		ii. Are commodity prices adjusted for **differential prices** paid by the poor due to purchases at **different price points**?		Yes/No
		iii. Are **Unit Values** used in some cases?		Yes/No
		iv. How often do HH surveys take place?		indicate periodicity
	c. Other source of data or methods used in costing the food basket			name the source
14. Is the Non-Food Poverty Line estimated by direct or indirect method?		**direct** (i.e. listing essential non food items and adding up their costs)		YES / NO
		indirect (e.g. Engel's Ratio)		YES / NO (**if YES goto question 19**)
DIRECT Method	**15. The non-food component (NFC) comprises these essentials:**			list the goods
	16. Reference Population for Non-Food Component	**a. A share of the population at the lowest end of the income or consumption distribution (e.g. lowest 20% of total HH expenditure)**		yes/no (if yes specify fraction)
		b. A share of the population between the lowest x% and y% of the income or consumption distribution.		yes/no (if yes specify fraction)
		c. Within a range (e.g. +/- 10%) around the previous poverty line.		yes/no (if yes specify fraction)
		d. Within a range (e.g. +/- 10%) around the previous food poverty line.		yes/no (if yes specify fraction)
		e. Within a range (e.g. +/- 10%) around the median of the income or consumption distribution.		yes/no (if yes specify fraction)
		e. other reference group		indicate fraction
	17. Is the NFC adjusted to account for the age structure of household?			YES/NO
	18. NFC adjusted to account for size of household (economies of scale)?			YES/NO (continue with question 23)

Continue with question 23

PART A. POVERTY LINE

METADATA			Your Answer	How to answer?
IN-DIRECT Method	**19. Is a fixed Engel ratio used?**	(Ratio: food expenditures in % of total expenditures)		Yes/No
	20. Is the Engel's coefficient estimated?			Yes/No, if yes specify method
	21. Is there another method used?			Yes/No, if yes specify method
	22. In case the Engel ratio is NOT fixed, which reference population is used?	**a. A share of the population at the lowest end of the income or consumption distribution (e.g. lowest 20% of total HH expenditure)**		Yes/No (specify fraction)
		b. A share of the population between the lowest 10% and 30% of the income or consumption distribution.		Yes/No (specify fraction)
		c. Within a range (e.g. +/- 10%) around the previous poverty line.		Yes/No (specify fraction)
		d. Within a range (e.g. +/- 10%) around the previous food poverty line.		
		e. Within a range (e.g. +/- 10%) around the median of the income or consumption distribution.		Yes/No (specify fraction)
		f. other reference group		Yes/No (specify fraction)
23. Specify other measures used in poverty measurement in addition to or instead of CBN poverty line?				
24. Which monetary indicators of welfare are used for measuring poverty?		**HH income**		Yes/No
		HH expenditure		Yes/No

PART A. POVERTY LINE

METADATA			Your Answer	How to answer?
25. Is the per capita monetary HH measure of welfare adjusted for age/sex (adult equivalent scale) and the size of the household (economies of scale)?				Yes/No
26. What are the sources of data that have been used/are being used to estimate the level of welfare of individuals or households?	**Household Surveys**	**Living Standard Measurement Survey**		Yes/No (indicate year of latest survey)
		Rapid Appraisal Survey		Yes/No (indicate year of latest survey)
		Demographic and Health Survey		Yes/No (indicate year of latest survey)
		National Poverty Survey		Yes/No (indicate year of latest survey)
		Income and Expenditure Survey		Yes/No (indicate year of latest survey)
		Other HH survey		indicate source
	Other Survey Sources	**Participatory Poverty Appraisal Survey**		Yes/No (indicate year of latest survey)
		Priority Survey		Yes/No (indicate year of latest survey)
		Employment Survey		Yes/No (indicate year of latest survey)
		Time Use Surveys		Yes/No (indicate year of latest survey)
		Core Indicators Questionnaires		Yes/No (indicate year of latest survey)
		Other		indicate source
	Non-Survey Sources	**Population census**		Yes/No
		National Accounts		Yes/No
		Administrative Records		Yes/No
		Other Sources		indicate source

PART B. UNMET BASIC NEEDS (UBN) APPROACH

METADATA		Your Answer	How to answer?
1. Is the Unmet Basic Needs (UBN) Approach used to measure poverty?			YES/NO
2. Which are the components of basic needs?	a. Housing / shelter conditions		YES/NO
	b. Education		YES/NO
	c. Health		YES/NO
	d. Sanitation/facilities		YES/NO
	e. Safe water criteria		YES/NO
	f. Community and neighborhood infrastructure		YES/NO
	g. Others		indicate components
3. Do you construct an index that combines the components of basic needs?			YES/NO
4. How are the weights of the components of the index constructed?	Equal weights		YES/NO
	Based on statistical model		YES/NO
	Other		YES/NO
5. How is a poor classified?	a. Poor is who misses ALL components of basic needs.		YES/NO
	b. Poor is whose needs in at least ONE component is not met.		YES/NO
	c. Poor is whose INDEX value of basic needs is below a certain threshold.		YES/NO
6.Sources of data to identify the poor	Population Census		YES/NO
	Administrative Data		YES/NO
	Household surveys		YES/NO
	Community Based Data		YES/NO
	Participatory Survey		YES/NO
	Other		indicate data source

PART C. SURVEYING TECHNIQUES USED IN DATA COLLECTION TO ESTIMATE THE LEVEL OF POVERTY

METADATA			Your Answer	How to answer?
0. Is the measurement of poverty based on INCOME or CONSUMPTION?		INCOME		YES/NO (if **YES, please answer questions 1 - 7**)
		CONSUMPTION		YES/NO (if **YES, please answer questions 8 ff**)
1. What is the recall period for reporting/observing receipts of INCOME (i.e. the period for which the surveyed have to indicate their incomes)				indicate period
2. Are the following types of frequent receipts of CASH income are surveyed?	Income from employment	Wages and salaries in cash		YES/NO
	Income of own account workers and employers			YES/NO
	Income from Rents	Building rents		YES/NO
		Rented and occupied by the household		YES/NO
		Other rents		YES/NO
	Property Income	Land rents		YES/NO
		Profits		YES/NO
		Deposits in the domestic economy		YES/NO
		Deposits in the Rest of the World		YES/NO
		Bonds		YES/NO
		Loans		YES/NO
		Dividends		YES/NO
		Interest		YES/NO
		Other property income		YES/NO
	Transfers	Pensions		YES/NO
		Social Benefits		YES/NO
		Insurance Pension		YES/NO
		Gifts		YES/NO
		Other Transfers from residents		YES/NO
		Transfers from Non-Residents		YES/NO
	Other incomes	Awards in cash		YES/NO
		Other		YES/NO

PART C. SURVEYING TECHNIQUES USED IN DATA COLLECTION TO ESTIMATE THE LEVEL OF POVERTY

METADATA			Your Answer	How to answer?
3. Are the following types of frequent receipts of income IN KIND surveyed?	Income from employment	Wages and salaries in KIND		YES/NO
	Income of own account workers and employers			YES/NO
	Income from Rents	Building rents		YES/NO
		Rented and occupied by the household		YES/NO
		Other rents		YES/NO
	Property Income	Land rents		YES/NO
		Profits		YES/NO
		Deposits in the domestic economy		YES/NO
		Loans		YES/NO
		Dividends		YES/NO
		Interest		YES/NO
		Other property income		YES/NO
	Transfers	Social Benefits		YES/NO
		Insurance Pension		YES/NO
		Gifts		YES/NO
		Other Transfers from residents		YES/NO
		Transfers from Non-Residents		YES/NO
	Other incomes	Awards in KIND		YES/NO
		Other		YES/NO
4. What is the method of valuation for income IN KIND?				indicate which prices are used (e.g. market prices)
5. What is the recall period for reporting/observing for non-frequent receipts of income?				indicate period

PART C. SURVEYING TECHNIQUES USED IN DATA COLLECTION TO ESTIMATE THE LEVEL OF POVERTY

METADATA			Your Answer	How to answer?
6. Are the following types of non-frequent receipts of CASH income are surveyed?	**Income from employment**	**Wages and salaries in cash**		YES/NO
	Income of own account workers and employers			YES/NO
	Income from Rents	**Building rents**		YES/NO
		Rented and occupied by the household		YES/NO
		Other rents		YES/NO
	Property Income	**Land rents**		YES/NO
		Profits		YES/NO
		Deposits in the domestic economy		YES/NO
		Deposits in the Rest of the World		YES/NO
		Bonds		YES/NO
		Loans		YES/NO
		Dividends		YES/NO
		Interest		YES/NO
		Other property income		YES/NO
	Transfers	**Pensions**		YES/NO
		Social Benefits		YES/NO
		Insurance Pension		YES/NO
		Gifts		YES/NO
		Other Transfers from residents		YES/NO
		Transfers from Non-Residents		YES/NO
	Other incomes	**Awards in cash**		YES/NO
		Other		YES/NO
7. Are the following types of non-frequent receipts of income IN KIND surveyed?	**Income from employment**	**Wages and salaries in KIND**		YES/NO
	Income of own account workers and employers			YES/NO
	Income from Rents	**Building rents**		YES/NO
		Rented and occupied by the household		YES/NO
		Other rents		YES/NO
	Property Income	**Land rents**		YES/NO
		Profits		YES/NO
		Deposits in the domestic economy		YES/NO
		Loans		YES/NO
		Dividends		YES/NO
		Interest		YES/NO
		Other property income		YES/NO
		Social Benefits		YES/NO
		Insurance Pension		YES/NO
		Gifts		YES/NO
		Other Transfers from residents		YES/NO
		Transfers from Non-Residents		YES/NO
	Other incomes	**Awards in KIND**		YES/NO
		Other		YES/NO
8. How is CONSUMPTION data collected?		**How many different recall periods are used for FOOD items?**		indicate number of recall periods

PART C. SURVEYING TECHNIQUES USED IN DATA COLLECTION TO ESTIMATE THE LEVEL OF POVERTY

METADATA			Your Answer	How to answer?
	a. What is the recall period for reporting/observing COMSUMPTION expenditure?	What is the recall period for FOOD items?		indicate period
		How many different recall periods are used for NON-FOOD items?		indicate number of recall periods
		What are the recall periods for NON-Food items?		indicate periods
	b. Is there a multiple reporting of recall periods for the same item? (e.g. indicate consumption for the last month and the last 12 months)			YES/NO
	c. How many visits per household for the entire survey?			state number of visits
	d. Are diaries used?	Household diaries		Yes/No
		Individual adult diaries		Yes/No
	e. Is the recall method used? (i.e. households have to remember their consumption)			
	f. Are all households in the sample visited at each visit?	All		YES/NO
		Not all. Sample is split into ___ subgroups.		indicate number of subgroups
9. Which categories of consumption expenditures are surveyed?	a. Food			YES/NO (if possible indicate items)
	b. Is the quantity of food consumed surveyed?			YES/NO (indicate whether this is collected regularly or through a special module added to survey, and indicate how often the special module is colected)
	c. Non-alcoholic beverage			YES/NO (if possible indicate items)
	d. Alcoholic beverage, tobacco and narcotics			YES/NO (if possible indicate items)
	e. Clothing and footwear			YES/NO (if possible indicate items)
	f. Housing, water, electricity, gas & other fuels			YES/NO (if possible indicate items)
	g. Furnishings, hh equipment and routine hh maintenance			YES/NO (if possible indicate items)
	h. Health			YES/NO (if possible indicate items)
	i. Transport			YES/NO (if possible indicate items)
	j. Communication			YES/NO (if possible indicate items)
	k. Recreation and culture			YES/NO (if possible indicate items)
	l. Education			YES/NO (if possible indicate items)
	m. Restaurants and hotels			YES/NO (if possible indicate items)

PART C. SURVEYING TECHNIQUES USED IN DATA COLLECTION TO ESTIMATE THE LEVEL OF POVERTY

METADATA	Your Answer	How to answer?
10. Which types of non-consumption expenditures are surveyed?		indicate types (e.g. gifts, donations, …)
11. What is the recall period for reporting/observing non-consumption expenditure		indicate period (week/month/…)
12. Which types of other disbursements are surveyed? (e.g. parking tickets…)		indicate types
13. What is the recall period for reporting/observing other disbursements other than expenditures		indicate period (3 months…)
14. Types of consumption of home production (own produced consumption)		indicate types
15. What is the recall period for reporting/observing consumption of home production.		indicate period (week/month/…)
16. What is the method of valuation of own produced consumption?		indicate prices (e.g. market prices, …)
17. Which types of business stock consumed are surveyed?		indicate types
18. What is the recall period for reporting/observing consumption from business stocks?		indicate period (week/month/…)
19. Is data on owner-occupied housing surveyed?		YES/NO
20. What is the method of valuation for the consumption of owner occupied dwellings?		indicate prices (e.g. market rent of equivalent housing …)

PART D. OTHER APPROACHES TO IDENTIFY AND ESTMATE THE LEVEL OF POVERTY

1. Further comments on questions in the questionnaire

	Part of the Questionnaire	Question No	Additional Comment
Example 1	A	6.c.	The country adopts the menu-based approach wherein food poverty lines equivalent to the cost of daily per capita food requirements are derived by pricing low-cost & nutritionally adequate menus (breakfast, lunch, supper and snack) for each urban and rural area of each region using average prices. The menus are composed of food items that are commonly-eaten and low cost in the area.

2. Methods not covered by this questionnaire

E. POVERTY DATA (please enter data for the available measurement categories and the latest available year of the given time scope)

A. Based on POVERTY LINE

LEVEL	Type		1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
National	Urban & rural	Poverty line in national currency																					
		Food Poverty Line																					
		Non-Food Poverty Line																					
		Number of poor																					
		Poverty Rate in %																					
	Urban	Poverty line in national currency																					
		Food Poverty Line																					
		Non-Food Poverty Line																					
		Number of poor																					
		Poverty Rate in %																					
	Rural	Poverty line in national currency																					
		Food Poverty Line																					
		Non-Food Poverty Line																					
		Number of poor																					
		Poverty Rate in %																					
Weighted average of poverty at the level of **Regions**	Urban & rural	Poverty line in national currency																					
		Food Poverty Line																					
		Non-Food Poverty Line																					
		Number of poor																					
		Poverty Rate in %																					
	Urban	Poverty line in national currency																					
		Food Poverty Line																					
		Non-Food Poverty Line																					
		Number of poor																					
		Poverty Rate in %																					

E. POVERTY DATA (please enter data for the available measurement categories and the latest available year of the given time scope)

LEVEL	Type		1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
	Rural	Poverty line in national currency																					
		Food Poverty Line																					
		Non-Food Poverty Line																					
		Number of poor																					
		Poverty Rate in %																					
Weighted average of poverty at the level of **Provinces**	**Urban & rural**	Poverty line in national currency																					
		Food Poverty Line																					
		Non-Food Poverty Line																					
		Number of poor																					
		Poverty Rate in %																					
	Urban	Poverty line in national currency																					
		Food Poverty Line																					
		Non-Food Poverty Line																					
		Number of poor																					
		Poverty Rate in %																					
	Rural	Poverty line in national currency																					
		Food Poverty Line																					
		Non-Food Poverty Line																					
		Number of poor																					
		Poverty Rate in %																					

B. Based on UNMET BASIC NEEDS Approach

LEVEL	Type		1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
National	**Urban & rural**	Poverty line in national currency																					
		Food Poverty Line																					
		Non-Food Poverty Line																					
		Number of poor																					

E. POVERTY DATA (please enter data for the available measurement categories and the latest available year of the given time scope)

LEVEL	Type		1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
		Poverty Rate in %																					

E. POVERTY DATA (please enter data for the available measurement categories and the latest available year of the given time scope)

LEVEL	Type		1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
	Urban	Poverty line in national currency																					
		Food Poverty Line																					
		Non-Food Poverty Line																					
		Number of poor																					
		Poverty Rate in %																					
	Rural	Poverty line in national currency																					
		Food Poverty Line																					
		Non-Food Poverty Line																					
		Number of poor																					
		Poverty Rate in %																					
Weighted average of poverty at the level of **Regions**	**Urban & rural**	Poverty line in national currency																					
		Food Poverty Line																					
		Non-Food Poverty Line																					
		Number of poor																					
		Poverty Rate in %																					
	Urban	Poverty line in national currency																					
		Food Poverty Line																					
		Non-Food Poverty Line																					
		Number of poor																					
		Poverty Rate in %																					
	Rural	Poverty line in national currency																					
		Food Poverty Line																					
		Non-Food Poverty Line																					
		Number of poor																					
		Poverty Rate in %																					

E. POVERTY DATA (please enter data for the available measurement categories and the latest available year of the given time scope)

LEVEL	Type		1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
Weighted average of poverty at the level of **Provinces**	**Urban & rural**	Poverty line in national currency																					
		Food Poverty Line																					
		Non-Food Poverty Line																					
		Number of poor																					
		Poverty Rate in %																					
	Urban	Poverty line in national currency																					
		Food Poverty Line																					
		Non-Food Poverty Line																					
		Number of poor																					
		Poverty Rate in %																					
	Rural	Poverty line in national currency																					
		Food Poverty Line																					
		Non-Food Poverty Line																					
		Number of poor																					
		Poverty Rate in %																					

Statistical Addendum: Result of the UN Global Survey on Poverty measurement

	Year	National Poverty Rate (in %)	PL in national currency	Urban Poverty Rate (in %)	Rural Poverty Rate (in %)	Other PLs	Is the poverty measure ABSOLUTE or RELATIVE	Poverty Line established for each household	Income vs Expenditures	Level of calorie threshold	Calorie threshold per Adult equivalence scales	Poverty specific CPI used to costing the basket of goods	Regional patterns in food habits are taken into account
ECA REGION													
Botswana	2002-03	30.6	Many poverty lines, since poverty lines are determined by household types taking into sex, age, household size and region.	19.4	44.8	Food poor, Non-food Poor, and Ver poor	both	yes	Expenditures		no	yes- use special prices for costing basc requirements for the poverty basket	yes
Cameroon	**2001**	``````	148000 FCFA in 1996	52.1	n.a.	n.a.	absolute	yes	Expenditures	2900	yes	yes	yes
Kenya	**1997**	52.3	Per month: Urban Kshs 2648, Rural Kshs 1239	49.2	52.9	n.a.	absolute	yes	expenditures	2250	yes	yes	yes
MADAGASCAR	2002	80.7		61.6	86.4	no	ABSOLUTE	Adjusted for regional price difference	Expenditures	2133 cal / person/ day	No	No	No
MALAWI	1998	65.3 (absolute)	10.47	54.9	66.5	relative poverty line	both	YES	Expenditures	2198	Yes	no	yes
Mauricius	2001 - 2002	7.8% of HH (Relative Poverty)	Rs 2804 per month (relative PL)			Absolute PL 1$ PPP per day (RS 12.51 per day, RS380 per month): below 1% of the population	both	yes	Income		No		
MOROCCO	2004	14.2	Urban 3421; Rural 3098	7.9	22		both	No	Expenditures	2400	No	No	No
Mozambique	2002-2003	54.1	10263 per day (1US$=23341)	51.5	55.3	NO	Absolute	Yes	Expenditures	2150	No	Yes	Yes
Niger	1993	63	n.a.	n.a	n.a.	34% National extreme poverty rate	n.a.	n.a	n.a	n.a	n.a	n.a	n.a
Rwanda	2001	60.29	frw64000 per year	12.27 (capital Kigali); 19.38 (other towns)	65.66	food poverty line : frw45000 per year	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Senegal	2001-2002	57.1	Dakar - 879.0 Fcfa; Other Urban - 712.8; Rural- 497.9	Dakar - 42.0; Other Urban - 50.1	Rural- 65.2	food poverty line : Dakar - 342.4; Other Urban - 317.8; Rural - 290.9	Absolute	Yes	Expenditures	2400	Yes	No	No
Sierra Leone	2003-2004	70 (Absolute full poverty line, includes food plus basic needs : per equivalent adult food expenditure/Full Poverty)	Le770,678 per year, ie Le 2111 per day (US$1=Le2145)	15 (Capital Freetown); 70 (other urban)	79	extreme PL ; 26% are under Le377,045 annual expenditure, Food PL : 68%	both	yes	both	2700	yes	yes	no
South Africa	2000	57	322	38	80	$1/day, $2/day	Absolute	No	Expenditures	2261 (national average)	No	No	No
MAINLAND TANZANIA	2000/01	35.7		11.5	20.4			yes	Expenditures	2200	Yes	no	no
UGANDA	2003	38	36433	12.2	42		ABSOLUTE	Yes	Expenditures	3000	No	No	Yes

Statistical Adc

	Number of food items in the basket	Length of Recall period(s)	Diaries method used to collect consumption data?	Number of visits	Non-Food component of the PL obtained by the DIRECT metod	Non-Food component of the PL obtained by using the Engel ratio (INDIRECT)	How Often PL estimated	What are the sources of data used to estimate poverty?	How often is a HH survey undertaken?
ECA REGION									none of above
Botswana	11	monthly	yes	12	yes	no	First in 1976, 1989, 1997 and latest is 2003. 1989, 1997 and 2003 are based on 1985-86, 1993-94 and 2002-03 HIES	HIES and Special Price Surveys specifically for Poverty datum Lines	approx. 10 years
Cameroon	61	daily and weekly	Diaries method, recall method,	6	no	yes	every 5 years	Standard Living Condition , Demographic and Health Survey, National Poverty Survey, Income and Expenditure Survey Employment Survey	every 5 years
Kenya	100	food: weekly; non food: weekly and monthly	Diaries method, recall method	10	yes	no	Not fixed since 1981/82, 1992, 1994, 1997	DHS, national poverty and income and expenditure surveys, Population and Housing Census, national accounts, administrative records, Welfare Monitoring Survey, PA, Employment Survey, Core indicators questionnaire;	ad hoc
MADAGASCAR	82	Food and Non Food: Weekly monthly, 12 months	recall method	1	No	Yes	1993 and 2001	LSMS, Rapid Appraisal Survey, DHS, Employment Survey, Time Use Surveys	2 years
MALAWI	14	Food: 3 day recall on own production and 7 days recall on all purchased food items, Non Food: 1 week, 1 month, 3months,12 months		2	no	yes	5 years	LSMS, DHS, HIES, Core Indicators Questionnaires	5 years
Mauricius		Income: last pay (montly, weekly, daily, etc) except for self employed, it refers to las accounting year, and past 12 month		7				Income and Expenditure Survey	Every 5 years
MOROCCO	Nb d'articles du panier alimentaire de référence	Food: 2 weeks, 2 months, 1 year, Non Food: 2 weeks, 1 month , 3 months, 1 year	Diaries method	7	No	Yes	every 10 years	LSMS and HIES	Every 5 years
Mozambique	40	Daily, weekely, montly and annual depending on the types of goods (e.g. food, cloting, leisure or edcucation fees and durable goods)	Yes	3	No	Yes	5 years	HH Consumption survey	Every 5 years
Niger	n.a	n.a		n.a	n.a	n.a	n.a	Expenditure and Income HH Survey, in rural and urban areas	n.a
Rwanda	n.a.	n.a.		n.a.	n.a.	n.a.	n.a.	Population and Housing Census, MICS, CWIQ, SLC	huge surveys every 5 years, smaller surveys every 2 years
Senegal	26	Food: 3 days, Non Food: 4 months	Yes	10	Yes	No	In 1994-1995 and 2001-2002	HIES	Not regulary but now planned for every five years
Sierra Leone	40	monthly, then annualized; food daily	Diaries method, recall method	7	yes	no	first in 1990 and latest in 2004	MICS, Survey of HH Ependiture and HH Economics Activities, Integrated HH Survey, PPA and Focus Group Discussions, Population census and national accounts	not regular, first in 1989/1990 and then in 2003/2004
South Africa	Various	Durables 1 year, the rest montly	No diary in 2000. In process of changing to diary.	2	Yes	No	under review	Income and Expenditure Survey	n.a.
MAINLAND TANZANIA	28	Income: 12 months prior to date of interview, food: daily for 1 calender month	Yes	8				Household Budget Survey	after every 5 years
UGANDA	28	Food: 7 days, Non Food: 1 month, 1 year	recall method	1			No regular interval	DHS, HIES, PPA Survey	Every 2 years
									none of above

Statistical Addendum: Result of the UN Global Survey on Poverty measurement

ECE REGION

ALBANIA	2002	25.4 (absolute)	4891			50 and 60% median per capita consumption, $2 and $4 PPP	both	Yes	Expenditures	2288	Yes	No	yes
ARMENIA	2003	42.9	12629	39.7	47.5	1$ US per day, 2 $ US per day, 4 $ USper day	Absolute	No	expenditures	2100	No	No	No
AUSTRIA	2003	13.2					Relative	yes	Income		No		
BELARUS	2004	17.8	125.7			________	Absolute	Yes	EXPENDITU RES	Total population - 2470	Yes	No	No
CANADA	2001	9.3				LICO - low income cutoff	Relative	no	INCOME		No		
CROATIA	2003	16.9	18895.88				Relative	yes	INCOME		No		
CYPRUS	2003	15	4389			yes, lower income line	Relative	YES	INCOME		No		
CZECH REP.	2002	8.1 (relative poverty rate)	123,132	n.a	n.a.	n.a.	both	Yes	Income	n.a.	No	No	n.a.
FRANCE	2001	6.1	602			Subjective, Par les conditions de vie	Relative	No			No		
GERMANY	2001	11	18492			at-risk-of-overty line calculated as 60% of the median household income	Relative	yes	Income		No		
GREECE	2004	20	4965 euro	19	24	22	Relative	Yes	Income	No	No	No	No
HUNGARY	2004	20-30	53307	X	X	X	Absolue	YES	Expenditures	2500, 2./	yes	no	no
IRELAND	2003	22.7	9668	21.4	25.7	The at risk of poverty rate is an income based measure and the consistent poverty rate combines this with some non-monetary deprivation indicators	Relative	Yes	Income		No		
ISRAEL	2003	22.4	1736	19.3		none	Relative	no	Income		No		
Italy	2004	13.2	919.98			80% and 120% of standard poverty line	Relative	yes	Income		No		
LATVIA	2003	16	733				Relative	no	Income		No		
LITHUANIA	2003	15.9	312 LTL per month				Relative	Yes	both		No		
MACEDONIA	2003*	30.2	63197.47				Relative	No	Expenditures		No		
MOLDOVA	2005	26.5 (PL not approved by the government)	327			no	both	no	Expenditures	2282 adjusted to urban and rural, sex, age and ability to work	Yes	no	no
NETHERLANDS	2000	11.9 (low income threshold)	national 9.4 (low income threshold). urban 8 (relative poverty threshold)	10 (relative poverty threshold)			both	yes	Income		No		
NORWAY	2002	4.9				Yes, lower income line.	Relative	Yes	Income		No		
POLAND	2003	11.7 (people living at subsistence minimum)	357 PLN (illustrative values in 4 th quarter for 1 person hh)	7.5	18	povert lines: - relative 60% of median equivalent income (Laeken indicators - see: Eurostat Methodology), 50% of average equivalent expenditure, - 'legal', - subsistence minimum, subjective (LPL)		Yes			No		
Romania	2003	18.8	1751857	11.6	27.3	-	absolute	Yes	Expenditures	-	2550	No	-
RUSSIAN FED.	2004	17.8	2376*			No	Absolute	Yes	both	2730 (able-bodied men), 2110 (able-bodied women)	Yes	NO	YES
SLOVAKIA	2003	21	6200			Laeken indicators: Risk-of-poverty threshold, Risk-of-poverty rate(before and after transfers), S80/S20 quintile ratio, Gini	Relative	no	Income		No		
SPAIN	2001	19	901888			No	Relative	Yes	Income		No		
TURKEY	2002	26.96 (absolute)	2510930	21.95	34.48	1)Relative poverty line (50% of median consumption expenditure per adult equivalent individuals) 2) International absolute poverty lines (: $1, $2.15, $4.3 a-day-per-person by Parity of Purchasing Power)	both	Yes	Expenditures	2100	No		No

Statistical Adc

ECE REGION									none of above
ALBANIA	60	Food: 14 days, Non Food: 1 month, 6 months, 12 months		2	Yes	No	1	Living Standard Measurement, Diaries method, recall method	N.A.
ARMENIA	24	Income: month, Food: daily, Non Food: 1 month, 6 months, 12 months		5	Yes	No	1	Living Standard Measurement, Priority Survey,	since 2001 annually
AUSTRIA		Income: last calendar year					yearly since 1995 (with the exception of 2002)	Living Standard Measurement	
BELARUS	40	Income: 3 months, Food: 2 weeks, Non Food: 3 months		17	Yes	No	every 5 years	Income and Expenditure Survey, Diaries method	quarterly
CANADA		Income: calendar year, Food Diary survey (1-week and 4-week periods), Non Food: calendar year		3			5 times, 1959, 1969, 1978, 1986, 1992,	Income and Expenditure Survey, Diaries method, recall method	
CROATIA		Income: last 12 month					every year, from 2001.		
CYPRUS		Income: last 12 month					2 times on the bases of the new methodology. The first time was in 1997 and the most recent one in 2003	Income and Expenditure Survey	
CZECH REP.	147	Income:Yearly, Food and Non Food: Monthly		12	No	Yes	Irregularly	Living Standard Measurement, Income and Expenditure Survey Diaries method	Continuous Survey
FRANCE							Annuel		
GERMANY		Income: previous year (n-1)					every year, as available data permits		
GREECE	No	Income: Prevuious calendar year		1	No	No	Yearly	Income and Living Conditions	Yearly
HUNGARY	100	Food: month	yes	4	yes	yes	yearly	HBS	annual
IRELAND		Income: 12 months prior to date of interview		Not collected			The calculation of the poverty line is in accordance with the Laeken indicators in 2001		
ISRAEL		Income: 3 months					every year (from 2005 twice in a year)	Income and Expenditure Survey	
Italy		(a) food: weekly (b) non-food weekly, monthly, quarterly and yearly	Yes	2	yes	No	yearly	Italian Household Budget Survey	continuously
LATVIA		Income: Monthly, Yearly						Income and Expenditure Survey	
LITHUANIA		Income: Monthly, yearly, Food: 15days, Non Food: 15 days (alcohol, tobacco), month, 3 months		2			Yearly	Income and Expenditure Survey, Diaries method, recall method	
MACEDONIA		Food and Non Food: 15 days		2			every year	Diaries method	every year
MOLDOVA	37	Food and Non Food: daily		3	no	yes	it's fixed since 2001 and it's under revison now	Living Standard Measurement, Diaries method	Household budget survey which is conducted every month
NETHERLANDS		Income: previous calendar year,					every year		
NORWAY		Income: Calendar Year					Annual	Income and Expenditure Survey	
POLAND		HBS -Income: month, Food: month, Non Food: month, quarter		5			every year	HBS - Income and Expenditure Survey, Diaries method, recall method, Living Conditions Survey - recall method	HBS - every year
Romania	93	monthly	Yes	3	Yes	Yes	annually	Household Budget Survey	yearly since 1995
RUSSIAN FED.	156	Income: quarter, Food and Non Food: Daily		3	YES	NO	quarterly	Income and Expenditure Survey, Diaries method	n. a.
SLOVAKIA		Income: 1 year					one time survey in 1995, yearly from 2002, 2003	National Poverty Survey Income and Expenditure Survey	
SPAIN		Income: The previous year					YES (every year since 1994)	Living Standard Measurement	Yearly
TURKEY	80	Income: month and last 12 months, Food and Non Food daily (reference period is 1 month; by using diary-keeping method)	Diaries method, recall method	8	Yes	No	The household survey has been implemented every year regularly since 2002. The first study on poverty was done by using 2002 data. The studies with 2003 data have been continued.	Income and Expenditure Survey	

Statistical Addendum: Result of the UN Global Survey on Poverty measurement

UKRAINE	2004	27.3 (according to relative criterion - national poverty line) 65.6 (according to absolute criterion - cost of living)	271(poverty linel: 75% of per capita total media equivalent expenditure per month) 362.23 UAH on average per capita per month (absolute criterion - cost of living)	23.5 (according to relative criterion) 75.0 (according to absolute criterion - cost of living)	35,0 (according to relative criterion) 75.0 (according to absolute criterion - cost of living)	Poverty study also makes use of criterion for poverty line which has been set by UN for countries in Central and Eastern Europe. Percent of the population whose daily consumption expenditure does not exceed $ 4.3. (including purchasing power parity) According to this criterion, poverty line is 147.7 UAH and poverty level is 3.2%.	absolute	No	expenditures	When producing the national poverty line, calorie threshold is not used.When producing a set of foodstuffs that are included into cost of living, boundary measures for energetic value of meals are used: 1540 kcal (child 0-3); 2000 kcal (child 4-6); 2400 kcal (child 7-10); 2675 kcal (child 11-13);	See the answer to the previous question.	No	Over the year regional indicators for poverty are estimated on the basis of the national poverty line; once a year on the basis of regional poverty lines. Regional lines are produced on the basis of foodstuffs basket consumed by a
UK	2003	21 (relative)				For children only 3 poverty lines - 60% and 70% of median and '70% and deprived'	both	Yes	INCOME		No		

Statistical Adc

UKRAINE	55 for children up to 18 yrs, 42 for adults at working age, 39 for adults at non-working age	Food: Daily, over two weeks in a reference quarter. Non Food: daily, every 2 weeks ir a reference quarter (for not expensive goods). Quarterly (for more expensive goods that are purchased rather rarely). Data are reported by all respondents on the basis of records from auxiliary monthly journal.	16	Yes	No	It is estimed quarterly (1 quarter, the first six months, 9 months, year) since 1999.	Yes	Continuous survey: quarterly with full annual rotation of respondents.
UK		Income: year				Anounced in 2003, revised PSA target set in 2004	Family Resources Survey (FRS) British Household Panel Survey (BHPS)	Annual

Statistical Addendum: Result of the UN Global Survey on Poverty measurement

ESCAP REGION

Australia		No official estimates although there are estimates provided by research institutions	n.a.	n.a.	n.a.	A range of variables are used to assess poverty such as income, education, health and access to services	n.a.	n.a.	n.a.	Not calculated		No	Yes
Bangladesh	2000	49.8 upper PL	596.22	36.6	53.1	No	Absolute	No	Expenditures	2122	No	No	No
Cambodia	1999	35.9	Rural: 1751, Pnom Penh: 2408, other urban: 2008	9.7 (Pnom Penh), 25.2 (other urban)	40.1		Absolute	yes	expenditures	2100	no	no	no
China	2003	n.a.	637 Yuan a day (rural)	n.a.	3.1%	9,1% "low income group" plus "absolute poor", i.e. below 882 Yuar a day	absolute	n.a.	both	2100	n.a.	no	n.a.
Indonesia	2004	16.7	Per month National 122775 IDR, Urban: 143455 IDR, Rural: 108275 IDR	12.1	20	PL by Province level from 3.18% in Jakarta to 40.20% in West Irian Jaya	absolute	n.a.	expenditures	2100	no	no	no
Iran	2002	no national PL	Per month, rials. 302307 for Urban, 157481 for Rural (PL based on 50% of average hh expenditure)	12	10	Several poverty lines apply. For the year 2000, per month, rials: 1) Urban: 161928, Rural 89383 (basec on calorie requirement 2300) 2)Urban 153408, Rural 84684 (based on calorie requirement 2179 3)Urban 170467, Rural 98344 (based on 50% of median of hh expenditures) 4)Urban 614995 Rural 305573 (based on Angel's reverse Coefficient)	both	n.a.	expenditures	2179 or 2300	yes	n.a.	n.a.
Korea, Republic of	2000	7.97	928398			No	Absolute	Yes	both	adult1(36. M): 2,500, adult2(33, F) ; 2,000, child 1(7, M):1,800), child2(5,F):1,600	yes		No
MALAYSIA	2002	5.8	The PLI Values for Malaysia is based on monthly gross income by region as below :- Peninsular Malaysia (RM529), Sabah (RM690) dan Sarawak (RM600)	2.5	12.4	For HIS 2004, Malaysia will move to other methodology of calculating PLI	Both	No	Income	Minimum expenditure on food equals to 9910 calories for household of 5 persons	yes	No	Yes
MALDIVES						No	RELATIVE	No	Expenditures	2000	No	No	Yes
MONGOLIA	2002	36.1 (Relative poverty rate from LSMS survey)		30.3 (Relative poverty rate from LSMS survey)	43.4 (Relative poverty rate from LSMS survey)	No	both	Yes	both	2100 on average (adjusted for each provinces based on age and gender structure of the population)	Yes	no	No
Myanmar		26.6	18442.73	20.7	28.4	Urban PL 18874.30 Rural PL 18236.53	Relative	No	Expenditures	2100	No	No	No
NEPAL	2003-2004	30.8		9.6	34.6		Absolute	no	Expenditures	2144	No	no	Yes
NIUE	2002		55 (absolute)	na	na	Purchasing Power Parity poverty Line, Relative Poverty Line	both	no	Expenditures	3000	No	no	
Philippines	2003	30.4	12267	16.5	43.6	urban PL 14177 rural PL 11581	Absolute	Yes	Income	2000 on the average	no	no	yes
Sri Lanka	2002	22.7	1423 Rs per month (official PL average of lower and upper PL)	7.9	24.7	Per month, Rs: 973 food PL, 1267 lower PL, 1579 upper PL. PL by district from 1338 to 1537 (from 6% to 37%)	absolute	no	expenditures	2030	yes	yes	no
Thailand	2002	15.5	1190 baht per month	6.7	19.7	PL national rural 1058, urban 1471. PL by region and by type of place (urban or rural)	absolute	yes	income	2003	yes	no	yes
Vietnam	2002	29	1915000 Vietnam dong (US$127) per year	9.04	44.85	food PL 1381000 Vietnam Dong (US$ 92) per year, 11%	Absolute	no	both	2100	no	no	no

Statistical Adc

ESCAP REGION

									none of above
Australia	n.a.	Varies from annual to daily diaries	Yes	4	n.a.		n.a.	Various but Household Expenditure Survey is main data source	5 yearly
Bangladesh	11	Food Daily, Income Monthly & Yearly	No	7	No	No	3-4 years interval	HIES	3-4 years interval
Cambodia	150	food weekly, non food: monthly, last 6 month, yearly last school year	Diaries method , recall method	1	no	yes	every 3 years	Socio-Economic Survey (LSMS, DHS), PPA Time Use, Employment survey	every 3 years
China	n.a.	n.a.		n.a.	no	yes	yearly poverty headcounts	National Rural HH Survey (diary method), National Rural Poverty Monitoring Survey (diaries), regional statistics from administrative reports.	
Indonesia	52	1 week for food items, 1 month or 1 year for non food items	Recall method	1	yes	no	yearly	National Socio-Economic Survey, annual panel surveys, LSMS	every 3 years, for consumption module
Iran	n.a.	1 month for food items, 1 month or 1 year for non food items		1	no	yes	yearly	Urban and Rural HH Income and Expenditure Survey 1991-2001, recall method	n.a.
Korea, Republic of	100	Income: Yearly; Food: Monthly	Yes	4	Yes	No	Every 5 years since 1988	Living Standard Measurement, Income and Expenditure, Participatory Poverty Appraisal, Core Indicators Questionnaire	Every 5 years
MALAYSIA	16	The recall period for information on income was twelve month prior to the month of interview	No	3	Based on Household Expenditure Survey : average expenditure of households on these items	Based on Household Expenditure Survey : average expenditure of households on these items	Every Household Income Survey year	Census of Population and Housing, Householc Income Survey, Household Expenditure Survey, Consumer Price Index	The frequency of Household Income Survey in Malaysia is twice in 5 years
MALDIVES	80	Income: Monthly, Food: Weekly, monthly and 3 months, Non Food: Monthly, Yearly and 3 months		2	No	No	Additional poverty line has been made in 2003	Income and Expenditure Survey, Vulnerability and Poverty Survey, Diaries method, recall method	Every 5 years
MONGOLIA	13	Income: Monthly & Yearly, Food: Daily, Non Food: Monthly & Yearly		3	Yes	Yes, when conducted the LSMS	The Official PL- revised in every year . Since 1991	Living Standard Measurement, articipatory Poverty Appraisal Survey, Diaries method, recall method	every 3 or 5 yrs
Myanmar	10	(a) food weekly and monthly (b) Non-food monthly and yearly	No	3	No	Yes	1	Household Income and Expenditure survey	every 5 year for Household Income and Expenditure Survey
NEPAL	37	Food: 12 months, Non Food 30 days, 12 months		1	Yes	No	first 1995/96; second 2003/04	Living Standard Measurement Survey	Every 5 years
NIUE		Food: daily, Non Food: weekly, monthly		2	no	no	no, fixed since 2002	Income and Expenditure Survey, Diaries method, recall method	5years
Philippines	22	(a) food: weekly (but semestral for food received as gift); (b) non-food: monthly and semestral		2	no	yes	yearly	Census of Population and Housing, Family Income and Expenditure Survey, Metro Manila Urban Transportation Integration Study (income), recall method	every 3 years, for Family Income and Expenditure Survey
Sri Lanka	n.a.	n.a.		n.a.	no	yes	n.a.	HH Income and expenditure survey	n.a.
Thailand	n.a.	The preceding month and the past 12 month for averaging to monthly income		n.a.	yes	no	every 2 years	Socio-Economic Survey of HH, demografic and health survey, population census, Income and Expenditure Survey	n.a.
Vietnam	40	food: monthly and yearly, nor food: yearly		1	no	yes	PL established in 1993, later on adjusted by non-food CPI.	Living Standards Measurement Survey, Income and Expenditures Survey, recall method	every 2 years
									none of above

Statistical Addendum: Result of the UN Global Survey on Poverty measurement

ESCWA REGION

IRAQ						No	both	No	Expenditures	2436	Yes		Yes
JORDAN	2002	14.2	JD 392				ABSOLUTE	yes	Expenditures	2309	Yes		
Occupied Palestinian Territory	2003	Official 47%	1800 per month for a reference HH of 2 adults and 4 children),	n.a.	n.a.	Subsistence PL (deep PL: food, clothing and housing): 205 NIS per month per person, (Poverty 16.2%)	Relative	Yes	Expenditures	n.a.	yes	no	n.a.
Oman	1999	according to Human Poverty Index: 22.3% (Absolute Poverty Rate)	n.a.	n.a.	n.a.	no	Both	no	income	2238	no	no	no
Yemen	2005	14.5	2310			lower poverty line 35.9 at national level	Absolute	no	Expenditures	2200	no	no	yes

Statistical Adc

ESCWA REGION									none of above
IRAQ	25				Yes	No	No - fixed since 1993	Income and Expenditure Survey	
JORDAN	205	Food: weekly, Non Food: monthly		30		Yes	approximately every five years	Income and Expenditure Survey, Diaries method, recall method	Five years
Occupied Palestinian Territory	n.a.	monthly		4	no	yes	not regular, 1996-1998, 2001, 2003	HH Expenditures and Consumption Survey, National Poverty Survey Participatory Assessment Project, Diaries method	not regular, first in 1996-1998, then 2001, then 2004
Oman	52	income: monthly and yearly		n.a.	no	yes	first line in process	Income and Expenditure Survey	every 5 years
Yemen	35		no	not conducted with household	no	yes	cost of food bundle to meet the minimum requirement (basket food) and component of basic non-food to obtain Plu	Expenditure and consumption data extracted from household survey	