

DIRECTIONS IN DEVELOPMENT
Poverty

Public Finance for Poverty Reduction

*Concepts and Case Studies from
Africa and Latin America*

Blanca Moreno-Dodson and Quentin Wodon,
Editors



THE WORLD BANK

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Edited by

Blanca Moreno-Dodson

Quentin Wodon



THE WORLD BANK
Washington, DC

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This work is dedicated to

Richard Musgrave
The Father of Modern Public Finance
(1910–2007)

Professor Musgrave was convinced that governments have an important economic role to play, and that taxes and public expenditures can be used to improve social welfare. He served as a senior adviser to many governments, especially in Latin America and Asia. One of the editors of this book [B. Moreno-Dodson] was privileged to meet him at the International Institute of Public Finance Congress and to benefit from his wisdom on critical public finance issues. His legacy will endure.

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Foreword

Public Finance for Poverty Reduction provides an innovative analysis of many difficult policy issues plaguing less-developed economies in growing their economies while achieving poverty reduction. It is well worth a read. It is, in part, a good application of the framework developed by the late Richard Musgrave, who defined *public finance* as a field of study concerned with the government's functions focused on resource allocation, distribution, and stabilization of an economy. It also is appropriately concerned with administrative practice, and it provides excellent case studies on some new approaches to improving fiscal, spending, and tax policies in less-developed economies.

Resource allocation is critical to understanding how public policies affect both the static and the dynamic efficiency of an economy or, in other words, the best allocation of resources to achieve the highest standard of living. Distribution is concerned with the support given to the people who are the least well-off in society, while ensuring that policies are applied equally to those who are similarly well-off. Fiscal stabilization, less invoked these days with the importance of monetary policy targeted at inflation, is still critical to policy in a world where deficits and debt can produce havoc in a government's ability to raise capital from internation-

al markets and to afford program spending without having to increase taxes to fund it.

Although each of these public sector functions is well defined, trade-offs are always involved in reaching each. Redistribution of resources through tax policy or spending programs can have incentive effects that undermine economic efficiency if people decide to work, save, or invest less in markets. Efficient tax policies—a head tax being one of them—could impose heavy burdens on the poor. Tight fiscal policies to avoid deficits and foreign indebtedness can make it difficult to implement public programs that are needed to improve the economy or support the poor.

Life is never simple for governments, especially those in less-developed economies where the trade-offs frequently are more difficult to achieve with limited resources. Moreover, the outcomes can be stark, with high levels of poverty if successful results are not forthcoming.

Although often it is easy to identify good reasons for public intervention by governments, it is another matter to witness good implementation of public programs—so much so that some people argue that governments should consider a hands-off approach rather than starting up ill-designed programs. Thus, it is critical to understand the administrative resources available to governments to implement policy as well as the incentives for governments to carry out public policies to achieve worthwhile public objectives without being corrupted by poor practices.

The advantage of this book is that it is not restricted to the typical approach used in public finance texts: outlining theoretical ideas and some econometric knowledge for helping with the application of the ideas. Instead, it provides interesting new approaches to implementing growth-oriented and poverty-reducing spending, tax, and fiscal stabilization policies that have been attempted in various countries.

The first chapters in *Public Finance* are appropriately “theoretical” in reviewing basic concepts, such as fiscal sustainability, revenue design, accountability measures, and tax and benefit analysis. Without focusing too much on the concepts alone, the chapters provide good discussions of practical solutions to some of the difficulties faced by governments in reaching their objectives.

The chapters in Part Two evaluate approaches to policies to stabilize the economy, reduce poverty, or implement better spending programs in Paraguay, Mexico, Peru, and Uruguay. Part Three focuses on the poorest continent—Africa—with case studies of Guinea, Rwanda, Senegal, Niger,

and Cape Verde. Several new approaches to implementing public policies are described in some detail, showing that it also is feasible to apply those policies in poor countries with a weak institutional environment.

The most useful aspect of these case studies is that they provide helpful ideas for implementing policies rather than just focusing on the problems. Without doubt, transparency and accountability help improve the application of programs, but some simple approaches to measurement also make policies more effective. For many government planners in less-developed economies, some ideas in these case studies can be useful for policy development.

The best part of this book, therefore, is that it offers hope to governments that it is possible to successfully implement public policies focused on fiscal stabilization, economic growth, and poverty reduction. It is best to approach this book as one that contributes to our knowledge of how to make Richard Musgrave's framework achievable.

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Visiting Professor, New York University Law School
April 2007

Preface

Public Finance for Poverty Reduction includes a series of papers that were prepared in the context of a World Bank Institute (WBI) public finance learning program intended to build capacity in developing countries, with a special focus on Latin America and sub-Saharan Africa. The book places a particular emphasis on the fiscal issues encountered by countries that are in the process of implementing a poverty reduction strategy. To define the contents of the public finance learning program, numerous consultations were conducted with practitioners in developing countries and with representatives of the World Bank and the donor community. These consultations identified the areas of interest and the demands for capacity enhancement. The following developing countries were involved in the discussions and/or benefited from the course itself: Benin, Bolivia, Burkina Faso, Ethiopia, Ghana, Guatemala, Guinea, Honduras, Kenya, Nicaragua, Paraguay, Senegal, and Zambia. The learning program was prepared in partnership with the governments of Belgium, France, Germany, and Spain, among others; and it received support from the University of Antwerp (Belgium), Complutense University of Madrid (Spain), Harvard University and Georgia State University (United States), the Institute of Fiscal Studies (Spain), and the group InWEnt (Germany).

The learning program benefited especially from the support of Belgium's Directorate-General for Development Cooperation. The publication of the book was made possible by support from the Belgian Poverty Reduction Partnership, a trust fund managed by the Poverty Reduction and Economic Management Unit (PREM) in the World Bank's Africa region. The preparation of the case studies from Latin America benefited from the support of the regional studies program of the Chief Economist's Office for Latin America and the Caribbean. The case studies for sub-Saharan Africa were produced as background work for poverty assessments prepared by the World Bank.

The editors would like to thank Ishac Diwan, Robert Ebel, and Vinod Thomas, under whose direction the Public Finance and Poverty Reduction WBI Program was launched to support countries implementing a poverty reduction strategy; Paula Donovan, Guillermo Perry, and Sudhir Shetty for providing their support for work on public spending and poverty in Latin America and Africa; Jack Mintz for carefully reviewing each chapter of the book and providing thoughtful comments; Vito Tanzi for his support and comments; Danny Leipziger for his support during the finalization of this book at PREM; and José Manuel Gonzalez-Páramo, from the Board of the European Central Bank, for his contribution to the analysis on the role of the state in developing countries. The editors are also grateful to Paul Cartier, Erwin De Wandel, and Harold Vandermeulen from Belgium's Directorate-General for Development Cooperation, not only for making the publication of this book feasible, but more generally for encouraging us to devote time and resources for capacity building for government staff and researchers in partner countries.

Finally, this book would not have been possible without the professional editing of Christine Cotting from UpperCase Publication Services and the services of Stephen McGroarty, Andres Ménèses, and Dina Towbin at the Office of the Publisher at the World Bank.

Blanca Moreno-Dodson
Quentin Wodon
October 2007

Abbreviations

AIPP	Apoyo a Instituciones Públicas y Privadas (Uruguay)
ANEP	Administración Nacional de Educación Pública (Uruguay)
AUPI	Asociación Uruguaya de Protección a la Infancia
BIC	<i>bénéfices industriels et commerciaux</i>
BNI	basic needs index
BNR	Banque Nationale du Rwanda
BPS	Banco de Previsión Social (Uruguay)
CAFOD	Catholic Agency for Overseas Development
CAIF	Centros de Atención a la Infancia y la Familia (Uruguay)
CIRR	commercial interest reference rate
CIT	corporate income tax
COD	cut-off date
CPIA	Country Policy and Institutional Assessment
CTAR	Regional Administration Council (Peru)
CWIQ	Core Welfare Indicators Questionnaire

DEO	district education office
DHMT	district health management team
DHO	district health office
DISSE	Dirección de Seguros Sociales por Enfermedad (Uruguay)
DSA	debt sustainability analysis
EIU	Economist Intelligence Unit
ENIGH	Encuesta Nacional de Ingreso-Gasto de los Hogares
EURODAD	European Network for Debt and Development
FAIMO	Food for Work (Cape Verde)
FGT	Foster-Greer-Thorbecke
FONCODES	Fondo Nacional de Compensation y Desarrollo (Peru)
FONCOMUN	Fondo de Compensación Municipal
G-8	Group of Eight
GDF	<i>Global Development Finance</i>
GDP	gross domestic product
GE	grant element
GNP	gross national product
HIPC	heavily indebted poor country
IDA	International Development Association (U.K.)
IDA14	the 14th replenishment of the IDA's resources
IMF	International Monetary Fund
IMM	Intendencia Municipal de Montevideo
IMSS	Instituto Mexicano del Seguro Social
INAME	Instituto Nacional de Menor (Uruguay)
INDA	National Institute of Feeding (Uruguay)
INEI	Instituto Nacional de Estadística e Informática (Peru)
INJU	Instituto Nacional de la Juventud (Uruguay)
ISR	Impuesto Sobre la Renta (Mexico)
LIC	low-income country
LSMS	Living Standards Measurement Study
MDGs	Millennium Development Goals
MDRI	Multilateral Debt Relief Initiative

MEF	Ministry of Economy and Finance (Peru)
METR	marginal effective tax rate
MEVIR	Mejoramiento y Erradicación de la Vivienda Rural Insalubre (Uruguay)
MICS	Multiple Indicators Cluster Survey
MINECOFIN	Ministry of Economics and Finance (Rwanda)
MINEDUC	Ministry of Education (Rwanda)
MINISANTE	Ministry of Health (Rwanda)
MINSA	Ministry of Health (Peru)
MTEF	medium-term expenditure framework
MTSS	Ministerio de Trabajo y Seguridad Social (Uruguay)
MVOTMA	Ministry of Housing and Transportation (Uruguay)
NAFTA	North American Free Trade Agreement
NPV	net present value
ODA	official development assistance
OECD	Organisation for Economic Co-operation and Development
PAE	Programa de Alimentación Escolar (Uruguay)
PEL	Primera Experiencia Laboral (Uruguay)
PEO	provincial education office
PETS	public expenditure tracking survey
PIT	personal income tax
PNCA	Programa Nacional de Complementación Alimentaria (Uruguay)
PNCA-M	PNCA-Materno-Infantil (Uruguay)
PNCA-P	PNCA-Pensionistas (Uruguay)
PRL	Programa de Reconversión Laboral (Uruguay)
PRONAA	Programa Nacional de Asistencia Alimentaria (Peru)
PRSP	Poverty Reduction Strategy Paper
PSM	Minimum Social Protection (Cape Verde)
PTA	parent-teacher association
QSDS	quantitative service delivery survey
RHO	regional health office

SAAC	Servicio de Asistencia Alimentaria Colectivizada (Uruguay)
SAT	Sistema de Administración Tributaria (Mexico)
SHCP	Secretaria de Hacienda y Credito Público
SIAF	Integrated Financial Management System (Peru)
SIAV	Sistema Integrado de Acceso a la Vivienda (Uruguay)
SimSIP	Simulations for Social Indicators and Poverty
TCI	<i>taxe conjoncturelle à l'importation</i>
TDP	<i>taxe dégressive de protection</i>
TEC	<i>tarif extérieur commun</i>
TNPA	Todos los Niños Pueden Aprender (Uruguay)
UI	unemployment insurance (Uruguay)
UTU	Universidad del Trabajo del Uruguay
VAT	value-added tax
VDL	Vaso de Leche (Glass of Milk)
WAEMU	West African Economic and Monetary Union
WBI	World Bank Institute

All dollars are U.S. dollars unless otherwise noted.

CHAPTER 1

Public Finance for Poverty Reduction

An Overview

Blanca Moreno-Dodson and Quentin Wodon

Governments in low-income countries have the difficult task of making wide-ranging decisions about public spending, taxation, and borrowing with the aim of helping their countries maintain long-term debt sustainability, achieve higher economic growth, and ultimately reduce poverty. Making such decisions is difficult because it involves considering multiple trade-offs. There are at least four reasons why designing and implementing fiscal policies that contribute to growth and poverty reduction are particularly challenging tasks in developing countries. First, private-market failures are widespread and often unpredictable. Second, government and institutional failures also limit the effectiveness of public interventions. Third, raising public revenues is difficult in a context of macroeconomic and growth instability, high debt ratios, weak tax administration, and large informal sectors. Finally, many developing countries lack the data necessary to conduct a thorough analysis of the effect of government policies on the poor segments of the population.

Despite those challenges, however, the budget remains one of the most important instruments (together with laws and regulations) that governments have at their disposal to foster poverty reduction. Policy makers in both developing and developed countries, as well as nongovernmental or-

ganizations and providers of aid, can benefit from a deeper understanding of how internally or externally financed public funds channeled through the budget can be used more successfully to benefit the poor in a realistic manner.

To set the stage for the chapters that follow—chapters that address public financing and poverty reduction—we start here with a brief discussion of the rationale behind the role of the government in public finance. Then we discuss some of the limitations faced by governments in developing countries. We follow those discussions with an overview of the nature and structure of the material presented in this book and with our thoughts on germane topics yet to be addressed adequately.

Rationale for the Role of Government

Before analyzing the appropriate levels of public spending, taxation, and debt in a particular country context, it is worth asking why it is even pertinent for governments to play a role that promotes growth and poverty reduction.

Believing that competition and the profit motive would lead individuals pursuing their private initiatives to serve the public interest, many economists have argued for the government to play a limited role in this regard. According to their view, its role should be constrained to correcting market failures and providing basic public goods, including law and order, national defense, and basic physical infrastructure.¹ Other economists, however, have advocated much wider government interventions—among them, promoting income equality. It is widely accepted that well-designed government institutions are necessary for country development; but the task of defining the most suitable size and type of government, and the right mix of markets and government activities, remains difficult.

A starting point in this discussion is recognizing that there are at least three reasons for government involvement in a market economy: (1) to establish the preconditions for markets to operate efficiently, (2) to correct market failures, and (3) to improve social welfare and promote equity.

First, governments need to set up the preconditions for markets to operate efficiently by creating the necessary institutions, laws, and regulations that will facilitate their functioning. Where government intervention in areas such as property rights and competition laws is lacking, some

market activities may not develop at all, or they may develop in an inefficient manner with impossibly high entry costs or administrative and legal barriers.

A second reason for governments to intervene is to correct market failures. In a general sense, these failures refer to a set of conditions under which a market economy does not allocate resources efficiently. Correcting such a situation requires that the government assist the “invisible hand”² to approximate what the market would have done in the absence of market failure. There are various types of market failures, each requiring different forms of government intervention (World Bank 1997). In the case of public goods, for example, the market usually fails to define the charge that individual consumers should pay for their use. Here the function of the government to overcome that failure would be revealing the citizens’ preferences for public goods—preferences often expressed and channeled through the political process.

Closely related to public goods is the concept of externality—the recognition that consumption or production of some goods may generate positive or negative external effects for the society that are not reflected in their price. This argument has often been used to justify a government’s role on the grounds that, without such intervention, the market would overproduce or underproduce those goods, depending on whether the externalities were positive or negative. In addition, market failures often are associated with incomplete markets and imperfect or asymmetric information among consumers and suppliers. Markets may not provide goods or services whose costs are less than what consumers are willing to pay.³ Similarly, imperfect and asymmetric information may lead to an erroneous valuation of goods and services, and therefore to inadequate supply or demand. Finally, market failures are related to problems of adverse selection and moral hazard when buyers or sellers act exclusively on the basis of their own benefit and to the detriment of the general interest.⁴

The third and equally important rationale justifying government intervention refers to the concern for distributive justice or equity. Even if markets could function efficiently, by their nature they would not ensure that growth and income are distributed in a fair or just manner. Government thus should play a role in income distribution, without compromising the efficiency of the markets to allocate resources. Welfare economics considers the function of the government as going beyond the provision of public goods and focusing on the distribution of income.

Although the concern for equity is typically associated with the role of government, this does not mean that only the government should or could contribute to reducing poverty. If one thinks of poverty as resulting from a lack of opportunities, empowerment, and social protection, it is clear that the government is not solely responsible for filling that lack.⁵ In fact, the private sector does play an active role in creating economic opportunities (employment, credit), promoting inclusion of all members of the civil society (associations of private sector producers, workers, parents of students, and the like), and protecting citizens (education, health care, and social protection, with or without public sector involvement in financing or delivery), thus contributing to reducing poverty either through its independent actions or by association and partnership with government activities.

The three reasons for government intervention described above suggest that there is substantial scope for government action, particularly in countries where poverty is widespread and only some segments of the population benefit from growth and development. There is a growing awareness and global consensus about the need to increase efforts to combat poverty more vigorously by providing opportunities and assets for people who are less well-off on equity grounds. In addition, empirical results generally suggest that improvements in income distribution may contribute to greater economic growth, faster development, and less poverty. Inequality often produces insecurity and crime, which are negative externalities with detrimental economic and social effects both nationally and globally.

Limits to Government Intervention in Developing Countries

Several features distinguish the government from the private sector. Governments have both strengths and weaknesses that must be understood in an effort to decide what functions they should perform. On the positive side, in democratic countries the people who run public institutions are elected or are appointed by an elected official. This makes them legitimate in the eyes of the population. In addition, the democratic government is endowed with certain rights that private institutions do not have—such as imposing taxes on citizens; seizing private properties for public use; and prohibiting, punishing, and requiring participation. These capacities can be exercised because government institutions have two unique

features: cohesion and universality (Stiglitz 1995; Tanzi 1998). In some circumstances, governments may be able to curb negative externalities when the private sector, acting alone, cannot.

On the negative side, however, the government also faces limitations that differ from those of the private sector. First, the political process itself imposes restrictions because the mandate of the government often is vague and subject to political pressure from interest groups. Even the existence of externalities would not justify public action if externalities were politicized to justify inappropriately large government interventions. Second, other restrictions are associated with the difficulty in predicting changes in the external environment and, more particularly, in the private sector reaction to a changing world, as well as in gathering information reflecting the results of private or public actions. Third, the rules governing public institutions often are more rigid than those of the private sector because of the fiduciary responsibilities the government bears to the population and the complexity and interaction of the many objectives being pursued in the name of public interest. All such limitations may reduce the efficacy of government interventions.

Thus, if there is agreement to say that markets are fully efficient only under fairly restrictive assumptions (many of them nonexistent in developing countries), there is also recognition that government failures limit the effectiveness of a government in correcting market inefficiencies. For that reason, many economists argue that the government should focus on areas where market failures are most significant and where the conditions ensure that it can make a difference. In addition to government failures and difficulties in adjusting to a changing environment, there are institutional failures related to the gap between government goals and the availability of existing policy tools to pursue those goals. That gap leads policy makers to use public policy instruments whose efficiency is less than ideal. Moreover, for the government to perform its essential tasks, public institutions must be guided by the appropriate incentives. If public institutions are used by individuals for their own ends and to the detriment of the general interest, the government becomes an impediment to economic activity, progress, and development.

When assessing the role of government, we must divide its functions into two broad categories: the government as a provider and the government as a promoter/facilitator/partner. Regarding its provider function, there is now evidence and widespread acceptance that ownership of reg-

ular production processes is not a sensible function for the government. The private sector obtains better results than does the government, even in areas that previously were considered natural monopolies⁶ (energy, telecommunications), mainly as a result of technological changes. The government, however, is better placed to provide such public goods as macroeconomic stability, justice, external defense, a clean environment, and dispute resolution. Also, the government often is better positioned to provide protection from poverty or destitution and to defend individual rights and social stability (Drèze and Sen 1991). Now, not all these functions require the government to be a provider of goods or services because many can be facilitated simply by regulations and the creation of an appropriate framework.

Regarding the role of the government as a promoter/facilitator/partner, the nature of regulation is a key ingredient. Regulations can become beneficial or harmful, depending on how they are used. Necessary regulations are those that enable activities to operate more efficiently and protect individuals from risk and losses. Necessary regulations include air and road traffic regulations, and drug and food safety norms. Regulations also can be used in lieu of taxes to mitigate negative externalities, as in the case of environmental regulations. However, regulations may constitute an inferior public policy instrument. For example, regulation of harmful emissions may be inferior to using tradable pollution vouchers. By creating a private market for the right to pollute, the government may be able to channel the pursuit of self-interest to achieve a given reduction in pollution at minimum costs—an outcome that regulations may not be able to achieve.

Damaging regulations are those that allow individuals to enter an economic activity on favorable terms (by granting special concessions) to seek their own benefit to the detriment of the general interest, or to pursue objectives that are questionable from a social point of view; and those that are inefficient in the way they achieve well-justified social objectives.

Regulations do not always represent an alternative to public spending. Pension reform is the clearest area in which government regulations that encourage individuals to allocate part of their income to pensions translate into lower government spending. However, in other areas, such as unemployment, sickness, or protection from other risks, regulations may have the opposite effect.

In developing countries, governments face especially significant difficulties when, acting as providers or mere facilitators, they strive to estab-

lish the preconditions for markets to operate efficiently, correct for market failures, and improve social welfare. These difficulties are the result of many factors, including an uneven income distribution and a high percentage of the population affected by severe poverty; a high degree of vulnerability to external shocks of all kinds (for example, natural disasters, world prices, and aid dependency); numerous, pervasive, and unpredictable market failures resulting from imperfect information, prevalence of monopolistic practices, and different kinds of negative externalities; a lack of appropriate incentives for the private sector to operate in terms of competition policy, regulatory framework, and the judiciary system; and government and institutional failures resulting from weak capacity and rigidities, as well as problems of credibility and governance.

In this context, one could conclude that there is a greater need for government intervention in developing countries. However, a greater role for the government does not necessarily mean the need for higher expenditures and the revenues required to finance them. It is important to distinguish between the size of the government measured quantitatively (perhaps as a share of gross domestic product [GDP]) and the positive role that government can have as assessed qualitatively. In practice, although developed countries show relatively higher ratios of public revenue and expenditure to GDP than do developing countries, presumptively this does not say much about the effectiveness of those governments. There is evidence that the share of public expenditures in GDP in developed countries has been increasing over the last decades. This indicator does not reflect the “economic” role of the government because most of its functions associated with legislation, the judiciary system, and macroeconomic and foreign trade policies typically represent only about 2–3 percent of GDP. It is significant from the social point of view, however, because the composition of those expenditures often reveals an increase in social safety nets. This result may be attributed to a number of factors, such as the importance of labor in the industrialization process, changes in the number and age structure of the population, and attempts to promote education and reduce income inequalities.

The results of those large expenditures in developed countries in terms of improvements in income inequality and other social and economic indicators are not necessarily clear. In other words, there is no obvious evidence that larger governments, if measured by public spending as the percentage of GDP, have generated better social outcomes. In some cases, an

increase in expenditures combined with a general public aversion to paying taxes have generated higher public deficits and larger debt-to-GDP ratios in the developed world—something that typically must be avoided in developing countries, given the limited ability of these countries to repay their debt. Furthermore, developing countries generally face greater difficulties in raising fiscal revenues to finance increasing public expenditures than do developed countries. These difficulties often translate into macroeconomic deficiencies—such as inflationary monetary financing, quasi-fiscal activities, high levels of debt, and deterioration of the government's net worth—not always appropriately reflected in conventional measures of fiscal deficits.

Structure of the Book

The objective of this volume is to introduce its readers to key themes and simple analysis techniques related to public finance and poverty. It is based on a Public Finance for Poverty Reduction program prepared at the World Bank Institute, in cooperation with the Poverty Reduction and Economic Management Network at the World Bank. The program was designed for policy makers and researchers in both Latin America and sub-Saharan Africa.⁷ Case studies were prepared as part of the operational work of the World Bank in both regions, primarily as background research for poverty assessment or public expenditure reviews.

The book first provides a set of four conceptual chapters addressing debt, taxation, public expenditure tracking surveys, and benefit incidence analysis. These chapters are followed by case studies on each theme, first from Latin America and then from sub-Saharan Africa. The idea behind combining conceptual chapters and case studies is twofold: to provide some theory and background on key themes that are important in analyzing links between public budgets and poverty reduction, and to show concretely how simple tools developed by economists can be used to shed light on the issues confronted by policy makers. The book provides only an introduction to the themes reviewed, given the very extensive and complex literature on the topics covered. An effort was made here to present in simple ways the core principles and techniques as well as the empirical results from the case studies so as to make the book accessible to a wider audience beyond economists.

Thus, in this book we provide a discussion of some key techniques that can be used to produce public policies that improve the lives of poor people. The techniques are related to the analysis of debt, taxation, and public expenditure (in the last case, with an emphasis on both tracking surveys and benefit incidence analysis). The objectives are not only to define and explain concepts (in the first part of the book), but also to illustrate how those concepts are being used in practice (in the second and third parts devoted to case studies in Latin America and sub-Saharan Africa).

What follows here is a brief overview of the discussions to come in the rest of this volume.

Debt Sustainability

In poor countries, the need to balance short-term fiscal policies with long-term development goals (such as those expressed in the Millennium Development Goals) typically is associated with the government's commitment to implementing a poverty reduction strategy. Particularly in sub-Saharan Africa, this commitment takes place within the context of the debt relief provided under the Enhanced Heavily Indebted Poor Countries (HIPC) Initiative and more recently under the Multilateral Debt Relief Initiative (MDRI). Given this context, the first theme covered in this book is debt sustainability. Along with taxation, monetary financing, internal borrowing, and quasi-fiscal activities, foreign debt historically has been one of the most important ways through which governments raise the resources needed to implement their development policies. In some cases, however, this has been a double-edged sword, given the need to repay the loans obtained from donors and other creditors. Reliance on external debt was not always determined by how much debt could be serviced and repaid, taking into account real growth and international interest rates, and the use of the loans received did not necessarily provide poor people the greatest benefit.

One can refer to debt sustainability as the requirement that indebtedness (or debt service) be kept in line with capacity to repay. But a country's capacity is not easy to define. Various approaches have been used in the literature to define debt sustainability, including external, fiscal, and solvency approaches. Chapter 2 discusses these approaches and shows how they have been made operational through the HIPC Initiative. In recent years, beyond the capacity of countries to repay, a greater emphasis

has been placed on the negative impact of high levels of debt (through the concept of debt overhang), as well as on the “human development” dimensions of debt sustainability. Alternative approaches to analyzing debt sustainability have been instrumental in bringing about additional debt relief to poor countries through the MDRI.

The basic concepts of debt sustainability are discussed and illustrated in the cases of Paraguay for Latin America (chapter 6) and of Guinea, Rwanda, and Senegal for sub-Saharan Africa (chapter 10). The case studies rely essentially on the traditional concepts of external and fiscal sustainability rather than on other alternative approaches discussed in chapter 2. Emphasis is placed on using simple examples to show how debt sustainability depends critically on various growth and taxation-spending scenarios. A simple debt simulation tool is used to perform complex simulations easily. The tool can be used by analysts to help the government and other actors identify some simple trade-offs between debt sustainability and key macroeconomic variables involved in the debt dynamics—variables such as growth, interest rates, inflation rates, exchange rate changes, as well as fiscal and current account deficits and their impact on spending to alleviate poverty.

Taxation

Taxation is the second topic discussed in the book. Taxes are needed to fund public expenditure, and they have direct distributional effects. The existing evidence, however, shows that, unless personal income taxes play a greater redistribution role in developing countries, contributing to equity via taxation will be difficult. Even when the personal income tax base is developed, income tax competition from other countries and tax administration limitations may constrain the government’s ability to use the tax system to redistribute income and wealth. Nonetheless, the design of specific tax instruments should take poverty concerns into account—for example, by exempting basic foodstuffs from such indirect taxes as the value-added tax. A pro-poor exemption of that type could be offset through higher indirect tax rates on luxury products. Similarly, policies to mitigate the antilabor bias of corporate income tax in small and open economies can make tax policy more pro-poor. In addition, broad-based tax systems, with few deductions and exemptions (apart from a personal income tax exemption not larger than per capita income, and low or zero tax rates on purchases of basic goods) and with relatively low tax rates

(albeit proportional or moderately progressive in the case of the personal income tax), compatible with administrative capabilities, are more likely to provide a sound basis for economic growth.

The conceptual issues related to taxation are discussed in chapter 3, which considers the following questions: What is the role of the tax system? What criteria can policy makers use in evaluating tax systems in general and specific tax instruments in particular? What factors should policy makers consider in determining the aggregate level of taxes? What factors should be considered in determining the relative use of different tax instruments? How effective are different tax instruments in redistributing wealth or income in a society? and When designing different tax instruments, how effective are particular tax provisions in reducing the tax burden on poor people? Although there are no definitive answers for all these questions, the discussion in chapter 3 offers some guidance.

The case study of Latin American taxation presented in chapter 7 is devoted to Mexico. The study offers a wide-ranging evaluation of the performance of Mexico's tax system over the 1980s and 1990s in several important areas, including revenue adequacy, structure, temporal elasticity, stability and behavior over the business cycle, efficiency, and equity. This evaluation includes a discussion of various hypotheses that may explain why the system has not performed as well as possible.

The taxation case study for sub-Saharan Africa (chapter 11) is devoted to Niger and is limited in scope. Its main objective is to demonstrate how, even with limited available data, simple techniques can be used to analyze the potential effect of indirect tax reforms on poor people. Specifically, chapter 11 provides first a review of medium-term targets for generating public revenues in Niger (together with a description of the current structure of tax revenues); then it uses household survey data to assess the potential distributional incidence of selected reforms under consideration in the country in the first few months of 2005; and, finally, it shows briefly how the overall impact of any tax reform depends in part on how larger tax revenues are spent.

Public Expenditure Tracking Surveys

There is broad agreement that the revenue side of fiscal policy can affect growth and poverty reduction positively, mostly by providing funds to finance public spending, particularly in physical (basic infrastructure) and human (education and health care) capital to benefit poor people. But in

the desire to avoid excessive interference from the state in the productive sectors and to minimize distortions in the economy, there also is broad consensus that public expenditure is a more potent instrument to reduce poverty than is taxation itself. Despite constraints on the absorptive capacity of countries that lack institutional strength, there is ample room to improve the allocation of public expenditure to reduce poverty in most developing countries.

The focus in this book is on public expenditure tracking surveys (PETSs) and the associated quantitative service delivery surveys (QSDSs). As noted in chapter 4, studies suggest no close link between public spending and outcomes, with higher spending not necessarily leading to enhanced services because leakage prevents funds from reaching schools and health clinics, and because waste and corruption often distort public spending impact. The PETS is useful in ascertaining the extent to which public spending actually reaches households—and especially the poor. Implementing a PETS and publicly disclosing the results have been shown to improve the allocation and use of funds in several developing countries. Better monitoring and tracking of funds have reduced leakage. These surveys demonstrate that data collection and analysis, and the subsequent dissemination of results, can be potent means of increasing transparency in the use of government funds and can give a stronger voice to poor people.

Chapters 8 and 12 are devoted to surveys carried out in Peru and Rwanda, respectively. Poor targeting, deficient financial management, and leakage all were found to varying degrees in Peru. The targeting of public spending varied greatly from one social program to another. The financial management issues there included the volatility of central government funding, insufficient transparency, and a lack of auditing and supervision in municipalities' use of funds. The PETS was used specifically to examine leakage in the Vaso de Leche (Glass of Milk) program. The greatest leaks were found not between the central government and municipalities, but at the local level.

In Rwanda, the survey was used to analyze the health care and education sectors. The study found delays in the transfer of public resources from the central administration to primary beneficiaries, and leaks at the regional and district-level health and education offices—again with weak accountability, bookkeeping, internal financial controls, and auditing. In both primary education and health care, allocations from the central gov-

ernment only paid the salaries of teachers and health workers, so facilities relied on household contributions, fees, and sporadic contributions from donors and nongovernmental organizations to fund their needs and activities. That reliance led to affordability issues and to a lack of such inputs as student textbooks.

Benefit Incidence Analysis

The final topic covered in the book is benefit incidence analysis, which can be used for both taxes and public expenditure. This analysis combines administrative data (on taxes and/or spending, often at a disaggregated level, such as primary rather than secondary and tertiary education) and household survey data to measure how revenue and expenditure policies affect different groups of households. The tool also can be used for other purposes, such as assessing the distribution of user charges in various sectors (such as education and health care, and basic infrastructure services).

As is noted in chapter 5, establishing the incidence of taxes and expenditure is important because those people who actually pay the taxes are not necessarily those who bear the burden of the taxes. Similarly, public expenditures that, in principle, are intended to benefit the poor may be badly targeted and thereby benefit better-off households. Subsidies for the lower brackets of the tariff structure of electricity and water consumption provide a classic example: the subsidies are supposed to make services affordable for the poor, but because the poor tend to have very low rates of connection to the electricity and water networks, the subsidies often end up benefiting the middle class instead. These are the situations that benefit incidence analysis is meant to identify. Although such exercise is important, it is not necessarily easy to implement. It is not a simple matter to shift from a positive analysis of who benefits from public expenditure or who pays taxes to a normative judgment of the policy changes that should be adopted to improve the system.

Chapters 9 and 13 offer case studies on benefit incidence analysis in Uruguay and Cape Verde, respectively. The Uruguay chapter discusses a range of social assistance programs that use various targeting schemes with quite different outcomes. The chapter first organizes the programs according to their risk management role and then examines their performance, using indicators of costs, incidence, and targeting. The discussion points to examples of good practice and to missed opportunities in

program design. Chapter 13 analyzes the targeting performance of public transfers in Cape Verde—a small West African economy following a social-democratic model that heavily subsidizes the social sectors but that, at the time of the study, faced tighter budget constraints. Beyond the basic analysis of the incidence of public spending, the chapter provides a framework for analyzing the determinants of targeting performance. The framework uses both access and subsidy-design factors that affect performance. Finally, the chapter explores the potential for better targeting under a proxy means-testing system or geographic targeting.

The Way Forward: Topics for Future Study

There are many topics of importance in public finance not covered in this book. A key dimension is the political economy of the design and execution of public spending programs. Because of the need to attract middle-class support for social programs, countries face limits in their ability to target benefits strictly to the poor. Given this political constraint, improving targeting performance may not always serve the poor if it undermines public support for the programs.

A second important topic for future consideration is budgetary planning in response to macroeconomic stability goals and longer-term development objectives. The role of medium-term expenditure frameworks in enforcing a multiyear fiscal constraint, enhancing budget discipline and sustainable expenditure policy, and improving government performance cannot be underestimated. But even well-prioritized budgets designed under a medium-term framework can be undermined by shortcomings in actual spending when large differences between approved and executed budgets appear in countries with limited monitoring and control systems.

Finally, we have not addressed the cyclicity of public spending, whereby public expenditures in many countries are cut during recessions because of a lack of resources, thereby hurting the poor at the moment they most need support.

The ultimate impact of public finance decisions on poor people depends as much on the interaction among various fiscal dimensions as on particular interventions within any given areas. In particular, the redistributive effect of tax policy depends not only on tax design and compliance, but more essentially on how their beneficiaries use the funds raised by those taxes. Although the public spending program clearly remains the

most direct instrument by which governments provide opportunities, empowerment, and protection to the poor, clearly it also is essential that the revenue side of the budget be considered, given its implications for efficiency and equity in the economy and its impact on the dynamics of debt and growth. Thus, to make the best decisions about the allocation and execution of public budgets, governments should consider both public spending and the revenues raised to finance them.

Despite the range of topics beyond the scope of this volume, we hope the chapters provide a good introduction to some of the critical issues faced by policy makers when trying to assess the impact on poverty of the decisions they make in the area of public finance.

Conclusion

In concluding this introduction, it is important to say that the goals of the government should be established in such a way that they are consistent with its ability to operate efficiently, while they promote an improved role for markets. The great need for government intervention in developing countries to deal with market imperfections and inequalities essentially calls for reducing government and institutional failures, improving public sector performance so that the main functions of the government can be ensured, and promoting effective public-private partnerships. Ultimately, it is essential that the fiscal policy instruments used by the government contribute to eliminating—not exacerbating—market distortions, and to improving—not worsening—income distribution.

Notes

1. A “public good” is a commodity for which the cost of extending the service to an additional person is zero (the commodity is said to be *nonrival*), and for which it is impossible to exclude other individuals from enjoying it (the commodity is *nonexcludable*). Because private provision of public goods generally is insufficient to meet the public need, government must step in to encourage the production of such goods. National defense provides a perfect example of a public good: when a nation protects its freedom, it does so for every individual and can exclude no one from enjoying that freedom.
2. This refers to Adam Smith’s definition.
3. In some cases, private markets may not function well at all. In the case of private unemployment insurance, for example, demand and potential supply ex-

- ist, but the inability of private firms to monitor and verify private behavior prevents the creation of a well-functioning market for unemployment insurance.
4. *Adverse selection* results when differences in information (or information asymmetry) between two parties lead to an unequal or inefficient exchange on the market. *Moral hazard* occurs in situations where agents maximize their own utility to the detriment of others because they do not bear the full consequences (or reap the full benefits) of their actions as a result of uncertainty, incomplete information, or the nature of the particular contract in force. Moral hazard behavior implies that economic agents take on more risk than they would take on normally in the expectation that some of their potential liabilities will be covered by others.
 5. *Opportunities* essentially refer to jobs, regular income, and assets. *Empowerment* is associated with inclusion and capabilities to influence the decision-making process. *Protection* is a need emerging from the basic needs of the poor (education, health care, basic infrastructure, and so forth) and their vulnerability to external shocks. For more information, see World Bank (2000).
 6. A *natural monopoly* is one that does not arise from government intervention in the marketplace to protect a favored firm from competition, but rather develops from special characteristics of the production process in the industry under the existing status of technology. Theoretically, a natural monopoly arises when there are very large economies of scale relative to the existing demand for the industry's product, so that the larger the quantity of the good a single factory produces, the cheaper the average costs per unit—right up to production at a level more than sufficient to supply the entire demand in the relevant market area. Natural monopolies typically are utilities, such as water, electricity, and natural gas.
 7. The program and the preparation of this book benefited from the support of Belgium's Directorate-General for Development Cooperation.

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PART ONE

Concepts in Public Finance

*Debt, Taxation, Public Expenditure Tracking
Surveys, and Benefit Incidence Analysis*

CHAPTER 2

Debt Sustainability for Low-Income Countries

A Review of Standard and Alternative Concepts

Danny Cassimon, Blanca Moreno-Dodson, and Quentin Wodon

Governments in low-income countries (LICs) have the difficult task of making wide-ranging decisions about public spending, taxation, and borrowing. Although we can analyze at length how both public spending and taxation can be designed and implemented to contribute to growth and poverty reduction, the biggest challenge that most developing countries face is in determining how much they can borrow without jeopardizing their long-term prospects. The objective of this chapter is to introduce the key issues involved in debt sustainability analysis (DSA). We will review the main approaches developed in the literature, starting from the traditional fiscal and external approaches and covering recent alternative frameworks, such as the debt overhang analysis and the human development approach (especially as it relates to the funding requirements for achieving the Millennium Development Goals [MDGs]).

Debt sustainability requires that indebtedness be kept in line with the capacity of the borrower to repay (IMF 2003). At a firm or project level, this means that borrowed funds should be invested productively with a return high enough to cover debt-service costs. This simple definition, however, is not as easily applied to countries as it is to firms or projects.

Government borrowing often is used to cover public deficits rather than to invest in specific projects, and the returns to public investments in the social sectors or infrastructure may materialize only in the distant future. This makes it difficult to take the returns to investment into account. In addition, debt-servicing capacity is determined by government revenues, which depend on tax rates as well as on economic growth. Finally, debt sustainability is affected by variables that often are not under government control, such as the level of world interest rates, the degree of concessionality in the loans received, and the foreign exchange rate.

Given the complex web of factors that affect debt sustainability and are affected by it, the concept cannot be captured in a single indicator or in simple rules of thumb that would apply indiscriminately to all countries. What is needed when working on debt sustainability is a country-specific analysis looking at a set of different indicators and their dynamics, with a particular focus on identifying binding constraints to development as well as key vulnerabilities to which the country may be exposed in the future. At the same time, some guidance and an overview of the main approaches used in the literature on debt sustainability should be useful to anyone studying the relationships between public finance and poverty reduction.

The traditional approaches to debt sustainability cover two basic criteria: *fiscal* and *external*. Consider first fiscal sustainability. Developing countries typically experience a chronic shortfall of domestic savings over the (targeted) level of domestic investment required to generate enough growth to reduce poverty and to meet the MDGs. This savings gap often is mirrored by a fiscal gap—that is, the public sector runs a fiscal deficit to allow for more spending than would be allowed on the basis of government revenue (or more investment than would be allowed on the basis of public saving).¹ To the extent that it is not covered by monetary financing, the deficit feeds into increased debt, either foreign or domestic.

In some countries, it is necessary to consider the possibility of a recurrent-fiscal gap. For instance, if there is limited tax capacity, it is not possible to make some crucial recurrent spending that would provide the minimum quality of public services in such areas as law and order, road maintenance, basic health care, or education services. Such expenditures may have an important bearing on the profitability of public investments as well as on private investment. A second possibility for the occurrence of a recurrent-fiscal gap is when there is some unused capital expenditure

budget that, for some reason, cannot be transferred into the current budget. This may happen in some aid-dependent developing countries where there is not enough country budget ownership and donors funding investment projects face absorption capacity limits on the recipient side but are reluctant to divert some of those resources to the current budget.

Beyond a fiscal gap, many countries are confronted with an external financing gap, which may lead to concerns about the external sustainability of the country's debt. LICs must rely on foreign capital to finance their savings gap. In an open economy, the excess of domestic investment over domestic savings is equal to the trade deficit; or, put in other terms, an excess of domestic investment over national savings translates into a current account deficit. Because LICs' debts are largely denominated in foreign currencies, productive investments should enable countries to convert domestic resources into foreign exchange by generating sufficient export earnings—but this is not always the case.

In addition to the concerns about fiscal and external debt sustainability, the recent literature has identified two additional constraints that feed into debt sustainability concepts and indicators. These relatively recent phenomena, partly linked to the current debt burden itself, have been translated into “alternative” concepts of debt sustainability, two of which are especially important here. First, a high current debt itself may severely hamper future debt-servicing capacity because it might introduce to the economy all kinds of disincentive effects to invest and adjust, resulting in a severe negative effect on future economic growth. This is the so-called *debt overhang hypothesis*. This effect is usually linked to a high stock of debt. Second, a high current debt-service burden also may act as an important constraint that is difficult to deal with from a political or moral point of view. The issue is that the resources allocated to debt service may crowd out social or other poverty-related spending as defined, for instance, through the measures needed to reach the MDGs or other targets specified in a country's Poverty Reduction Strategy Paper (PRSP). As such, a wedge can be inserted between the capacity to pay debt service and what would be considered “affordable” debt service (EURODAD 2001) in order not to crowd out priority sector spending. The so-called *human development approach* to debt sustainability refers specifically to the spending necessary to reach social and poverty reduction goals, and the political pressure to take on more debt to finance needed additional expenditures.

Given the multiple dimensions of the debt sustainability issue, instead of using a one-dimensional measure of debt sustainability, we would argue that it is preferable to rely on a framework that recognizes the multiple constraints faced by LICs. This argument implies that DSA should be carried out using a menu of indicators, including both the present value of the debt stock and debt-service indicators relative to a range of variables, such as exports, revenues, and GDP; and analyzing their dynamic evolution over time using realistic macroeconomic assumptions. It also is important to simulate the effect of country-specific key bottlenecks and vulnerabilities. To apply such a menu of indicators and approaches successfully in a country-specific context, one has to show which aspects are most binding in a particular case and moment in time.

This chapter is structured as follows. In the next section, we provide a brief review of the theoretical concepts used in traditional debt analysis to derive a list of possible constraints and variables that affect debt sustainability. In the third section, we discuss how different indicators have been applied in operational schemes, such as the Enhanced Heavily Indebted Poor Countries (HIPC) Initiative and the new (revised) International Monetary Fund (IMF)/World Bank (2006) framework for long-term debt sustainability for LICs. The fourth section is devoted to an analysis of alternative DSA frameworks (such as the debt overhang hypothesis and the human development approach to debt sustainability). There is also a brief discussion of the new debt relief initiative advocated by the Group of Eight (G-8)—the Multilateral Debt Relief Initiative (MDRI)—that situates debt relief within an MDG perspective. A conclusion completes the chapter.

Traditional Approaches to Debt Sustainability: A Brief Review

LICs are confronted by multiple constraints when making policy decisions that may affect their debt sustainability. First, there is a foreign exchange constraint, reflecting limits on the ability to transform domestic factors of production into the foreign exchange required for external debt service and the financing of imports. There is a fiscal constraint, reflecting the government's limited ability to tax in order to meet its debt-service obligations, next to other expenditure priorities. And one could add a constraint in terms of the fungibility of resources—for example, due to earmarking of revenues for certain sectors, subnational governments, or

public agencies; or due to restrictions on shifting resources from investment to recurrent expenditures. All these constraints may lead to a severe shortage of funds available for recurrent expenditures and thus cause situations where debt service has to compete with other recurrent priority spending. These constraints, and the need to borrow to invest for the country's development and provide much-needed basic services to the population, also may give rise to the so-called twin-deficit situation—a fiscal deficit coupled with a current account balance deficit.

Our objective in this section is to link the different potentially binding constraints faced by LICs with simple concepts and indicators that are developed in the literature and applied in practice to measure debt sustainability. We focus first on fiscal sustainability concepts, and then discuss external sustainability indicators. We also briefly present the solvency approach to debt sustainability. Building on the concept of the present value of debt in the solvency approach, and given that most low-income debt is concessional, we then show how the conventional fiscal and external sustainability concepts can be fine-tuned by using this present value of debt concept rather than nominal stocks or debt-service flows. We start with the traditional approaches to debt sustainability, leaving the other two alternative concepts for later.

Fiscal Approach

The conventional accounting approach to fiscal sustainability is based on a simple indicator: the ratio of debt to gross domestic product (GDP). The difficulty lies in estimating this ratio and in analyzing how it changes over time. There are many good descriptions of the mathematics of debt sustainability in the literature. One such description, which is both detailed and short, is provided by Ley (2004). To present the concepts of debt sustainability as simply as possible in our review, we will not derive the key results of the literature; rather, we simply will provide and interpret them. The reader is referred to Ley (2004) or other similar accounts for a formal treatment.²

To estimate the ratio of debt to GDP at any point in time, one first must estimate the level of debt. It is easiest to start with nominal debt (as opposed to the present value of debt that we will define later). We first note that, at any point in time, the government budget constraint states that a (primary) fiscal deficit not financed by money creation will feed automatically into higher public debt. Conversely, fiscal surpluses can be

used to reduce the public debt stock. This means that the debt at time t is equal to the debt at time $t - 1$ plus the interest paid on the debt minus the creation of money and a term (the primary budget balance) equal to the difference between the resources available to the government from tax revenues and foreign aid in the form of grants, and the use of those resources in the form of recurrent consumption and investments. Formally, this equation can be written as follows:

$$D_t = D_{t-1} + iD_{t-1} - (T + A_{gb} - I_g - C_g^*) - \Delta M = (1 + i)D_{t-1} - (B + \Delta M), \quad (2.1)$$

where D is the stock of public debt; i is the average nominal interest rate on public debt; T is the domestic government revenue, consisting mainly of taxes; A_{gb} is foreign aid in the form of grants flowing to the government budget; C_g^* is government recurrent spending (including transfers) but exclusive of interest payment on public debt; ΔM is monetary financing; and B is the primary (that is, noninterest) government balance, including budgetized grant aid (with $B > 0$ denoting a surplus).

The concept of sustainability implies that we must look at changes in debt indicators over time, and that we must normalize these indicators by a measure of the government's ability to service debt, such as government revenue or GDP. Let's denote by d_t the ratio of debt to GDP at time t ; by r_t the average real interest rate on the debt (after netting out inflation to simplify the notation); by g_t the real growth rate of GDP; and by b_t^* the ratio of the primary balance, including any monetary financing, to GDP at time t . With a few assumptions and relatively simple algebra applied to equation (2.1), we can show that changes to the debt-to-GDP ratio over time will adhere to the following "law of motion":

$$\Delta d_t = \left(\frac{r_t - g_t}{1 + g_t} \right) d_{t-1} - b_t^*. \quad (2.2)$$

Equation (2.2) makes it clear that two key factors affect the ratio over time. The first factor is the difference between the average real interest rate on the debt (as denoted by r) and the real growth rate of GDP (denoted by g). The term $(r - g)/(1 + g)$ usually is referred to in the literature as the "endogenous dynamics" element of the relationship. The second factor is the primary balance, including seigniorage or the creation or printing of money by the government. Thus, if the average interest rate is structurally higher than the GDP growth rate, the debt-to-GDP ratio will

rise unless the government runs a sufficiently large primary fiscal surplus. Keeping the debt-to-GDP ratio stable also will require a primary surplus. If, on the other hand, the growth rate of GDP exceeds the average rate of interest on public debt, keeping the debt-to-GDP ratio stable or even reducing it is compatible with running a primary fiscal deficit. The intuition for this result is that higher growth will generate higher revenues that will make it easier to pay the government debt in the future. Note also that equation (2.2) can be transformed into a relationship showing the primary balance (with monetary financing) b^* that is required to stabilize the public debt-to-GDP ratio (that is, $\Delta d = 0$). For countries that are able to borrow at concessional interest rates, it is easier, in principle, to realize a positive growth-to-interest rate differential. This in turn makes debt sustainability easier to achieve and maintain even when running fiscal primary deficits. In reality, however, there have been many disappointing cases of LICs with exploding debt ratios, despite favorable borrowing terms, resulting from lower-than-expected growth rates (the implicit “return” on the borrowed funds), large deficits, or a combination of the two.

One could argue that sustainability should not be defined only in terms of maintaining a stable debt-to-GDP ratio. Sustainability ultimately depends on the difference between the current level of the debt ratio and its “desired” level. Given a range of combinations of growth rates, interest rates, and primary surpluses (for a given debt ratio), it is possible in principle to arrive at and sustain a desired level of indebtedness. But the fiscal sustainability framework presented here is intentionally not normative—it only highlights the dynamic behavior of the indicator chosen to analyze the sustainability of debt over time. More normative definitions of what could constitute a desired, optimal, or sustainable level of debt will be introduced in later sections of this chapter. Note also that, in principle, vulnerability to output shocks (which negatively influences the debt-to-GDP ratio) could be dampened by making debt contingent—for example, by creating instruments such as GDP-linked debt. In practice, however, it appears to be extremely difficult to create a market for such instruments.³

To this point we have treated the government budget identity and public debt dynamics without considering whether financing was through foreign or domestic debt. For most LICs, borrowing is primarily foreign, which means that debt is contracted not in domestic but in foreign currency and, as such, it creates a structural mismatch problem on the gov-

ernment's balance sheet (that is, revenues in local currency and part of the expenditures in foreign currency). Exchange rate dynamics thus play an important role in determining the domestic cost of debt service and fiscal sustainability.⁴

Define by $\varepsilon_t = \Delta e_t/e_{t-1}$ the change in the exchange rate over two periods (with a depreciation showing a positive sign), by α^f the part of the debt that is denominated in foreign-currency, by r^* the weighted average real interest rate on both foreign and domestic debt, and by r^f the real interest rate on the foreign debt. It can then be shown that

$$\Delta d_t = \left(\frac{r_t^* - g_t + \varepsilon_t \alpha^f (1 + r_t^f)}{(1 + g_t)} \right) d_{t-1} - b_t^* \quad (2.3)$$

Equation (2.3) introduces a foreign exchange rate effect through the endogenous dynamics term of the debt sustainability relationship, which now is driven by four variables: (1) the interest rate on the debt, (2) the growth rate of GDP, (3) the inflation rate (which does not appear in the equation because we use real interest rates), and (4) the foreign exchange rate. A depreciation of the currency will lead to an increase in the debt ratio over time, and this increase will be larger if the share of the debt denominated in foreign currency is larger and if the real interest rate paid on the debt in foreign currency is higher.

Note also that changes in the exchange rate have a direct effect on the domestic value of the foreign debt stock, and thus on the value of the debt-to-GDP ratio—that is, on the value of d_{t-1} in equation (2.3). Because the foreign exchange rate affects both the numerator and the denominator of the debt-to-GDP ratio, the overall effect depends on the degree of matching in the economy between the composition of debt and the composition of output. The direct effect of exchange rate changes on the debt-to-GDP ratio will be maximal when all public debt is foreign and the economy produces no tradable output (or vice versa). In general, one could argue that it is advisable, when feasible, to try moving the debt composition as close as possible to the composition of output in the economy.

One more extension developed by Ley (2004) is to decompose the economy into the conventional tradable and nontradable sectors to show the additional effect of exchange rate changes on price changes in the tradable sector, which again affect the endogenous dynamics term. Ley showed that the inflation rate in an open economy may be broken into

two components, similar to the interest rate decomposition, to express it as a weighted average of domestic and foreign inflation rates. The valuation gains or losses in tradable sector output induced by the exchange rate then depend on the share of tradable output in total output. Because this introduces an exchange rate effect on the denominator of the endogenous dynamics term in equation (2.3), it dampens the previous foreign exchange rate effect so that the result shown in equation (2.3) is best interpreted as the maximum foreign exchange effect.

One last remark on the accounting approach to DSA refers to the use of specific variables for the denominator and numerator in the debt ratio. We have presented the basic analysis of debt dynamics using the debt-to-GDP ratio as a good indicator to measure debt sustainability. This should be a rather obvious choice for fiscal sustainability, although other indicators relating debt to government revenues can provide useful additional information. Moreover, sustainability indicators where the numerator is a flow variable rather than a stock variable, such as debt service to GDP or to government revenues, also can provide complementary and sometimes more useful information.

External Approach

We now turn to a discussion of the sustainability of the combined public and private debt from a foreign exchange or external point of view. The idea is to measure sustainability in terms of a foreign exchange constraint instead of the fiscal constraint. A sustainable fiscal stance may not be sufficient for external sustainability if private sector investment exceeds private sector savings. Conversely, an unsustainable fiscal deficit may translate into a sustainable external position if the balance of private savings minus private investment is positive and compensates for an unsustainable fiscal deficit. Thus there may be divergence between fiscal and external sustainability (Parker and Kastner 1993).

For external debt analysis, all variables (including output) are now expressed in U.S. dollars rather than domestic currency, given the prominence in U.S. dollar-denominated debt.⁵ Let us define D^f as the total foreign debt stock, which is both public and private; i^f as the average nominal interest rate on total foreign debt; $NICA^*$ as the noninterest current account, except for current transfers; Tr as the sum of official grants and other current transfers; FI as the non-debt-creating (that is, equity)

capital flows; and ΔNFA as the change in official reserves and other foreign assets (with a positive figure denoting an increase in foreign assets), which also includes “exceptional finance.” The basic debt relationship over time is given by the following equation:

$$D_t^f = (1 + i_t^f)D_{t-1}^f - (NICA_t^* + Tr_t) - FI_t + \Delta NFA_t. \quad (2.4)$$

Equation (2.4), which is very similar to equation (2.1), provides the starting point for the analysis. The only difference is that, instead of considering money financing for the fiscal approach, the relationship now is based on the current account financing. The equivalent to equation (2.2) for the fiscal approach is

$$\Delta d_t^f = \left(\frac{r_t^f - g_t^f}{1 + g_t^f} \right) d_{t-1}^f - nica_t^{**}. \quad (2.5)$$

The key results are similar to those obtained for the fiscal accounting approach to debt sustainability. As before, the first key factor affecting the ratio of debt to GDP is the difference between the real interest rate on the debt and the real growth rate of GDP. These variables are expressed in equation (2.5) with a tilt to highlight the fact that they are now expressed in dollar terms. For example, the growth rate is now the dollar-denominated growth rate. The second factor is now the adjusted non-interest current account balance. A noninterest current account not financed by non-debt-creating equity flows or changes in the foreign reserves position feeds into higher external debt, whereas noninterest current account surpluses can reduce the external debt stock. Thus, if the average interest rate is structurally higher than the GDP growth rate, the debt-to-GDP ratio will rise unless the country runs a sufficiently large noninterest current account surplus. On the other hand, if the growth rate of GDP exceeds the average rate of interest on external debt, keeping the debt-to-GDP ratio stable, or even reducing it, is compatible with running a current account deficit.

As for the fiscal approach, exchange rate effects play a role in the dynamics of the external debt-to-GDP ratio to the extent that output is not exclusively tradable sector output. For example, exchange rate depreciation directly increases the ratio of external debt to GDP as it decreases the dollar value of GDP. Similar to the extensions alluded to in the discussion of the fiscal approach, changes in the exchange rate can be intro-

duced more specifically in the analysis, and the exchange rate effect will depend on the shares of tradable versus nontradable output. The effect will be maximal when tradable output is zero.

Solvency Approach

The accounting approach to DSA enables one to estimate a sustainable fiscal stance at a particular moment in time on the basis of a definition of the fiscal deficit, which refers to the result of a fiscal year and its corresponding annual borrowing requirements. However, governments do not finance their expenses entirely with their annual income. Instead, they shift spending between periods to meet annual fiscal targets. To analyze the medium- and long-run sustainability of the fiscal policy, we must consider the financing constraint facing the public sector in a long-term dynamic context. Looking at the government budget constraint from this intertemporal viewpoint introduces the concept of long-term “solvency.” Even if the government faces substantial fiscal deficits and a high (or possibly unsustainable debt-to-GDP ratio) today, the government still can be considered solvent as long as resources generated in the future are sufficiently large to cover all future debt-service obligations. The borrower may experience a “liquidity” problem, but lenders should not worry too much about current debt-servicing problems if they are prepared to roll over current debt-servicing obligations. The same type of argument can be made to some extent for the external approach to debt sustainability.

To take this argument into account, the solvency approach to fiscal debt sustainability is based not on nominal debt, but on the present value (*PV*) of future debt payments. The government can be considered solvent as long as the present value of future resources available for debt servicing (*DS*), as represented by future primary fiscal balances (adjusted for seigniorage, B^*), is larger than the present value of all future public debt-servicing obligations (which equals the current public debt stock for borrowers at market terms)—in other words, if the government has a positive net worth. The case of an equality between debt-service obligations and future primary fiscal balances is referred to as the “no-Ponzi game” condition.⁶

Because solvency is an intertemporal concept, these results imply that there is no unique fiscal stance that ensures solvency. Higher expenses today could be compensated by a cut in spending tomorrow, and governments have the flexibility to adopt different fiscal policy packages and

choose the timing for doing so. This framework can be used to calculate the required primary surplus necessary to stabilize the debt-to-output ratio, which will depend on the difference between the (real) interest rate and the (real) GDP growth rate. Again, inflation rates and exchange rate (changes) can be introduced into the analysis.

Take *PVD* and *PVB*, respectively, to represent the present value (*PV*) of future debt-service payments (*DS*) and of future primary fiscal balances (including seigniorage, B^*) by discounting these values of *DS* and B^* at the appropriate (real) discount rate, δ . As such, public debt can be considered sustainable from a solvency point of view as long as

$$\begin{aligned} PVB(B^*, \delta, \pi) &= \sum_{t=s}^{\infty} \frac{DS_t}{[(1 + \pi)(1 + \delta)]^{t-s}} \geq \sum_{t=s}^{\infty} \frac{B_t^*}{[(1 + \pi)(1 + \delta)]^{t-s}} \\ &= PVD(DS, \delta, \pi). \end{aligned} \quad (2.6)$$

The net worth of a country is simply the difference between the two. The upper bound for the time index of the present value calculation used in determining the solvency constraint is important. Choosing an infinite time horizon enables the country to stay solvent whenever it stabilizes the debt-to-GDP ratio over time, without needing to pay back the debt entirely. The analysis conducted in some of the existing solvency models implies that solvency is ensured only when the rate of growth of the debt-to-output ratio remains below the long-run value of the difference between the real output growth rate and the real interest rate. This implies that the present discounted value of the government debt converges to zero (Cuddington 1997), which is necessary only when working with a solvency concept in a finite time horizon (T instead of ∞).

On a theoretical level, the solvency approach is the appropriate way to look at fiscal sustainability. In practice, however, determining long-term fiscal sustainability using the solvency constraint is difficult in part because estimating the present value of future revenue and expenditure flows is problematic, particularly in LICs. Projecting real rates of growth and real interest rates over the long run also can be very uncertain.⁷ For this reason, only a few studies have tried to apply the solvency constraint to developing countries (Buiter and Patel 1992; Haque and Montiel 1994; Cuddington 1997). Most of the available models do not pretend to find a long-run general equilibrium path, nor do they ensure consistency of the

fiscal stance with balance of payments and growth targets. Therefore, from an operational viewpoint, the solvency approach is less useful for debt analysis than other, simpler approaches.

In a similar way to what has just been outlined for fiscal analysis, we could try to evaluate solvency, including the external constraint, by analyzing the relationship between the future external debt-service paths and some indicator of future capacity to generate foreign exchange, such as current account balances or expected growth of exports. Again, however, it has proved difficult to translate this into operational indicators. One interesting example is provided by Cohen (1985), who defined a solvency index that measures the fraction of exports that should be devoted to repaying the debt in order to satisfy the solvency constraint. In follow-up work, Cohen (1996) estimated that, for African countries, a debt-to-export ratio of about 210 percent should be the threshold at which a country's debt should be rescheduled. Because this index is based on trade flows only, leaving aside capital movements, it needs to be used with caution. In a situation of massive capital flight, it should be used together with an evaluation of the capital outflows and their possibility of being repatriated while causing liquidity problems.

Concessionality and the Present Value of Debt

The concept of the present value of debt introduced in the solvency approach is especially important for LICs. To the extent that debt is highly concessional, nominal debt may not be a good indicator of debt burden because nominal debt stock will not reflect adequately the present value of the future debt-servicing burden. For countries with highly concessional debt, therefore, it is particularly appropriate to use the present value of debt—that is, the discounted value of all future debt-service payments—as a measure of the future debt burden. What would change in our analysis of the fiscal and external approaches to debt sustainability if we were to use the present value of debt instead of its nominal value? One way to move from a nominal to a present value approach is to use the grant element (GE) concept, as shown in equation (2.7), which is defined as the difference between the nominal stock of debt and its present value, expressed as a percentage of the nominal debt stock. Note also that the value of the GE depends on the discount rate used (that is, a reduction of the discount rate reduces the GE of debt by increasing the present value of the debt).

$$GE_t = \frac{(D_t - PV_t)}{D_t} \Leftrightarrow D_t = \frac{PV_t}{(1 - GE_t)}. \quad (2.7)$$

To look at the dynamics of the GE, define μ_t as the change in GE over time, with $(1 - GE_t)/(1 - GE_{t-1}) = 1 - \mu_t$. The parameter μ is thus equal to zero if the GE of the overall debt stock remains unchanged between two periods, and the parameter is positive (negative) if the GE increases (falls). Using this definition, it can be shown that the change in the ratio of the present value of debt to GDP over time, which is denoted as Δpv , is equal to

$$\Delta pv = \frac{r_t^f - g_t' - \mu_t(1 + r_t^f)}{(1 + g_t')} pv_{t-1}^f - (1 - GE_t)(nica_t^{**}). \quad (2.8)$$

There are two main differences between equations (2.5) and (2.8). The first difference is that a higher degree of concessionality (a larger value for GE) relaxes the constraint imposed by the adjusted noninterest current account balance. The second difference is that, if the degree of concessionality increases over time, the required growth rate, necessary to ensure that the debt ratio does not increase, is reduced. Simply stated, a higher degree of concessionality over time reduces the required ability to finance future interest payments through growth. Conversely, for countries whose borrowing becomes less concessional over time (for example, because a country reaches middle-income status and graduates from the International Development Association [IDA]), the required growth rate to ensure sustainability will increase with the drop in concessionality of the loans received.

Equation (2.9) provides the law of motion of the present value debt-to-GDP ratio under the fiscal accounting approach, starting from equation (2.3), which already factored changes in the exchange rate. There is one variable in equation (2.9) that needs to be defined: a_{gb} is the net budgetized grant aid as a ratio of GDP (and b^{**} is the primary balance without grants) to single out the effect of (budgetized) grant aid on the dynamics.

$$\Delta pv = \left(\frac{r_t^* - g_t + \varepsilon_t \alpha^f (1 + r_t^f)(1 - \mu_t) - (1 + r_t^*)\mu_t}{(1 + g_t)} \right) pv_{t-1} - (1 - GE_t)(b_t^{**} + a_g b_t). \quad (2.9)$$

As before, a large depreciation that raises the domestic currency value of foreign currency debt can lead to a sharp rise in the debt ratio, even if revenue growth exceeds the interest rate, and the primary balance after grants is in surplus. Thus, substantial changes in the present value debt-to-exports ratio can occur in only a few years, even with a prudent and highly concessional borrowing policy and low fiscal deficits.⁸ In addition, as was the case with external sustainability, equation (2.9) shows that, in the fiscal approach, changes toward higher concessionality over time will decrease the burden placed on growth to be able to repay loans, and reduce the impact of variations in the exchange rate because grants do not have to be repaid. In addition, a higher level of grant aid will reduce the financing gap.

It is also worth noting that the external or fiscal financing gap—that is, the second term on the right-hand side of equations (2.8) and (2.9)—is the factor that most directly captures the tension between debt sustainability and the need for financing. A fiscal gap is equivalent to the adjusted primary deficit after grants, whereas an external gap is defined as the adjusted noninterest current account deficit. When a country or government boosts its investment to achieve higher growth and eventually greater poverty reduction, the financing gap rises, as reflected in a larger current account and/or fiscal deficit, unless there is an offsetting fall in domestic public or private consumption. In the absence of higher grants or other nondebt financing, such as debt rescheduling or the buildup of arrears, debt ratios would increase.

In the applied chapters on Paraguay, Guinea, Rwanda, and Senegal in this volume, case studies that rely on the above-mentioned concepts or adaptations of them are provided to reveal the sustainability of various growth and taxation-spending scenarios over time. The debt module of SimSIP (which stands for Simulations for Social Indicators and Poverty) is a simple tool used to perform complex simulations easily. Analysts can use such tools to help governments and other actors identify some simple trade-offs between debt sustainability and key macroeconomic variables involved in the debt dynamics, such as growth, interest rates, inflation rates, and exchange rate changes, as well as fiscal and current account deficits and their impact on antipoverty spending.

In the rest of this chapter, we consider the operational aspects of debt sustainability analysis, including alternative frameworks that have been proposed to look at the issue and the latest initiatives (such as the HIPC

Initiative and the MDRI) taken by donors to reduce the burden of debt service for poor countries.

Operationalizing Debt Sustainability Concepts: The HIPC Initiative

How can the different concepts and indicators of debt sustainability be put together in an operational framework to guide monitoring and decision making on real-world country cases?

Four Steps Necessary to Conduct a DSA

This section sketches four basic steps required to conduct a DSA, and then briefly discusses the HIPC framework adopted by the IMF and the World Bank. The four steps actually draw on what already is operational at the IMF and the World Bank (IMF 2002; IMF and IDA 2005). The steps are as follows:

1. Deciding on the appropriate debt sustainability concepts and indicators.
2. Conducting consistent analysis of the debt dynamics based on the chosen menu of indicators, under a most-likely benchmark scenario, over a medium-to-long-term period.
3. Running stress tests using a number of detailed alternative scenarios, taking into account the most relevant structural vulnerabilities of the economy.
4. Translating debt sustainability into borrowing policies.

The first step involves measuring the selected indicators. One requirement for this step is an up-to-date and complete database of the country's debt. This might demand that a lot of technical assistance be given to a debtor country's debt management offices by the Commonwealth units, the IMF, the United Nations Institute for Training and Research, the World Bank, and the bilateral donor-funded HIPC Capacity Building Program.⁹ This step also requires country-specific analysis. First, the analysis should lead to a decision on the coverage of debt—that is, whether it is useful to include domestic debt in the coverage of public debt and private debt in the coverage of external debt. Furthermore, it should be decided whether to prioritize the use of nominal debt stocks in the analysis or to

focus more on the present value of debt. Next, one should consider whether to put the focus on debt stock ratios or on debt-service analysis: is it debt overhang or the crowding-out of current resources that is the key constraint? Finally, one should decide whether to focus more on external or on fiscal sustainability—that is, whether a country basically is constrained more by foreign exchange issues or by recurrent fiscal gaps, and thereby choose the most appropriate debt indicator denominators (exports, GDP, or government revenues).¹⁰

In the second step, when the key constraints are identified and appropriate indicators are chosen, DSA applies the basic dynamics formulas, such as those derived before, to the current values of the indicators to derive their medium-to-long-term evolution. Again, this should be done on the foundation of most-likely base values for the key macroeconomic variables involved in the dynamics. For this, the IMF and the World Bank have designed templates—one for fiscal and one for external debt analysis—that can be adjusted to fit a specific country situation. The templates look at the role of endogenous dynamics, as well as the role of primary fiscal and noninterest current account balances. For LICs, it is important that the dynamics explicitly take into account the importance of budgeted grants and other non-debt-creating flows, as well as the use of “exceptional financing.”¹¹

Next to highlighting the evolution under a baseline scenario, it is crucial to perform the stress tests described in step three to determine the impact of possible shocks and alternative outputs of key macroeconomic variables. Scenarios can be based on historic volatilities or can take into account changed structures and likely new near-future threats (such as the impact of HIV/AIDS) or opportunities as well as needs (such as those related to the MDGs and the increased focus on poverty reduction). Following the discussion of the human development approach to debt sustainability, a case could be made routinely to include in those stress tests one scenario involving the projected amount of spending needed to meet the MDGs or other similar objectives put forward in the country’s poverty reduction strategy.

The final step produces borrowing policies. The overall picture of the medium-term evolution of key debt indicators should feed into policy prescriptions regarding future borrowing. For LICs, this typically refers to a minimal grant element required in future borrowing. Here again a latent conflict often is detected between requirements to meet debt sus-

tainability in a conventional way and borrowing policies linked to meeting poverty reduction and MDG needs. It also is important to note that DSA often has been performed jointly by the IMF and the World Bank on the basis of country input. Now, however, it is growing more common for countries (especially within the HIPC Initiative context) to conduct their own DSAs using the same tools and formulas as the IMF and World Bank use, largely thanks to capacity-building assistance provided.

Debt Sustainability Concepts Used in the HIPC Initiative and the Impact of the Initiative

The best-known operational debt sustainability framework has been the one devised to guide debt relief decisions for the HIPC Initiative. Started in 1996, the initiative explicitly aimed to use the debt relief instruments to reduce to a sustainable level the participating countries' debt burden. The purpose of this section is not to evaluate the initiative in detail for there is a large body of literature on the topic.¹² We give only a brief overview of the framework used.

The HIPC Initiative sustainability framework focuses on the stock concept for deriving threshold indicators. The present value definition, rather than nominal stocks, is used to reflect the relative degree of concessionality of the country's debt. The particular thresholds use elements of both the fiscal and external sustainability frameworks. More precisely, there are two key ratios: (1) a ratio of the net present value of debt to exports that should remain below 150 percent (external window), and (2) a ratio of the net present value of debt to government revenue that should remain below 250 percent. HIPCs can qualify for this fiscal window if their economies are sufficiently open, as indicated by an exports-to-GDP ratio of at least 30 percent and a government revenue-to-GDP ratio of at least 15 percent (to reduce moral hazard). These thresholds resulted from a 1999 modification of the original HIPC Initiative into the Enhanced HIPC Initiative in an attempt to provide broader, deeper, and faster debt relief (the original HIPC targets were set at 200–250 percent for the ratio of the net present value of debt to exports, and at 280 percent for the ratio of the net present value of debt to government revenue). The Enhanced HIPC Initiative also set targets for indicators related to a debt-service concept, fixed at 15–20 percent of exports (down from 20–25 percent in the original framework), but these are merely indicative targets.

It is important to note that the HIPC Initiative framework relies on data concerning external public and publicly guaranteed debt (outstanding and disbursed), including arrears. This means that domestic debt is not included in the fiscal window.¹³ Similarly, private external debt is not included in the external window.¹⁴ A three-year average is used for calculating exports (of goods and services). Government revenue is central government revenue, excluding grants. Currency-specific commercial interest reference rates are used as discount rates for calculating the present value of the debt. The amount of relief is determined on the basis of a DSA. Note that the debt thresholds used in the Enhanced HIPC Initiative are not to be considered as an elaborated framework of debt sustainability (IMF 2003). The level of the thresholds was set to provide a cushion against external shocks and some safety margin to avoid debt crises.

Recently, the World Bank and the IMF have revised the framework of the Enhanced HIPC Initiative to better tailor DSA and thresholds to country circumstances, and they have broadened this into a forward-looking debt sustainability framework for all LICs. Originally, under the Enhanced HIPC Initiative, the thresholds were set at a uniform level for all countries. To provide future-oriented guidance on new borrowing and lending decisions, the new framework adapts the thresholds according to the performance of the countries as measured through the Country Policy and Institutional Assessment (CPIA).¹⁵ Table 2.1 provides the new indicative thresholds for different levels of policy quality. Furthermore, the new debt sustainability framework adopted by the Bretton Woods insti-

Table 2.1. Debt Sustainability Thresholds and Policy Performance for IDA14
percent

<i>Debt sustainability indicator</i>	<i>CPIA score</i>		
	<i>Strong</i> (CPIA ≥ 3.75)	<i>Medium</i> (CPIA 3.25–3.75)	<i>Poor</i> (CPIA ≤ 3.25)
Present value of debt/GDP	50	40	30
Present value of debt/exports	200	150	100
Present value of debt/revenue	300	250	200
Debt service/exports	25	20	15
Debt service/revenue	35	30	25

Source: IMF and IDA 2005.

Note: CPIA = Country Policy and Institutional Assessment; IDA14 = the 14th replenishment of the IDA's resources, agreed in 2005.

tutions takes into account debt sustainability indicators for determining country allocations within the IDA. Previously, debt sustainability did not enter directly into determining IDA allocation because all IDA credits were in the form of highly concessional loans. Under IDA13 (the 13th replenishment), however, donors decided that up to a fixed percentage of IDA allocations could be in the form of grants to reduce future debt burdens. More important, IDA14 country allocations include debt sustainability issues in a direct way by distributing country allocations between loans and grants, with a higher proportion of grants when debt sustainability is more of a concern (IDA 2005a).

Alternative Approaches to Analyzing Debt Sustainability

The policy-making implications of the debt sustainability concepts discussed so far are quite straightforward: debt-service sustainability often requires government action and adjustment at the direct government public budget level (revenue and spending behavior), influencing fiscal balances and/or actions to enhance a country's capacity to generate foreign exchange and influencing trade balances and current accounts. At the same time, governments should aim at stimulating economic growth (important also for endogenous debt dynamics), as well as reducing poverty. This very well may lead to situations of inherent conflict, whereby debt service is prioritized and debt sustainability is achieved or maintained at the expense of growth and/or poverty reduction. Moreover, it may lead to situations in which debt itself acts as an obstacle to growth and poverty alleviation. This difficult trade-off or dilemma has given rise to a number of alternative definitions of or approaches to debt sustainability—notably the debt overhang approach and the human development approach. These alternative approaches are more normative in nature than the preceding ones because they more explicitly hint at some optimal debt levels that could be targeted.

Debt Overhang

One alternative way to define debt sustainability refers to the presence of *debt overhang*, defined as the negative effect of a large debt burden on economic growth (Krugman 1988). As such, the threshold for debt sus-

tainability could be defined as the level just before debt starts to have a negative impact on economic growth. This level might differ from the debt sustainability thresholds used in traditional fiscal and external approaches because the absence of debt-servicing problems does not necessarily mean that there is no negative effect of debt on growth.

Debt overhang occurs when an excessive debt stock introduces negative externalities in the economy beyond the transfer of resources, first on investment and adjustment and then on economic growth. This is because high (current and future) debt transfers lead to anticipation by domestic and foreign investors of future higher taxes and increased uncertainty, both of which create a disincentive effect on the present investment or adjustment decisions of an indebted country. The concept of “investment” has to be viewed broadly here. It refers to accumulation in human capital—through spending on education and health care—as well as in physical capital, such as machinery and infrastructure. It also captures many types of policy reforms, including structural reforms and macroeconomic stabilization, whose long-term benefits may come at the expense of short-term costs.

There are many potential incentive effects at work in the debt overhang approach. First, debt overhang may reduce the willingness of debtor governments to execute adjustment programs because a possibly large part of the benefits will go to foreign creditors as increased debt-service transfers and will not stay in the country as increased consumption or additional investment capacity. Second, debt overhang may depress private investment (by both domestic and foreign investors). Indeed, because the public sector has to service the debt, public spending will have to be reduced, internal transfers will have to be operated from the private sector, or, most likely, both actions will occur. As a consequence, not only public investment but also private (domestic and foreign) investment will be depressed as expected external transfers are transmitted throughout the economy in the form of higher uncertainty and large expected taxes of different kinds. These effects reduce perceived future net after-tax returns on investment and increase the risk premium on investment. Additionally, the public sector may be tempted to use taxes on financial intermediation, such as the inflation tax. This negative incentive effect can be particularly pronounced in the sectors most likely to be tapped for public financing, be it the monetary and financial systems, the manufacturing sector, or trade activities.

Apart from the investment disincentive effect, debt overhang also will scare off potential new foreign lenders. In the absence of seniority, new loans enter the same pool as old loans and instantly metamorphose into as poor a financial claim as the old loans. Furthermore, as long as the old claims stand undiminished, the new lenders will have to share the fruits of any improved creditworthiness with the old lenders. This depresses the return to the potential new lenders, and keeps them from doing business with the debtor countries. As a consequence, these countries are shunned in international credit markets and cannot borrow as they otherwise could. Some high-yielding investments, which investors would undertake notwithstanding the disincentive effect described earlier, may thus go unexploited because of a lack of financing (Diwan and Rodrik 1992).

Through those various channels, debt overhang therefore acts as a brake on economic growth, beyond siphoning off public resources for debt service. This line of reasoning then generally is turned into an argument in favor of debt relief because it can be claimed that debt reduction has a more beneficial effect than an equivalent amount of aid injected in a debt-ridden economy. The difference resides in the stimulating effect on the private sector stemming from debt relief, made possible by the reduced foreign claim on future gains. By selecting debt relief, the donor ensures that the proceeds of economic growth remain within the economy. Political features also are important: debt relief increases domestic acceptance of austerity because the burden of reforms is perceived to be shared with creditors.

The debt overhang hypothesis also gives rise to the concept of a debt Laffer curve (Krugman 1988), suggesting that expected payments to creditors might even start to decrease with higher debt at high debt ratios because of this debt overhang effect. Again this can be turned into an argument in favor of debt relief. For countries with high levels of debt, it might be in creditors' self-interest to grant some debt relief because it would lead to higher expected payments. Empirical studies, predominantly using information from the secondary market of value-impaired debt (such as Claessens 1990; Cohen 1991) do seem to validate the existence of the debt Laffer curve and the position of some countries at the "wrong side" of the curve, where creditors collectively benefit from granting debt relief. Yet the available evidence in this area must be treated with caution. The apparent disincentive effect of a large debt on investment, and hence on growth, may reflect instead the fact that low investment re-

sults from the general dismal state of the economy in some countries where a large debt overhang is just another reflection of the conditions. Results from most early studies using a linear relationship between debt and growth show that the strength of the association between debt and growth varies substantially according to the selection of the debt indicator and the model specification. Upon suggestion that this relationship between debt and growth might follow a nonlinear inverted U—that is, following the Laffer curve argument—nonlinear specifications are better.

The more recent studies do seem to point to a higher effect of debt on growth. But the magnitude of the effect varies substantially across specifications, and it presents large cross-country variation. Patillo, Poirson, and Ricci (2002) showed that the average effect of external debt on growth is negative when the debt stock exceeds 160–170 percent of exports or 35–40 percent of GDP; they also found that the marginal effect of external debt on growth is negative in a very wide range of 30–115 percent of exports for nominal debt (or 30–295 percent of exports with debt expressed in present value), or between 5 percent and 90 percent for the nominal stock-to-GDP ratio (and between 5 percent and 50 percent for present value of the debt-to-GDP ratio). Patillo, Poirson, and Ricci (2004) showed that this debt overhang effect is stronger in countries with policies and institutions of weak quality, and with lower aid flows. In a way that is similar to the World Bank and IMF framework that will be discussed below, this would call for a country-specific determination of debt sustainability thresholds. Finally, Clements, Bhattacharya, and Nguyen (2004) showed that a substantial reduction in the debt stock for HIPCs is associated with an annual increase of approximately 1.0 percent in per capita income, and that it could accelerate growth indirectly by about 0.5 percent a year in some HIPCs if a substantial percentage of the debt relief were directly channeled into public investment. The study also hinted that this effect will be largely realized when envisaged HIPC debt relief is executed.

Debt Sustainability from a Human Development Perspective

A more radical alternative approach is often referred to as the *human development approach* to debt sustainability and debt relief. This approach prioritizes the MDGs instead of conventional debt sustainability, and it states that even if a country has the resources to pay its contractual debt

service, current debt service might crowd out public spending of resources needed to reach substantial poverty reduction or the achievement of the other MDGs. As such, debt sustainability is defined as that level where debt service no longer crowds out MDG-priority public spending. This introduces a concept of “affordable” debt service linked to the MDGs, and the notion is translated into an argument in favor of debt relief—preferably in terms of debt-service relief. Clearly, reducing debt service can benefit the recurrent expenditure budget directly. In most LICs, if we postulate the existence of a recurrent-fiscal gap, applying this alternative debt sustainability concept might be very effective in relaxing this gap.

In practice, the approach can be operationalized in many different ways. The crowding-out effect on priority spending by debt service could be minimized by establishing upper limits on debt-service ratios (debt service related to government revenue or GDP). One prominent proposal along these lines was suggested by Birdsall and Williamson (2002). Another was pioneered in a Catholic Agency for Overseas Development (CAFOD) article by Northover, Joyner, and Woodward (1998), and extended by Berlage et al. (2003). We describe below the basic algebra of this approach.

The CAFOD proposal works in the following way. Define for each country the tax-revenue base as $Y - A$, where Y is GDP and A is nontaxable income. The proposal suggests taking as A all incomes below the poverty line of \$1 a day per person, and then defining the standard revenue as equal to $a(Y - A)$. This is obtained by applying to Y a standard-tax rate a . The “net feasible revenue” is then the standard revenue minus B , where B is an allowance for basic human needs. Net feasible revenue measures the government resources available to meet other public expenditures, including debt service. When the net feasible revenue is negative, any amount of debt is “unsustainable” and should be cancelled outright. When the net feasible revenue is positive, sustainable debt service is defined as an acceptable proportion b of net feasible revenue to be devoted to debt service. Therefore, the sustainable debt service is equal to $(b.a)(Y - A) - bB$. This can be rewritten as $c(Y - C)$, with $c = b.a$, $C^* = b.a.A + b.B$, and $C = C^*/c$. This estimation may result in a negative figure if the allowance for basic needs exceeds standard revenue. Hence, the final formula is a definition of sustainable debt service (*SDS*) as a suitable fraction c of an adjusted national income $Y - C$ whenever the latter is positive. That is,

$$SDS = c.max [0, Y - C]. \quad (2.10)$$

Instead of computing this on an annual basis, Berlage et al. (2003) turned this into a 15-year scheme (until 2015) to make sure that debt is fully extinguished after 2015 and that it stays sustainable throughout the period by including an insurance scheme. For this, the authors first computed net feasible revenue. If negative, the country's debt is cancelled outright. If positive, one must calculate *SDS* according to equation (2.7) and go to the next step. That next step consists of multiplying the calculated *SDS* by 15 to obtain the net present value of debt that will be amortized in 15 years by that *SDS* (using a real discount rate equal to the rate of growth of real GDP). One then compares the result with the country's net present value of outstanding debt (call it *NPV*), and retains the lower of the two figures, which can be denoted by *NPV**. The corresponding debt service, *SDS**, is equal to *NPV** divided by 15.

The final step consists of comparing *SDS** with *SDS*. If *SDS** = *SDS* as given by equation (2.6), then by construction it is equal to $c(Y - C)$. The country benefits from a debt reduction equal to the difference between *NPV* and *NPV**. For each of the next 15 years (each year being *t*), the country will transfer into a trust fund (called PAIR) an amount equal to $SDS_t^* = c.max [0, Y_t - C_t]$. At the end of the 15 years, no further service will be required on the initially outstanding debt. That debt will be extinct. If *SDS** < *SDS*, the country does not benefit from a debt reduction because its outstanding debt is sustainable. However, it is still desirable to let the country benefit from the embedded insurance mechanism. If we define $d = NPV^*/NPV (= SDS^*/SDS)$, with $d < 1$, the country's annual service then will be $SDS_t^* = d.c.max [0, Y_t - C_t]$. Again, no further service will be required after the year 2015.

Thus, the basic conceptual setup by Northover, Joyner, and Woodward (1998) is to determine the resources needed for the country to attain the MDGs first, and then attempt to achieve them with the resources generated by the public sector in the government budget (on the basis of an objective minimal "tax rate" on GDP, to avoid moral hazard). The affordable debt service is determined on the basis of the resources left after spending everything needed to achieve the MDGs and other priority spending (rather than de facto prioritizing debt service).

It is clear that applying this kind of approach in practice would be fraught with difficulties, including problems of moral hazard. Putting for-

ward such an alternative approach, however, has influenced actual debt relief practices in a more indirect way. Applying this approach has shown that, for a number of countries (although not for all of them), no resources would be left for debt service. Related to these proposals are calls for a more “independent” determination of debt sustainability or “insolvency.”¹⁶ Finally, the more ethical approach to debt sustainability uses the concept of odious debt, again to advocate for full debt repudiation (Birdsall and Williamson 2002, appendix C; Kremer and Jayachandran 2002). Several of these approaches and concepts have been used by advocates, especially within the nongovernmental organization community, to call for full debt cancellation across the board. It can be argued that these approaches have contributed to the international community recently having granted additional debt relief through the MDRI.

An Explicit MDG Perspective in the MDRI

One requirement of the HIPC Initiative is for participating countries to increase their poverty-reducing expenditure after receiving the debt relief. This means that some countries may struggle to meet poverty reduction and MDG goals while maintaining debt sustainability (Fedelino and Kudina 2003). This has been documented by country-case research. Edwards provided an interesting example by introducing a model that explicitly considers the role of domestic debt and computes the fiscal policy path that is compatible with aggregate fiscal sustainability (2002b) and with external sustainability (2002a) in the post-HIPC era. Applying the model to the case of Nicaragua illustrates the challenges in the post-HIPC period. Under a reasonable set of assumptions regarding future GDP growth, concessional loans, and donations, the required fiscal adjustment appears to be severe and threatens to jeopardize implementation of the country’s poverty reduction strategy. Such case studies and, more generally, some countries’ continued difficulty in remaining on a sustainable debt path even after implementing the HIPC Initiative have reinforced the call for a broadened framework. It was this call that became the basis for the additional debt relief granted in the MDRI.

At its Gleneagles Summit in July 2005, the G-8 called on the African Development Bank, the IMF, and the World Bank to provide additional debt relief by cancelling all the remaining debt owed to those three institutions by a sample of LICs—more precisely, owed by those countries that have or will soon have achieved the completion point under the

HIPC Initiative. Later, this proposal became officially referred to as the Multilateral Debt Relief Initiative. Since then, the governing boards of these institutions have responded positively to the proposal, and implementation has started.¹⁷

This additional debt relief is limited to post-completion point HIPC Initiative countries,¹⁸ and its purpose was not to allow countries to regain debt sustainability in a conventional sense because, in principle, HIPC debt relief already had achieved this. As such, at least in theory, MDRI debt cancellation refers explicitly to a human development type of debt sustainability concept, linking the debt relief explicitly to the need to provide additional resources to selected LICs to meet the MDGs. The entry conditions for the recipient countries refer to (1) broad macroeconomic stability, (2) overall commitment by the recipient government to implement a poverty alleviation strategy in the framework of the PRSP initiative, and (3) a minimal quality of public expenditure management in the recipient country. These requirements should facilitate the use of the resources freed by this additional debt cancellation for expenditures that actually further the MDGs or similar objectives put forward in the country's PRSP.

As of the date of writing, all completion point HIPC countries have been benefiting from the MDRI (as have two non-HIPCs, Cambodia and Tajikistan, which receive only additional IMF debt relief). This has resulted not only in close to \$19 billion¹⁹ in additional debt relief in present value terms, but also in a considerable reduction in the recipient country's debt sustainability indicators. One concern among donors is that this reduction in debt ratios might trigger a new buildup of debt in the future, posing additional challenges to the forward-looking debt sustainability framework for LICs in place (see IMF and World Bank 2006).

Conclusion

The analysis of debt sustainability in LICs cannot be based simply on models that have been developed for industrial countries because a number of characteristics that are rather specific to LICs must be taken into account. LICs receive little external private capital flows, whether in debt or equity form. The relative absence of foreign investment in equity form limits the use of non-debt-creating external flows (other than grants) to finance foreign exchange gaps. By contrast, LICs sometimes receive sub-

stantial amounts of official grants that reduce the foreign exchange gap and supplement domestically generated government revenues, and thereby relax the fiscal gap and, potentially, the recurrent-fiscal gap. This is more the case when grants are in the form of budget support and when fungibility of spending is not hampered by earmarked aid flows. On the other hand, given its relative importance in the government budget, aid uncertainty and volatility may complicate debt sustainability analysis.

LICs also receive sometimes highly concessional official financing apart from grants. This makes it more likely that the return on investment does exceed its cost, and the debt dynamic is sustainable. It also introduces a potentially large difference between the nominal debt stock (book value) and the present value of future debt service, and it increases the appeal of looking at debt sustainability indicators based on present value concepts of debt. Some LICs often rely on substantial amounts of exceptional financing to cover both fiscal and foreign exchange gaps. Exceptional financing refers here particularly to the use of arrears on (external) debt, debt rescheduling, and/or debt forgiveness (possibly including nonconcessional IMF lending).²⁰ Also, government's use of domestic debt to finance fiscal gaps generally is limited in LICs, even if domestic debt markets are developing rapidly in some countries. Moreover, private sector external debt generally is limited. Given all these factors, LICs typically experience a large vulnerability to external shocks of all kinds. Therefore, it is important to look for mechanisms that may link debt service more explicitly to the capacity to pay.

Taking into account the context of LICs, the objectives of this chapter have been to present a number of basic concepts related to debt sustainability, to highlight their dynamic nature, and to explain how the concepts and related indicators can inform public policy in LICs. To judge whether a given debt evolution hampers debt sustainability, we must determine indicative threshold values for the relevant variables. It must be emphasized, however, that many factors influencing debt sustainability are not easily brought together in a few thresholds. Over time, a large body of literature has emerged that tries to look at what indicators are most relevant and what indicators are likely threshold values. Studies have tried to identify the probability of debt unsustainability on the basis of (ex post) analysis that discriminates between problem and no-problem countries, distinguishing those countries that have experienced debt serv-

icing problems from those that have not, regardless of the measures that were used.

The empirical studies using these frameworks rely on limited dependent variable models, such as discriminant analysis or logit and probit analysis; or on more sophisticated methods, such as binary recursive trees (as in Manasse and Roubini 2005). When judged against the target of providing unified, absolute thresholds, the success of these models to date has been fairly modest. Results typically are being used as guiding values rather than as absolute threshold values, especially when determining debt sustainability on the basis of one or a few indicators only. This conclusion was reaffirmed by recent analysis (Kraay and Nehru 2006). The authors started from a novel way of defining a problem situation of debt sustainability, labeled “debt distress,” and configured it as a situation in which a country resorts to exceptional finance in any of three forms: (1) building significant arrears on external debt; (2) rescheduling the debt, notably in the Paris Club; and (3) using nonconcessional IMF lending. Using probit analysis, they showed that cross-country and time variations in the incidence of debt distress are explained not only by debt burden indicators but also by differences in the quality of institutions and policy (for example, as measured by the World Bank’s CPIA Index), and by vulnerability to external shocks. IMF analysis basically has confirmed those results, which have directly fed into the new forward-looking debt sustainability framework of the IMF and the World Bank (IMF and IDA 2005; IMF and World Bank 2006). Indicative threshold values, however, have been and will continue to be used in operational work.

In the future, the probability of debt problems likely will remain high in many LICs, and is likely to increase sharply if large-scale finance required to meet the MDGs is provided, even at historic levels of concessionality (Kraay and Nehru 2006). Therefore, a richer framework of debt sustainability is called for, one in which the use of simple debt burden indicators is extended by adding indicators for quality of policies and shocks and by taking into account the needs of poor countries. The existence of difficult trade-offs also suggests that the targeted level of sustainable debt should vary (positively) with the quality of its policies and institutions, and (negatively) with the vulnerability to shocks that the country experiences: country-specific debt thresholds reflecting both policies and shocks are simply more appropriate.

Beyond the issue of the choice of indicators for DSA, what ultimately matters for policy is trying to assess how much “fiscal space” a country has to pay for public spending and what its sources of financing could be without compromising the country’s solvency in the long run. The concept of fiscal space, which is broader than that of debt sustainability, refers to a government’s ability to undertake spending without impairing its solvency—that is, without compromising its present and future ability to service its debt (Heller 2005). In recent years, this concept has emerged as an important subject for debate in the international community. It was used initially to advocate for traditional fiscal deficit targets not limiting the ability of a government to finance growth-enhancing projects. More broadly, it refers to any constraints to particular public expenditures that could lead to higher growth and better achievements of poverty reduction and social goals, such as the MDGs. Fiscal space can be created by improving the effectiveness of public expenditure, increasing fiscal revenues, mobilizing grant aid, and/or issuing new internal or external debt. A country thus can create fiscal space within or outside its existing borrowing parameters.

Several policy packages that would not jeopardize solvency can be pictured, but the choice of specific policies cannot be determined without considering country circumstances. Improving the effectiveness of public expenditures can liberate public resources for allocation to priority sectors, but also should enhance growth and contribute to improving the country’s solvency. Similarly, increasing fiscal revenues can create fiscal space and have a positive impact on growth and solvency when additional revenues result mainly from enlarging the tax base, applying new nondistortionary taxes, harmonizing tax rates and tax systems, and improving tax compliance. Grants also can contribute to creating fiscal space in a productive manner, but the funds should be used to finance pro-growth expenditures that are consistent with the rest of the budget and that take into account multisectoral synergies. Finally, some countries may choose to generate fiscal space by increasing the use of their internal or external borrowing capacity. The ultimate result will depend on how the additional resources affect the solvency equation through the exchange rate, interest rates, and growth channels.

Notes

1. A fiscal gap is a special subcategory of the savings gap. Its existence assumes that it is impossible to transfer the private savings slack into budgetary resources either by increased taxation or by the inflation tax. Otherwise, there can be only one overall savings gap.
2. As the abstract of Ley's article nicely states, there is "nothing new here—just a concise yet detailed presentation of the simple but inexorable algebra of sustainability."
3. See Borensztein and Mauro (2004) for an extensive analysis in favor of issuing GDP-linked debt, and the comment to their proposal by Claessens (Borensztein and Mauro 2004, pp. 208–10) that focuses mainly on practical difficulties. Other recent proposals focus on the establishment of a new IMF facility to provide insurance or contingency financing to protect against these shocks.
4. There is actually a small body of related literature on the concept of "original sin"—that is, a situation in which the domestic currency cannot be used to borrow abroad and sometimes even domestically (see Eichengreen and Hausmann 1999). Proposals to allow countries to borrow abroad in domestic currency are discussed in Hausmann and Rigobon (2003).
5. For some Francophone African countries, one might use the euro instead.
6. For detailed solvency constraint models, see Agénor and Montiel (1996).
7. Although many economists view "net worth" as the right fiscal concept to focus on, most of them agree that it is difficult to measure. Easterly (1999) has tested empirically the implications of a fiscal model introducing the net worth concept, but has not provided an operational estimate of this variable, given existing difficulties.
8. A notable example is the situation that exists in Uganda. For more information, see IMF (2003, p. 26).
9. For an early review of the program, see IDA and IMF (2002).
10. Simple indicators, such as the exports-to-GDP ratio (χ) or the government revenues-to-GDP ratio (ρ), can help a lot in determining the key constraints: low values (relative to group averages) on these simple indicators already detect a key vulnerability. For an application in Bolivia, see IMF (2003, p. 23).
11. The templates together with country applications can be found at the World Bank's Web site (<http://www.worldbank.org>). For a manual describing how to perform a DSA for LICs, see World Bank (2006b). For a detailed analysis of fiscal debt sustainability using this framework for a stylized typical LIC with a high debt, see Baldacci and Fletcher (2004).

12. For detailed reviews, see Birdsall and Williamson (2002), Gunter (2002), World Bank (2003, 2006a), Sun (2004), UNCTAD (2004), Chauvin and Kraay (2005, 2006), and IDA and IMF (2006).
13. Exclusion of domestic debt is consistent with the treatment by the Paris Club, and it is explained by the difficulties involved in including in the analysis the HIPC's rather narrow internal financial markets.
14. Hjertholm (2003) has shown that the thresholds used for the two windows are not analytically comparable.
15. Beginning in 2005, the CPIA is fully disclosed, and it has been renamed the IDA Resource Allocation Index.
16. These proposals generally are known as referring to a "fair and transparent arbitration procedure." For an early proposal along these lines, based on the internationalization of the U.S. Bankruptcy Code, see Raffer (1990); for a more recent proposal, see Sachs (2002).
17. For details, see African Development Bank Group (2006), IMF (2006), and IDA (2005b), respectively. See especially IDA and IMF (2006) for an overview of the current status of implementation. Recently, the Inter-American Development Bank also decided to join the MDRI and grant additional debt relief to its post-HIPCs.
18. An exception to this limitation is IMF debt relief for which LICs with a per capita annual income of less than \$380 also qualify (IMF 2006).
19. A billion is 1,000 millions.
20. The extensive use of exceptional financing itself can be used as an indicator to identify unsustainable debt. Kraay and Nehru (2006) denoted this as "debt distress" and used the concept to derive sustainable debt thresholds.

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CHAPTER 3

Revenue Design and Taxation

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This chapter examines issues in designing tax systems for developing countries. In devising strategies to reduce poverty, taxes play an important role. The following six questions may be useful in thinking about taxes as an integral part of a poverty reduction program:

1. What is the role of the tax system?
2. What criteria can policy makers use in evaluating tax systems in general and specific tax instruments in particular?
3. What factors should policy makers consider in determining the aggregate level of taxes?
4. What factors should be considered in determining the relative use of different tax instruments?
5. How effective are different tax instruments in redistributing wealth and/or income in a society?
6. In designing different tax instruments, how effective are particular tax provisions in reducing the tax burden of the poor?

No clear or definitive answers exist for any of these questions, but the discussion in this chapter seeks to identify elements that may help in our search for answers.

Before turning to these questions, three additional items merit consideration. First, it is important that governments consider tax schemes and

expenditure programs together. In examining such important issues as the aggregate level of taxes and the size of the public budget, or the aggregate tax burden on a specific group, or the progressivity or regressivity of a specific tax, it is necessary to consider both the cost imposed and the benefits received.

Second, a country's use and design of tax instruments are constrained by its fiscal architecture and level of tax compliance. Fiscal architecture is a concept related to identifying the revenue capacity of different types of taxes based on the economic, demographic, social, and institutional characteristics of a specific country. No one tax system fits all. The fiscal architecture of each country presents a range of alternatives for policy makers to consider in raising revenue to fund government operations. The reality of tax compliance also helps policy makers in designing tax policy. In many countries, tax administration concerns strongly influence tax policy. The economic structure in many developing countries makes it difficult to collect certain taxes. An analysis of how citizens are complying with their tax obligations should help identify the limitations of various types of taxes and offer guidance on the design of different tax instruments.

Finally, countries no longer can effectively design their tax systems in isolation. The increased mobility of capital and labor requires policy makers to consider the tax systems of other countries. Globalization and reduced trade barriers threaten two major sources of tax revenue for developing countries: trade taxes and corporate income taxes. The challenge many countries face is replacing reduced tax revenues from those sources with taxes that do not burden the poor disproportionately.

Objectives of Tax Systems

Tax systems can serve several different purposes. Three common objectives are (1) to raise revenue to fund government operations, (2) to assist in the redistribution of wealth and/or income, and (3) to encourage or discourage certain activities through the use of tax provisions.

Raising Revenue to Fund Government Operations

Taxes exist primarily to raise money to fund government operations. The history of all tax systems rests on the need to raise sufficient funds to pay for those services. In many countries, large increases in tax rates or the

adoption of new taxes often can be tied to increases in government outlays, sometimes from military activities.

Several considerations exist in choosing aggregate tax levels. Governments generally fund expenditure programs either by collecting tax revenue or issuing debt. The demand for government services generally increases with economic growth. In participatory democracies, it is hoped that the size of government expenditure programs reflects the wishes of the voters. Common expenditure programs include health and welfare programs, defense spending, social security, and interest and repayment of principal on government debt.

Under that view, the role of the tax system is to raise an amount of revenue that is tied to the level of government services. For those countries with significant sources of revenue other than taxes, government can fund operations with less reliance on current tax revenue. For those countries that borrow to fund government services, current and future tax revenue will be required to service the debt.

Assisting in the Redistribution of Wealth and/or Income

Wealth and income inequality exist in many market economies. Although in the past the conventional view was that poor economies would have less relative inequality than wealthier economies, many poor countries are among those nations with the most unequal distribution of resources in the world. Redistribution may be desirable to promote social equity and to foster participatory democracy. Taxes can redistribute resources by both reducing the wealth and income of the rich and transferring funds directly or indirectly to the poor.

Redistribution via taxation comes with economic costs. A trade-off frequently exists between distribution of income and economic performance. For example, high marginal income tax rates may be desirable for equity reasons, but may create distortions and reduce total production; they may create incentives to reduce work effort; and may influence savings, portfolio decisions, entrepreneurship, and risk taking.

Countries differ in their ability to target specific taxes and specific spending programs to promote income redistribution. The differences result from a variety of political, economic, and administrative factors. In addition, the increased mobility of high-value labor and different types of capital make it more difficult for countries to use income taxes to redis-

tribute wealth or income, and may require the use of other types of fiscal instruments.

Some economists question whether taxes should be part of any income redistribution system at all and whether redistribution should be accomplished primarily through expenditure programs (for example, programs for education, health care, welfare, and training and employment). Some countries may find it desirable to raise funds in the most effective and efficient manner possible, with little or no concern for equity issues, and may address redistribution concerns through expenditure programs. Even in those countries, however, it is important to avoid taxes that promote and enhance income disparities.

Encouraging or Discouraging Certain Activities with Favorable Tax Provisions

Policy makers can use the tax system to encourage or discourage certain activities. For example, taxes can be used to correct market failures, such as positive or negative externalities that exist when market prices fail to reflect all the benefits or costs associated with an activity. The classic negative externality is pollution: firms that pollute affect the welfare of others, often in a way that is outside the market mechanism.

The presence of externalities could prompt different types of government action. The government could regulate the activity by providing rules of conduct and penalties for failure to comply; it could establish clear property rights, such that all affected parties would be brought together to bargain in a manner that could result in the parties accounting for the costs and benefits of their activities; or it might use the tax system as a tool to correct for externalities. For example, a tax on pollution may correct for market failure by requiring polluting firms to bear the cost that pollution causes to society. Excise taxes on tobacco, alcohol, and gasoline for motor vehicles may seek to reduce the use of those products by imposing additional costs that reflect some or all of the negative externalities those products generate.

Policy makers also can use the tax system to promote or discourage activities apart from market failures. Countries use tax provisions to encourage larger families, retirement savings, capital investment, research and development, home ownership, and a host of other activities that may or may not have elements of market failure. Policy makers often can choose to subsidize an activity either directly through grants and other

programs or indirectly through the tax system. Many countries use a “tax expenditure” budget to account for the costs of tax provisions that are used to promote nontax objectives.

Considerations for Choosing among the Objectives

Tax systems share many of the same objectives. What differs is the weight placed by policy makers on each one of those objectives. In some countries, raising revenue is the overriding concern. In others, reducing inequality may justify a substantial reduction in tax receipts. Finally, the importance placed on certain nontax objectives may call for the extensive use of the tax system for instrumental purposes.

What also varies are tax systems’ capacity for and constraints to achieving the objectives in different countries. Policy makers must consider whether tax authorities have the capacity to administer new tax proposals and whether taxpayers reasonably can comply with such proposals. In addition, a tax proposal that appears attractive and progressive on the surface may have different consequences in practice. For example, providing tax incentives through the income tax system for housing, health care, or retirement expenditures may not be very successful if only a relatively small percentage of the population pays income taxes. Similarly, trying to use the tax system to redistribute income may be of limited use where income taxes play a small role in raising revenue and the tax administration is not efficient in preventing high levels of tax evasion.

Criteria for Evaluating Taxes

This section reviews the three common criteria for evaluating both specific taxes and complete tax regimes. The criteria—efficiency, fairness, and administrative feasibility—may be easier to describe generally than to apply in specific circumstances.

Efficiency

Efficiency in tax discussions traditionally has focused on neutrality. The tax system should interfere as little as possible with economic decisions. A neutral tax system will improve the allocation of resources in society by minimizing the “deadweight” loss of distortions. Distortions come in many forms: a change in the selection of products, a choice between work

and leisure, or a choice between present and future consumption. Economists focus on three different effects in examining distortions: the *income* effect, the *substitution* effect, and the *financial* effect. The income effect arises because taxes reduce the amount of resources available to an individual. The substitution effect arises when individuals change behavior by choosing nontaxed activities over taxed ones, or lightly taxed activities over highly taxed ones. The financial effect arises as taxpayers change the organization or structure of their activities because of taxes.

With the possible exception of a lump-sum head tax, all taxes distort against someone or something. Income taxes reduce incentives to work and save, and consumption taxes reduce incentives to spend and work. Even if we remove tax distortions, it is unclear that we actually are improving the allocation of resources, given other distortions in the economy. One response to a world in which market conditions do not conform to some ideal model is to come as close as possible to that model. Economists, however, recognize that making a noncompetitive economy more competitive does not guarantee an improved allocation of resources. The “theory of the second best” holds that unless a market satisfies all conditions of some ideal model, correcting one market imperfection does not necessarily move the economy closer to optimal resource allocation.

Efficiency also may mean more than just removing distortions or adopting neutral taxation. Although it has been common to seek tax reforms to level the playing field, in many countries the focus has shifted to using the tax system to unleash the country’s economic potential. Some reformers advocate using the tax system to increase capital formation and improve international competitiveness. For example, some people may call for a shift to higher consumption taxes and lower income taxes as a means of reducing the tax burden on income from capital. Whereas one approach to tax reform efforts is to reduce the disparity among the effective tax rates on different types of business activities, another approach focuses on the overall level of capital income taxation.

Horizontal and Vertical Equity

The concept of equity can be analyzed under different perspectives, mainly in reference to the beneficiaries of income distribution measures. Traditionally, tax scholars have defined fairness in terms of horizontal and vertical equity. Horizontal equity requires those in similar circumstances to pay the same amount of taxes. For apportioning tax liability, horizontal

equity often embraces some notion of ability or capacity to pay. Vertical equity requires “appropriate” differences among taxpayers in different economic circumstances.

On the surface, both concepts have great intuitive appeal. Those people who have the same ability to pay should bear the same tax liability. Similarly, it makes good sense for there to be appropriate differences for taxpayers in different situations. Unfortunately, both concepts may have limited usefulness in tax policy debates.

The concept of horizontal equity has been challenged as incomplete, not helpful, and derivative. For example, an income tax can satisfy horizontal equity requirements completely only if we assume individuals have identical tastes, a single type of ability to generate income, or income itself. When we allow preferences to vary and provide for different types, then only a tax based on an individual’s ability to earn income—rather than actual earnings—can provide effectively for equal taxation of those people in equal positions. In addition, the concept of horizontal equity may be incomplete to the extent that it focuses only on a short time period (such as one year), fails to consider the impact of all taxes, or ignores the provision of government services or other benefits. Finally, the concept of horizontal equity also may not be useful unless we can determine which differences are important and why those differences justify different tax treatments.

Similarly, much disagreement exists about the usefulness of vertical equity and what constitutes appropriate differences in treatment. Consider several possible conceptions of fairness. To some, fairness could require that all individuals pay the same amount of tax. Thus, one could design a tax system that imposes a head tax on each individual. Fairness also could require all taxpayers to pay the same rate of tax on their income. In many countries, the “flat tax” or “single rate tax” rhetoric enjoys great popularity. Although most flat rate proposals provide for a high threshold (zero-rate bracket) before the flat rate is imposed, the notion of one tax rate that fits all strikes many people as an equitable manner of determining tax liability. To others, however, fairness requires those taxpayers with higher incomes to pay a higher percentage of their income in tax. Although the progressive rate structure may rest on a shaky theoretical foundation, it has been the most common income tax rate structure. Many people are attracted to assessing tax on the basis of ability to pay, with the result that the rich are better able to contribute to financing government operations.

Consumption and Income Taxes

Several tax reform proposals bring back into focus the question of the relative fairness of consumption taxes versus income taxes. Consumption tax proponents question whether any income tax system can be fair. There are several, somewhat related strands to their positions. One approach takes a societal view: income is what individuals contribute to society; consumption is what they take away from the pot. Therefore, if we want a society that will continue to grow and prosper, we are better off taxing consumption rather than income. A second approach considers consumption as a better measure of a household's ability to pay because of the greater variations in income over a persons' or a households' lifetime. Finally, income taxes impose higher tax burdens on households with higher savings, thereby penalizing savers over those who consume currently.

Proponents of income taxes claim a person's net increase in economic wealth is a better measurement of ability to pay than the use of his or her income. That is, an income tax proponent would say the person who earns \$1 million and spends \$10 has a greater ability to pay than the person who earns \$10 and spends \$10. Under a consumption tax, both would bear the same tax burden, whereas, under an income tax, the first person described would bear a much greater tax burden.

Some consumption tax advocates concede the consumption tax alone would not be appropriate if it failed to tax a person's savings as well as consumption. It is argued, however, that the income tax is not the appropriate tool to tax savings. One alternative would be to impose a consumption tax on spending and a wealth tax on savings.

In short, fairness discussions in general, or horizontal and vertical equity in particular, are of limited usefulness by themselves. Simply saying that we should accord equal treatment to equals adds little to tax policy discussions. We need to choose an "ethical" framework before making any comparisons—whether comparing equals or making "appropriate" comparisons among unequals. Without such a fundamental framework one cannot evaluate the relative fairness of different proposals or different tax regimes. Perhaps the best we can do is to determine the consequences of a proposal or regime, and then evaluate those consequences in the context of different "ethical" structures.

Tax Incidence

It is important to distinguish between those people who have the liability to pay a particular tax and those who suffer the economic incidence or

burden of the tax. Analysis of tax incidence recognizes that the tax burden falls on individuals in their roles as consumers, producers, and factor suppliers; not on corporations or other institutions. Estimating the tax burden requires making incidence assumptions on at least five types of taxes: personal income taxes, payroll taxes, consumption taxes (including excise taxes), wealth taxes (including property taxes), and corporate income taxes.

Determining tax incidence requires a good understanding of how various markets operate in an economy, particularly the ability of different types of taxpayers to shift the cost of the tax to other economic actors. Who actually bears a tax depends on the relative supply and demand elasticities of consumers and suppliers and other factors. Although economists have made important advances in estimating tax incidence, much work remains, especially in determining tax incidence in developing countries.

For example, it is still not clear who bears the cost of the corporate income tax. Because corporations are merely legal constructs, the tax cost must fall on individuals. As a result of the corporate tax, shareholders (or all owners of capital) could receive lower returns, consumers could pay higher prices, workers could earn lower wages, or there could be some combination of all three possibilities. In addition, the tax consequences in the short run could differ from long-run consequences.

In developed countries, the incidence of the corporate income tax has been subject to much academic inquiry, with mixed success. Determining the incidence of the corporate tax in developing countries is even more difficult. It may be useful to consider the major sources of corporate tax revenue. To the extent that tax revenue is received from state-owned enterprises, the tax can be viewed as transfer payments within the government, with no distributional impact. If corporate tax revenues are received from local monopolists, then the tax likely falls on the monopolists. If the revenues are received from foreign corporations, then the incidence of the tax may depend on each corporation's share of market power in the country as well as on the tax system in its home country.

The conventional wisdom has been that capital-importing countries should tax foreign corporations doing business within their borders, especially if the tax regime of the home country provides for a foreign tax credit for income tax paid in the source country. If the host country does not tax, then this would result in a revenue transfer between the treasuries of the country of investment and the home country of the foreign in-

vestor. This situation, however, assumes that the foreign investor would be subject to home-country tax liability on income earned in the source country. However, multinational corporations are quite adept at structuring their operations through low-tax or tax-haven jurisdictions, through blending income from high-tax and low-tax jurisdictions to maximize the use of foreign tax credits, and through transfer-pricing arrangements that result in little or no tax being due in the home country. Therefore, it is unlikely that “mere transfers” between treasuries of the respective countries is an accurate representation of the tax situation between home and source countries.

The classic approach to tax incidence suggested by Arnold Harberger (1962) showed that the incidence of the corporate tax in a closed economy was borne by all holders of capital. However, the incidence is likely much different in small, open economies. Harberger (1995) contended that it is likely that the incidence of the tax (indeed, an amount even greater than the tax collected) falls on labor rather than capital. The progressivity or regressivity of the corporate tax thus depends on incidence assumptions, and the applicability of such assumptions can vary between developed and developing countries, and among developing countries. It is quite plausible that the corporate tax could contribute to the regressivity of a tax system, rather than being a progressive tax on holders of capital, as traditionally thought.

Consider also the payroll tax. Economists generally assume the payroll tax is borne by workers, regardless of the actual division between employers and workers on the obligation to pay the tax. Again, the incidence depends on the elasticities of supply and demand. In those circumstances where the supply of labor is relatively inelastic, most or all the tax burden falls on workers. In some instances, the imposition of a payroll tax may even have additional effects. The change in the after-tax wage will have both income and substitution effects on workers. Indeed, it is possible in some unusual circumstances that the wage rate could fall by more than the amount of the tax. In this case, because of the additional supply response, the employers actually could benefit from the imposition of a tax on labor.

Policy makers have found it useful to examine tax incidence across different income groups. Taxes or tax systems are considered regressive if the burden falls more heavily on low-income groups than on high-income groups, progressive if the burden falls more heavily on high-income

groups than on low-income groups, and proportional where incidence is uniform across income groups.¹

Two other considerations add to the difficulty of determining the tax burden on both individuals and groups of individuals in different income classes. The first factor is the need to consider the tax incidence of a group of taxes. The more different types of taxes, the harder it is to untangle the tax incidence of a particular tax and the cumulative and interactive effects of the total group of taxes.

Second, a complete analysis of incidence requires consideration of all parts of government activities. In examining both specific taxes and tax systems as a whole, it is important to consider both taxes and benefits from government expenditure programs. For example, a complete analysis of the incidence of a social security tax requires estimates of the incidence of the tax and the retirement benefits provided under the retirement system. Similarly, as set forth in later chapters, it is useful to compare the tax incidence on individuals in different income classes with the benefits provided under such government expenditure programs as education, health care, and housing assistance.

Actual and Perceived Fairness

In all countries, the tax system effectively can be split into two parts. One part of the system has relatively high tax compliance rates. A substantial portion of labor income may be subject to final or provisional withholding; many forms of income from capital may bear withholding or information-reporting requirements; and many, but not all, medium- and large-size corporations may comply with public reporting requirements and keep relatively accurate books and records. Legal taxpayers operate in the formal economy, and the difference between estimated tax liability and actual tax payments is relatively small.

In contrast, the second part of the tax system has relatively low compliance rates. This part of the economy comprises many small enterprises operating, at least in part, in the informal economy. Here, tax evasion is quite high and efforts to bring this sector into compliance are difficult and expensive. The tax administration lacks the information and resources to tax a large informal sector of the economy effectively.

When governments require additional tax revenue, the common approach is to raise tax rates on the part of the tax system where compli-

ance rates are high. This contributes to the actual and perceived unfairness of the tax system as reforms increase the tax burdens on taxpayers with high compliance rates.

Administrative Feasibility

An important goal of a good tax system is administrative feasibility. A part of this goal is that the taxpayer's cost of compliance and the government's cost of enforcement are as low as possible. A common refrain is that tax systems should be simple to understand, simple to comply with, and simple to enforce. The cost of compliance includes such items as filing tax returns, remitting taxes, and planning to minimize or evade taxes. The costs of enforcement include the resources devoted to collecting, auditing, taxpayer services, and other similar expenditures.

Several factors contribute to the complexity of tax systems. Complexity could result from having exemptions or special rules for different taxpayers, from adopting subjective rules rather than objective rules to address the characteristics of specific taxpayers, or from trying to craft rules that anticipate taxpayer abuses. Complexity also results from complicated situations. As transactions and economies become more intricate, tax rules need to address many more difficult and subtle issues. For example, the tax treatment of financial instruments is much more challenging in countries where sophisticated investment bankers and lawyers spawn many different types of instruments to address the needs of their clients than it is in countries where only a few simple types of financial instruments exist.

Many factors contribute to the challenges to effective tax administration, including the number of taxpayers, the different taxes, the existence of a large informal sector, a large number of self-employed individuals, the lack of adequate books and records, low literacy rates among taxpayers, and the high level of tax evasion.

Considerations for Choosing among the Criteria

Policy makers in different countries are likely to differ in the weight they accord to efficiency, fairness, and administrative feasibility. In addition, within each country there are likely to be substantial differences among tax instruments and over time. For many tax design questions, there can be conflicts among the criteria. For example, allowing various personal

deductions in the individual income tax system (such as deductions for medical expenses and casualty losses) may be desirable on equity grounds because it may allow for a more accurate determination of a taxpayer's ability to pay. Personal deductions, however, may create significant administrative difficulties for the taxing authorities who seek to prevent taxpayers from improperly claiming or overstating deductions. Similarly, having a preferential low rate for certain types of food under a value-added tax (VAT) may be desirable to address regressivity concerns, but may increase administrative costs substantially.

Aggregate Level of Taxes

Economic theory provides little guidance on choosing the aggregate tax levels, given a certain level of economic development. Most academic studies focus on the structure of a tax system, given a particular tax revenue requirement. As discussed earlier, it is not possible to separate the question of the appropriate aggregate level of taxes from the question of the appropriate level of government expenditures.

Countries vary greatly on the aggregate level of taxation. Table 3.1 uses the most common index—taxes as a percentage of gross domestic product

Table 3.1. Comparative Levels of Tax Revenue, Selected Years, 1985–97
percent of GDP

<i>Economy/region</i>	<i>1985–87</i>	<i>1995–97</i>
OECD countries ^a	36.6	37.9
America	30.6	32.6
Pacific	30.7	31.6
Europe	38.2	39.4
Developing countries ^b	17.5	18.2
Africa	19.6	19.8
Asia	16.1	17.4
Middle East	16.5	18.1
Western Hemisphere	17.6	18.0

Source: Tanzi and Zee 2000.

Note: OECD = Organisation for Economic Co-operation and Development.

a. Excludes the Czech Republic, Hungary, the Republic of Korea, Mexico, and Poland.

b. Comprises 8 African countries, 9 Asian countries, 7 Middle Eastern countries, and 14 Western Hemisphere countries.

(GDP)—to compare tax levels among developed and developing countries. The average level of tax revenue for developed countries (represented by a selection of countries in the Organisation for Economic Co-operation and Development) was approximately 38 percent of GDP for the period 1995–97. In contrast, the average level of tax revenue in a mix of 38 developing countries for the same time period was only about 18 percent.

There are several different techniques and measures to use in evaluating a country's tax system. Tanzi and Zee (2000) noted that one can estimate a "hypothetical tax-to-GDP ratio" by isolating several independent variables (such as per capita income, share of agricultural output, openness of the economy, and ratio of money supply to GDP), and then comparing the tax performance to that of countries with similar characteristics.

The effectiveness of the VAT system also can be determined by computing "VAT productivity"—a measure that focuses on VAT revenue as a percentage of GDP divided by the VAT rate. It also is possible to estimate the amount of various types of income from national income accounts and other data sources. This information enables policy makers to estimate the potential tax revenue from different tax instruments, assuming different tax compliance rates. In all those instances, of course, the utility and reliability of these estimates depend on the quality of the underlying data.

Part of the variation in aggregate tax revenues among countries can be explained by different demands and tastes for government services. The demand for such services tends to increase with per capita income. Countries, and presumably the residents of those countries, also may have different views on such important issues as public versus private provision of education, health care, and retirement benefits, and the size and quality of government provisions of defense, transportation, and other services. These issues are primarily political matters to which advisers may have little to contribute. Because taxes are the primary vehicle to fund government services, higher taxes are required to fund higher service levels.

Part of the variation in aggregate tax revenues also can be explained by the amount of other sources of nontax revenue available to governments. Countries with substantial revenues from state-owned resources or from natural resources do not need to rely as much on tax revenues to fund government operations.

Another part of the variation can be explained by different capacities to tax. The demographics and structure of an economy, which determine

its fiscal architecture, significantly influence the capacity of its government to collect tax revenue from particular sources of income. Increased competition for trade and investment may further erode traditional revenue sources for developing countries. Finally, countries vary greatly in their ability to impose and collect taxes. Substantial tax administration challenges and weak tax administration may result in tax receipts that fall considerably below projected amounts.

Relative Use of Different Tax Instruments

The literature on optimal tax rates provides some guidance on the choice and design of tax instruments to fund government activities. There is a gap, however, between optimal tax theory and practical guidance on designing tax systems. The optimal tax approach rests on several common methodological assumptions: (1) the government needs to raise a specified amount of revenue; (2) the government uses income taxes, commodity taxes, or some combination of both; (3) the government makes decisions that are consistent with individual and corporate optimization; and (4) the government makes choices that maximize a “social welfare function” reflecting the value its citizens place on the welfare of certain individuals.

The restrictive nature of those assumptions has limited the usefulness of applying optimal tax theory to tax design questions. Several economists have begun relaxing some of these assumptions, however, and they have included political and administrative aspects in the optimal tax framework.

Different Types of Taxes

One important issue is the number of different taxes that should be part of a tax system. There are several advantages to using many types of taxes. First, doing so may insulate against economic or cyclical changes. Changing economic conditions may affect a particular tax base but are very unlikely to affect *every* tax base at the same time. Second, the use of multiple taxes allows lower rates on any one tax base. This will reduce the distorting effect of a tax, especially given that distortion increases substantially as the tax rate increases. Third, it may be more politically palatable to have a larger group of taxes with low rates than a smaller group of taxes with high rates. Finally, multiple tax bases may reduce evasion or

avoidance because taxpayers are unlikely to avoid all taxes. For example, taxpayers who avoid or evade income taxes will be subject to consumption taxes when they spend their savings, or to property taxes when they invest unreported income.

There also are several disadvantages to using many different types of taxes. First, multiple taxes likely mean higher administrative costs for both taxpayers and taxing authorities. Administrative costs for adopting new taxes are likely to be much higher than the increase in administrative costs incurred by trying to extract more revenue from existing taxes. Second, depending on the nature and design of the taxes used, the cumulative distorting effect may be greater than the effect of using fewer tax instruments—especially where different taxes apply to the same transactions. Third, using multiple taxes makes it harder to determine the individual tax burden distribution of the various taxes. As discussed earlier, determining incidences of individual taxes is difficult. Determining the incidence of multiple taxes on an individual or group of individuals is even more complex. Finally, taxpayers facing multiple taxes will have difficulty determining how taxes could or should influence their decisions.

Considerations for Determining the Relative Mix of Taxes

Determining the relative mix of tax instruments requires examining several factors: (1) revenue estimates based on certain design considerations, (2) administrative considerations for both taxpayers and taxing authorities, (3) equity considerations, and (4) transition and political considerations in preparing and implementing tax reform proposals.

Countries use many different types of tax instruments to fund government operations. The most common types include (1) taxes on consumption, such as VAT, excise taxes, and trade taxes like import duties and export fees; (2) taxes on labor income (wage taxes, either stand-alone or as part of a personal income tax system, and social security taxes); (3) taxes on business and investment income (corporate income taxes and taxes on income from capital as part of a personal income tax system); (4) wealth and inheritance taxes; and (5) property or land taxes.

Intercountry Comparisons

One approach to determining the relative tax mix is to look at other tax systems to see the different sources of tax revenue. Although this is a use-

ful exercise, it provides little theoretical support for why one particular tax combination may be preferable to another combination.

Table 3.2 provides comparisons among developed and developing countries on the relative use of different tax instruments and how their use has changed over time. Three important insights emerge from the table. The first involves the relative use of trade taxes between developed and developing countries. Whereas trade taxes are a relatively insignificant source of revenue for developed countries (less than 1 percent of total tax revenue and about 0.3 percent of GDP), trade taxes often constitute between 20 and 40 percent of total tax revenue for developing countries (a total of 3.5 percent of GDP of a total tax revenue of about 19 percent of GDP). Generally, the percentage of trade taxes in total tax revenue for developing countries is higher for low-tax-yield countries (tax revenue as a percentage of GDP in the range of 5–10 percent) than for medium-tax-yield or high-tax-yield countries (tax revenues of 10–20 percent of GDP or tax revenues greater than 20 percent of GDP, respectively).

Second, in contrast to developed countries, developing economies rely much more on consumption taxes than on income taxes. For developed countries, revenue from income taxes generally exceeds revenue from consumption taxes by a substantial margin (14.2 percent of GDP for income taxes, compared with 11.4 percent of GDP for consumption taxes). Developing countries, however, garner double the tax revenue from consumption taxes than from income taxes (10.5 percent of GDP from consumption taxes, compared with 5.2 percent of GDP from income taxes).

Finally, the relative proportions of income taxes paid by individuals and corporations differ significantly between developed and developing economies. For developed countries, revenues from individual income taxes exceed revenues from corporate income taxes by a margin of 3 to 1. In contrast, revenues from corporate income taxes in developing countries exceed revenues from individual income taxes by a small margin (2.6 percent of GDP for corporate income taxes; 2.2 percent for individual income taxes).

Revenue Considerations

Countries with different economic and demographic characteristics will have divergent appetites for diverse tax instruments. A major purpose of the fiscal architecture analysis is to provide estimates of the revenue ca-

Table 3.2. Comparative Composition of Tax Revenue, Selected Years, 1985–97
percent of GDP

<i>Economy/region, 1985–87</i>	<i>Income taxes</i>			<i>Consumption taxes</i>				<i>Social Security</i>
	<i>Total</i>	<i>Of which</i>		<i>Total</i>	<i>Of which</i>			
		<i>Corporate</i>	<i>Personal</i>		<i>General</i>	<i>Excise</i>	<i>Trade</i>	
OECD countries ^a	13.9	2.8	11.3	11.3	6.0	3.8	0.7	8.8
America	14.0	2.5	11.4	7.6	3.4	2.2	0.6	5.8
Pacific	17.1	3.9	13.2	7.5	2.3	3.7	0.8	2.8
Europe	13.3	2.7	11.0	12.4	6.8	4.0	0.7	10.1
Developing countries ^b	4.9	2.8	1.7	10.3	2.3	2.6	4.2	1.2
Africa	6.3	2.9	3.1	11.7	3.2	2.3	5.7	0.4
Asia	5.7	3.5	2.1	9.5	1.9	2.5	3.6	0.1
Middle East	4.7	4.3	1.0	9.1	1.5	2.4	4.4	1.2
Western Hemisphere	3.7	1.8	1.0	10.6	2.6	3.0	3.7	2.4
<i>Economy/region, 1995–97</i>								
OECD countries ^a	14.2	3.1	10.8	11.4	6.6	3.6	0.3	9.5
America	15.4	3.0	12.3	7.0	3.7	2.0	0.3	6.1
Pacific	16.2	4.3	11.4	8.4	4.3	2.6	0.6	3.5
Europe	13.7	2.9	10.6	12.4	7.3	4.0	0.3	10.8
Developing countries ^b	5.2	2.6	2.2	10.5	3.6	2.4	3.5	1.3
Africa	6.9	2.4	3.9	11.6	3.8	2.3	5.1	0.5
Asia	6.2	3.0	3.0	9.7	3.1	2.2	2.7	0.3
Middle East	5.0	3.2	1.3	10.3	1.5	3.0	4.3	1.1
Western Hemisphere	3.7	2.3	1.0	10.6	4.8	2.3	2.6	2.5

<i>Economy/region, 1995–97</i>	<i>Income/consumption taxes (%)</i>		<i>Corporate/personal income taxes (%)</i>	
	<i>1985–87</i>	<i>1995–97</i>	<i>1985–87</i>	<i>1995–97</i>
OECD countries ^a	1.2	1.2	0.2	0.3
America	1.8	2.2	0.2	0.2
Pacific	2.3	1.9	0.3	0.4
Europe	1.1	1.1	0.2	0.3
Developing countries ^b	0.5	0.5	1.6	1.2
Africa	0.5	0.6	0.9	0.6
Asia	0.6	0.6	1.6	1.0
Middle East	0.5	0.5	4.3	2.5
Western Hemisphere	0.4	0.4	1.8	2.3

Source: Tanzi and Zee 2000.

Note: OECD = Organisation for Economic Co-operation and Development.

a. Excludes the Czech Republic, Hungary, the Republic of Korea, Mexico, and Poland.

b. Comprises 8 African countries, 9 Asian countries, 7 Middle Eastern countries, and 14 Western Hemisphere countries.

capacity of various taxes, given the characteristics of the country. Economic factors include the structure of the economy, the composition of earnings, and manual resource endowments. Demographic factors include the size, education level, and age distribution of the population; the relative size of urban and rural populations; and family size.

In determining a tax mix, it is useful to have estimates of the revenue potential for each tax instrument. Because the design considerations for each instrument greatly affect revenue estimates, calculations are required for the various assumptions that underlie an instrument's design and scope (for example, assumptions as to tax rates, base, and coverage). Revenue estimates for an individual income tax, as an example, will depend on the percentage of the population that is subject to the tax (the choice of the tax threshold or zero-rate band), the income subject to the tax and the allowable deductions, and the rate structure.

Administrative Considerations

It is necessary to have estimates of compliance and enforcement costs for each tax instrument, based on various rate, base, and coverage scenarios. Substantial variations in these costs may influence the roles a particular tax instrument plays in the tax system. For example, the collection costs and auditing costs for an individual income tax per unit of tax revenue collected may be much higher than the collection and auditing costs for a VAT. In addition, it is important to estimate the level of tax evasion for different tax instruments and the cost and probability of reducing evasion to an acceptable level.

Fairness Considerations

Even in the absence of high-quality data, it is important to estimate the distribution of tax burdens, based on scenarios affecting individuals in different income groups. This exercise involves determining the necessary information requirements, identifying key assumptions, and modeling the cumulative effects of different tax instrument packages.

Political and Transition Considerations

Finally, any major changes in tax systems depend on political considerations because tax reforms result in winners and losers. It is important to realize that policy makers do not start with a clean slate in designing tax systems. System changes often are slow, piecemeal, and laced with politi-

cal compromises. Given that reality, instituting reform from a particular existing tax system likely differs from the more desirable effort of designing a tax system de novo.

Effectiveness of Tax Instruments in Redistributing Wealth or Income

Tax instruments vary greatly in their ability to redistribute wealth or income. This section examines the use of taxes to achieve a more equitable distribution.

Different Tax Instruments

Individual income taxes and wealth taxes are the primary instruments to achieve income distribution. Whether and to what degree corporate income taxes aid in this respect depend on who finally bears the corporate tax burden—shareholders, laborers, or consumers. Taxes on consumption generally are assumed to be regressive because lower-income groups tend to spend a higher percentage of their income than do higher-income groups. The regressivity of consumption taxes, however, is less severe or is eliminated when measured over the lifetime of individuals rather than on an annual basis. Indeed, a VAT with a zero-rate for basic food commodities may be progressive when considered over a lifetime perspective.

Redistribution through taxes usually involves two aspects: progressive tax rates and transfer payments of cash or in-kind benefits. A tax system is progressive if the tax rate rises faster than income, so tax as a percentage of income increases as income increases. The progressivity of the tax system generally is measured in terms of income because the objective of the progressive tax system is to transfer to the state a portion of a taxpayer's net increase in wealth (that is, his or her income) that would otherwise have been saved or spent. The transfer then permits the government to spend or save that revenue.

Income distribution goals also may be important for two other aspects of tax design: earmarked taxes and tax expenditures designed to assist particular income groups. Earmarked taxes (or hypothecated taxes, as they are known technically) are taxes levied to fund particular programs. Common hypothecated taxes are social security taxes to fund pensions, unemployment “insurance” taxes to fund unemployment benefits, educa-

tion taxes to fund schools, and taxes to fund national health systems. Although these taxes generally are regressive in nature, when combined with their associated spending programs they may be progressive if a disproportionate share of the spending programs' benefits goes to lower-income people.

Tax provisions designed to assist particular income groups commonly take two forms. One form is the use of tax credits available only to low-income people. These credits may be used to offset a qualifying individual's normal tax liability; if the credits are made "refundable," the government will provide a cash transfer to the extent the available credit exceeds an individual's tax liability. The other, and more common, form is the specific tax exemption designed to assist low-income people.

For developing countries, the effectiveness of income taxes in redistributing income may be limited for several reasons. First, individual income taxes are a relatively small part of the tax system. Revenues from those taxes in developing countries are only about 2.2 percent of GDP, or 12.0 percent of total tax revenues, compared with 10.8 percent of GDP or about a third of total tax revenues in developed countries. Second, weak tax administration may make it difficult to collect income taxes on income other than wages. Even though the income tax system is nominally progressive, if residents of developing countries are able to shift assets out of the country, the progressivity may be illusory. Finally, over the past 20 years there has been a steady decline in the top personal income tax rate throughout the world (on average, from more than 50 percent to slightly above 30 percent).

This trend does not mean that income tax systems necessarily have become less progressive. One easily can imagine a tax system with a top personal income tax rate of 30 percent and a broad tax base, few deductions, and high compliance rates being much more progressive than a tax system with a nominal 50 percent top personal rate, a narrow base, many deductions, and high levels of tax evasion. In designing personal income tax systems, however, policy makers likely will face both internal and external pressures to have top marginal tax rates that are comparable to the rates of countries in the same region. If the top marginal rates do not exceed the mid-20s or 30s, the ability of income tax systems to redistribute income may be much less than in the 1960s and 1970s when policy makers had greater flexibility in choosing top marginal tax rates.

Costs and Benefits of Using Taxes to Redistribute Wealth and Income

Determining the equity benefits of income redistribution requires some type of ethical framework or “social welfare function” to compare the improvement in aggregate social welfare produced by income transfers. Different income distribution theories include entitlement-based theories, utilitarian theories, and a Rawlsian theory focusing on individuals who are least well-off.

Entitlement theories hold that a person deserves goods either because she produces them or because of some trait she possesses. The broadest view would have individuals keep whatever they could earn in the market. The entitlement principle also could be qualified in several ways, such as by limiting tax claims only to labor income or to income earned in a competitive market. Adjustments could be made for inequalities that arise from certain advantages accorded some people over others.

Welfarist or utilitarian theories focus on the welfare or utility enjoyed by members of a society. Such theories determine the welfare of a society by aggregating the well-being of all individuals in the society. Simple utility theories focus on the unweighted sums of the individual utilities. This approach seeks to maximize the total welfare of society without explicitly addressing its distribution among individuals. Weighted utility theories give greater weight to less well-off members of society than to those who are better-off. Proponents of weighted utility theory would accept a reduction in society’s total welfare if it increases the welfare of the members who are less well-off.

The leximin, founded loosely on the work of the philosopher John Rawls, bases its judgment of a society’s welfare on its least well-off members. The theory rests largely on the “difference principle,” which provides that social and economic inequalities are justified only if they increase the well-being of the least advantaged members of society. By focusing solely on the worst-off members of society, proponents of the leximin approach justify reductions in the welfare of other members if it improves the welfare of the worst-off members.

The cost of higher tax rates depends, in part, on the elasticity of the wage supply. If elasticities are low, the marginal costs of using the tax system to redistribute income may be low. In contrast, if labor supply is quite responsive to changes in tax rates, then the economic costs will be

substantial. High tax rates also may contribute to greater tax evasion. Although the economic literature is inconclusive on the relationship of tax rates to tax evasion, high marginal tax rates on income from capital may cause taxpayers to move their investments either to the black economy or outside the country.

Inheritance and wealth taxes can be useful tools in redistributing wealth. These taxes often are crafted with relatively high threshold amounts so that only the wealthy or relatively wealthy are subject to them. The rates often are quite high, and the symbolic value of these taxes can be quite important in terms of their income distribution effect. The effectiveness of these taxes in redistributing wealth, however, depends on the ability of taxpayers to shift money outside the country (either legally or illegally) and the ability of the tax administration to impose and collect these taxes. Inheritance and wealth taxes may be net revenue losers if the amount of tax revenue raised is less than the amount of potential income tax receipts lost when income from capital is shifted outside of the tax system.

Effectiveness of Particular Tax Provisions in Reducing the Tax Burden on Poor People

Tax instruments differ in their effectiveness in reducing the tax burden on poor people. This section examines special provisions in both the individual income tax and the VAT that try to target special relief to low-income groups. It also addresses excise, social security or payroll, and business taxes.

Individual Income Tax

Countries can use the individual income tax system to address poverty issues in one of three ways: (1) by using the system as a part of the social welfare program to provide cash transfers to low-income individuals, (2) by adopting a high threshold to exempt certain low-income individuals from income tax, and (3) by adopting provisions to reduce the tax burden of low-income people.

Tax System as Part of the Transfer System

The tax system can be used as an assistance vehicle for poor individuals or families. Proposals have suggested a “negative income tax” whereby

those individuals or families with incomes below a certain threshold would receive cash transfers through the tax system. Another proposal is to target relief only to the working poor or, even more narrowly, to the working poor with families. Under this alternative, individuals with labor income below a certain amount would receive cash transfers equal to a percentage of their earnings. People without any labor income (or earning less than a particular amount) would not be eligible for income-based assistance.

In examining the desirability of those approaches, policy makers need to consider the relative efficiency and feasibility of using the tax system to provide these benefits rather than using a direct expenditure program administered outside the tax system. In countries where a significant portion of low-income individuals already are part of the tax system, these approaches may have the advantage of using an administrative structure that may be more efficient than the countries' current bureaucracy for providing assistance. Even in such cases, however, using the tax system to provide transfers to low-income individuals has the disadvantages of increasing the administrative burden on tax authorities and of diverting scarce resources from the primary task of imposing and collecting taxes.

Exclusion of Poor People from the Income Tax System

The easiest way to provide tax relief to low-income individuals is simply to relieve them from their obligation to pay taxes. The income tax rate structure in many jurisdictions contains a "tax-free threshold" at the bottom end of the rate scale, essentially a zero-rate band. That threshold is merely another way of restating the progressive rate structure.

Few conceptual advantages exist to using a zero-rate band in the progressive rate structure. However, tax-free thresholds are politically popular because they exempt low-income individuals or families from income tax liability by removing them from the tax system. A zero-rate band also encourages people to participate in the labor market by allowing them to earn a certain amount without incurring any income tax liability. In practice, tax-free thresholds may create potential problems. First, they encourage higher-earning individuals to split income by shifting it, particularly investment income, to related people so the tax-free threshold can be exploited more than once. Countries with substantial tax-free thresholds (for example, ones equal to average per capita income) usually also

have elaborate antishifting measures to prevent or reduce income shifting from higher-income to lower-income people.

A second and frequently more serious problem is the disincentive effect of the jump from the tax-free threshold to the first positive income band. The marginal rate of tax on additional money earned above the threshold rises significantly if the lowest rate is zero. Depending on the social welfare system in place, this rise in income might be accompanied by a reduction in transfer payments or entitlements to other social assistance, so the jump in tax rates is amplified. Taken together (the tax on income above the threshold and the loss of transfer payments when income rises above the threshold), in some developing and many developed countries the effective marginal tax rate on people moving from the zero-rate band to the lowest income tax rate band often is quite high and, in some cases, is greater than 100 percent. This can act as a significant disincentive for people entering the workforce, particularly secondary earners who would have to give up, or pay others to perform, household duties.

Provisions Targeted at Low-Income People

The income tax system can provide relief to low-income people through special deductions or credits that effectively reduce the after-tax costs of certain expenditures. Examples of expenditures that could qualify for favorable tax treatment include payments for family support, medical expenses, job training and relocation expenses, and education expenses.

Many income tax systems provide some assistance for taxpayers who support a dependent spouse or dependent children. Some systems also provide recognition for the cost of supporting other relatives. Various mechanisms are used to provide assistance for family support through the income tax system. Originally, many jurisdictions provided a deduction from income as a means of providing assistance—an approach often criticized for its “upside-down” effect. Because any deduction reduces the taxpayer’s total taxable income, the benefit of a deduction varies according to the taxpayer’s marginal tax rate. Thus, a deduction to assist family support will be of great value for highest-income taxpayers, of little value to low-income taxpayers, and of no value to individuals and families below the tax threshold. If a program seeks to assist taxpayers with the cost of supporting dependents, a program that delivers most assistance to those people who need it least may be of limited usefulness.

To overcome the upside-down effect of deductions providing larger subsidies for higher-income taxpayers, many countries prefer to use tax credits as a means of giving assistance for family support through the tax system. A tax credit is a credit that can be used to offset the amount of money a taxpayer owes the government. It has the advantage of providing equal assistance to all taxpayers, regardless of income level.

A simple tax credit system often is subject to criticism on two accounts. First, tax credits are of no value to low-income people who have no tax liability to be offset by the credit. To overcome that problem, many countries use what are known as “refundable” tax credits, which offset a taxpayer’s tax liability and provide the taxpayer a cash transfer “refund” of the credit amount that exceeds the liability amount.

Tax credit systems also are criticized for providing assistance for support of dependents to high-income taxpayers who do not need the subsidy. To overcome this effect, many countries give some or all of their tax-based family support assistance in the form of a “disappearing” or “tapered” income tax credit. A disappearing credit decreases as the taxpayer’s income rises. Most often, the credits decrease one monetary unit for every two or three monetary units derived by the taxpayer in excess of a stated threshold.

Value-added Tax

A single VAT rate may be regressive relative to income because low-income individuals spend a higher percentage of their earnings than do high-income individuals. Economists note that, although the VAT may be regressive relative to income on an annual basis, it likely is proportional to lifetime income. As discussed earlier, many countries seek to offset the regressivity of the VAT by reducing the tax burden on basic goods and services. These necessities may constitute a higher proportion of total spending by low-income people, compared with the spending of high-income individuals.

However, it may be that individuals of different income groups are purchasing many of the same goods and services. High-income groups may just be buying more expensive varieties of products than those who are less well-off. If that is true, the use of lower VAT rates on some basic goods and services may be ineffective in achieving distributional goals. It may be more effective to address such goals outside the VAT system.

Using multiple VAT rates imposes significant administrative costs because of the difficulty of defining supplies eligible for lower or no taxes. The most difficult distinctions are often among different types of food. Countries that have lower or zero-rates for different types of food products often find their administrative systems bogged down and the appeal process clogged with disputes about the character of different food products. Attempts to distinguish between “restaurant” food and food prepared for home consumption have proved unworkable because different types of suppliers may supply both ready-to-eat and raw foods for consumption on or near the premises or at home.

A more workable alternative may be to zero-rate or apply a lower tax rate to only a limited number of basic food commodities, such as rice and cooking oil. This approach has two advantages. First, it avoids many of the demarcation disputes found in all tax systems with broader concessions. Second, this approach mitigates the regressivity of the exemption. A broad exemption for “food” may benefit higher-income individuals more than those with lower incomes because richer people buy more expensive foods and actually may spend a higher percentage of their income on food. However, a concession only for a very limited number of defined basic foodstuffs may be of less benefit to high-income taxpayers because both the percentage of income and the actual amount spent on those basic foodstuffs may decline as income rises.

It also is important to examine the potential economic consequences of favorable treatment for certain types of goods and services. When the tax system treats specific commodities favorably, the relative prices for those and related products may change. For example, preferential treatment of rice may reduce the use of substitute grains, and preferential treatment for cooking briquettes may create disincentives to use alternative fuels.

Excise Taxes

Excise taxes play a major role in raising funds in developing countries. For example, almost all Latin American countries collect more revenues from excise taxes than from individual income taxes. Taxes on alcohol and tobacco in many countries account for a vast majority of revenue, and it is not surprising that those taxes have been so successful. First, because the demand for these products is relatively inelastic, taxes can be raised without substantial changes in the level of consumption. Second, the adminis-

trative challenges in collecting excise taxes often are significantly less than in other taxes. Finally, governments have strong reasons to reduce consumption of alcohol and tobacco to improve the health of their people.

If governments want to use the tax system to reduce poverty, however, reducing excise taxes on alcohol and tobacco, particularly on low-priced products, is likely one of the most effective ways to achieve that objective. These taxes, however, may be regressive in many countries, and an increasing reliance on other tax instruments that may be more progressive may be part of a strategy to “un-tax” the poor.

Payroll Taxes

Countries vary greatly in their use of employment taxes (referred to collectively as “payroll taxes” in this chapter). Some developing countries—particularly in Africa and Asia—do not impose payroll taxes. For other developing countries—including the formerly socialist countries and many Latin American nations—payroll taxes play a major role in the tax system. For example, as set forth in table 3.2, developing countries in the Western Hemisphere collect, on average, more than 2.5 times as much revenue from payroll taxes as from individual income taxes. Given that several developing countries in the Western Hemisphere make little or no use of payroll taxes, the relative proportions of individual income taxes and payroll taxes in the remaining countries are even more dramatic.

It is not possible to evaluate the incidence of payroll taxes and benefits without considering the proportion of workers covered by payroll taxes. In countries with a large informal sector, payroll taxes may operate as an additional tax imposed for participating in the formal sector, and so may increase the supply of workers in the informal sector. The increased number of laborers therefore reduces wages in the informal sector. It is not clear what effect eliminating payroll taxes and increasing corporate income taxes will have on wages. As discussed earlier, in small, open economies, the burden of the corporate tax may fall largely on labor.

Many workers (in both developed and developing countries) pay more in payroll taxes than they do in individual income taxes. Whether these workers ultimately receive benefits that equal or exceed the combined value of the taxes paid by the employee and the employer depends on the nature of the program and on certain assumptions regarding investment return and life expectancy. For our purposes, however, it is important to note that, in many developing countries, payroll taxes (and subsequent benefits)

are a key component in determining the progressivity of the tax system and in thinking about measures to reduce the tax burden on poor people.

Several alternatives exist for changing the payroll tax regime to reduce the tax burden on the poor. At one extreme, a country could eliminate payroll taxes and fund benefits out of general tax revenues. Other alternatives include increasing exemption levels and reducing tax rates for low-income workers, and changing the benefit formulas to provide for redistribution within the payroll tax system.

Business Taxes

Policy makers also can consider using business tax provisions to reduce poverty. In both developed and developing countries, tax regimes contain a wide array of incentives aimed at improving the economic conditions of targeted groups. One common measure provides tax benefits to employers who hire additional low-income or otherwise disadvantaged workers. Countries also use tax incentives to encourage investment in regions with high rates of poverty and unemployment. As with other proposals that use the tax system to solve nontax problems, it is very difficult to estimate the costs and benefits of using tax incentives to increase employment and investment. Although tax benefits for job creation and capital investment have great political appeal, it is not clear that using the tax system is the most efficient way to achieve those objectives.

Conclusion

Taxes play an important role in any poverty reduction strategy. Their most important function is to raise revenue to fund government expenditure programs. Whether taxes can aid in the redistribution of income or provide targeted relief is a difficult question—and the answer depends on country-specific factors. However, until personal income taxes in developing countries play a greater role in funding government programs, redistribution via taxation will be very difficult. Even then, income tax competition from other countries and limitations of tax administration will limit a country's ability to use the tax system to redistribute wealth and income. Addressing poverty concerns through the design of some other specific tax instruments may be more promising. Although any proposal needs to be considered in the context of the entire tax system, reducing the number of individuals subject to income taxation, examining

measures to reduce the payroll tax burden on low-income taxpayers, and placing lower tax rates on certain basic foodstuffs and fuel merit serious consideration.

Note

1. Chu, Davoodi, and Gupta (2000) reviewed several studies of the incidence of tax systems in developing countries. In 36 studies of overall tax systems in 19 countries, they reported that 13 studies found the tax system progressive, 7 studies found it proportional, 7 studies found it regressive, and the remaining 9 had mixed findings or insignificant effects.

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CHAPTER 4

Assessing Front-line Service Delivery

Public Expenditure Tracking Surveys

Ritva Reinikka and Jakob Svensson

The considerable body of cross-country studies relating public spending with economic growth and, to a lesser extent, with social development seems ambiguous at best. For example, Kormendi and Meguire (1985) and Ram (1986) found that higher government expenditures are associated with higher growth, whereas Landau (1986), Barro (1991), Dowrick (1992), and Alesina (1997) found such expenditures to be associated with lower growth.¹ Easterly and Rebelo (1993) showed that overall public investment has a very low impact on growth, but that certain types of investment expenditures are correlated with growth. Devarajan, Swaroop, and Zou (1996) observed that the standard candidates for productive expenditures had either a negative or an insignificant relationship with growth.

The relationship between the amount of resources spent on schooling and education outcomes also is ambiguous. The findings of different studies in industrial and developing countries, as summarized by Hanushek (1995) and Kremer (1995), respectively, reached different conclusions regarding the effectiveness of education expenditures. In developing coun-

We gratefully acknowledge contributions by Jan Dehn.

tries, the relationship between resources spent and educational outcomes appears to be weak.

Until now, the lack of reliable data on public spending in many countries has limited a closer look at the relationship between such spending and health outcomes. Emerging evidence indicates that total public spending on health has had much less impact on average health status than one might have expected, and certainly less than one could have hoped for (Filmer, Hammer, and Pritchett 2000). One study found that socioeconomic characteristics, including income and female education, explain most cross-country variation in child mortality, whereas public expenditure on health, as a share of gross domestic product (GDP), is a small and statistically insignificant determinant (Filmer and Pritchett 1999). According to those estimates, doubling public spending from 3 to 6 percent of GDP would improve child mortality by only 9 to 13 percent. Other multivariate estimates of the determinants of life expectancy and child mortality also showed that income is always significant, but that the public share of GDP that is spent on health is not (see a review by Musgrove 1996). Bidani and Ravallion (1997) found, however, that public spending has a large effect on the health status of the poor, but estimated that public spending on aggregate health status (of the poor and nonpoor populations taken together) has only a small effect.

Several studies have argued that the ambiguity regarding the relationship between public spending and growth, or the negligible positive effect on outcomes from social sector spending, is likely to reflect problems of *identification*, broadly defined. More spending does not necessarily imply more public services (Pritchett 1996; Reinikka 2001; Reinikka and Svensson 2001). From the supply side, one can identify two general explanations for the ambiguity. First, low efficacy in the transfer of funds within the public sector (for example, leakage of funds) may prevent spending from reaching the intended end entity in charge of delivering public services (for instance, schools). Second, low efficacy on the part of the end user in creating valuable goods and services (even if funds reach the intended end user), as well as waste and corruption (within schools or health clinics, for example), may hamper severely the production of valuable services.

How then does one determine that public spending actually has been converted into services that are socially valuable? This is a difficult question to answer because data on *actual* spending for basic services typical-

ly are not available in developing countries. The empirical growth literature presents an abundance of explicit and implicit attempts to separate productive public spending from expenditures that have no direct effect on productivity—for example, by determining *ex ante* what types of spending are likely to be productive. The partitioning of expenditure categories, however, does not address the core problem—that public spending data, irrespective of category, tend to be a poor proxy for actual service delivery.²

Thus, it is not enough to analyze cross-country macroeconomic and budget allocations data. Microlevel tools are needed to reveal and understand provider behavior and the translation of public spending into services (in terms of both the quantity and the quality of services) that reflect the public funds spent on them.³ This chapter presents a new survey tool and some of its first applications to document front-line service delivery from public, private nonprofit, and private for-profit providers. This tool has two variants: a diagnostic public expenditure tracking survey (PETS), and a more comprehensive facility-based quantitative service delivery survey (QSDS).

The rest of this chapter is organized as follows. The next section discusses key features and potential uses of the PETS and the QSDS tools. Then we describe a number of survey applications in Uganda, Tanzania, Ghana, and Honduras. The following section discusses the role of asymmetric information in public spending and its adverse consequences for service delivery. There we also suggest ways to tackle the problem through innovations in transparency. The final section concludes the report.

Provider Surveys: Key Features and Potential Uses

The financing and provision of services are two aspects of service delivery. Even for those services for which there is a strong case for public financing, there may not be a case for public provision. Until now, the financing issue has been given most of the attention. This chapter focuses on issues and problems of service provision and on three principal types of service providers in a typical developing country: (1) government at all levels, especially lower tiers; (2) nonprofit private providers (nongovernmental organizations [NGOs], faith-based groups, and the like); and (3) for-profit private providers. For example, estimates suggest that 80 percent of the health care services in India are privately financed and provided (World

Bank 2001b). In Uttar Pradesh, one-quarter of rural children and 70 percent of their urban counterparts go to private hospitals (World Bank 2001b). In some sub-Saharan African countries, nonprofit providers deliver more than half of all curative health services—most of them privately funded (for example, see Hutchinson 2001).

The microeconomic survey approach presented here focuses on provider behavior in general, including issues of incentives, oversight, accountability, and multiple-principal/multiple-agent dynamics in the public sector.⁴ As mentioned earlier, the two instruments are the PETS and the QSDS.⁵ Because information on actual public spending seldom is available in many developing countries, the PETS was designed to provide the information missing from different tiers of government and front-line service facilities. In the QSDS, the facility or front-line service provider is typically the main unit of analysis, in much the same way that the firm is the unit under observation in enterprise surveys and the household is the unit observed in household surveys. The QSDS easily can be applied beyond the government to include NGO-run and privately operating providers. In each case, quantitative data are collected through interviews and directly from the service provider's records. Facility data can be "triangulated" by surveying local governments, umbrella NGOs, and private provider associations as well. Compiling facility-level quantitative data typically requires much more effort than does, for instance, a perception survey of service users; and that makes the QSDS both more costly and more time consuming to implement than its qualitative alternatives.

The PETS can be conducted in conjunction with the QSDS. Combining them enables users to make a direct evaluation of the effect of wider institutional and resource-flow problems on front-line service delivery. The facility-level analysis also can be linked "upstream" to the public administration and political processes (including public official surveys), and "downstream" to households to combine the supply and demand sides of service delivery.

The PETS and the QSDS have two broad uses. First, they serve as diagnostic tools on service delivery. Many countries formulate policies within a paradigm of large, ambitious public spending programs intended to address issues of efficiency and equity. However, the implementation capacity of governments seldom has been incorporated systematically into the analysis of public expenditure priorities. Second, these surveys provide

primary data on service providers for empirical research. Empirical evidence is lacking on questions of incentive and moral hazard, despite a plethora of appealing theoretical arguments (Dixit 2000). Well-designed and well-executed surveys thus may provide the necessary data to undertake such empirical analysis.

Data Collection

Microlevel data collection is necessary because information systems that report on spending and public services in developing countries either are nonexistent or suffer from poor-quality data. The dearth of information extends across all sectors and to all service categories. The PETS and QSDS offer a means of compiling such information. Given their public expenditure focus, the following data are particularly interesting: the quantity and quality of service outputs, inputs, resource allocations within facilities and lower tiers of government, financing (including user fees and donor financing), management systems and incentives, community participation, and staff attendance. Much of these data have not been collected from front-line service providers. Therefore, an important contribution of the PETS and the QSDS is the establishment of stylized facts about service provision. Such facts then can be used as benchmarks for cross-country studies, and as baselines for monitoring the effectiveness of policy changes within individual countries.

Diagnosis

If designed appropriately, given the country circumstances, the PETS and the QSDS can be used to diagnose and quantify problems of inefficiency, low service quality, and resource leakage; to capture manifestations of moral hazard in public service, such as shirking and ghost workers, asymmetric information, ineffective management and supervision systems; and to point out distributional issues (see Bardhan and Mookherjee 1999, 2000).

Capacity Building

Undertaking the PETS and the QSDS in partnership with local research institutions can yield the additional benefit of building local capacity for policy analysis. Working with local academics, research institutions, and

relevant government agencies also can be very useful in building local ownership of and demand for policy research.

Research

The QSDS owes more to enterprise or household surveys than to conventional public expenditure analysis, given its focus on provider behavior incentives. Whereas firm surveys focus on issues like investment response or productivity, and household surveys focus on demand for services, the QSDS explores provider behavior that underlies service delivery outcomes. The implication is that the novelty of this approach lays not so much in the development of new methods of analysis as in the application of known survey techniques to the evaluation of front-line public expenditure and to the analysis of provider behavior. Important empirical research questions that the PETS and the QSDS can answer include the following:

- How can we design institutions that can generate the “right” incentives within the public sector (characterized by multiple principals and multiple agents) and the private sector, compatible with increasing the quantity and improving the quality of basic services?
- How does decentralization affect public expenditure outcomes and the quantity and quality of basic services?
- What is the optimal role for various tiers of government, and under which circumstances?
- How can we strengthen voice mechanisms for service users in developing countries and counter problems created by asymmetric information?
- What type of accountability and oversight arrangements between various tiers of government can help improve basic service delivery?
- How can local participation and partnerships with the private sector and civil society enhance basic service delivery?
- How can private providers best be regulated?

Explaining variation in service delivery outcomes can be a difficult task, however. It entails being able to identify exogenous sources of variation in institutional features across facilities amenable to policy manipulation, and to relate them to input choices and actual outcomes at the facility level.

Survey Applications in Selected Countries

Several countries have implemented diagnostic PETS, but the QSDS is still being fielded in a number of countries. Therefore, this section reviews the experience gained mostly from the PETS in Uganda, Tanzania, Ghana, and Honduras. In the first three cases, leakage of public funds (defined as the share of intended resources/funds not received by the front-line service provider/facility) was the main issue; the Honduran PETS focused on staff behavior, including attendance and job migration. Nearly all applications of the PETS so far have concentrated on health care and education.

Leakage of Public Funds

Uganda was the first country to carry out a PETS. The study, in 1996, was motivated by the observation that, despite a substantial increase in public spending on education since economic recovery started in the late 1980s, the official reports of primary enrollment remained stagnant. The hypothesis was that actual service delivery, proxied by enrollment in primary school, was much worse than budgetary allocations implied because public funds were subject to capture by local government officials and did not reach the intended facilities (schools). To test that hypothesis, a PETS was conducted to compare budget allocations with actual spending through various tiers of government, including front-line service delivery points, in primary education and health care (Ablo and Reinikka 1998; Reinikka 2001). The PETS also collected quantitative data on outputs produced by service facilities (schools and clinics) and data on facility characteristics.

Adequate public accounts were not available to report on actual spending, so the surveys of 19 districts (out of 39), 250 government-run primary schools, and 100 public health clinics collected a panel data set on spending (including in-kind transfers) and outputs for 1991–95. Previous survey work in Uganda had been limited to households, and issues concerning the flow of public funds or school enrollment had relied on limited official statistics or administrative records. Initially, the objective of the PETS was purely diagnostic—that is, to provide a reality check on public spending. Subsequently, it became apparent that, apart from diagnostics, a quantitative tool like the PETS could provide useful microeconomic data for ana-

lyzing, say, service provider behavior and incentives in the same fashion as household surveys are used to explore household behavior.

The Ugandan school survey provided a stark picture of public funding on the front lines. On average, only 13 percent of the annual capitation (per student) grant from the central government reached the schools in 1991–95. Eighty-seven percent either disappeared for private gain or were used by district officials for purposes unrelated to education. Roughly 70 percent of the schools received very little or nothing. According to yearly data, in fact, 73 percent of the schools received less than 5 percent, and only 10 percent of the schools received more than 50 percent of the intended funds. The picture looks slightly better when constraining the sample to the last year of the survey period, but only 22 percent of the total capitation grant from the central government reached the schools in 1995.⁶

It was not possible to track teachers' salaries, given the lack of disaggregated pay data from the central government. Other available evidence (a comprehensive payroll clean-up), however, suggested that the average share of ghost work was 20 percent in 1993 (see table 4.1). Because records at the district level were found to be patchy, a detailed comparison between budgets and actual spending could be made only about non-wage spending between the central government and the school (that is, without the middle tier of government—the district).

The school survey unearthed other important information critical to understanding the education delivery system and the efficacy of potential interventions. First, instead of enrollments being stagnant as official enrollment statistics indicated, the school survey showed a 60 percent in-

Table 4.1. Leakage of Public Funds for Education, Uganda, 1991–95
percent

Year	Salaries	Nonwage expenditures	
		Mean	Median
1991	—	97	100
1992	—	96	100
1993	20	85	100
1994	—	84	100
1995	—	78	100

Source: Authors' calculations based on 1996 PETS data and data from the government of Uganda (for salaries).

Note: — = not available; PETS = public expenditure tracking survey.

crease in primary enrollments during the survey period of 1991–95. That finding suggests that, although the input flow suffered from major problems, performance of the education system (in terms of school enrollment) had improved much more than the information system that reported on it. Second, the survey confirmed that public primary education was mostly funded by parents who contributed, on average, up to 73 percent of total school spending in 1991 (42 percent at the median school). During the repressive regimes of Idi Amin and Milton Obote in the 1970s and 1980s, government gradually retreated from funding and managing primary schools, leaving the parent-teacher associations (PTAs) no option but to take over. The survey data demonstrated that this situation had not changed much by 1991. Government's share of funding increased during the survey period but, by 1995, parents still financed an average 60 percent of total primary school spending (at the median school, the parental share was reduced to 23 percent). It is striking that parental contributions continued to increase in real terms, despite higher public spending.

The PETS approach for health care did not work as well as it did for primary education. The survey confirmed that health facilities did not keep systematic financial or patient records in 1991–95. Most transfers from government were in-kind transfers. Therefore, a quantitative assessment of the flow of resources to health centers or services delivered by them could not be achieved.⁷ The two (seemingly comparable) social sectors demonstrated quite different institutional behaviors, at least as manifested in recordkeeping at front-line service facilities.

More generally, the school survey quantified a moral hazard problem—that is, the adverse effects of asymmetric information on the flow of funds. Because local government officials (the agent) had an information advantage, they could obtain rents at the expense of PTAs. As confirmed by the PETS, the problem was huge in nonwage spending. Following publication of the survey findings, the central government made a swift attempt to remedy the situation. It began publishing the monthly intergovernmental transfers of public funds in the main newspapers and broadcasting information about the transfers on radio; it also required primary schools to post information on inflows of funds for all to see. This action not only made information available to PTAs, but also signaled to local governments that the center had resumed its oversight function.

Initial assessments of these reforms a few years later, through two locally implemented follow-up PETS, showed that the flow of funds im-

proved dramatically: from 13 percent (on average) reaching schools in 1991–95 to approximately 80–90 percent of intended capitation grants reaching schools in 1999 and 2000 (Ministry of Education and Sports 2000, 2001). Delays in transfers remained considerable so that, had the leakage been measured on an annual basis, it likely would have been higher than the reported 10–20 percent, although significantly lower than the almost 80 percent experienced in 1995. (We will return to the issue of asymmetric information later in this chapter.)

Tanzania implemented surveys to track public expenditure in 1999 and in 2001. As in neighboring Uganda, there was a strong suspicion in Tanzania that serious problems existed in the flow of funds from the central government via the local authorities to front-line service facilities. As in many other low-income countries, basic service delivery there is funded primarily by central government transfers (rather than local taxation). The first Tanzanian PETS (which was limited to three districts, 45 primary schools, and 36 health facilities) pointed to problems that were qualitatively similar to those observed in Uganda a few years earlier; quantitatively, however, the problems appeared to be somewhat less severe (PricewaterhouseCoopers 1999). As in Uganda, local (district-level) councils diverted to other uses a large part of the funds disbursed by the center for nonwage education and health care expenditures (that is, the districts distributed the diverted funds to sectors other than education and health care, and used them to achieve private gains). Leakage was estimated at 57 percent in education and 41 percent in health care. Again, funds for salaries appeared to be less prone to diversion, but payrolls suffered from ghost workers and front-line staff suffered pay delays.

Tanzania's second PETS also tracked flows of money and materials from the central government via regional and local governments to basic service delivery points, combining existing documentation with records and facility visits and interviews (REPOA and ESRF 2001). The sectoral focus was on health care and education, although some information was collected on other pro-poor expenditures (rural water supply, rural roads, judiciary, and HIV/AIDS). The survey covered five districts (four primary schools and four clinics in each district).

Considerable delays in disbursement of funds were found at all levels of government. However, the study did not provide average figures for leakage or delays. Delays were reported to worsen for nonwage expenditures and in rural areas. Also, rural districts received a smaller share of the

intended resources than urban districts received. The underlying causes include cash budgeting leading to volatile transfers because of fluctuations in revenue. That, in turn, gave rise to information asymmetry as it became increasingly difficult for beneficiaries to know the amount of their monthly allocation or entitlement. In particular, council staff was reported to take advantage of the information asymmetries relative to service facilities. Similarly, highly aggregated government records were found to undermine transparency in public spending.

The findings of Tanzania's two surveys were disseminated during national budget consultations, but they have not had as strong a catalytic effect on central government oversight or transparency arrangements as have the surveys in Uganda. Nevertheless, Tanzania's treasury has initiated regular dissemination of itemized local government budgets to members of parliament; and it regularly publishes budget allocations for the selected pro-poor spending programs in both Swahili- and English-language newspapers, including allocations for ministries, regions, and local authorities (councils). These practices are still relatively recent, and an awareness campaign about these new transparency measures was launched in 2001. According to the 2001 PETS, only a few local authorities displayed budgets on public notice boards.

Ghana conducted a PETS in 2000. As in Uganda and Tanzania, it measured actual expenditures (including in-kind transfers) on basic education and primary health care to estimate the leakage of public funds in the transfer process from central government via districts (local governments) to service facilities. In addition, a survey of user perceptions was carried out. The Ghana PETS covered four districts in each of its 10 geographic regions. In addition to interviews with 40 district education officers and 40 district health officers, 119 primary schools, 79 junior secondary schools, and 173 primary health clinics were included in the facility-level survey. The sample frame coincided with the 1998 household survey, but no explicit link with that survey was made in the PETS (Ye and Canagarajah 2001).

The results from the Ghana PETS indicated that only about 20 percent of the nonwage public health expenditure and 50 percent of the nonwage education expenditure reached the front-line facilities. As observed in Uganda and Tanzania, the leakage in salaries was much smaller (around 20 percent). Contrary to the Ugandan and Tanzanian experiences, a large proportion of the leakage in Ghana seemed to occur between line min-

istries and district offices when public expenditures were translated from funds into in-kind transfers.⁸

The in-kind nature of transfers gave rise to information asymmetries and lack of accountability within the delivery system, and it discouraged opportunities for feedback from front-line facilities regarding their resource needs or their complaints. The possibilities for leakage were found to be much greater when the value of the materials distributed was unknown to their recipients.

The PETS opened an avenue for practical interministerial collaboration in Ghana and provided a practical approach for assessing front-line expenditures and service delivery. However, progress can still be made to catalyze a stronger response to reduce leakage, either through innovations in transparency or increased central government oversight.

In summary, the three surveys for which leakage of public funds was the main focus reveal that nonwage expenditures (subject to an intergovernmental transfer mechanism) suffered more from extensive leakage than did salary expenditures. The surveys also demonstrated that the sources of leakage could be different tiers of government. In Uganda and Tanzania, the most serious leakage arose at the local government level, whereas in Ghana it occurred before the resources reached the local government. In each case, the leakage level of nonwage expenditures was massive. For example, it is well known that books and other instructional materials (nonwage inputs) are essential ingredients for improving the quality of schooling. If between 50 percent (Ghana) and 87 percent (Uganda) of the funding for these inputs never reaches the schools, leakage must be recognized as a major education policy issue demanding attention.

Absenteeism and Job Migration

Honduras used the PETS to explore and diagnose moral hazard with respect to front-line health care and education staff (World Bank 2001a). The surveys conducted in Ghana, Tanzania, and Uganda established that leakage resulting from bureaucratic or political capture was a less critical factor in salary expenditures. Honduras demonstrated, however, that there are other issues related to staff behavior and incentives in public service that can have similar adverse effects on service delivery, issues such as ghost workers, absenteeism, and capture of jobs by employees. The hypothesis for the Honduran PETS was that the central payroll of-

office in Honduras had no means of ensuring that public employees really exist (ghost workers) and no means of knowing whether they actually work where they are supposed to work (migration of posts). In particular, migration of posts poses a big problem, facilitated by the Honduran system of staffing that does not assign posts to individual facilities but to the central ministry. Given that the central ministry has discretion over the geographic distribution of posts, the system provides an incentive to front-line staff to lobby the ministry to have their posts transferred to more attractive locations—most often to urban areas. The implication is that posts migrate from rural and primary health care/primary school levels toward cities and higher levels of health care/schooling. This is neither efficient nor equitable.

In light of the hypothesis, the objectives of the PETS were to quantify the incongruity between budgetary and real assignments of staff and to determine the degree of attendance at work. The PETS used central government information sources and a nationally representative sample of front-line facilities in health care and education. Central government payroll data indicated each employee's place of work. The actual unit of observation in the Honduran study was not the facility but the sector staff, both operational and administrative and at all levels of the two sectors from the ministry to the service facility level.⁹

The Honduran PETS detailed a range of problems in the health sector. First, 2.4 percent of staff in the health sector was made up of ghost workers, notably general practitioners (8.3 percent) and specialists (5.1 percent). Second, absenteeism was a generic problem, with an average attendance rate of 73 percent across all categories of staff. That meant that only 73 percent of the staff was at work in the five days prior to the survey. Thirty-nine percent of absences were without justifiable reason (such as sick leave, vacations, and compensation for extra hours worked). That amounted to 10 percent of total staff work time.¹⁰ Third, holding multiple jobs was prevalent, but especially for general practitioners and specialists. Fifty-four percent of specialist physicians had two or more jobs (of which 60 percent were in a related field). Multiple jobs probably reflected employee capture (that is, the post belonged to the individual). Fourth, 5.2 percent of sampled staff members had migrated to posts other than those to which they were assigned in the central database, while 40 percent had moved since their first assignment (legitimate or not, the change had not been recorded). The highest proportions of migrators

were found among general practitioners. Migration always occurred from lower- to higher-level institutions, although there was some lateral migration. Job migration was found to reflect a combination of employee capture and budget inflexibility.

In education, 3 percent of staff members on the payroll were ghost workers, and 5 percent of the primary school teachers were unknown in their workplaces. Staff migration was highest among nonteaching staff and secondary teachers. Absenteeism was less of a problem than in the health sector, with an average attendance rate of 86 percent across all categories of staff. Unaccounted-for absences were 15 percent of all absences. Multiple jobbing in education was twice as prevalent as in health care, with 23 percent of all teachers doing two or more jobs. However, half of the multiemployment was by secondary school teachers who were paid for a set number of hours rather than for fulltime jobs so that they legitimately could hold two jobs. Multiple jobs were almost always in a related field. Finally, the finding that 40 percent of all education sector employees worked in administrative jobs suggested a preference for non-front-line service employment.

In brief, employees sought movement upward through the system, taking their posts with them. Inflexibility of the budgeting system contributed to this situation because managers preferred to shuffle posts rather than apply for new ones. The PETS study was carried out in 2000, and by 2007 there had been little follow-up on the findings within government.

Role and Adverse Consequences of Asymmetric Information in Public Spending

A key finding of the public expenditure tracking surveys discussed above is that asymmetric information can have a considerable adverse effect on the flow of funds to the front line and on service delivery. Because access and ability to acquire information differ within segments of society, the actual programs also may have adverse equity implications. We observed that cash budgeting, deemed necessary to bring about fiscal discipline in a number of low-income countries, has serious negative side effects because it produces volatile monthly releases of funds, aggravating the informational disadvantage that beneficiaries typically have. This situation leads to extremely high levels of funds leakage. As demonstrated by ex-

penditure tracking surveys, nonwage expenditures are particularly vulnerable to leakage.

Educational spending in Uganda is a case in point. As described above, a PETS to gauge the extent to which public resources actually filtered down to the intended end user revealed that, in the mid-1990s, for every dollar spent by the central government on nonwage expenditures at the primary level, the schools received, on average, only 22 cents. Most schools received nothing. Apart from the high degree of leakage, the unique panel data from the Ugandan PETS also revealed large variations in leakage across schools and over time.¹¹ Reinikka and Svensson (2001) developed a simple bargaining model to explain these differences. In the absence of central government oversight, local government officials and schools bargain over the nonwage expenditures (per-student capitation grant) that the central government disburses to local governments (districts). The district is supposed to pass the grant on to schools. District officials have discretion over these funds because schools at the district level only know the amount of monthly transfers. In principle, a PTA could obtain information on disbursements of the capitation grant but, in practice, contacting the central government is costly. Even if the PTA decides to incur the cost of obtaining the necessary information, exercising its voice is also costly (Hirschman 1970). It would require organizing the parents and teachers, and then lodging a complaint with a higher authority. In the model, resource flows—and leakage—are endogenous to school characteristics because schools use their higher bargaining power, relative to other parts of government, to secure greater shares of funding. These resources therefore are not allocated according to the rules underlying the government's budget decisions, with obvious equity and efficiency implications.

The bargaining model's predictions are confirmed by the school-level data. Specifically, larger schools appear to receive a larger share of the intended funds (per student). Schools with children of better-off parents also experience a lower degree of leakage, as do schools with a higher share of unqualified teachers. After potential selection and measurement issues are addressed, these school characteristics have a quantitatively large impact on the degree of leakage.

These findings provide new insight into an area studied almost exclusively using cross-country data. The findings show that a large part of the variation in corruption and/or diversion of funds from their intended use

at the local level can be explained by studying the interaction between the local officials and the end users (schools, in this case) as a bargaining game. From an analytical point of view, this approach differs from much of the existing literature on corruption because it focuses on the principal's (the school's) rather than the agent's (the district officials') incentives and constraints. The results suggest that systematic efforts to increase citizens' ability to monitor and challenge abuses of the system, and to inform them about their rights and entitlements, are important aspects in controlling corruption.

It is interesting to note that the extent to which funding reached the intended beneficiary had less to do with conventional audit and supervision mechanisms than with the schools' opportunity to voice their claims for the funds. Traditionally, it has been left to the government and its legal institutions to devise and enforce public accountability. The Uganda findings question this approach, but the issue is not specific to Uganda. As government's role and services have expanded considerably during the past decades, it has become apparent that conventional mechanisms, such as audit and legislative reviews, may not be enough. Collusion, organizational deficiencies, abuse, and lack of responsiveness to citizens' needs cannot be detected and rectified easily, even with the best of supervision. When institutions are weak, as is common in many developing countries, the government's potential role as auditor and supervisor is even more constrained.

As discussed above, the second PETS assessment of reforms conducted a few years later showed that the flow of funds improved dramatically (Ministry of Education and Sports 2000, 2001). The improvement clearly suggests that provision and dissemination of information can play a crucial role in improving outcomes. A quantitative evaluation of the impact of the informational innovations (that is, the empowerment of schools/parents through improved information on entitlements) would warrant a repeat survey using the QSDS approach. Such an evaluation is interesting not only from a Ugandan perspective; it also has the potential to provide detailed information on a simple but possibly powerful policy instrument—that is, the provision of information on public services, entitlements, and spending items through mass media and other means.

Recently, *knowledge* and *empowerment* have become buzzwords in the development policy debate. From a research perspective this might seem surprising, given that there is very little empirical (quantitative) informa-

tion on the effect of policies aimed at informing and empowering citizens about their rights and entitlements. This lack of empirical evidence is even more surprising when we note that social scientists long have stressed the role of a free press as an essential institution for citizens to make well-grounded decisions about public affairs (although the role of information in improving public service delivery is typically not stressed).

Conclusion

Recent development debate emphasizes the importance of improving basic service provision in developing countries. Until recently, the analysis of service delivery has focused almost entirely on the financing of services. Provision of services—particularly issues related to institutions, incentives, and provider behavior—has received much less attention. The PETS and the QSDS are new and promising microeconomic tools to address this deficit. Our review showed that these surveys are useful instruments, both for problem diagnosis and for research. Experience also suggests that rigorous survey methods and careful implementation are required to ensure good quality and comparability of data across countries. These are important lessons for the expenditure tracking surveys that currently are in the field in Africa and Latin America, as well as for the first multicountry round of the QSDS being implemented in the health care and education sectors in Africa and East Asia. For the latter, the emphasis is on generating primary data for research.¹²

The PETSs implemented as of late 2006 have focused on quantifying moral hazard problems manifested in the leaks of public funds both in education and health care and in staff behavior. All three sub-Saharan African studies chose to examine leakage of funds, and all confirmed that leaks indeed obstructed social service delivery in Africa. Whereas ghost workers on payrolls accounted for about 20 percent of total spending, leakage of nonwage expenditures, as measured by the surveys, ranged from 41 to 87 percent. Honduras expanded its use of the PETS to quantify ghost workers, absenteeism, and job migration (resulting from employee capture) and to diagnose their underlying reasons. In Honduras, those factors were considered to be a more problematic form of leakage than was the diversion of nonwage public funds by bureaucratic and/or political capture.

The findings reported here have implications for the large cross-country literature on public spending and growth in developing countries, and for the literature on the macroeconomic impact of foreign aid. In particular, the findings highlight the identification problem of using public spending data in an attempt to evaluate the efficacy of public capital or services. Given the extent of and variation in leakage and attendance, using budget allocation data to assess the effect of public spending on growth and social outcomes will severely underestimate any potential positive effect actually produced by the public capital or services created by public funds. Based on the existing cross-country work, the effect of government spending on growth and social development outcomes is ambiguous. The results reviewed in this chapter suggest that increased spending does not necessarily translate into an equivalent increase in output and services.

The Uganda case also illustrated the possible positive impact that collection and dissemination of quantitative data on public services can have as a tool to mobilize “voice.” When individual complaints about services are made or when the characterizations of services offered are based on isolated experiences, they tend to be brushed aside as anecdotal or, at best, partial evidence. But when that public feedback is supported by systematic comparative data that are difficult to ignore, the citizens’ voice can provide a spark for (public) action. For example, when the degree of leakage became public knowledge in Uganda, the central government enacted a number of changes, instituting a public information campaign to promote transparency and increase public sector accountability by giving citizens access to information they needed to understand and examine the workings of the capitation grant program for primary schools. The underlying idea was that providing adequate information would empower schools and citizens to monitor and challenge abuses of the system. As a result, the flow of funds improved greatly. Our review confirms that similar problems exist elsewhere, and we believe that the information campaign approach adopted in Uganda is widely applicable.

The studies reviewed here focused mostly on moral hazard and the negative effects of provider behavior on service delivery. Those studies revealed that major problems exist today in the basic service delivery systems of many developing countries—and they are seldom quantified at the microeconomic level. In the future, it would be valuable to broaden the diagnostic work and research using the PETS and the QSDS to examine more positive features of the public sector, such as idealism and

professionalism and their effects on service delivery. Such studies could prove equally inspiring for developing country reformers.

Notes

1. Similar ambiguity exists between aid and growth and between aid and social development. Boone (1996) found no statistical relationship between aid and either growth or social development outcomes. Svensson (1999) and Burnside and Dollar (2000) found similar unconditional results, but they did identify a positive relationship between aid and growth conditional on the recipients' policies (institutions). Hansen and Tarp (2001), using different methods, found a weakly positive relationship between aid and growth.
2. When output measures—such as telephones per worker (Easterly and Levine 1997) or electricity available from the public grid to enterprises—rather than spending have been used (Reinikka and Svensson 2002), a positive relationship emerges between public capital and growth.
3. There is a large body of research (using Living Standards Measurement Study [LSMS] surveys) that focuses on demand for education and health care services and on household production of human development outcomes, but it is beyond the scope of this chapter.
4. Dixit (2000) provided a review of the theory of incentives.
5. Provider or service facility surveys are not entirely new. LSMS surveys have included health facility modules on an ad hoc basis (for example, Alderman and Levy 1996). A number of the Demographic and Health Surveys carried out in more than 50 developing countries have included a service provider component. Similarly, the Family Life Surveys implemented by RAND have combined health provider surveys with surveys of households. For a review of health facility surveys, see Lindelöw and Wagstaff (2003).
6. A few obvious outliers in the original data set were excluded from the analysis.
7. Interviews at health facilities indicated (qualitatively) that in-kind transfers, typically made directly to the health facility from the central medical store, reached the intended health centers. Using focus groups and direct observation, McPake and others (1999) highlighted problems in efficacy of service delivery at the facility level. Health workers routinely were found to charge users more than the formally agreed levels, and the drugs supplied by donors or the government routinely were used as a source of additional income. Their leakage estimates ranged from 40 to 94 percent of the public supply of drugs to the facilities in the mid-1990s.

8. The Ghana PETS applied a survey method that was somewhat different from the two others. In particular, recall methods rather than direct examination of facility or district records was used. Similarly, the ex ante budget allocation rules appear less clear (or were not fully specified in the PETS). This finding may bias the leakage estimates somewhat, and those estimates should be taken only as indicative.
9. The health care sample frame consisted of 14,495 staff members in 873 workplaces. The education sample frame had 43,702 staff members in 9,159 workplaces. The total sample was 1,465 staff nationwide, with 805 staff members from health care and 660 staff members from education. These survey respondents were clustered within 35 health care establishments and 44 education establishments. The samples were stratified by type of facility and by type of employee. Population weighting was used to determine how many of each type of employee to draw from each type of facility. Two questionnaires were used for each institution from which individual staff members were sampled. One questionnaire was for the institution's manager and one was for each individual employee working in the sampled institution on the day of the visit. If the individual was not there, close colleagues were asked to fill in the required information about the employee.
10. Attendance was lowest among general practitioners (61 percent). No group attended more than 76 percent of the time.
11. Although there was variation in leakage across regions (districts), the bulk of the variation was within the regions. The standard deviation of leakage (the share of intended capitation grants received) across regions was roughly one-third of the average standard deviation within regions.
12. The PETS has been undertaken in several countries, such as Chad, Peru, Rwanda, and Senegal. Some QSDS countries are Chad, the Lao People's Democratic Republic, Madagascar, Mozambique, Nigeria, Papua New Guinea, Uganda, and Zambia. Some surveys are linked explicitly to household surveys and others to surveys of public officials.

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CHAPTER 5

The Impact of Budgets on the Poor

Tax and Expenditure Benefit Incidence Analysis

Jorge Martinez-Vazquez

Two of the most important goals of government policy are to address inequalities in the distribution of income and to improve the welfare of poor people. An important part of the theory and practice of public finance is dedicated to conceptualizing and measuring how the revenue and expenditure sides of government budgets affect the distribution of income among households. This effect is known as *tax and expenditure incidence* or, in shorter form, *fiscal incidence*. Research on fiscal incidence enables us to understand how government policies affect the distribution of income; how equitable those changes may be; and, in particular, how government policies actually help poor people.

Establishing the incidence of taxes is important because those people who actually bear the burden of taxes generally differ from those who legally are liable to make payment to the tax authorities. Establishing the incidence of government expenditures is important because not all expenditures benefit households of different income levels to the same extent. Even those government expenditures intended to benefit low-income households may not do so because of inappropriate targeting or because poor people face difficulties in gaining access to public services. In short, the effect of government budgets on the distribution of income

and the status of the poor is not obvious or immediate, and general impressions regarding that impact may be quite mistaken.

Fiscal incidence analysis is important and, if done correctly, it is complex and difficult. Such analysis contains a blend of positive and normative issues. Who benefits from and who pays for government services? It is an eminently positive question. However, to ask if the answers to that question are adequate, desirable, and right is to ask a normative issue. Normative values are likely to differ, sometimes quite significantly from person to person, so we should not expect always to find consensus on the desirable degree of redistribution. Nevertheless, it would be a mistake to shy away from distributional and equity issues merely because they cannot be studied scientifically. Assessing the distributional impact of government policy is at the core of what policy makers and ordinary citizens expect economists to do.

Ultimately, fiscal incidence analysis is an effective tool for determining whether government tax policies and expenditure programs have the desired effect on income distribution and on the poor. Major tax reforms and large government expenditure programs are undertaken routinely in many countries with specific redistributive objectives, including lifting tax burdens borne by lower-income groups and directly helping poor people. For example, understanding the incidence of expenditures on education and health care for the poor is important because improved education and health status have been shown to be the most effective means of escaping poverty. Tax policy and, especially, public expenditures are potentially powerful tools to combat poverty. Thus, it is important to ask whether government tax and expenditure policies have the intended effects—and that is what fiscal incidence analysis does.

Seen from a proactive perspective, one of its main goals is to contribute to the design of good government policy. The right policy choices require information, for example, on which groups are likely to pay particular taxes and which groups are more likely to benefit from some expenditure programs. Policy makers have many questions about how to lighten the burden of taxation on lower-income groups and how to increase the effectiveness of public expenditures. Is it possible to broaden the bases of a value-added tax (VAT) or flatten the rate structure of income taxes without decreasing the overall progressivity of the tax system? What is the better way to target public spending to improve the condition of the poor? Fiscal incidence analysis provides some critical information to help

policy makers achieve a more equitable distribution of income and improve the effectiveness of public policy.

The body of literature related to distribution and equity issues in public finance and to the many incidence studies that have been conducted is immense, so it is impossible to offer in this chapter more than an overview of the main issues. The primary objectives are to provide an adequate background for the conceptual bases of fiscal incidence analysis; to highlight some of the key measurement issues; to review the main techniques used to estimate tax, benefit, and overall fiscal incidence; and to summarize the empirical results obtained from studies in developing countries.

Analyzing Tax Incidence

Tax incidence analysis is the identification of who in the economy ultimately bears the burden of government taxes. At first glance, tax incidence analysis appears to be deceptively simple. The tax laws are explicit as to who has to pay taxes so, to establish tax incidence, why can't we simply ask the tax administration authorities who paid taxes and how much did they pay? As discussion below will show, generally there can be large differences between who the law says is obligated to pay taxes and who in the economy ultimately bears the burden of taxes. If we acknowledge that we need to look at how private markets react to taxes, then in theory we should be able to find equilibrium prices and quantities before and after the tax changes, and their comparison should give us the information needed to establish the incidence impact of any tax changes. That exercise, however simple it appears, would require a vast amount of information on consumer preferences, technology used by producers, and so on—information that is not available. Therefore, the theory and practice of tax incidence encompasses a series of methodologies, from simple to complex, that focus on the key elements in the response of economic agents to taxes and that leave out the rest.

Tax incidence analysis is a well-developed area in the field of public finance, and its literature is vast. This chapter will cover only the most significant contributions to that literature.¹ Despite this vast literature, establishing firm evidence on the distributional impact of taxes remains a difficult activity because of the need to allow for general equilibrium effects in the whole economy. Because of these difficulties, there always has

been a grain of skepticism about the accuracy and even the meaning of empirical findings in tax incidence.²

However, our knowledge of tax incidence has been advanced significantly by our better understanding of key economic issues in fiscal incidence analysis; the availability of greater amounts of data, including household income and expenditure surveys in many countries; and more powerful computation techniques, such as microsimulation and computable general equilibrium models. Although far from perfect, the evidence produced by tax incidence studies is invaluable to policy makers and governments always fiddling with tax reform. At any rate, as Musgrave et al. (1951) have put it, policy makers always make assumptions on tax incidence in the formulation of tax policy, so the real question is, can economists improve on the guesses of policy makers? The answer to this question is unequivocally *yes*.

Tax incidence analysis has moved forward on different fronts. First, there have been “conventional” studies of incidence that use presumptive reasoning based on economic theory to ascertain the final incidence of taxes and then allocate those tax burdens to households preordered by income level. Classical examples of this approach include Musgrave et al. (1951), Musgrave, Case and Leonard (1974), and Pechman and Okner (1974). In more recent times, this approach has benefited from the use of microsimulation models, which allow the computation of tax liabilities using data from thousands of actual tax returns. Second, there is a “general equilibrium” approach to tax incidence, pioneered by Harberger (1962), who assumed a small number of economic sectors and consumers to arrive at general equilibrium price changes in response to new taxes. The information we are able to obtain from this approach has been enhanced enormously by the application of powerful computation techniques in numerical general equilibrium models, which allow us to solve for equilibrium prices with many economic sectors and consumers (see, for instance, Ballard et al. 1985).

Statutory Tax Incidence Versus Economic Tax Incidence: Tax Shifting

The first step in tax incidence analysis is to distinguish between *statutory* incidence (also called *legal* or *nominal* incidence) and *economic* incidence. The first term pertains to those taxpayers who are required by law to pay the tax. The second term pertains to those taxpayers who ultimately bear

the tax burden. Generally, tax burdens can be shifted from those who are legally responsible to pay a tax to other agents in the economy who are not legally responsible for paying it. This happens because those who statutorily must pay the taxes can alter their economic behavior and transfer or shift the burden of those taxes to other agents. The shifting of taxes takes place through changes in prices that firms pay to suppliers (such as labor and landowners), the return firms receive on capital, and the prices they charge to consumers. Thus the economic incidence of a tax refers to who *finally* experiences a decrease in real income as a result of a tax.³

The degree of shifting depends on the elasticities of demand, supply, and substitution in the use of production inputs among the economic agents interacting in the activity or market being taxed. Those economic agents with lower elasticities—that is, with less flexibility to react—are more likely to bear the ultimate tax burden. Because it generally takes time to react and adjust behavior in markets, long-run elasticities tend to be higher than short-run elasticities. Therefore, the full degree of tax shifting can take some time. In this sense, the economic incidence of taxes will tend to differ in the short and long runs.

Tax Burdens and Excess Burdens

Conventional studies of tax incidence commonly assume that total tax burdens coincide with the revenues collected by government. The equivalence between tax burdens and revenues collected is convenient within the context of conventional tax incidence analysis because that methodology allocates the taxes collected among the different income groups of taxpayers. Thus, the equivalence of tax burdens with taxes collected is a simplifying assumption, but one that may not be accurate in all cases. As noted above, tax incidence works through changes in prices of inputs (wages, return on capital, or land rents) and through changes in the prices of commodities or the uses of income. Therefore, the resulting change in real income for households or the actual burden of taxes may be larger than the taxes collected by government.⁴ General equilibrium approaches to tax incidence are much better equipped to account for these burdens as measured by the impact of changes in prices. Conventional studies generally cannot do that.

In addition to ordinary tax burdens, taxes generally impose on consumers several forms of excess burdens, also known as *deadweight losses*. These excess burdens arise because taxes lead to less efficient use of re-

sources by distorting the choices of economic agents. For example, the consumption bundle chosen by consumers after a sales tax is levied may be different from the bundle chosen before the tax. The change in consumer behavior by consumers is thus a reaction to the different relative prices they face as a result of the tax. The change in individual welfare beyond the taxes actually paid is the excess burden of taxation.

With the exception of lump-sum taxes, all taxes cause larger or smaller excess burdens. For example, income taxes distort labor–leisure choices and decisions about saving and investment. Conventional tax incidence studies usually ignore excess burden losses and equate total burdens to total revenues collected by government. That approach is acceptable as long as we realize that we are differentiating between taxation’s equity effect (tax incidence) and its efficiency effect (excess burden losses). Numerical or computable general equilibrium models of tax incidence can account for excess burden losses in the overall distribution of tax burdens.⁵

Use of the Counterfactual

To establish the incidence of taxes, we need to compare the distribution of income that results from the presence of taxes with some initial benchmark distribution of income, or the *counterfactual*. One approach is to use a “differential incidence approach” by comparing the new results to a distribution of tax burdens that would have taken place if revenues had been collected in the same amount with a proportional income tax. The assumption is that a proportional income tax would be the most neutral tax alternative to finance the budget. However, the counterfactual would need to be the distribution of income that would have taken place in the absence of taxes and in the absence of the behavioral responses to them—and that is a tall order because we have never observed an economy without taxes. In practice, several compromises are made to arrive at the counterfactual. As we see below, general equilibrium approaches are better equipped to address this issue.

Conventional Models of Tax Incidence

The basic method underlying conventional models⁶ of tax incidence is to allocate tax burdens to different income groups, ordered from rich to poor by deciles or quintiles of the population, on the basis of a series of assumptions about who bears the final burden of taxes. For each tax, a

portion of the revenues collected is imputed as tax burden to each income group in a way that exhausts the total collected revenues. For example, the revenues from excise taxes on tobacco products are allocated to different income groups in proportion to their relative share in the consumption of tobacco products. To arrive at an estimate of the incidence for the entire tax system, the incidence for each tax is calculated separately for each income group. These results are added up across all taxes for each income group to arrive at the total tax burden for each income group. Typically, the total burden is expressed as an average total tax rate—that is, the proportion of income paid in taxes by each income group. The information on total income, sources of income, and expenditure patterns typically is obtained from data in household or consumer income and expenditure surveys. Figures on taxes collected are obtained from the tax administration authorities.

Other approaches have been used in estimating conventional incidence, perhaps the oldest of which is the “representative (or typical) household approach.” In this approach, incidence estimates are made on the basis of computing taxes for a relatively small number of artificial households whose composition, income sources, and expenditure patterns are assumed to represent the rest of the population. These households also may be assumed to live in different geographical locations.⁷ The representative household approach can use the same assumptions for tax shifting as the conventional approach based on a distribution of income. But in its crudest form, the representative household approach simply computes taxes according to the provisions in the tax laws and under assumed income source and consumption patterns. In such a case, the results are merely a statement of statutory or legal incidence.

Several other conventional approaches to the estimation of tax incidence include (1) classifying income distribution and estimating incidence by factor shares in income (labor, capital, and so on); and (2) estimating incidence as effective (average or marginal) tax rates by main economic sector (agriculture, industry, services), at a much more disaggregated level, or even by subnational jurisdictions (see Bird and De Wulf 1973; OECD 2000).

Assumptions Used in Conventional Models of Tax Incidence

Conventional tax incidence studies compute tax incidence on the bases of annual data for income sources and expenditure patterns and of several as-

assumptions concerning how the different taxes are shifted to households because they are consumers, producers, or owners of production factors (labor, capital, and land) (see Browning 1978; Shah and Whalley 1991). These shifting assumptions allow for the impact of taxes on sources of income or on the uses of income or expenditures. These assumptions are known in the literature under different, interchangeable terms: *shifting assumptions*, *incidence assumptions*, or *sources and uses side effects*.

The role of the incidence assumptions is to assist in allocating the burdens of each tax to different income groups. This process builds on the fact that the composition of income on the sources side and the composition of expenditures on the uses side vary by income group. For instance, income from capital tends to be concentrated in the highest and lowest tails of the income distribution. (Concentration in the lowest tail results from the presence of retired workers who are living off their past savings.) On the other hand, labor or wage income tends to be proportionally distributed along all income groups. On the uses side, households of different income groups have different spending profiles (basic commodities versus luxury items and so on), and savings tend to be concentrated in the highest income groups. When there are no different rates or exemptions for necessities, sales or consumption taxes tend to be regressive.

Although the incidence results can be quite sensitive to the shifting of assumptions, typically there has been wide agreement on the assumptions used,⁸ which include the following:

- The individual income tax typically is assumed not to be shifted, and thus it is assumed to be paid by the recipient of income.⁹ In the presence of progressive tax rates, therefore, this tax usually has a progressive incidence.
- Payroll and social security taxes typically are assumed to be fully shifted to workers, regardless of who is legally liable to pay them. Most or at least a portion of these taxes is paid by the employers. In the presence of a ceiling for contributions—a frequent feature in tax systems—the taxes tend to be regressive. In developing countries, however, where only workers in the formal sector pay such taxes, the final incidence can be progressive.
- There tends to be more disagreement about shifting when it comes to corporate income taxes. A variety of shifting assumptions have been proposed and analyzed for this tax. These assumptions include (1) no

shifting at all so that shareholders pay the full tax; (2) the shifting to all capital owners through a leveling-off or equalizing of after-tax rates of return for all capital; and (3) the forward shifting to consumers in the form of higher consumer prices in varying proportions of the tax burdens (one third, half, two thirds), depending on the degree of monopoly power assumed to exist in the markets. Perhaps the most commonly used assumption is that half of the tax burden is paid by all owners of capital, and the other half is paid by consumers. It is less common to assume backward shifting to other factors of production, but backward shifting of the corporate income tax to labor suppliers and capital owners can be the proper assumption for small, open economies facing a highly elastic supply of capital. An increasing number of developing countries have fit this profile in recent times. The corporate income tax becomes less progressive as more of the tax is assumed to be shifted forward to consumers or backward to workers.

- In practically all cases, consumption taxes (including several forms of sales tax, VAT, and excise tax) are assumed to be shifted forward to consumers.¹⁰ Incidence studies typically find sales taxes and the VAT to be regressive. In the case of VATs, however, regressivity is reduced when multiple rates (lower for necessities and higher for luxury items) are used or basic goods and necessities are exempted. The incidence of sales taxes is complicated in many countries by the presence of cascading and multiple rates and exemptions.¹¹ The regressivity conclusion for sales taxes and VATs may not be correct for developing countries where only households operating in the formal sector—typically those with higher incomes—may pay those taxes. Excise taxes also typically are assumed to be shifted forward to consumers. They can have a progressive effect, as in the case of luxury goods (gasoline, cars, expensive liquor, or perfumes) and a regressive effect (tobacco products and cheap liquor). Customs tariffs or taxes on imports typically are assumed to have the same incidence as sales taxes and VATs for lack of better information regarding which income groups end up consuming the imported goods.
- Export taxes are common among some developing countries, despite the recommended best policy of abolishing them unless the country has a monopoly power in international markets. If the country has such a power, part of the export tax effectively may be exported by shifting it to foreign consumers. Without monopoly power, export tax-

es are assumed to be paid by the producers/exporters. The final incidence of export taxes is regressive if the producers/exporters are small farmers of traditional export crops, and it is progressive if the producers/exporters are wealthy farmers or international companies.

- Property tax incidence usually is more controversial. Some studies assume no shifting, with the tax paid by the property owners or shifted to all owners of capital. Others assume forward shifting to renters, with the shifted proportion varying across studies. There are three formal theories of property tax incidence: the traditional view, the new view, and the benefit view. In the traditional view, the property tax is a combination of a tax on land and a tax on structures. In this view, tax on land is paid by landowners and tax on structures may be paid by owners or shifted to renters. In the new view, the tax is interpreted as a combination of a uniform national tax on all capital owners and an excise tax on local capital in the amount equal to the difference between local taxes and the national average. The national tax is paid by all capital owners, whereas the excise tax is paid by local capital owners or shifted backward to other factors of production. The benefit view perceives property tax as a benefit tax or a payment for the benefits property owners receive from local public goods and services. The validity of the benefit view depends critically on several assumptions about land zoning by local governments and about the mobility of taxpayers (assumptions that are unlikely to be met in most developing countries). The incidence of the property tax can be regressive if, under the traditional view, we assume that at least part of the tax is shifted to renters. The actual incidence of the property tax on renters is complicated by the dynamics of housing markets and public choice processes at the local level (see, for example, Martinez-Vazquez and Sjoquist 1988).

In summary, as a bit of a generalization, conventional tax incidence studies assume that the final burden of direct taxes is borne by owners of the factors of production (that is, taxes on labor income are borne by workers and taxes on capital income are borne by capital owners), and that the final burden of indirect or consumption taxes is borne by consumers. This set of assumptions has been criticized for its extremity and asymmetry. In effect, it is assumed that owners of factors of production have perfectly inelastic supplies and that consumers have perfectly inelastic demands for commodities. In practice, however, these assumptions

have been justified because the conventional incidence results obtained with more realistic and laborious assumptions on elasticities tend to yield quite similar results.

Equilibrium Approaches to Tax Incidence

The general equilibrium approach to tax incidence was pioneered by Harberger (1962).¹² The underlying method of the approach is to study the incidence of taxes within the context of a simplified general equilibrium model of the economy. Tax incidence is established by comparing the vector of equilibrium prices before and after the tax change. This may be done in the context of “differential” tax incidence, where one tax is substituted for another while keeping government expenditures constant; or in the context of “absolute” tax incidence, where a tax is introduced holding government expenditures constant. In the latter case, the additional revenues collected by government may be rebated to taxpayers in a lump-sum fashion.¹³ A simple version of the Harberger model assumes two goods or sectors in the economy with their respective production functions and two factors of production—labor and capital. Those factors of production also are assumed to be fixed in total supply and mobile across sectors. In addition, one can assume several households with different endowments of labor and capital. Producers are assumed to maximize profits and consumers are assumed to maximize utility. The structural system is solved without and with taxes (or with two different taxes) for prices so that all markets are in equilibrium. The comparison of pre- and postequilibrium prices reveals the distribution of tax burdens. Hence, it could occur that, as a result of a tax on company profits, the return to capital is lower postequilibrium. One of the greatest insights gained from these simplified general equilibrium models is that the final incidence of taxes depends on the values of several critical parameters in the economy—parameters such as capital-to-labor ratios in different sectors and the elasticity of substitution in the combination of inputs in the production functions (see Boadway and Wildasin 1984).

A second and more recent stage in the general equilibrium approach to tax incidence has been the development of numerical or computable general equilibrium models. These complex models attempt to capture in more detail the general equilibrium responses to taxes in the economy. The models are solved numerically using data from the national income

accounts and household expenditure surveys and taxpayer data from the Ministry of Finance (see Fullerton, Shoven, and Whalley 1978; Fullerton et al. 1979; and Ballard et al. 1985). General equilibrium models capture all the parameters that should play a role in final tax incidence among different income groups: different demand patterns, different endowments in resources, and variations in capital-to-labor ratios in different economic sectors.

To give some flavor of the structure of these models, let us briefly consider the model used by Devarajan, Fullerton, and Musgrave (1980). It consists of 19 industries that use two inputs (labor and capital) and outputs of other industries as intermediate inputs, with production functions that exhibit constant elasticity of substitution. The producer goods are used directly as intermediate inputs, by government and foreign traders, and indirectly for final consumption by households through a fixed coefficient matrix of transition into 16 consumer goods. The authors assumed 12 consumer groups differentiated by income with different endowments of labor and wealth and with utility functions defined across 16 consumer goods. The government collects taxes on many of the activities and spends the revenue on producer goods and on direct transfers to consumers. Producers maximize profits and consumers maximize utility. In a competitive equilibrium, demand equals supply in all markets. Given the endowments, the utility and production parameters, and the government taxes, the model is solved numerically by the algorithm yielding a price vector that satisfies equilibrium in all markets, as well as the consumer and government balanced-budget constraints. The base solution to the model is an equilibrium that replicates the data available. Tax incidence results are derived by changing taxes and comparing the new equilibrium solution with the base solution. The comparison enables us to establish utility or income changes for each income group (that is, tax incidence), as well as changes in total income, new factor allocations across industries, and so on.

Conventional Versus General Equilibrium Approaches: Advantages and Disadvantages

There is no ideal or unique approach to the study of tax incidence. All approaches used present advantages and disadvantages (see Devarajan, Fullerton, and Musgrave 1980; Fullerton and Rogers 1991). In the case of

the conventional approach, advantages are that the method is relatively simple and easy to implement, the underlying assumptions are transparent, and the implications of alternative assumptions can be compared easily. The conventional approach also can use detailed data by incorporating microsimulation models for large samples of taxpayers. The microsimulation model is a computer program with a tax calculator; it makes a pass through the data for each household, calculates income and taxes, and finally adds the computed taxes to arrive at the tax burden for each income group.

On the minus side, there are some practical limitations to conventional tax incidence studies. A critical step in the computation of tax incidence is to have good information on income distribution. This information is not always available, especially in developing countries. Household surveys have become more common, but often the only reliable data in these surveys concern household consumption. In addition, under the conventional approach it is much harder to make the right assumption to get at general equilibrium effects of taxes. As Devarajan, Fullerton, and Musgrave (1980) pointed out, the possible effects of sales taxes on factor prices are ignored by conventional studies; typically, second-round effects on the prices of commodities are also ignored. In a similar fashion, income taxes may affect households not only through changes in income sources but also through changes in relative prices.

Because of the critical role played by the shifting assumptions, conventional incidence studies have been said to “stipulate” the incidence of various taxes (Devarajan, Fullerton, and Musgrave 1980). On the other hand, however, numerical general equilibrium models also assume or stipulate a long list of critical values for final incidence—values such as substitution elasticities in production and in demand and supply (Fullerton and Rogers 1991).

A general equilibrium approach offers the following advantages: (1) an explicit structural model of the economy, with demand functions derived from explicit utility functions, and supply functions derived from explicit production functions; (2) more transparency on how the incidence results are linked to assumptions on particular parameters, such as the elasticity of substitution in production; (3) more complete incidence results because all taxes are allowed to interact with each other rather than to be computed in isolation; (4) the results are expressed in more theoretically correct measures, such as the equivalent variation; and (5) incidence re-

sults include measures of “excess burdens,” thus allowing total burdens to exceed total taxes paid.

On the minus side, general equilibrium models are operationally intensive and can take many iterations to find an equilibrium price vector. Because of these computational demands, the number of taxpayers needs to be small.

How do the different approaches compare in terms of their results? Are we bound to get a different or even an opposite conclusion about tax incidence, depending on the method we use? Which method should we use? To some extent, the method we use depends on our goals. If we are interested simply in arriving at estimates on the distribution of tax burdens, a conventional approach is adequate. The general equilibrium approach is best suited to identifying the excess burdens of taxation by allowing behavioral responses of economic agents to taxes through changes in consumption, labor supply, and savings and investment decisions.

Devarajan, Fullerton, and Musgrave (1980) compared the results for tax incidence obtained using the basic method in the conventional approach to tax incidence with the results obtained from a Harberger-type model and a computable general equilibrium model. In effect, this was a test of the validity of the underlying assumption in conventional tax incidence analysis—that is, the initial impact of taxes, either on the use side or the source side, dominates other second-round and general equilibrium incidence effects. In the final analysis, the incidence results from the traditional model were comparable to those obtained from the general model, although that was not true for every tax.

Lifetime Versus Annual Tax Incidence

Conventional tax incidence studies and many of those using a general equilibrium approach use annual income as the benchmark measure for individual welfare. However, a considerable body of research in economics has shown that individuals/households make consumption decisions based on their lifetime income as opposed to their current or annual income (see Menchik and David 1982; Fullerton and Rogers 1991). For many individuals, current or annual income is subject to large fluctuations. People may have low current income simply because they are in a low-income period of their lives (of school age or in retirement). Given that individuals will pass through these different stages in the life cycle, it is entirely possible that a tax system found to be regressive or progressive

on an annual income basis actually is proportional or neutral on a lifetime income basis. This different perspective on tax incidence has yielded a number of studies on lifetime incidence.¹⁴

In general, the study of lifetime incidence requires more data, but it can yield revealing results. For example, the classification of individuals by annual income often is quite different from classification by lifetime income. Annual tax incidence analysis groups those with similar annual incomes (which may be the result of different reasons and circumstances, such as age). Lifetime tax incidence analysis groups individuals with the same life span, regardless of age. However, as Fullerton and Rogers (1991) pointed out, a lifetime perspective is in no way superior to an annual income perspective in arriving at a measure of “ability to pay.” A lifetime incidence approach raises the important issue that it may not be enough to be concerned only with equity or incidence issues on an annual income basis. What may be needed is to think about equity and incidence from both an annual perspective and a lifetime perspective. Tax systems must be equitable on annual and lifetime bases.

Given that a lifetime perspective on tax incidence can be illuminating, how different can we expect incidence conclusions to be from lifetime and annual perspectives? It is interesting that Fullerton and Rogers (1991) found the patterns of lifetime incidence often to be quite similar but less pronounced than those from an annual income perspective. If taxes are found to be progressive or regressive from an annual perspective, they remain so from a lifetime perspective—but in a less pronounced way.

Tax Expenditures

Tax expenditures are special provisions in the tax laws of many countries. They pursue a variety of policy objectives and take the form of exemptions, special deductions, tax credits, or even special lower tax rates (see Owens 1983). The term *tax expenditure* results from their most immediate impact: they reduce government revenues.

Like taxes and regular expenditures, tax expenditures have an incidence impact on both horizontal and vertical equity. Typically, by design or intent of the law, these expenditures break the principle of horizontal equity. Their effect on vertical incidence can go either way—making a tax system both more progressive and more regressive. The direction depends first on a variety of public choice issues. For example, richer and more politically active groups may have more success protecting their interests in

national legislation. It depends also on some technical issues. Tax expenditures can have a less progressive or even regressive impact if they are given in the form of exemptions or deductions from income rather than as credits against tax liabilities. This is so because, under a progressive individual income tax, the actual value of the deduction or exemption increases the marginal tax rate taxpayers face—and that rate increases with income. Higher-income groups also can benefit more if the tax expenditures support certain kinds of private expenditures. For example, private education tuition fees may be partly or fully deductible from income under the personal income tax, and the use of private education is likely to increase with income. In addition, tax expenditures cannot help poor people who don't pay taxes, and many do not. This point illustrates well the limitations of redistributive policies from the tax side of the budget.

Incidence of Negative Taxes

One also can speak about the incidence of negative taxes—that is, the incidence of cash and in-kind transfers. By their nature, cash transfers targeted to the poor are highly progressive (see Milanovic 1995). Even equal per capita transfers are quite progressive because they decrease rapidly as a proportion of income. However, there are caveats on these easy conclusions about the incidence of cash transfers. Because of stigma among the recipients and inadequate administration, benefits often are taken up unevenly or to a small extent, and that may affect the progressivity assumed for this type of transfer.

Analyzing the incidence of in-kind transfers typically allocates to the different income groups receiving these transfers a monetary equivalent of the costs of providing the transfers.¹⁵ Depending on the degree of participation by income group, the transfer program will be more or less progressive. In-kind transfer programs, such as those for food, tend to be quite progressive, but that is not true of all in-kind transfer programs. For instance, voucher programs for higher education tend to benefit higher-income groups disproportionately, so they generally are regressive.

Impact of the Institutional Setting on Tax Incidence

Particular institutional issues—such as the level of private market development, the extent of the underground or informal sector, or particular government policies outside the tax area—can have a significant effect on

the overall distribution of tax burdens and, in some cases, can reverse the conclusion about the final incidence of taxes that we would have reached in the absence of those institutional issues. This point was well made in Shah and Whalley (1991), who argued that the mechanical application of tax incidence assumptions and analysis from developed countries to developing ones may be misleading and even completely wrong. Those authors provided the illustrations that follow.

In the case of the external sector, many developing countries still derive an important part of their government revenues from customs tariffs levied on the imports of merchandise. The conventional assumption, as it applies to developed economies, is that import taxes are passed on to consumers so their final incidence is proportional or regressive. However, several institutional factors in developing countries, such as quotas or import licensing restrictions and rationing of foreign exchange, may reverse the final incidence of import tariffs entirely. Because either quotas or foreign exchange rationing constrains the quantity available for national consumption, domestic prices tend to be higher because supply is lower—not because of the customs tariff. The higher prices induced by the quotas and foreign exchange rationing benefit the few who are able to obtain the import permits or the foreign exchange. What the customs tariff does is transfer to the government some of these rents obtained by the wealthy. Under those circumstances, the final incidence of a customs tariff would be progressive rather than proportional or regressive. A similar case occurs under credit rationing in developing countries' domestic markets. If credit rationing is an obstacle to entry and competition, then economic rents may arise in many economic sectors. The incidence of the corporate income tax in this case will be merely a transfer of rent to the government.

Foreign ownership of enterprises also may change how we view the final incidence of the corporate income tax. In many cases, foreign owners receive a tax credit in their country of origin for the income taxes paid to host governments. In such cases, the incidence of the corporate income tax is not what is conventionally assumed. Actually, the corporate income tax paid by the foreign-owned company in a developing country is paid by the treasury department of the country that is home to the foreign company.

Take two other institutional factors that are more common in developing countries: price controls and black markets. If price controls exist, sellers may not be allowed by law to pass higher taxes on to consumers.

Therefore, the incidence of a sales tax may not be so regressive because part of the tax burden may be paid by enterprise owners.¹⁶ In the presence of black markets, higher taxes may drive more economic activity underground so only consumers buying in the formal sector will pay the tax. Another differential fact of tax systems in developing countries is that tax evasion is more widely spread. Tax evasion has many sources, including black markets and the corruption of public officials. Whatever the cause, the conventional assumption for developed countries that income taxes are borne fully by the recipient of income can be inappropriate when applied to developing countries.

Tax Incidence and Fiscal Decentralization

In countries with a significant level of fiscal decentralization, regional or state governments and local or municipal governments may exercise considerable tax autonomy. This means that the study of tax incidence exclusively at the central government level may yield a misleading picture of the overall distribution of tax burdens. Unfortunately, it is generally much harder to obtain full information on subnational taxes. It is not surprising that incidence studies that include or focus only on subnational taxes are uncommon.

In general, omitting subnational taxes from tax incidence analysis is likely to present a picture of incidence that is more progressive (or less regressive) than is actually the case. This inaccurate portrayal occurs because regional and local taxes tend to be more regressive than do central taxes. Tax incidence studies conducted at the state and local levels in the United States serve as evidence here. Those studies have found the overall distribution of tax burdens to be regressive (see Phares 1980; Pechman 1985; Citizens for Tax Justice 1996). In countries where subnational income taxes are not as common as in the United States, more regressivity may be expected. The wider use of sales taxes at the subnational level tends to contribute to the regressive distribution of tax burdens, whereas the incidence of property taxes (also widely used) depends on how these taxes are structured. Charges, tariffs, and cost recovery fees also are important in many fiscally decentralized systems. However, as discussed above, these charges generally are assumed to be distributionally neutral under the benefit principle.

An important aspect of tax incidence at the subnational level is the ability a jurisdiction may have to shift the burden of some taxes to resi-

dents of other jurisdictions. This phenomenon is known in the public finance literature as *tax exporting*. The shifting of regional and local taxes can take place because the final consumption of commodities and therefore the payment of sales and excise taxes falling on them is done by residents outside the jurisdiction levying the tax. Exporting also can take place if part of the tax actually is paid by owners of production factors, such as capital, who reside outside the jurisdiction collecting the tax. That may be the case, for example, when the incidence of the tax implies reduced capital earnings. But some of the local income taxes can be exported also if, for example, the national income taxes allow a deduction for the payment of local and regional income taxes. In effect, that deduction means the rest of the nation helps pay for the subnational income tax by reducing the actual burden of local residents. Because of the possibility of tax exporting, one of the basic principles of tax assignment in the theory of fiscal decentralization is that regional and local taxes should be levied on tax bases that cannot be exported. In reality, of course, this principle is not always followed. If not prohibited from doing so, subnational governments have powerful economic and political incentives to levy taxes that are paid by nonresidents.

How important is tax exporting at the subnational level? A classic estimate was made by McLure (1967) for the United States.¹⁷ He found that tax exporting among states in the United States ranged between 17 and 38 percent of public expenditures. But those rates were significantly higher for taxes with exceptionally high export rates, such as corporate income taxes, gambling taxes, and taxes on petroleum and other mineral resources. He did not find, however, any significant relationship between the level of per capita income and the portion of taxes exported in a given state. Therefore, there was no tendency for tax exporting to be either progressive or regressive between states.

Tax Evasion and the Incidence of Tax Evasion

Most conventional and general equilibrium studies of tax incidence ignore tax evasion. When tax evasion is allowed for,¹⁸ the general assumption is that “statutory” tax evaders—those legally responsible for paying the tax who fail to do so, at least in its entirety—are the exclusive beneficiaries of tax evasion (see Martinez-Vazquez 1996).

However, the incidence of tax evasion generally is a more complex phenomenon. A helpful way to interpret many forms of mostly undetect-

ed or unenforced tax evasion is to view them as de facto tax advantages (or tax expenditures) that are there for the taking by people willing to incur some risk of detection. From that perspective it is clear that market responses, when feasible, may compete away the value of those tax advantages. This means that any benefits of tax evasion may be shifted to other agents through market forces similar to those responsible for the shifting of tax burdens. This basic principle may be illustrated with a couple of examples. If taxi drivers or waiters are more able to evade income taxes because they work for cash, should we expect them to benefit fully from tax evasion and, as a result, enjoy higher after-tax income than do workers in other fields with comparable skills? The answer is that those wage differentials—the benefits from tax evasion—are unlikely to stick with those workers. Entry and competition for those jobs will guarantee that after-tax incomes are more or less equalized in sectors offering different possibilities to cheat on income taxes. In effect, the benefits from tax evasion will be shifted forward to consumers or users of those services if markets are competitive. Otherwise, they could be captured—shifted backward—to employers who own the market-protected businesses. As another example, it is quite unlikely that undocumented or migrant workers in a developed economy will be the ultimate beneficiaries of their evasion of income taxes. The high elasticity of worker supply should compete away this advantage, and the benefits of tax evasion will be shifted forward to employers and/or the buyers of the goods and services produced in those sectors where tax evasion takes place. Of course, many other market scenarios are possible, and the market conditions may be such that no shifting of tax evasion benefits takes place. What we need to remember is that the incidence of tax evasion can be quite complex and subject to as many qualifications and shifting mechanisms as the incidence of taxes.

Impact of Other Government Policies on Income Distribution

In addition to taxes and expenditure programs, governments undertake an array of policies that can have a large effect on income distribution—particularly on the welfare of poor people. Macroeconomic policies can have a significant effect on income distribution, but the channels through which that effect occurs can be complex. At the top of the list are monetary and other macroeconomic policies that can lead to increases in unemployment or inflation.¹⁹ Inflation is widely recognized as the most re-

gressive “tax” any government can implement. Primarily it is the poor who “pay the tax” via reductions in the real value of their money holdings because they cannot hold assets that protect real values.²⁰

Understanding the final impact of macroeconomic policies on income distribution is complicated by the fact that the same budget deficits that lead to accommodating monetary policy and eventually inflation may have their roots in government policies with explicit redistributive objectives, such as price subsidies or increased hiring in the public sector (Demery and Addison 1987).²¹

Besides macroeconomic policies, governments use a variety of policy instruments that have significant direct and indirect effects on the distribution of income and the welfare of the poor. These instruments include

- Price controls on goods and services, including house rents.
- Minimum wages.
- Foreign exchange rationing.
- Prohibition on exports and import quotas.
- Interest rate controls on deposits and other forms of financial repression.

The effects of these policies on income distribution are mixed. For example, price controls for farm products tend to hurt the rural poor while they benefit the urban poor and the rich. Financial repression of interest paid on bank deposits tends to hurt the poor more because of their inability to seek alternative savings vehicles. Foreign exchange rationing and import quotas, as we have seen, tend to be quite regressive, and export controls can hurt small traditional crop farmers. It is beyond the scope of this chapter to review the intricacies and alternative outcomes of this list of government policies, but this important point needs to be made: even though our focus is on tax incidence (in this section) and expenditure incidence (in the next section), there are many other government policies that have as large or larger potential effects on the distribution of income and on the welfare of the poor.

Country Examples of Tax Incidence

In the tax incidence literature, there is a long list of studies with empirical estimates of incidence going back more than half a century.²² In this section of the chapter, we review the incidence results obtained in some studies and summarize general trends in the findings of earlier studies.

Three of the more-recent studies of tax incidence in African countries looked at Ghana (Younger 1996), Madagascar (Younger et al. 1999), and Uganda (Chen, Matovu, and Reinikka 2001); and each one reached quite similar conclusions. The tax systems of those three countries are progressive or mildly progressive, but two types of taxes there are quite regressive. The first is an excise tax on kerosene, which is used as a cooking fuel mostly by lower-income households. The second tax is duties on traditional agricultural exports (cocoa in Ghana, vanilla in Madagascar, and so on). The pay-as-you-earn income taxes tend to be the most progressive, but it is interesting to note that most consumption taxes, including the VAT, also are progressive. This progressivity results from the common phenomenon in developing countries that only transactions in the formal sector are taxed, and many low-income households function almost completely within the informal sector.

Several incidence studies in Latin America also reached the same overall conclusion of progressivity or mild progressivity in the tax systems, among them a study of Guatemala (Bahl, Martinez-Vazquez, and Wallace 1996) and a study of Mexico (Martinez-Vazquez 2001). The majority of other studies for developing countries, reviewed in Shah and Whalley (1991), also found a broadly progressive overall incidence pattern.²³ Tax incidence studies for countries in the Organisation for Economic Co-operation and Development (OECD) also found generally proportional or mildly progressive patterns (Messere 1997). It would appear that, over time, OECD governments have taken steps to maintain the proportionality or mild progressivity of their entire tax systems. For instance, during the rate-flattening tax reforms of the late 1980s, the decrease in progressivity was offset by increasing minimum exempt thresholds, providing more generous family allowances, broadening the tax base by making interest income and capital gains taxable, and disallowing deductions that tended to benefit higher-income taxpayers.

These findings on an overall progressive tax incidence over the last two decades contrast with those found in earlier studies, as reported in Bird and De Wulf (1973). Of the 24 Latin American tax incidence studies those authors reviewed, only 4 were found to have some degree of progressivity in the tax systems.

It is unclear whether the move toward progressivity in more recent decades has been a result of changes in tax policies or of differences in the measurement of tax incidence. It is not very likely that tax systems

around the world have become more progressive on paper. The general nature of tax reforms in developing and developed countries between 1986 and 2006 has been by two means: (1) introduction of VATs on the use of income side and in substitution for a variety of sales taxes; and (2) flattening of rates and broadening of tax bases on the source of income side, with a decrease in the importance of corporate income taxes. These broad policy changes should not have altered much the overall level of progressivity, as discussed by Messere (1997) for OECD countries. It is more likely that improvements in our understanding of tax incidence issues have affected the conclusions reached. For example, it was typical of earlier studies to assume that any kind of sales tax was highly regressive. More recent studies have taken into account that, in developing countries, lower-income groups may not pay consumption taxes because they live mainly outside the formal system.

Two lessons can be extracted from the vast number of studies on tax incidence. First, it is important to look at the incidence of the tax system as a whole. By design, some taxes (such as consumption taxes) tend to be more regressive and other taxes (such as those on income) tend to be more progressive. Looking at tax incidence in a piecemeal fashion is likely to lead to inaccurate conclusions about the impact of the tax system on the distribution of income. It also may lead to abandoning or minimizing certain taxes that can play an important role in revenue mobilization with relative efficiency or low excess burden cost, or that can be more easily administered. Tax incidence analysis needs to be performed within the big picture, even when there are theoretical and practical difficulties in aggregating the results from the incidence of isolated taxes.

The second lesson is that tax systems may not have a large effect on the distribution of income. That is, a government's capacity to redistribute income on the revenue side of the budget is limited, and that limitation is more pronounced in developing countries because the overall tax effort as a percent of gross domestic product tends to be significantly smaller.²⁴

Estimating the Incidence of Public Expenditures

As we have seen in the previous section, tax policy has a limited ability to implement significant changes in the distribution of income. That limitation is of greater policy significance at the lower end of the income distribution than at the higher end. Even though some countries have imple-

mented a variety of negative income taxes (effectively, transfers) and provide a variety of tax credits to lower-income households through their tax policies, the impact on the welfare of their poor people is generally quite limited. This truth is reflected in the old dictum in fiscal incidence that “taxes cannot make poor people rich.” It generally is admitted that effective income redistribution to improve the status of the poor has to come from the expenditure side of the budget.

Although public expenditure policy is more important for its potential impact on income distribution, generally it is not true that the study of the incidence of public expenditures is easier than tax incidence analysis. The key difficulty in measuring the impact of public expenditure on individual welfare is that, with some rare exceptions, we are unable to measure output from government expenditures. How public expenditures affect different groups depends on the composition of public expenditures, among other things—that is, what programs are being implemented; and how much funding is going to each program, such as to basic education versus university-level education, or to primary health care versus tertiary hospitals with sophisticated inpatient care. The effect of public expenditure on the distribution of income depends also on the efficiency of public expenditures—that is, the cost effectiveness of funds in delivering services and the matching of needs and preferences of taxpayers. Because of the difficulty of measuring public sector outputs, efficiency issues generally are ignored in the study of expenditure incidence. Instead, incidence concentrates on the question of how benefits from certain public expenditures are distributed among different income groups by identifying the cost of the inputs or some derived measure of “willingness to pay” as the benefits.

Government expenditure policies are implemented normally in the pursuit of two general objectives. The first objective is to increase overall efficiency in the allocation of resources by providing certain goods and services that private markets fail to provide or fail to provide at an optimal level. These goods and services are nonexcludable and show joint consumption. The second objective is to improve equity in the distribution of income. This is accomplished through income transfers and through the provision of goods and services that may be of greater benefit to the poor population. Naturally, the study of expenditure incidence is concerned directly with expenditure programs explicitly intended to improve distributional equity. However, many public expenditure pro-

grams pursuing efficiency gains and dealing with private market failure also have significant distributional implications.

In reality, it is often difficult to discern what objective a particular expenditure program may pursue. For example, public education may be justified because of the failure of private markets to provide an adequate supply, but it also can have a significant impact on income distribution. Thus, the scope of public expenditure incidence analysis is not limited exclusively to those government expenditure programs that have a declared objective to help the poor or redistribute income. Perhaps we need to look at the incidence of many other types of public expenditures but, as we will see below, there is also a practical side to the scope of public expenditure incidence analysis. For some types of public expenditures it is not possible or meaningful to study the distributional impact.

Information on the distributional effect of expenditure programs, and particularly of their impact on poor people, is important to inform the policy debate and ultimately to produce the right policy choices.

The Basic Measurement Issue

The basic problem is how to measure the benefits accruing to individuals from public services. Economists' first inclination is to use an analogy of private goods provided in private markets. In the case of private goods, individuals maximize utility by consuming private goods to the point where the marginal rates of substitution or their marginal benefit is equal to the market price of the private good. Thus, although marginal private benefits are not observable directly, we can infer them from market prices. In the case of public services, many of them are provided without direct charges. Even if there is a fee or price charge, however, that price generally cannot be interpreted as the marginal benefit for individuals because the supply of most public services is rationed or does not respond to demand.²⁵ That is, individuals cannot adjust consumption up or down so that their marginal valuation of the service equals the price. Thus, in the case of public services, prices do not signal willingness to pay or marginal benefits.

In the cases of rationed publicly provided private goods and pure public goods, a theoretically sound measure of individual benefits is the individual's marginal valuation of the good or his willingness to pay for the given quantity being provided.²⁶ This is also known as the individual's *virtual*

price or his *Lindahl price*.²⁷ That general approach to measuring benefits from public goods was developed by Aaron and McGuire (1970). In practice, it is possible to derive marginal willingness to pay for public goods by first estimating individual demand for public goods, as was done for local public goods across states in the United States (Martinez-Vazquez 1982). However, that method requires variations in quantities of the public good supplied as well as tax prices and incomes across jurisdictions, so it is not practical for estimating the incidence of publicly provided commodities by the central government.²⁸ Because of the difficulty in estimating marginal willingness to pay, the obvious alternative was to consider under what circumstances it would be possible to use the more readily observable unit cost of provision as an estimate for marginal benefits.²⁹

Two general approaches have been used widely to estimate public expenditure incidence.³⁰ The first method, and the one most frequently used, is known as the *benefit incidence approach*. In essence, this approach uses the estimated inputs costs or marginal costs of provision as the measure for marginal benefits. The second method is known as the *behavioral approach*. It uses econometric techniques to estimate behavioral demands for publicly provided private goods, which then can be used to derive willingness to pay. In the rest of this section, we review these two approaches and their respective advantages and disadvantages. In reality, the two approaches are compatible, so we also review some recent studies that have combined them. We conclude with a review of country findings.

Before reviewing the benefit incidence and behavioral approaches, it is important to notice that there are some other methods in economics that can be used to measure the incidence of public expenditures. The first of these techniques is the *indirect market technique* in which one uses the indirect valuation of the public service as revealed by consumers who purchased private goods complementary to the public good. The best-known example of this technique is provided by those studies that use estimates of time and money spent on complementary goods to use public parks (Maler 1971; Bradford and Hildebrandt 1977). The second technique, widely used in the field of environmental economics, is *contingent valuation*, which strives to obtain information on the valuation of environmental public goods through direct consumer questionnaires and surveys or in experimental lab settings (Mitchell and Carson 1989). Although the indirect market technique may be harder to apply to a wide range of public services, there is no apparent reason why the contingent valuation

technique has not been applied outside the case of environmental public services.

The Traditional Approach: Benefit Incidence

The benefit incidence approach, also called the *classic* or *nonbehavioral approach*, was pioneered in twin World Bank studies by Selowsky (1979) in Colombia and by Meerman (1979) in Malaysia.³¹ Its main goal is to identify who benefits from public spending and by how much. Formally, benefit incidence measures by how much the income of a household would have to be raised if the household had to pay for the subsidized public services at full cost. The essential effort of the approach is to use information on the cost of publicly provided goods and services, coupled with information on their use by different income groups, to arrive at estimates of the distribution of benefits. Individual beneficiaries typically are grouped by income level, but they also can be grouped by geographical area, ethnic group, urban and rural location, gender, and so on.

Information on individual or household use of the public services typically is obtained from surveys.³² By concentrating on different rates of public services usage, benefit incidence analysis enables us to focus on the important issue of how effectively public expenditure programs target the poor.

The nature of benefit incidence—requiring information on unit costs in the provision of public services to individuals and the rate of use of those services by different individuals—makes it inapplicable to many, economically important public expenditures that have no private beneficiaries. The existence of several constraints, the nature of public services, available information, and the like have led benefit incidence practitioners to concentrate on three main categories of public services: education, health care, and some types of infrastructure. For many other public goods and services (such as national defense, the judiciary, and police protection), benefit incidence may be applied on the basis of two rather extreme assumptions (Hemming and Hewitt 1991). First, the total value of public goods and services to individuals is equal to the total cost of provision. Of course, this assumption is required in all studies of benefit incidence. Second, total benefits are shared or distributed among individuals in certain proportion to their incomes. Even if costs are a reasonable approximation for benefits, the distribution of individual benefits is unlikely to be pro-

portional to income.³³ The evidence available from estimated demand for public goods, voting referenda, and surveys have shown that willingness to pay for public goods can differ quite considerably among different income groups.³⁴

According to Demery (2000), in practice, performing benefit incidence analysis generally involves these three steps:

1. Obtain estimates of the unit cost or subsidy implied by the provision of a particular public service. Data for this step usually come from public expenditure accounts, such as budget data on costs per student or subsidy by level of schooling.
2. Impute the subsidies to individuals or households identified as consumers of the service by using information available on use by different income groups—for instance, enrollment rates in public schools across population quintiles ordered by income levels ranging from poor to rich, or clinic visits reported by different households in consumer expenditure surveys.
3. Aggregate individuals or households into groups ordered by income or expenditure or by any other classification of interests, such as race or gender; distribute the benefits among the different groups; and arrive at a per capita estimate of the incidence of subsidies accruing to each group.

Because benefit incidence analysis uses cost estimates as proxies for benefits and makes no attempt to derive direct estimates of benefits that individuals receive, the term *benefit incidence* may appear misleading. It has been used to distinguish from what has been called *expenditure incidence*, which measures the income flows that government expenditures create in providing services by hiring administrators, renting buildings, and so forth. As Demery (2000) put it, the focus of benefit incidence is on recipients, not providers. For this reason, he suggested a less misleading term would be *beneficiary incidence*. Perhaps *cost incidence* would be even more accurately descriptive.

The Behavioral Approach: Marginal Willingness to Pay

The fundamental practice underlying the behavioral approach is to use individual preferences to derive marginal willingness to pay as the measure

of individual benefits from public expenditures.³⁵ The approach uses econometric methods to exploit variation in behaviors in the use of public services, prices, incomes, and other household characteristics across individuals and time to estimate demand functions for public services.³⁶ These demand functions generate price elasticities and willingness to pay that vary by income group. With that information one can estimate the incidence of public spending programs. Thus, the behavioral approach enables us to investigate whether a particular expenditure program has pro-poor incidence and whether poor people may have a more elastic response to any changes in costs associated with the use of the service—that is, how individuals react to expenditure programs and how their welfare is affected as a result.

Being able to discern the behavioral effects of public expenditure programs opens up possibilities for the better design of public policies, particularly for better targeting expenditures to the poor. For example, a reduction of social welfare programs can be evaluated not only by how it may affect the distribution of income but also by how it may affect labor market participation, family planning, and overall earnings (see Schoeni and Blank 2000). If we know that demand for medical care or basic education is quite responsive to changes in prices, and that the price elasticity of demand falls with income, we can anticipate that the use cost recovery fees should reduce the demand for those services and that the poor will be affected especially.³⁷

Traditional Versus Behavioral Approaches: Advantages and Limitations

Both the benefit incidence and the behavioral approaches have pros and cons—in fact, some of the same strengths and weaknesses.³⁸ In addition, these approaches are compatible. In fact, they have been combined successfully in some studies of expenditure incidence. Nevertheless, it is useful to review each approach's advantages and disadvantages separately if only to design a better combination of them (see Demery 2000; van de Walle 1998; and Selden and Wasylenko 1992).

These are the advantages of the benefit incidence approach:

- It provides simplicity and transparency of estimation procedures.
- It enables us to study which public expenditure programs are most effective in reaching and improving the status of poor people.

- It may be better suited to investigate a “capability” perspective for benefit incidence analysis—that is, how governments contribute to education and health status.

These are the limitations of the benefit incidence approach:

- The cost measures may not be a good enough approximation of true benefits or marginal valuations of the public service. Unit costs of provision also ignore any long-term benefits (such as basic education or immunization services).
- Unit costs may reflect inefficiencies in public service provision, and may not capture possible differences in the quality of services in rich urban areas and poor rural areas.
- The approach has been described as an exercise in accounting—accounting that focuses only on current flows and ignores capital expenditures and the long-run effects of expenditure programs on individuals.
- It cannot incorporate changes in the behavior of individuals in response to changes in public spending, nor can it reveal any information on existing barriers or constraints to participation in government expenditure programs. For example, we may find that poor households do not send their children to school, but benefit incidence does not suggest why that is so and it does not provide a course of policy action.
- It typically does not take into account other government costs, such as administrative costs.
- It does not allow for individual (private) cost to the participants.
- Although simple and transparent, the approach often faces serious data problems in participation rates by beneficiaries and on unit costs. The latter problem is more prevalent in decentralized systems with several tiers of government providing the same service concurrently.
- Its focus on average benefits from public spending is not helpful for policy making because public spending decisions tend to be based on impact at the margin. For example, larger education expenditures can buy better quality for the education of the better-off or can increase schooling of the poor.
- The scope is limited to public expenditure programs for which private beneficiaries can be identified. Because a large share of government expenditures is nonrival in nature, benefit incidence necessarily has a limited coverage.³⁹

- The self-reported utilization rates of services may be biased. For example, the measure of covered needs in health services may underestimate the needs of the poor because lower-income households are less likely to report an illness during the period covered in the survey, and because less access to health facilities by the poor may lead to less frequent recognition of their illnesses.
- It can ignore important interaction effects with the private sector. For instance, if the private education sector is able to attract a greater number of richer students, benefit incidence of education becomes more progressive or pro-poor. However, if the quality of education depends on peer pressure, among other things, the lower number of children from better-educated and wealthier families in public schools may reduce the quality of public education for the poor.
- The counterfactual (situation without government intervention) typically is assumed to be the distribution of per capita income less the monetary value of the benefits from government programs. However, public policies affect individual behavior, such as in labor supply, consumption, and savings and investment decisions. In addition, public expenditure programs displace private alternatives or can increase the private consumption of goods that complement public services.

The behavioral approach has the following advantages:

- It is more theoretically sound, with clear foundations in microeconomics.
- It yields estimates of marginal (rather than average) incidence.
- It enables us to estimate incidence for public expenditures when specific users cannot be identified.
- It enables us to identify incidence on several dimensions of welfare, yielding both money metrics of welfare (such as willingness to pay and compensating and equivalent variations) and nonmoney measures (such as infant mortality or nutritional status).
- By incorporating individual behavioral responses, it provides concrete guidance for policy reform.

The behavioral approach is limited in the following ways:

- The approach is more data intensive and the methods are more complex.
- Information or data requirements, such as fees and other private expenses incurred by the beneficiaries, are high, and seldom may be met.

- It suffers from a series of econometric problems. For instance, policy measures may not be exogenous, and thus the estimation of the model may lead to biased coefficients.⁴⁰
- The approach needs to take into account the impact of nonbeneficiaries' changes in behavior. For example, households may offer less help to family relatives when the government introduces a welfare scheme to help deserving households.
- Willingness to pay for services expressed by the head of the household may have little to do with the private benefits that children receive from education or health care. Measures of willingness to pay are likely to ignore externalities and social benefits as well.

Benefit Incidence and Behavioral Approaches Combined

Clearly, the theory and practice of expenditure incidence analysis is in a state of flux. Neither the benefit incidence approach nor the behavioral approach is a perfect method. Each one has its own strengths and suffers from a variety of weaknesses. The natural evolution or the next step in the field has been to combine both approaches to build on their respective strengths and overcome their limitations. Several recent studies have started this work (Hammer, Nabi, and Cercone 1995; Ravallion, van de Walle, and Gautam 1995; and Younger 1999).

As van de Walle (1998) pointed out, one way to proceed is to use the behavioral approach to measure benefits net of behavioral responses. However, because the regression analysis in the behavioral approach only predicts mean outcomes, the benefit approach can be used in a second step to determine incidence on a more disaggregated level and to quantify changes in the distribution of income.

That is the direction followed in Younger (1999). He first used the behavioral approach to estimate demand curves for education and health services in Ecuador. Next, he used the compensating variation rather than the unit costs of provision to determine the individuals' value of the services.⁴¹ Finally, Younger used these estimates of individual benefits to evaluate the progressivity of government expenditures, as is done in conventional benefit incidence analysis.

Another interesting application of benefit and behavioral approaches combined sought to distinguish between the extent of "protection" against poverty, as done in conventional benefit incidence, and "promotion" out of

poverty, which looks at the behavioral responses of the recipients of social welfare payments (Ravallion, van de Walle, and Gautam 1995).

Country Examples of Expenditure Incidence

For the reasons presented above, the vast majority of benefit and behavioral incidence studies have focused on four sectors of government expenditure programs: education, health care, water/sanitation, and other infrastructure. Here we first review the findings of the two seminal benefit incidence studies by Selowsky (1979) and Meerman (1979). Then we review the incidence findings of several more-recent studies that have used both the benefit and the behavioral approaches.

Selowsky (1979) used the benefit incidence approach to study the distributional impact of government expenditures on education; health care; and investments in electricity, water, and sewerage in Colombia. These expenditures represented approximately a third of total government expenditures in the 1974 budget. The benefit incidence analysis was based on a countrywide survey of 4,019 households. His main findings included the following:

- The total subsidy to education was evenly distributed across income quintiles.
- The results were quite diverse among educational levels. Whereas the distribution of the subsidies to primary education was highly progressive, it was highly regressive for higher education. This finding resulted mainly from higher-income groups having higher rates of access to college education.
- The total health subsidy was relatively similar across households, although it varied significantly by type of program. Although the incidence of the national health system was progressive, the social security system (where access depended more on having a job in the formal sector) tended to favor the middle-income groups.
- Although the health subsidy per household did not vary with income, the impact was regressive in per capita terms because family size was inversely related to income.
- For electricity, water, and sanitation, only 25–30 percent of the services went to the bottom 40 percent of the households, and almost all beneficiaries lived in urban areas.

Meerman (1979) also used the benefit incidence approach in Malaysia to study the distributional impact of government expenditures on education; health care; and investments in electricity, water, and sewerage. These expenditures represented approximately a third of total government expenditures in the 1973 budget. His main findings included the following:

- For education, the distribution of benefits became more regressive with the level of education (primary, secondary, and postsecondary). That was because enrollment ratios increased with income; the subsidy per student increased with education level (the postsecondary level per student was 13 times the primary education level); and even though education was free, there were substantial out-of-pocket expenditures (books, fees, meals, uniforms, shoes, transport, supplies, and so forth) that affected the enrollment rates more negatively.
- For health care, benefits were quite equally distributed by income group.
- For electricity, water, and sewage disposal, the distribution of benefits was highly unequal, with access increasing by community size and household income. This finding reflected the fact that all these services were offered at fees that covered total costs and, consequently, supply went where demand was more highly concentrated.
- In terms of overall incidence for all allocable public expenditures in Malaysia, the highest-income quintile received a household per capita benefit that was above the mean, the lowest-income quintile received one far below the mean, and the three remaining quintiles received benefits very close to the mean.

More recently, Selden and Wasylenko (1992) used a benefit incidence approach to estimate the distributional impact of public education expenditures in Peru. They found a mildly progressive or pro-poor incidence. Part of the reason was that a lower proportion of poor children aged 6 through 12 years were enrolled in primary schools, compared with children from middle- and high-income households. Females of school age as a group received fewer benefits than did their male counterparts, also a result of different enrollment rates between the two groups. Out-of-pocket expenses for attending public schools represented a substantial barrier to school participation by children of low-income households. However, an-

other incidence study of education in Peru, using a behavioral approach, found that rural households, including the poor, were willing to pay fees high enough to more than cover the operating costs of opening new secondary schools in their villages (Gertler and Glewwe 1990).

Younger's (1999) study, discussed previously, used a combination of benefit and behavioral approaches to examine the incidence impact of education and health care expenditures in Ecuador. He found that primary education was most progressive, followed by health consultations for children at public facilities, consultations for adults, secondary education, public universities, and finally private universities.⁴²

From this brief review of the empirical literature on the incidence of public expenditures, several patterns emerge. Incidence studies of public expenditures only cover a share of total government expenditures, mostly focusing on education, health care, and basic utilities. The incidence of public education expenditures generally varies with the level of education services. Primary and perhaps secondary education tends to be pro-poor and higher education/university typically benefits the rich much more than the poor.⁴³ The incidence of health care expenditures tends to be flatter, although primary care tends to be more pro-poor and more sophisticated types of health care are more pro-rich (See Sahn and Younger 2000). The incidence of expenditures on utility infrastructure tends to favor the rich.

Net Fiscal Incidence: Combining Tax and Expenditure Incidence

In the two previous sections, we have reviewed the method used in estimating tax incidence and expenditure benefit incidence. In an ideal world, however, the distributional effects of public expenditures should not be analyzed in isolation from the distributional effects associated with the taxes used to finance them, or vice versa. Even if the tax system as a whole is regressive, the overall impact of the budget may be progressive when the distribution of expenditure benefits is sufficiently progressive. Thus, the last step in fiscal incidence analysis needs to be the simultaneous consideration of tax and expenditure benefit incidence. This analysis is often known as *net fiscal incidence* or simply *fiscal incidence*.

From a policy viewpoint, fiscal incidence, not tax or benefit incidence, clearly is the relevant equity measure that government authorities need

to use in judging particular policies. For instance, a program that charges cost recovery fees in the health sector may be regressive from the revenue side but may have progressive fiscal incidence if the revenues are used to finance better health care services or easier access to services by the poor. An increase in excise taxes may be rejected on equity grounds as being regressive, but it may be desirable from an equity stand if the resulting revenues are used to finance school construction in poor neighborhoods. More generally, governments need to gauge how well they are able to achieve their distributional objectives,⁴⁴ and that can be accomplished only if they adopt a net fiscal incidence perspective.

Two sets of issues stand in the way of using fiscal incidence as the equity standard for government policies. The first set of issues is that budgetary policy ordinarily is quite fragmented. Most of the time, either comprehensive tax reform or the fine-tuning of individual taxes is undertaken in isolation from government expenditure policies. Similarly, most expenditure programs are assessed on their own merits without a clear link to any particular type of revenue source. Correspondence between tax and expenditure policies most often takes place only at the macroeconomic level to ensure a balanced budget or a particular deficit level. There are many good reasons in budgetary policy and practice for delinking tax and expenditure decisions, and this is not the place to discuss them. But fragmentation in budget policy decisions makes the task of assessing fiscal incidence much harder and less relevant. With the few exceptions of government programs that have both revenue and expenditure sides, the analysis of fiscal incidence is only relevant for the entire government budget. Of course, this is ultimately the issue that should matter the most.⁴⁵

The second set of impediments to using fiscal incidence is of a technical nature. Fiscal incidence has quite demanding data and information requirements: at the very least, it compiles the conceptual and data difficulties of tax and benefit incidence. It is not surprising, therefore, that there is much less empirical literature on fiscal incidence than on tax or expenditure benefit incidence.⁴⁶

How do we estimate fiscal incidence? It measures the changes in income distribution associated with a particular tax-expenditure government package. Ignoring data limitations for the time being, and following Hemming and Hewitt (1991), the computation of net fiscal incidence would involve these steps:

1. Determine the distribution of “original” income—that is, private income from all sources before transfers, taxes, and government expenditures.⁴⁷
2. Allocate taxable cash transfers by income to the distribution of original income to get the distribution of total income.
3. Allocate direct taxes by income to obtain the distribution of posttax income.
4. Allocate indirect taxes, nontaxable cash transfers, and in-kind transfers by income to obtain the distribution of net income.
5. Allocate benefits (income equivalent) from public goods and services to obtain the distribution of final income.

Although the labels used for the different concepts of income may be changed, these steps generally capture the methodology behind the computation of fiscal incidence.

Let us now bring back the issue of data availability. Although generally there is information on direct and indirect taxes and on most transfers, usually there is no information available on the distribution of original income. And as we saw in an earlier section, it is possible to estimate the monetary equivalent of benefits from some public goods and services. Even in the best of cases, however, more than half of government expenditures are not allocable directly to individuals. For completeness, these other expenditures may be allocated at cost across individuals in proportion to income or in equal per capita terms. Neither of those two approaches is ideal.⁴⁸ Adopting an equal per capita assumption clearly will make fiscal incidence results more progressive. The fundamental question is, why use an equal per capita criterion? There are as many good reasons to use any of the other criteria, but none of those reasons is convincing.

A good way to understand the complexities and issues surrounding the estimation of fiscal incidence is to review an empirical study, so let us consider the study of the Philippines conducted by Devarajan and Hosain (1998).

As a first step, they used the 1988 Family Income and Expenditure Survey to map families of different income classes into deciles. To estimate the incidence of taxes, they used a multisector, computable general equilibrium model of the Philippine economy. Besides including indirect relative price effects on tax incidence, computable general equilibrium en-

abled them to better capture the impact of the peculiarities of Philippine institutions on tax incidence. For example, the model allowed for an open economy by assuming that domestic production and imports are imperfect substitutes in all markets. The model also allowed for the effect of interindustry transactions (cascading) via an input-output table. To take into account the level of evasion in the Philippines, the computations used effective tax rates (tax revenues divided by the tax base) rather than statutory tax rates. Overall, the investigators found that the distribution of tax burden in the Philippines was largely neutral, with all income deciles paying roughly 20 percent of their income in taxes. The slightly regressive nature of indirect taxes was offset by the progressive nature of income taxes.

On the expenditure side, Devarajan and Hossain focused on the expenditure categories with significant distributional implications: education, health care, and infrastructure. Because data were lacking, they used an indirect approach to benefit incidence. They looked at the regional pattern of expenditures, in combination with information on income distribution and utilization rates for services (primary and secondary enrollment rates and hospital and clinic utilization rates). That enabled them to make inferences about a nationwide incidence pattern by income group. Overall, they found a progressive or pro-poor incidence of expenditures. Thus, combining neutral tax incidence and the progressive expenditure benefit incidence implied a progressive fiscal incidence for the Philippines.

Conclusion

Poverty has very complex and difficult roots, so its eradication cannot rely on simple measures. Government fiscal policy can help, however, by ensuring that the tax burdens on poor people are nil or very low, and that the composition and direction of public expenditures favor the poor. Implementing those types of policies requires understanding well the tax and benefit incidence or fiscal incidence of government budgets.

An important conclusion reached here is that there is no unique or best way to measure individual welfare and changes in the distribution of welfare. We need to be aware that using different measures generally can yield different conclusions on the effect of government policies. Thus, it is extremely important in fiscal incidence analysis to be explicit about the definitions being used and the assumptions made.

What can we conclude from the review of incidence studies? Although it is difficult to generalize—and it may even be dangerous because incidence results are very sensitive to country-specific conditions—some general patterns do emerge from our review. First, the higher use of direct taxes tends to make the final distribution of income more equal—that is, direct taxes generally tend to be progressive. The reverse is true for indirect taxes: the higher relative importance of indirect taxes tends to make tax systems more regressive. As a net result, we are likely to find in the typical country that overall tax incidence may be proportional or mildly regressive for very-low-income groups, proportional over a large range of middle-income groups, and progressive for higher-income groups. Many tax systems tend to show a proportional to a mildly progressive incidence impact. In general, taxes have not been a very effective means of redistributing income. Potentially large excess burdens or efficiency losses associated with highly progressive taxation are reasons for the limited redistributive scope of tax policy. Second (and not discussed in any depth here), direct cash and in-kind transfers tend to be quite progressive unless there are serious targeting problems. Third, the expenditure side of the budget (including transfers) can have a more significant impact on income distribution. Expenditure programs in the social sectors (education and health care) become more progressive as more is spent in relative and absolute terms on those services used with greater frequency by the poor (basic education and primary health care). As noted by Selowsky (1979), government expenditures even in the poorest countries tend to be quite large by comparison with the income received by the poorest groups of the population. Therefore, affecting the benefit incidence of public expenditures does have a significant potential for changing the welfare of poor people—that is, increasing the supply of certain services (education, health care, and clean water) has been critical to lifting people out of endemic poverty. Although less evidence is available, in terms of net fiscal incidence, budgets appear to have an overall neutral or mildly progressive impact on the distribution of income.

Other government policies, such as those addressing monetary issues and exchange rates, may have distributional effects that are as significant as tax and expenditure policies, which often are designed with particular distributional objectives in mind. Economists have not devised adequate methodologies to take into account jointly the fiscal incidence of taxes and expenditures, and the distributional impact of other government

policies. In a way, therefore, we are condemned to remain in partial light—if not total darkness—regarding the basic question of how government budgets affect the distribution of income. We need to accept that we have only partial answers. But we must hope that the more complete these partial answers are, the more likely we will be able to piece them together to answer the basic question that motivated this chapter: how do government budgets affect the distribution of income and particularly the status of the poor segments of the population?

Notes

1. For fuller reviews of tax incidence, see Newbery and Stern (1987), Shah and Whalley (1991), and Musgrave and Musgrave (1989).
2. See the early work by Bird and De Wulf (1973) for a particularly skeptical perspective.
3. Prices of assets also may change as a consequence of taxes because future tax liabilities get incorporated into the price of the asset. This is known as the *capitalization* of taxes.
4. For example, customs tariffs or taxes on imported goods drive up domestic prices, but these revenues go to domestic producers rather than to government.
5. Excess burden losses can be quite small when calculated in static one-period models, but can become significantly large when intertemporal dynamic effects of taxes on work effort and on saving and investment are allowed to affect the rate of economic growth (for example, see Fullerton and Rogers 1991).
6. Devarajan, Fullerton, and Musgrave (1980) called this approach the Pechman, Musgrave (or the PM) approach because of the prominence of those two economists in its implementation.
7. Wasylenko (1986) used the representative household approach together with conventional results based on the distribution of income for Jamaica. For other studies that have used this method, see Bird and De Wulf (1973).
8. For example, see Musgrave, Case, and Leonard (1974), Pechman and Okner (1974), and Gillespie (1980). The assumptions still used have not changed much since the original work by Musgrave (1959).
9. Tax evasion issues typically are ignored. The possible impact of tax evasion on incidence results is discussed later in the text.
10. However, there is econometric evidence supporting the view that some producers use a markup pricing system and absorb part of the tax.

11. Some conventional studies have used an input-output framework to establish effective rates in the presence of cascading and multiple rates and exemptions. For example, see Ahmad and Stern (1989) and Bird and Miller (1991).
12. See Mieszkowski (1969), McLure (1975), and Bovenberg (1987) for applications and expansions on Harberger's model.
13. See Musgrave and Musgrave (1989) for a discussion of these two alternative concepts of tax incidence. A third concept of incidence, also introduced by Musgrave, is that of "budget" incidence, where the combined effects of tax and expenditure incidence are considered simultaneously.
14. A complete formal definition of lifetime income is the value of assets held at death plus the present value of the sum of consumption over the lifetime. If one drops the value of assets at death and assumes that consumption is smooth over the life cycle, then annual consumption may be taken as an approximation of lifetime income.
15. It should be noted, however, that the benefits to individuals from in-kind transfer programs generally may be less than the cost of providing the transfer because the willingness to pay for the product (depending on tastes and the product's current availability) may be less than the market price or costs.
16. Of course, sellers may still shift part of the tax to consumers by other means, such as reducing the quality of the product. It is also possible that the tax is shifted backward to workers.
17. His methodology involved, first, using conventional assumptions on the theoretical analysis of the incidence of different taxes; second, allocating each tax to the consumer or producer groups hypothesized to bear the tax burden; and, third, imputing the part falling on each group to the jurisdictions where the groups reside. The taxes not borne by the residents of the taxing jurisdictions are those exported.
18. Some conventional studies allow for tax evasion by lowering the effective tax rates applied to certain categories of taxpayers in the computation of tax liabilities in the microsimulation models.
19. Several studies have analyzed the impact of inflation and unemployment on income distribution. For example, see Heller et al. (1988).
20. For example, Blejer and Guerrero (1990) offered evidence that inflation was a highly regressive tax in the Philippines. An example of the complexity of the operating channels is the impact of exchange rates on income distribution. These effects depend on the relative importance of traded and nontraded goods in the sources and uses of income sides of different income groups. In their study of the Philippine economy, Blejer and Guerrero found exchange rate policies had a progressive or pro-poor effect.

21. Of course, government employment policies may benefit the middle- and higher-income groups more than the poor. For example, see Collier and Gunning (1999).
22. For reviews and a summary of findings in the literature, see Bird and De Wulf (1973); De Wulf (1975), Wasylenko (1986); Shah and Whalley (1991); and Chu, Davoodi, and Gupta (2000).
23. Studies by Wasylenko (1986, 1991) are exceptions to the common findings. He found in Jamaica an inverted U-shape incidence pattern in which income was redistributed from the middle-income groups to the poor and the rich.
24. See Chu, Davoodi, and Gupta (2000) for the case of developing and transitional countries, and Atkinson (2000) for the case of OECD countries.
25. The reality of publicly provided services is a bit more complex (Cornes 1995). In some cases, governments may supply services at subsidized prices. In that case, individuals can act as they do in private markets and public prices reflect marginal benefits. In other cases, the publicly subsidized commodity is allocated via nonprice rationing, with or without a public fee. In such a case, prices (if any) do not reflect marginal valuation. The same is true for the case of pure nonexcludable public goods.
26. Using elementary demand theory, assume that individuals have downward-sloping demand curves for public goods derived, as in the case of private goods, from their maximization of utility (for example, as reported in Bergstrom and Goodman 1973). Then, the individual's marginal willingness to pay is given by the height of his demand curve at the quantity of the public good actually provided.
27. Erik Lindahl, a Swedish economist, was a pioneer in the discussion of individual valuation of public goods in the 19th century.
28. An advantage of the incidence approach using demand curves for public goods is that it can be applied to all types of public services provided subnationally, such as police protection, parks, and highways. As we will see later in the text, traditional benefit incidence studies and the behavioral approach to expenditure incidence can only be applied to public expenditures that have identifiable private beneficiaries: education, health care, and public utilities. However, these two latter approaches can be applied to central government expenditure programs, whereas the demand for public goods approach cannot.
29. Brennan (1976) showed that the unit or average cost of provision can be taken as a proxy for the individual's marginal valuation of the public good if: (1) public goods are optimally supplied so that, on average, the marginal costs of provision would equal the arithmetic mean of all individual marginal valu-

- ations; and (2) marginal costs and average costs of provision are the same. If these conditions are met, unit costs of provision would represent only average individual valuations for the public services. Thus, even when the above conditions are met, the use of unit costs as a proxy for marginal individual valuations ignores any differences in valuations across individuals.
30. See van de Walle (1998) and Demery (2000) for excellent and complete reviews of the issues.
 31. For other studies that have used a benefit incidence approach, see Selden and Wasylenko (1992) and Demery (2000). For an earlier review, see McLure (1974).
 32. These surveys include the Household Income and Expenditure Survey and the Living Standards Measurement Study.
 33. Hemming and Hewitt (1991) argued that using the assumption that benefits are proportional to income is tantamount to accepting that benefit incidence cannot be measured, and therefore is equivalent to ignoring the impact of public expenditures on the distribution of income. Other criteria that have been used to allocate “un-allocable” expenditures are equal per capita and in proportion to tax burdens (see Musgrave and Musgrave 1989).
 34. What can complicate things even more is public altruism for some goods (for example, higher-income groups may desire to pay for more consumption of education by lower-income groups). Then the individual benefits are much harder to determine (Martinez-Vazquez 1981). Any additional benefits from externalities are ignored in the traditional benefit incidence approach.
 35. This approach was pioneered by Gertler and Glewwe (1990) and Gertler and van der Gaag (1990). For a more recent application, see Younger (1999).
 36. For example, the demand curves for education in Gertler and Glewwe (1990) were derived from a utility maximization model of school enrollment decisions using a discrete choice framework (a nested multinomial logit model).
 37. For a discussion of health care used in Côte d’Ivoire and Peru, see Gertler and van der Gaag (1990). Gertler, Locay, and Sanderson (1987) also wrote about health services in Peru. It is not necessarily true that cost recovery fees must not be used. If the fee revenues are used to make the services more accessible to the poor, for example, the overall welfare of the poor may be improved.
 38. For example, both approaches are partial equilibrium analyses. So far, the application of the two approaches has been concerned with annual rather than lifetime incidence.
 39. For example, a study of benefit incidence that sought to be exhaustive (Devarajan and Hossain 1998) was able to cover only one third of government expenditures.

40. These biases may arise because of simultaneity (perhaps school feeding programs are started because of the low nutritional status of children) or because of omitted variables (such as regional variations) that influence both the policy variable (expenditures on school feeding) and the welfare outcome (nutritional status of children). In general, the biases can be controlled with adequate statistical techniques, provided the necessary data are available. For further discussion, see Besley and Case (1994).
41. The compensating variation is how much income we would need to give a household to make it as well-off if the public service were not provided.
42. Private universities also received government subsidies.
43. See van de Walle and Nead (1995) for a review of 13 countries generally supporting this conclusion.
44. However, governments may not always have an interest in finding out the net fiscal incidence of the budget. Political considerations may get in the way. For example, Meerman (1979) reported that the Malaysian authorities in 1974 deemphasized any discussion of incidence issues in the government policy plans so they could avoid disclosing that the Chinese ethnic minority (35 percent of the population) was paying for more than half of the government budget.
45. In the same way that tax or benefit incidence alone may give a misleading picture of the net impact on income distribution, focusing on the fiscal incidence of isolated government programs may be misleading. Those programs may be justified on efficiency or other grounds, whereas the existence of other progressive programs still can deliver an overall progressive fiscal incidence for the entire budget.
46. See Devarajan and Hossain (1998) for a developing country study; for a simpler application in the United States, see Musgrave and Musgrave (1989, ch. 12).
47. A general problem with all incidence analysis is determining the counterfactual—that is, the original distribution of income without the presence of government. As noted previously in text, this is never quite possible in a strict sense because both taxes and transfers affect the behavior of economic agents. Arriving at the original income would require netting out the economic agents' behavioral responses to fiscal policies. In addition, wages and most prices, which determine income, are affected by government policies. Thus, we truly do not know what the counterfactual income distribution would be without fiscal policy or government. In practice, several compromises are needed. For example, we can define the counterfactual as the distribution of income net of direct taxes and cash transfers.

48. As we discussed previously, another possibility that is used much less frequently is to allocate the expenditures in proportion to taxes paid (Musgrave and Musgrave 1989).

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PART TWO

**Case Studies from the Latin America
and the Caribbean Region**

CHAPTER 6

Analyzing Debt Sustainability

An Application of SimSIP Debt for Paraguay

Bernhard G. Gunter and Quentin Wodon

One of the most difficult tasks in preparing a poverty reduction strategy consists in setting priorities for public action, taking into account the cost of social programs and the capacity of the government to pay that cost. The ability to pay for social programs essentially is determined by the resources available to the government through taxation and/or loans. Thus, the issues of debt and fiscal sustainability are key. In this study, we used SimSIP Debt, a user-friendly, Excel-based tool for analyzing debt and fiscal sustainability issues. Our objective was not to suggest policy options for Paraguay, but to explain how SimSIP Debt can be used to illustrate various scenarios. The simulator was developed by Gunter et al. (2002) and it has two modules.¹

The Debt Projection Module enables the user to simulate the evolution of a country's debt over a 15-year horizon, based on initial conditions and projections for government expenditures, government revenues, and other parameters. Reflecting the fact that, for many countries, debt sustainability cannot be determined by only one specific indicator, this module adopts a flexible approach to the analysis of debt sustainability. Given that Paraguay's concessional debt is a small portion of the country's total debt, this study looks at the levels and trends of a variety of nominal debt sustainability indicators rather than so-called net present value indicators.

(We will explain later the distinction between an analysis in nominal terms and in net present value terms.)

The Deficit-Debt Consistency Module presents a variety of matrices to determine the consistency of a country's budget deficits with a desired level of short-term or long-term indebtedness and a variety of gross domestic product (GDP) growth rates. In the case of Paraguay, we look at such matrices for the nominal debt-to-GDP ratio, the nominal debt-to-exports ratio, and the nominal debt-to-revenue ratio. Each matrix shows how various levels of budget deficit relative to GDP ratios are consistent with both a range of real GDP growth rates and a range of debt targets. This type of analysis essentially enables the user to assess what level of budget deficit can be sustained without increasing debt ratios too much.

Before explaining our approach for analyzing debt sustainability, it is worth describing briefly the evolution of the debt situation in Paraguay. In 1989, the country's public external debt amounted to about 50 percent of GDP. Subsequently, the debt dropped significantly as the government purchased at a discount a sizable amount of delinquent commercial debt in the secondary market and rescheduled all remaining commercial debt arrears. In 1992, the government also paid 100 percent of any remaining official debt arrears to France, Germany, Spain, and the United States. As a result, in the mid-1990s the ratio of external public debt reached a minimum of about 15 percent. Since then, however, debt levels have been rising again, reaching nearly 30 percent in 2000 (see the annex for the trend in Paraguay's debt).²

Several factors explain the increase in the country's debt since the mid-1990s. The persistent recession observed since 1995 has put pressure on the amount of revenues collected by the government. Furthermore, between 1990 and 2000, although revenues increased from 9.5 percent to 11.5 percent of GDP, they remained based primarily on consumption taxes and royalties from hydroelectric power generation. Together with the prolonged recession, the limited tax base and instruments available for taxation have made it difficult for the government to raise revenues, at least in the short run.

At the same time, public spending has increased substantially, especially in the social sector. Social spending for education, health care, and social assistance tripled in per capita terms in the 1990s. It also increased from one fourth to 40 percent of total spending, and from less than 3 percent to 7 percent of GDP. Expenditures per capita in education more

than tripled. The increase was largest for primary and secondary education, but all levels of schooling benefited. Real expenditures for health also were increased substantially. In both education and health, most of the increase took place in the first half of the 1990s, but the effects on the budget have persisted since that time because the country entered a prolonged recession. Expenditures on social security and social assistance also increased in real terms and as a percentage of GDP, but they decreased as a share of total spending. Spending for housing, water, and sanitation decreased.

It is important to mention that, although Paraguay's percentage of increase in social spending through the 1990s was larger than in the rest of Latin America, the levels of social spending-to-GDP remained lower than those of other countries. Specifically, estimates from the Comisión Económica para América Latina y el Caribe (CEPAL 2002) suggested that the increase in public social spending per capita over the 1990s was larger in Paraguay (136 percent increase) than in Latin America as a whole (50 percent increase). Despite Paraguay's greater increase in spending, the level of spending remained four times smaller than in other Latin American countries (\$132 per person in Paraguay in 1998–99 versus \$540 in Latin America). As a share of GDP as well, the level of spending in Paraguay remained comparatively low.³

Still, from a debt sustainability perspective, as a result of the stagnation in revenues and the increase in spending, the central government went from a surplus of 2.5 percent of GDP during 1990–94 to a deficit of 5.5 percent in 2000. Because public sector wages use up most of the state's revenues, capital spending has been curtailed and financed with external funds. As a result, overall, the government has little room to maneuver—for example, to spend more on productive activities or on poverty reduction programs. In the first half of 2001, a better control of public expenditures was achieved and plans were discussed to increase revenues (that is, plans for extensions of the value-added tax, higher taxes on tobacco and alcohol, and import duty and annual “patent” on cars). That, however, had no dramatic effect on the current public spending constraint—and that is problematic, given the desire to fund new initiatives to reduce poverty as part of the national poverty reduction strategy proposed by the Ministry of Social Action.

At the time we wrote this report (in 2003), there were contrasting views on Paraguay's long-term debt sustainability (as was true for many

other developing countries), partly because of differences of opinion on what constitutes debt sustainability and partly because of differences in macroeconomic assumptions. The government of Paraguay's investment promotion Web site states that Paraguay's debt "does not represent a burden that threatens economic stability" and that "the country's abundant foreign reserves guarantee the normal servicing of the debt." At the same time, the Economist Intelligence Unit's country risk summary of October 2002 concluded that "[r]enewed weakness in the guaraní could compromise debt-servicing before long. A weak policymaking environment, poor economic performance, and recent external shocks could all complicate the picture. The Economist Intelligence Unit (EIU) is currently forecasting an external debt/GDP ratio of almost 70% by 2003 as US dollar GDP shrinks."⁴ There also were worries that, given the impact of the recession in Argentina, fiscal deficits will continue to increase and thus lead to an unsustainable debt.

Given this controversy, the tools provided in SimSIP Debt can be useful for policy makers and analysts conducting their own analyses. But one must be careful not to overestimate what one can learn from such modeling. Indeed, the concept of sustainability is very useful—but it also can be dangerous. When making projections 10 or 15 years ahead, there are tremendous uncertainties. It may be tempting for a government to base its strategy on, say, a medium-growth case scenario while ignoring significant risks that lower-growth case scenarios may entail. This means that there are some political economy dangers inherent in using simple forecasts and one must be careful about how one treats the uncertainties resulting from them. Although we will not enter into detailed policy discussions about Paraguay in this report, we do want to emphasize that debt sustainability is an area of macroeconomic policy where governments must be especially careful.

To help readers become familiar with the simulator and its assumptions, the rest of the report is structured as follows. In the next section we briefly present a few alternative approaches, concepts, and examples for analyzing debt sustainability, and we cover the theoretical background for the two modules of the SimSIP Debt simulator.⁵ The third and fourth sections provide preliminary results obtained with the two modules.⁶ The report ends with some conclusions and an outlook based on the latest available data.

Alternative Approaches to Analyzing Debt Sustainability

A common definition of debt sustainability is whether a country can meet its current and future debt service obligations in full, without recourse to debt relief, rescheduling, or accumulation of arrears. To determine if a country's debt is sustainable is complex, however, and there are various analytical approaches, as presented in the first chapter of this book. From a theoretical perspective, perhaps the most appealing approach is to derive debt sustainability criteria based on discounting the net present value (NPV) of the government's debt over an infinite horizon (Buiter 1995; Cuddington 1997). The limitations of this approach, however, have led to the development of more practical debt sustainability indicators, usually based on a ratio of a debt variable to another key macroeconomic variable.⁷ Still another approach is to look at the consistency of the government's budget deficit with the government's desired level of indebtedness.

To illustrate the variety of approaches used to analyze debt sustainability, we provide below a few examples of indicators used in the World Bank's *Global Development Finance* (GDF), the HIPC Initiative, the United Nations' Millennium Development Goals (MDGs), and the European Union's Maastricht Treaty.

The World Bank's GDF (formerly, World Debt Tables) classifies external indebtedness based on two ratios—the ratio of the NPV of total external debt (calculated based on all future debt service) to the three-year backward-looking average of gross national product (GNP), and the ratio of the NPV of total external debt (calculated based on all future debt service) to the three-year backward-looking average of exports of goods and services (including workers' remittances). If either ratio exceeds a critical value—80 percent for the NPV-debt-to-GNP ratio and 220 percent for the NPV-debt-to-exports ratio—the country is classified as severely indebted. If the critical value is not exceeded but either ratio is three-fifths or more of the critical value (that is, 48 percent for present value of debt service to GNP and 132 percent for present value of debt service to exports), the country is classified as moderately indebted. If both ratios are less than three-fifths of the critical value, the country is classified as less indebted.

In the framework of the HIPC Initiative, a country is considered to have a sustainable external debt if the ratio of the present value external debt

(calculated based on all future debt service) to the three-year backward-looking average of exports of goods and nonfactor services (excluding workers' remittances) is smaller than or equal to 150 percent. Although this indicator has benefits, it also may be sensitive to shocks. Suppose, for example, that there is a peak in terms of exports at some point because of an increase in some commodity prices. Heavy indebtedness may not be observed then if the last three years of exports have been strong, but the country may still be in severe trouble if export prices fall over the next several years. Given the limitations of the export criterion, especially for countries with a high export-to-GDP ratio and a sensitivity to terms-of-trade shocks, the HIPC Initiative added a fiscal criterion of debt sustainability for countries that have an export-to-GDP ratio of at least 30 percent and a government revenue-to-GDP ratio of at least 15 percent. For HIPCs satisfying both of those thresholds, the HIPC Initiative considers an additional fiscal criterion: a HIPC's external debt is sustainable if the ratio of the present value of public and publicly guaranteed external debt to government revenues is smaller than or equal to 250 percent.⁸

Within the enlarged set of MDGs, target 15 is defined to deal comprehensively with the debt problems of developing countries through national and international measures to make debt sustainable in the long term. The four indicators for this target are (1) the proportion of official bilateral HIPC debt cancelled, (2) the debt service as a percentage of goods and services exports, (3) the proportion of official development assistance provided as debt relief, and (4) the number of countries reaching HIPC decision and completion points.⁹

Finally, the European Union's Maastricht Treaty (signed in early 1992) limited the ratio of government debt to GDP to 60 percent, though it also was agreed that higher ratios are acceptable as long as the debt-to-GDP ratio is falling sufficiently over time. Indeed, the majority of European Union member-states had debt-to-GDP ratios above 60 percent for most of the 1990s, and at least three countries (Belgium, Greece, and Italy) had debt-to-GDP ratios of more than 100 percent. In any event, it should be stressed that the Maastricht Treaty's debt-to-GDP ratio ought not be interpreted as a debt sustainability indicator, but as convergence criteria set by a group of European countries that intended to adopt a single currency by the end of 2001.

We can conclude, therefore, that there are two main criteria to assess debt sustainability. The first criterion is to look at the external sustainabil-

ity of a country's debt. The second criterion is to look at the fiscal sustainability of a country's debt. Whereas the external criterion compares a country's external debt or debt service to its exports, the fiscal criterion compares a country's public and publicly guaranteed debt or debt service to government revenues. The results based on these two categories of debt sustainability criteria often yield similar results, but external sustainability is neither necessary nor sufficient for fiscal sustainability, and vice versa.¹⁰ The three variables most commonly used as a denominator of a debt ratio or a debt service ratio are (1) a country's GDP (or GNP), (2) its exports, and (3) its government revenues.¹¹

It also must be noted that excluding debt sustainability indicators that compare a country's current debt service obligations to variables such as exports, there are two alternative approaches for defining debt sustainability. The traditional approach compares the nominal stock of disbursed and outstanding debt to a given macroeconomic variable. The more sophisticated approach calculates first the NPV of all future debt service on disbursed and outstanding debt, and then compares the NPV debt to some macroeconomic variable (such as GDP, exports, and/or government revenues). The NPV calculation sums up all future debt service obligations, whereby future debt service obligations are discounted depending on when the debt service is due. This is especially important if a country has a lot of concessional debt. But because the proportion of concessional debt in Paraguay is relatively low, we will use nominal debt indicators in this report.¹²

Theoretical Foundations for the Modules in SimSIP Debt

The SimSIP Debt modules include two simulation worksheets—one for debt projections and one for assessing the consistency of various debt and budget deficit scenarios. We discuss both modules in this section.

Debt Projection Module

The Debt Projection Module calculates the values for various debt indicators, based on three modeling elements: (1) the modeling of government expenditures; (2) the modeling of government revenues; and (3) the specification of the government deficit, which is financed by new borrowing after deducting grants and debt relief. Both expenditures and revenues are

influenced by the level of GDP (Y), which is determined by the previous year's level [$Y(t-1)$], the projected real growth rate for the year (g), and the inflation rate (π):

$$Y(t) = (1 + \pi(t))(1 + g(t))Y(t-1). \quad (6.1)$$

On the expenditure side, the module differentiates between interest payments on public foreign debt, interest payments on public domestic debt, principal repayments on foreign and domestic debt, and other government expenditures. The average interest rates (not the interest payments) on outstanding foreign and domestic debts are exogenously fixed for any given year by loan contracts, although the module differentiates between interest rates on public domestic and foreign debt. Given that new loans (arising from principal repayments and deficit financing) are generally a small fraction of the debt stock, interest rates on domestic and foreign debts change only slowly over time. For simplicity, principal repayments are financed by new loans, although not necessarily from the same source (domestic or foreign) and at the same interest rate and maturity. All other expenditures (all expenditures excluding interest and principal payments) are a predetermined percentage of GDP, although this percentage rate may change over time.

If we denote the interest rates on domestic and foreign debt by i_f and i_d (averages for the various loan contracts), the stocks of debt by $D_f(t-1)$ and $D_d(t-1)$, and the exchange rate by $E(t)$ —this is the ratio of the value of domestic to foreign currency—we have three kinds of expenditures: interest payments on foreign government debt [$i_f(t-1) * D_f(t-1) * E(t)$], interest payments on domestic government debt [$i_d(t-1) * D_d(t-1)$], and government expenditures on social and nonsocial sectors [$G_{sec}(t) = \alpha(t) * Y(t)$]. Total government spending is

$$G(t) = i_f(t-1) * D_f(t-1) * E(t) + i_d(t-1) * D_d(t-1) + \alpha(t) * Y(t). \quad (6.2)$$

On the revenue side, we simplify the analysis by combining tax revenues, seigniorage, and all other nontax revenues to one variable, namely the percentage share [$\beta(t)$] of GDP. Changes over time in this percentage share reflect changes in tax rates, the efficiency of revenue collection, and money financing.¹³ The simulator calculates the intermediate values based on a linear trend. Grants $N(t)$ and debt service relief $DSR(t)$ are determined exogenously by foreign donors. Like foreign borrowing, grants

and debt service relief are converted into domestic currency at the end of each period. If revenues before grants and before debt relief are denoted by $REV_{bef}(t) = \beta(t) * Y(t)$, revenues with grants and debt relief are¹⁴

$$REV_{aft}(t) = \beta(t) * Y(t) + E(t) * N(t) + E(t) * DSR(t). \quad (6.3)$$

Budget deficits $BD(t)$ are simply the difference between total revenues (including grants and debt relief) and total government expenditures:

$$BD(t) = G(t) - REV_{aft}(t). \quad (6.4)$$

The module assumes that the government faces no constraints in financing expenditures through new borrowing, and the user is free to choose what share of the new debt comes from domestic sources. If new domestic and foreign borrowing by the government are denoted, respectively, by $BD_d(t)$ and $BD_f(t)$, the change in debt is

$$BD(t) = E(t) * BD_f(t) + BD_d(t). \quad (6.5)$$

The simulator makes no assumptions for the impact of new borrowing on GDP growth, inflation, the exchange rate, and the level of loan concessionality.¹⁵ Although the assumptions for GDP growth, inflation, exchange rate depreciation, and average interest rates on domestic and foreign loans are exogenous variables, the module enables us to adjust the growth rate of real GDP downward, the inflation rate and the exchange rate depreciation upward, and the interest rates on domestic and foreign loans upward the higher the average ratio of government deficit to GDP is over the projection period. For countries with sustainable poverty reduction strategies in place, these considerations are less crucial because consultations with donors would reduce the existence of excessive financing gaps. Combining equations (6.4) and (6.5) yields

$$G(t) - REV_{aft}(t) = BD(t) = E(t) * BD_f(t) + BD_d(t). \quad (6.6)$$

The model is dynamic because the current year's budget deficit is linked to the previous year's budget deficit through the current year's total government expenditures, which include interest payments on the previous year's debt stock. When the level of debt is known over time, it is easy to compute the NPV of a country's public foreign debt by using

debt-service projections based on the average interest rate and the average maturity of outstanding public foreign debt. In any case, for a country's public domestic debt and a country's private foreign debt, the NPVs are set equal to the nominal values.

Deficit-Debt Consistency Module

The Deficit-Debt Consistency Module builds on the theoretical framework of the Debt Projection Module, although it abstracts from the details of the composition of revenues and expenditures and just looks at the difference between the current year's stock of debt [$D(t)$] and the previous year's stock of debt [$D(t-1)$], which is the current year's budget deficit [$BD(t)$] after grants and after debt relief:

$$D(t) - D(t-1) = BD(t). \quad (6.7)$$

As is shown in the SimSIP Debt manual, equation (6.7) can be expressed in percentages of GDP (denoted by Y); and for a given set of parameters, we can derive a simple equation that says the difference between this year's and last year's debt-to-GDP ratios is equal to this year's deficit-to-GDP ratio minus a factor k times last year's debt-to-GDP ratio:

$$[D(t)/Y(t)] - [D(t-1)/Y(t-1)] = [BD(t)/Y(t)] - k [D(t-1)/Y(t-1)]. \quad (6.8)$$

Depending on whether we look at the dynamics of the domestic or the external debt stock, the factor k is defined slightly differently, as shown in equations (6.9) and (6.10). However, as long as we assume that the share of domestic and external financing remains constant over time, we can derive a combined equation that keeps the total public debt-to-GDP ratio constant.

For domestic debt dynamics:

$$k_d = (g + \pi) / (1 + g + \pi + g\pi), \quad (6.9)$$

and for foreign debt dynamics:

$$k_f = (g + \pi - e) / (1 + g + \pi + g\pi), \quad (6.10)$$

where g is the GDP growth rate, π is the inflation rate, and e is the rate of devaluation.

Equation (6.8) can be solved to provide the deficit-to-GDP ratio that keeps the debt-to-GDP ratios constant; that is,

$$[D(t)/Y(t)] = [D(t-1)/Y(t-1)]. \quad (6.11)$$

Inserting equation (6.11) into (6.8) yields

$$[BD(t)/Y(t)] = k[D(t-1)/Y(t-1)]. \quad (6.12)$$

As shown in the SimSIP Debt manual, equation (6.8) also can be expressed in NPV terms, which, after some simplifying assumptions and after keeping the NPV debt-to-GDP ratios constant, results in the following equation:

$$[BD(t)/Y(t)] = (i_{old}/i_{new}) k[D(t-1)/Y(t-1)], \quad (6.13)$$

whereby i_{old} is the average interest rate on the previous year's debt stock, and i_{new} is the average interest rate on the newly contracted loans.

Extensions of equation (6.8) also allow for the derivation of deficit-to-GDP ratios that keep the debt-to-exports and the debt-to-revenues ratios constant, in either nominal or NPV terms.¹⁶

Simulations for the Debt Projection Module in Paraguay

Consistent with economic theory, we include Paraguay's domestic public and publicly guaranteed debt and exclude Paraguay's private external debt for the fiscal sustainability analysis. Moreover, we exclude all domestic public debt and include Paraguay's private foreign debt for the external sustainability analysis.

External Sustainability

To analyze Paraguay's external debt sustainability, we first note that Paraguay's total external debt was estimated in the year 2000 to consist of \$2.234 billion public and publicly guaranteed debt and about \$500 million private (nonpublicly guaranteed) foreign debt. For our baseline scenario, we use the initial conditions and assumptions as displayed in figure 6.1. Furthermore, we need to make an assumption on the growth rate of the private foreign debt, which we assume to grow always at the same

Figure 6.1. Initial Conditions and Basic Macroeconomic Assumptions

Initial Value	Public Foreign Debt		Nominal GDP	Initial Value	Grants	Exports	Exchange rate
	Stock	Int. Pay.					
	2,061	124	7,521		30.0	3,188	3,486
				Growth (t0)	2.0	2.5	11.0
				Growth (t15)	2.0	8.0	5.0

Value (2000)	Discount rate (%)	Interest rate (%)	Inflation rate (%)	Real GDP growth (%)	Rev. to GDP(%)	Primary	
						Spending to GDP(%)	Average Maturity (years)
Value (2000)	6.0	6.0	9.0	2.5	17.0	18.0	22
Value (2015)	6.0	6.0	5.0	5.0	17.0	18.0	22

Source: Authors' calculations, using SimsIP simulator software.

Note: Pay. = interest payment; Rev. = revenue.

rate as GDP. In this external sustainability analysis, we also assume that the GDP growth rate gradually increases from 2.5 percent in 2000 to 5 percent in 2015, and we keep this assumption about GDP growth the same for all our scenarios.

The different scenarios for this external sustainability analysis are determined by differences in the growth rate of exports. For the baseline scenario, we assume that exports grow at the same rate as GDP (2.5 percent in 2000 and 5.0 percent in 2015); in a low-export scenario, we assume that the growth rate of exports remains always at 2.5 percent; and in a high-export scenario, we assume that the growth rate of exports increases gradually from 2.5 percent in 2000 to 8.0 percent in 2015.

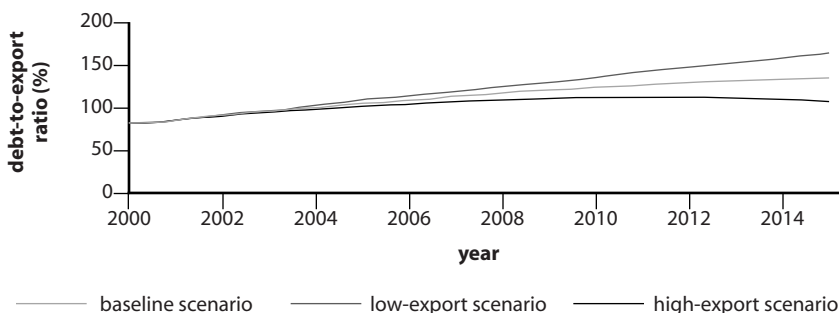
The results of these three scenarios are presented in figure 6.2, which shows an exponentially increasing external debt-to-export ratio for the low-export scenario, a more or less linear increase in the external debt-to-export ratio for the baseline scenario, and an initially increasing but then decreasing external debt-to-export ratio for the high-export scenario. In any case, we can see that, except for the high-export scenario, Paraguay is unlikely to achieve long-term external debt sustainability for the initial conditions and other assumptions as provided in figure 6.1. Again, this outcome would change if, for example, government revenues were to rise faster than spending.

Fiscal Sustainability

We analyze Paraguay's fiscal sustainability by looking at the impact of alternative scenarios on the public debt-to-GDP ratio, the public debt-to-

revenue ratio, and the public debt service-to-revenue ratio. The initial conditions and basic macroeconomic assumptions are provided in figure 6.1; the assumptions on Paraguay’s domestic public and publicly guaranteed debt are shown in figure 6.3. We then modify the macroeconomic assumptions by considering, first, a pessimistic scenario of 0 percent GDP growth throughout the projection period and, second, an optimistic scenario of a gradual increase in the GDP growth rate from 2.5 percent in 2000 to 10 percent in 2015. Note that whereas growth in a country depends in part on policy decisions regarding spending, taxation, and debt, it is defined here in a purely exogenous way to simplify the analysis. Thus

Figure 6.2. Results of Different Export Growth Scenarios



Source: Authors’ calculations, using SimSIP simulator software.

Figure 6.3. Assumptions on Public Domestic Debt

Public Domestic Debt				
	Public Domestic Debt (US \$)	Interest on Public Domestic Debt		
Initial Value	265	34.45		
	Share of Domestic Financing	Interest Rate	Discount Rate	Average Maturity
Value (t0)	10	13	6	5
Value (t15)	15	8	6	5

Source: Authors’ calculations, using SimSIP simulator software.

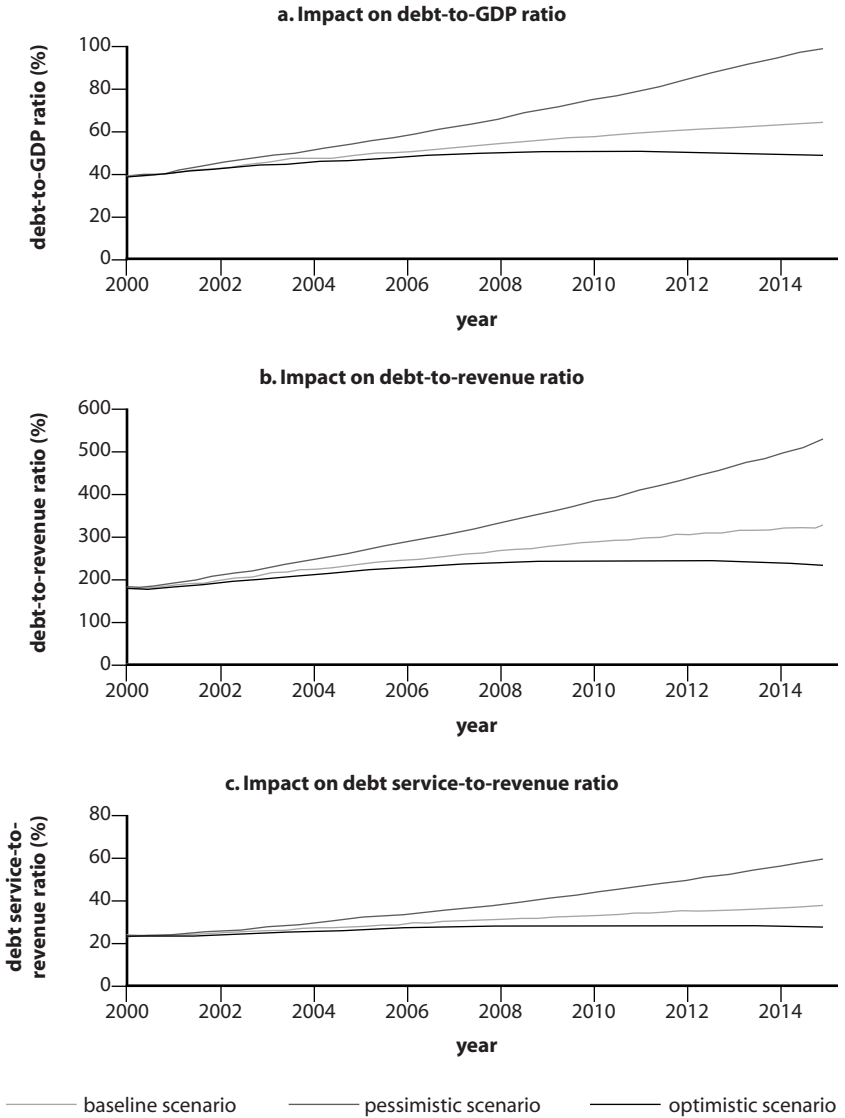
there is no feedback to growth from the other variables in the model. Also, although the simulator enables the user to assess the impact of debt relief, we do not do this here because Paraguay does not participate in the HIPC Initiative.

Figure 6.4 presents the results for the three GDP growth scenarios. The graphs show the evolutions of the debt-to-GDP ratios, the debt-to-revenue ratios, and the debt service-to-revenue ratios for the baseline, pessimistic, and optimistic growth scenarios. In the optimistic scenario, the debt ratios do not increase substantially, whereas they are much higher in 2014 than in 2000 in the baseline and pessimistic scenarios. That is because, in the assumptions in figure 6.1, we have maintained levels of spending and revenues that lead to a deficit, and over time, that deficit, together with interest payments, increases the debt level.

In the graphs presented in figure 6.5 we see the impact of different evolutions of government revenues and spending, keeping other initial conditions and assumptions as shown in figures 6.1 and 6.3. The high-expenditure scenario gradually increases the government's primary expenditure to reach 20 percent of GDP in 2015, leaving the initial percentage for 2000 unchanged at 18 percent. This implies that the government gradually increases its primary budget deficit (that is, before taking into account its debt service) to reach 3 percent of GDP in 2015. Alternatively, the high-revenue scenario gradually increases the revenue-to-GDP ratio from the initial 17 percent in 2000 to 19 percent in 2015. The gradual increase of the revenue-to-GDP ratio over 15 years suggests that the government will run a decreasing primary deficit for the first 7 years, and the deficit then will turn into an increasing primary surplus starting in 2008. However, debt-to-GDP ratios will continue to increase until 2010 because debt service payments remain.

Comparing the high-expenditure scenario in figure 6.5 with the pessimistic scenario in figure 6.4, we can see that the zero growth rate of GDP has a more detrimental impact on Paraguay's debt than does the gradual increase in the share of government expenditures to GDP. On the other hand, the gradual increase in the share of government revenues to GDP—from 17 percent to 19 percent—has a more positive effect on Paraguay's indebtedness than does the high-growth GDP scenario. Of course, those conclusions are specific to our assumptions; the reader could run the simulator with other assumptions.

Figure 6.4. Results of the Baseline, Pessimistic, and Optimistic Scenarios

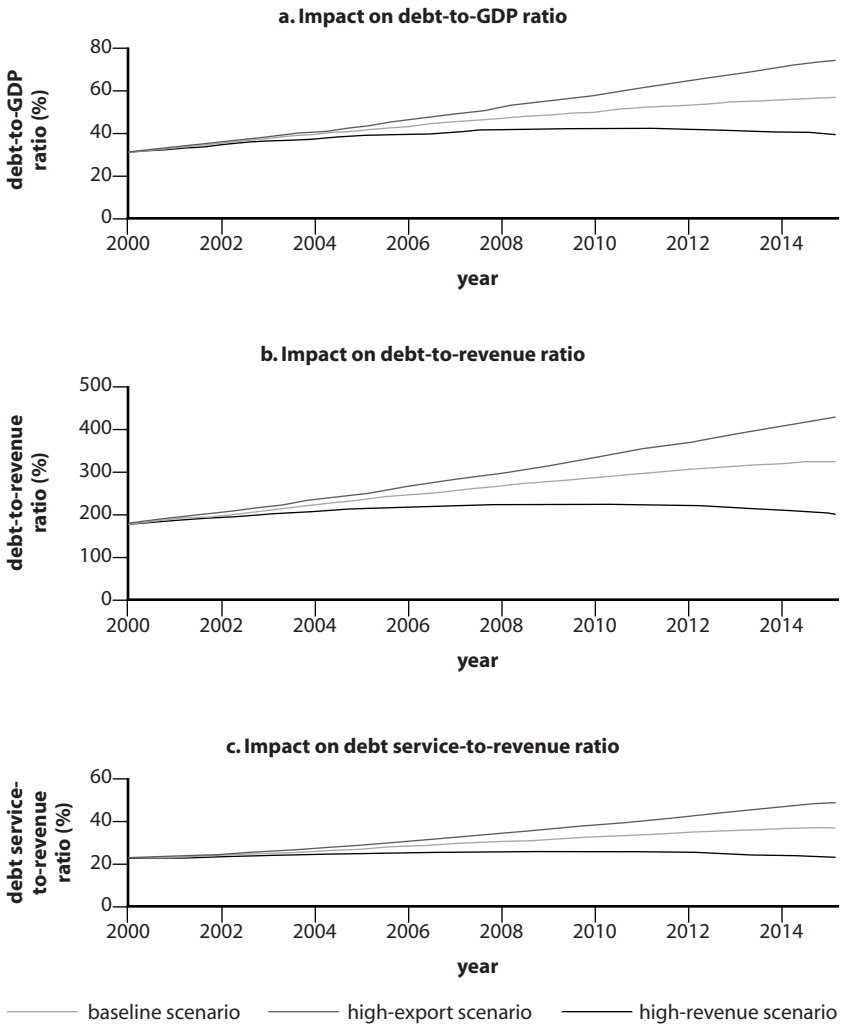


Source: Authors' calculations, using SimSIP simulator software.

Note: GDP = gross domestic product.

Note that these differences in results are largely due to having kept the expenditure-to-GDP and the revenue-to-GDP ratios constant in both the pessimistic and the optimistic scenarios. In reality, changes in growth rates

Figure 6.5. Results of Different Revenue and Expenditure Scenarios



Source: Authors' calculations, using SimsIP simulator software.

Note: GDP = gross domestic product.

usually will have an impact on the expenditure and revenue shares. Here we analyzed the impact of the various changes separately to see the effect of each parameter change and to show that similar results can be reached through different parameter changes.

Simulations for the Deficit-Debt Consistency Module in Paraguay

We now estimate the level of budget deficit that is consistent with various levels of short-run or long-run indebtedness and various growth scenarios. The two matrices shown in table 6.1 provide the short-term and

Table 6.1. Short- and Long-Term Consistency Matrices

a. Short-term consistency matrix				b. Long-term consistency matrix			
	GDP growth (%)				GDP growth (%)		
	3	4	5		3	4	5
<i>Total public debt/GDP</i>	<i>Sustainable deficit</i>			<i>Total public debt/GDP</i>	<i>Sustainable deficit</i>		
10	0.1	0.2	0.3	10	0.3	0.4	0.5
20	0.2	0.4	0.5	20	0.6	0.7	0.9
30	0.3	0.5	0.8	30	0.8	1.1	1.4
40	0.4	0.7	1.1	40	1.1	1.5	1.8
50	0.4	0.9	1.3	50	1.4	1.8	2.3
<i>External public debt/exports (%)</i>	<i>Sustainable deficit</i>			<i>External public debt/exports (%)</i>	<i>Sustainable deficit</i>		
10	0.1	0.3	0.4	10	1.2	1.3	1.5
20	0.2	0.5	0.9	20	2.3	2.7	3.0
30	0.2	0.8	1.3	30	3.5	4.0	4.5
<i>Total public debt/revenue (%)</i>	<i>Sustainable deficit</i>			<i>Total public debt/revenue (%)</i>	<i>Sustainable deficit</i>		
140	0.1	0.3	0.5	140	0.7	0.9	1.1
160	0.1	0.4	0.6	160	0.8	1.0	1.2
180	0.1	0.4	0.7	180	0.9	1.1	1.4
200	0.1	0.4	0.7	200	0.9	1.2	1.5
220	0.2	0.5	0.8	220	1.0	1.4	1.7

Source: Authors' calculations, using SimSIP simulator software.

Note: GDP = gross domestic product. Given real GDP growth rates (%), deficit-to-GDP ratios (%) consistent with various total nominal public debt-to-GDP ratios (%), nominal public external debt-to-export ratios (%), and total nominal public debt-to-revenue ratios (%).

long-term deficit-to-GDP ratios that are consistent with a range of GDP growth rates and a range of debt-to-GDP ratios, keeping the initial values and other parameters constant at their short- and long-term values. The short-term scenario corresponds to the values specified in figure 6.1, which means that the figures take into account 2000 data. The long-term scenario is based on the 2015 calculated values of the same parameters in figure 6.1. In both cases we assume that the share of domestic financing is kept constant at 12.8 percent and that the interest rate on public domestic debt remains fixed at 13.0 percent.

We can see that the budget deficit-to-GDP ratios for the long-term analysis are higher than for the short-term analysis, largely because of the more-than-proportional decrease in the rate of devaluation compared with the decrease in the inflation rate.¹⁷ Recall that the driving force for the consistency matrix is the factor k , defined in equations (6.9) and (6.10). If the devaluation and inflation rates would decrease in the same proportion, there would not be much difference between the short- and long-term consistent budget deficit-to-GDP ratios. The short- and long-term deficit-to-GDP ratios that are consistent with a range of GDP growth rates and a range of debt-to-exports and debt-to-revenue ratios are also shown in table 6.1. The positive effect of the relatively lower devaluation also is visible in the short- and long-term comparisons for these simulations. Furthermore, we can see that the consistent deficit-to-GDP ratios for all three short-term analyses are about the same. That is true because GDP, exports, and revenues all grow at the same rate of 2.5 percent for the short-term analyses. Conversely, the comparison of the long-term analyses shows that the consistent deficit-to-GDP ratios are considerably higher for the external public debt as a share of exports analysis, which occurs because exports are assumed to grow at 8 percent, compared with the 5 percent growth rates of GDP and revenues.

Finally, note that when assessing what level of budget deficit is sustainable, it is best to rely on the lowest level admissible under the various debt criteria because the various criteria must more or less be observed, given that there are good economic rationales for observing each and every criterion.

As shown in the SimSIP manual, there are a couple other general results that can be pointed out without running further simulations and that are worth mentioning here:

- The higher the real GDP growth rate and the higher the value of a debt indicator are, the higher is the value of the consistent budget deficit-to-GDP ratio, though it should be stressed that high debt indicators can lead to a debt overhang and low levels of GDP growth.
- The higher the inflation rate and the lower the devaluation rate are, the higher is the value of the consistent budget deficit-to-GDP ratio, though it should be stressed that the two variables usually are moving in the same direction because higher inflation rates usually suggest higher devaluations in the future.
- If a country is in the process of obtaining increasingly concessional loan terms from external creditors, the deficit-to-GDP ratios consistent with a specific NPV debt indicator and a given growth rate are higher than with a specific nominal debt indicator. (We did not discuss this here because our analysis is in nominal terms).
- If GDP and exports grow at the same rate, there will be no difference between the consistent ranges of deficit-to-GDP ratios for both the debt-to-GDP ratios and the debt-to-export ratios. Similarly, if GDP and revenues grow at the same rate, there will be no difference between the consistent ranges of deficit-to-GDP ratios for both the debt-to-GDP ratios or the debt-to-revenues ratios.
- The higher the growth rates of exports are, relative to the growth rates of GDP, the higher are the ranges of consistent deficit-to-GDP ratios for the debt-to-export ratios, compared with the consistent deficit-to-GDP ratios for the debt-to-GDP ratios. Similarly, the higher the growth rates of revenues are, relative to the growth rates of GDP, the higher are the ranges of consistent deficit-to-GDP ratios for the debt-to-revenues ratios, compared with the consistent deficit-to-GDP ratios for the debt-to-GDP ratios. Finally, the higher the growth rates of exports are, relative to growth rates of revenues, the higher are the ranges of consistent deficit-to-GDP ratios for the debt-to-export ratios, compared with the consistent deficit-to-GDP ratios for the debt-to-revenues ratios.

Conclusion

Using alternative macroeconomic assumptions and using the Debt Projection Module of the SimSIP Debt simulator, we have shown that both optimistic and pessimistic views on the Paraguay's future debt sustain-

ability can be entertained. As in other countries, changes in key parameters tend to have a large impact on sustainability. As our high-revenue scenario showed, for example, a gradual increase in the share of revenues to GDP from 17 percent to 19 percent over a period of 15 years (keeping everything else constant) could lead to a reversal in the otherwise worsening debt ratios in Paraguay. This sensitivity to changes in assumptions makes it difficult to provide good long-term estimates of a country's indebtedness; but it also shows that, in principle, public action to correct trends can be implemented, assuming that there is a capacity and the political will to do so. At the same time, we know that some factors are not necessarily within the control of governments. For example, changes in exchange rates are not always related to economic fundamentals, or they may overshoot fundamentals. When there is a crisis of investor confidence caused by increasing budget deficits, it can trigger first a currency crisis and then a debt crisis.

This study was written for illustrative purposes, and not for policy suggestions. However, it is worthwhile to recall that, at the time of writing, there were conflicting views of Paraguay's debt outlook. That is not too surprising because debt sustainability is an important topic for developing countries, and a sensitive one. From a macroeconomic point of view, it is also an area that must be dealt with very carefully. For example, greater debt may imply a higher deficit because of the interest expense, and this may be considered sustainable if high rates of economic growth are forecast. But if those high growth rates do not materialize for some reason, a country may fall into a debt spiral. When conducting debt analysis, therefore, one should be very careful not to use such an analysis to prop up spending and deficit budgets, even within the context of poverty reduction strategies that show high levels of need in any given country.

Annex

Table 6A.1. Trends in Paraguay's Debt, 1991–2000

Current US\$ millions

<i>Type of debt</i>	<i>1991</i>	<i>1992</i>	<i>1993</i>	<i>1994</i>	<i>1995</i>	<i>1996</i>	<i>1997</i>	<i>1998</i>	<i>1999</i>	<i>2000</i>
Total PPG debt	1,771	1,377	1,338	1,472	1,535	1,516	2,246	1,933	2,385	2,583
External debt	1,685	1,364	1,283	1,359	1,441	1,403	1,452	1,578	2,072	2,234
Public external debt	719	732	774	833	1,007	1,008	1,022	1,128	1,589	1,695
Publicly guaranteed external debt	965	632	508	526	434	395	429	450	483	539
Domestic debt	87	13	56	114	95	113	794	355	314	349
Public domestic debt	37	7	34	70	66	82	559	254	240	265
Publicly guaranteed domestic debt (estimated)	50	6	22	44	29	32	235	101	73	84
Private external debt	20	21	26	138	338	408	482	534	558	450
<i>Memorandum items</i>										
Gross domestic product	5,265	6,249	6,447	6,875	7,853	9,016	9,628	9,612	8,598	7,741
PPG external debt-to-GDP (%)	32.0	21.0	19.9	19.8	18.3	15.6	15.1	16.4	24.1	28.9
Total external debt	1,705	1,385	1,308	1,496	1,778	1,811	1,934	2,112	2,630	2,684
Exports of goods and services	1,885	1,810	2,539	2,688	3,140	2,775	2,615	2,426	1,779	1,525
Total external debt-to-exports (%)	90.4	76.5	51.5	55.7	56.6	65.3	73.9	87.1	147.8	176.0

Sources: Public external and public domestic debt data are from the Government of Paraguay's Web site (<http://www.hacienda.gov.py>); the sums of PPG external debt, private external debt, GDP, and exports are from the World Bank's Development Indicators database (except PPG external debt for 2000, which is based on data from the Central Bank of Paraguay); publicly guaranteed domestic debt data are estimated based on the ratio of public to publicly guaranteed external debt; GDP is from the World Bank's Development Indicators database; and the percentage of external debt relative to GDP is calculated on the foregoing data.

Note: GDP = gross domestic product; PPG = public and publicly guaranteed.

Notes

1. The SimSIP Debt simulator and its manual are available free of charge on the World Bank's SimSIP Web site, <http://www.worldbank.org/simsip>.
2. We use data until 2000 in this report; the situation has deteriorated further since then.
3. This share increased from 3.1 percent of GDP in the early 1990s to 7.4 percent in the late 1990s. Even at the end of that decade, only the Dominican Republic, El Salvador, Guatemala, and Peru had lower levels of spending as a share of GDP, whereas 11 countries in the study sample of the study had higher levels of spending; for Honduras, the level of spending was the same as for Paraguay.
4. This is a sharp increase to the June 2002 debt outlook, which projected the debt/GDP ratio at about 54 percent. The latest EIU's debt outlook is available on the American International Group's Web site, <http://www.aigonline.com>.
5. A detailed derivation of the theory underlying the two modules can be found in the simulator's Manual, which is available on the Web.
6. Again, we want to emphasize that the assumptions used and the results presented are for illustrative purposes only and should not be interpreted as the authors' own projections for Paraguay. Given the no-charge availability of the simulator on the Internet, the reader is welcome to simulate Paraguay's debt sustainability based on alternative assumptions.
7. For the key issues related to long-term debt sustainability of heavily indebted poor countries (HIPC), see Gunter (2001) and IMF and World Bank (2001).
8. For more information, see the World Bank's HIPC Web site, www.worldbank.org/hipc/.
9. Please see <http://www.undp.org/mdg/> for further information.
10. As Sachs et al. (1999) have pointed out, if debt sustainability is approached from a human and social development perspective, most of the poorest countries have an unsustainable debt simply because they have more urgent needs to reduce poverty than to make debt-service payments.
11. Note that there exists a variety of options for defining each of these three macroeconomic variables. For example, exports could include or exclude worker's remittances, take into account reexports or not, and be based on current-year values or be averaged over some time period.
12. There are many options for determining discount rates; and, depending on user preferences, distinctions can be made in terms of the currency in which future debt service is payable (for example, the discount rate for the U.S. dol-

lar or the British pound), the kind of reference rate to use for the discount rate (for example, the lending rate or the borrowing rate), the time period for the discount rate (such as the short-term or long-term lending rate), and the period over which the discount rate is averaged (such as over the last six months or the last 10 years). Because of the practical and theoretical limitations of using a complex definition of short-term discount rates to determine long-term debt sustainability, the SimSIP Debt's Debt Projection Module uses only one discount rate, which is flexible over time. As illustrated in more detail in Gunter (2002), there is no definitive correct or wrong concept of how to define discount rates. Generally however, using long-term average discount rates is preferred to avoid changes in the resulting NPV calculations that arise from marginal and arbitrary short-term changes in discount rates.

13. To avoid negative implications of increased money financing on growth, money financing usually is restricted. In general, the noninflationary level of seigniorage is limited to about 1 percent of GDP.
14. Note that changes in $\beta(t)$ over time may be occurring because of a natural relationship between taxes and income growth. We do not discuss here whether tax bases tend to rise proportionately with GDP, less so, or more so; nor do we estimate the elasticity of spending to GDP. The SimSIP simulator lets the user choose different values for the key parameters over time.
15. In reality, increased borrowing tends to increase the growth rate of real GDP up to some critical level (which is difficult to determine), and consistently high government deficits tend to have negative effects on real GDP growth and price stability. Depending on the country's access to foreign concessional financing, the costs of new borrowing also may increase with a rising fiscal deficit. At low levels of fiscal deficits, the portion of concessional financing will be relative high. With rising financing gaps, more and more new loans will have increased interest rates.
16. See the SimSIP Debt manual for the detailed equations.
17. In Paraguay, the developments of the late 1990s have shown that the rate of devaluation was persistently above the inflation rate. Although this may be caused by some catch-up effect from the early 1990s, when devaluations were considerably smaller than inflation rates, we would expect that the rate of devaluation is slightly above the rate of inflation in the long term.

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CHAPTER 7

Evaluating a Tax System

Mexico

Jorge Martinez-Vazquez

Mexico's tax system is a paradox. The tax policy and tax administration reforms of the late 1980s and early 1990s delivered a tax structure that in many ways is comparable, if not superior, to that in a number of Organisation for Economic Co-operation and Development (OECD) countries. Compared with many developing economies, however, Mexico's tax system continues to underperform in some fundamental ways, particularly in its ability to raise adequate revenues. The basic objectives of this evaluation are to explain this paradox and to identify the most important avenues for reform in tax policy, tax administration, and the political economy of tax reform in Mexico.

Revenue Adequacy: Comparing across Countries and Examining the Budget Deficit

One measure of fiscal adequacy in any country is whether sufficient revenues are generated to meet the desired level of expenditures. Failing to

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generate a sufficient amount of revenues can be attributed to either an unrealistic level of expenditures or inadequate revenue performance. Numerous previous studies have noted that the level of public expenditure in Mexico is too low for the country's physical infrastructure and human capital needs. Given this consensus, one of the Mexican tax system's most important problems is its inability to yield adequate revenues to finance basic public sector goods and services.¹

Over time, the ability of Mexico's tax system to raise revenues has not changed much and perhaps it has deteriorated more recently. At the end of the 1990s, tax revenues for the general government² as a percentage of gross domestic product (GDP)—one of the most common measures of revenue performance—remained slightly below the levels of the 1980s, in the neighborhood of 17 percent. Although general government revenues as a percentage of GDP have moved up and down since the 1980s, they have remained relatively stable overall, averaging 19 percent. Discounting the effect of privatization revenues in 1991, 1992, and 1994, general government revenues appear to have grown at the same pace as the economy over time. The narrower measures of total federal revenues (which exclude social security funds and subnational governments) and federal tax revenues (which exclude oil and other nontax revenues) as a percentage of GDP exhibited patterns similar to those of general government revenues over the same period.

The overall adequacy of revenues can be investigated further using two very different approaches. The first approach involves relevant international comparisons. The second approach examines the overall behavior of the government budget deficit.

International Comparisons

One way to approach the question of revenue adequacy in Mexico is to ask whether the country's tax effort is in line with those of other countries at the same level of development and with similar general economic characteristics. Although it is clear that there is no ultimate way to establish how high taxes should be in a country, the comparison with international practice enables us to know how far Mexico may be below (or above) the international norm. If the level of tax effort in Mexico is too low with respect to the international norm, it would indicate that less than the adequate level of public services is being provided and that the

level of public infrastructure is less than required for the country's development. Comparing Mexico's tax effort with those of other countries at similar levels of development also suggests how much tax effort can increase in Mexico without getting out of line with countries potentially competing for foreign direct investment.

For 1997, Mexico's tax effort lagged behind other comparable Latin American countries, whether measured as general government revenues as a percentage of GDP or only tax revenues as a percentage of GDP. By comparison to its partners in the North American Free Trade Agreement (NAFTA), Mexico exercises less than half the tax effort of Canada and a little over half the tax effort of the United States. Simply making comparisons of the ratio of tax revenues to GDP across countries may be misleading, however, because the ability to collect taxes across countries may differ as a result of the varying availability of tax handles and, in particular, because the overall level of development may differ. Therefore, in making international comparisons on tax effort, it is useful to control for these differences in ability to collect taxes. To this end, we use regression analysis to estimate the average capacity to collect taxes for a sample of countries, controlling for GDP per capita and for other proxies for the ability to collect taxes. Then we use these regressions to predict the level of tax effort that would be exerted on average, given the per capita income and other characteristics of any particular country.

More specifically, in the regression analysis approach the dependent variable is taxable capacity as measured by the ratio of tax collections to GDP. We regress this measure of taxable capacity on a variety of proxies for the tax bases, which are the independent variables in the regression analysis. From each estimated equation, a predicted value of the tax collection-to-GDP ratio is obtained—that is, the amount the country could collect if it exerted an “average” tax effort. The effective level of tax effort is then defined as the ratio of actual to predicted tax effort. By calculating the ratio of actual to predicted tax collections, we can derive a cleaner measure of tax effort because we are controlling for the effect of changes in the general tax base over time.

There are many different specifications that can be used in estimating tax effort across countries. Here we use three different models that often have been used in the past in this kind of analysis. For examples, see Bahl, Martinez-Vazquez, and Wallace (1996). Each of the models enables us to

derive an index for ranking countries according to their effective levels of effort. These models are

$$\text{Model 1: } T = a + b Y + c X_m$$

$$\text{Model 2: } T = a + b \text{ Mine} + c \text{ Ag}$$

$$\text{Model 3: } T = a + b Y + c X_m + d \text{ Ag},$$

where T = ratio of tax collections to GDP, Y = per capita GDP, X_m = ratio of the sum of exports plus imports to GDP, Mine = share of mineral and fuel exports in GDP, and Ag = share of agriculture in GDP.

As indicated above, the independent variables attempt to capture the effects of differences in overall economic structure on the ability to raise taxes. In particular, a higher level of per capita GDP proxies a generally greater ability to collect taxes. Similarly, a larger external sector (imports plus exports) and a larger share of mineral and fuel exports in GDP also proxy a greater ability to collect taxes. On the other hand, the larger the share of the agricultural sector in GDP, the lower the ability to collect taxes. The data used for the estimation are from the International Monetary Fund's *Government Finance Statistics Yearbook* (IMF 1999) and the World Bank's *World Development Indicators* (2000). The models were estimated for a sample of 32 developing countries from 1990 through 1996. By estimating tax effort over time, we are less likely to draw inferences based on the impact of conditions in a single year. Regardless of the model specified, Mexico ranked consistently among the bottom third of sample countries in terms of the level of tax effort. According to the three models, Mexico's tax effort was 82 percent, 63 percent, and 70 percent of the international average, respectively.³ Based on those estimates, a "normal" tax effort (tax collections as a percentage of GDP) for Mexico during that period would have been between 12.75 and 16.75 percent, as compared to the actual 10.5 percent. This is a fairly substantial gap in tax effort.

Tax Effort and the Budget Deficit

An alternate approach to assessing Mexico's tax effort is to examine the level and persistence of the budget deficit. The basic premise in this approach is that a budget deficit that is high and persistent could be taken as valid evidence that tax effort is too low for the expenditure needs of the country.

The actual budget deficit in Mexico exhibited very different profiles during the 1980s and 1990s. In the first decade, budget deficits greater than 10 percent of GDP were common. During the 1990s, however, the budget deficit never exceeded 4 percent of GDP and quite often was maintained under 1 percent of GDP.

Clearly, the sustained deficits during the 1980s could be interpreted as indicating that Mexico's level of tax effort was too low to cover the level of expenditures desired by the government. The budget imbalance during the 1980s was very pronounced. (Note that closing a deficit of 10 percent of GDP would have required practically doubling the level of tax effort.) But the same conclusion obviously does not apply to the 1990s. During that decade, the level of tax effort appears to have reflected the desired level of government expenditures more appropriately. Actually, the very small budget deficits since 1993 could indicate that Mexico has reached some sort of equilibrium relative to its desired level of tax effort. This conclusion, however, is subject to a general caveat. The absence of deficits only means with certainty that fiscal discipline has been enforced within available resources. It still is possible that the government may desire to increase its level of expenditures, and doing so will call for a higher tax effort if fiscal discipline is to be maintained.

Tax Structure

Mexico's tax revenue structure is similar to that of other modern tax systems, including the systems of OECD countries (Dalsgaard 2000). The share of federal revenue in general government revenues declined slightly over the 1980s and 1990s, from close to 88 percent in the early 1980s to 83 percent in 1998. Some of the difference went to social security revenues and to revenues generated by subnational governments themselves. From a revenue viewpoint, Mexico still can be considered a centralized country. In 1998, subnational government own-source revenues represented less than 6 percent of general government revenues.⁴

The federal government structure counts on income taxes (personal income tax [PIT] and corporate income tax [CIT], including the gross asset tax) as the most important source of revenue. In 1998, for example, income taxes represented 31 percent of total federal revenues. The relative importance of income taxes has fluctuated significantly over the past decades, reflecting the frequent changes in tax policy, the high sensitivity of income

taxes to the business cycle, fluctuations in revenues from petroleum, the significant spike in privatization proceeds in the early 1990s, and possibly the how income taxes have been adjusted with respect to inflation.⁵

The second most important source of federal revenues is the value-added tax (VAT), which represented 22 percent in 1998. The relative importance of the VAT has fluctuated widely during the past decades, reflecting, among other things, the increase in collections in 1990 after the federal tax administration service (Sistema de Administración Tributaria, SAT) took over collections from the regional administrations and the 1992 drop in the general rate (from 15 to 10 percent) and its increase again during the 1995 recession. The third most important source of federal revenues is hydrocarbon duties paid by Pemex, Mexico's state-owned petroleum company. A very close fourth source of revenues is excise taxes, which have experienced a significant increase over the past decades.

The direct contribution of hydrocarbon duties hides the relative importance of Pemex as a source of revenues for the federal government. The increases in collections from taxes on domestic goods and services (value-added and excise taxes) have come from taxes on petroleum products (see World Bank 2000). The hydrocarbon duty comprises an oil extraction royalty, the regular income tax, and an excise tax. Pemex, however, also contributes to federal revenues, paying ordinary VAT and custom duties, as well as an "excess profit fee" on windfall gains from oil exports. Although Pemex's payments have declined since the early 1980s, when all taxes are added, revenues from Pemex operations still represent the same share of federal revenues that they represented in the early 1980s—approximately 34 percent. The relative importance of taxes on international trade has decreased as expected from trade liberalization before and after NAFTA, but import taxes still represented 4 percent of federal revenues in 1998.

By comparison with other Latin American countries, the composition of tax revenues at the central government level in Mexico shows an adequate level of tax effort (as percent of GDP) for income taxes, but a relatively lower level of effort for domestic taxes on goods and services. For example, Chile, Costa Rica, and Peru all raise a higher share of GDP through VAT and excise taxes than does Mexico. Thus, if the government is committed to raising the overall level of tax effort in terms of GDP in the new round of tax reform, a logical area for increasing tax effort is to raise collections from the VAT and perhaps from excises.

Buoyancy of Revenues

Another important property of a tax system is its ability to generate automatic growth in fiscal revenues over time. The adequate rate of growth depends on the expenditure goals of government. A natural benchmark for dynamic performance of a tax system over time is its ability to grow at the same rate as GDP. Tax revenues increase over time because tax bases grow with the economy, because changes in the tax laws either broaden tax bases or increase tax rates, or because there is better enforcement of an existing tax structure. When only the first effect is present, the ability to grow is measured by the elasticity of the tax system; and when all effects can be present, the ability to grow is measured by its buoyancy.⁶

This means that the question of revenue adequacy also needs to be understood in a dynamic sense. The tax system must be able to collect more as the economy as a whole grows. This is an important feature of any tax system because the demand for public services also is very likely to expand with growth. If tax revenues grow automatically with the entire economy, a balanced budget can be maintained without a recurrent need for introducing new taxes or raising the rates of existing ones.

Formally, the elasticity is defined as the ratio of the proportional change in revenues to the proportional change in the tax base. It is often the case that GDP is used in lieu of the tax base. If the elasticity is greater than one, the government is able to expand the provision of goods and services as the economy grows and even is able to reduce taxes (by lowering tax rates, for example). Conversely, if the elasticity is less than one, the government will struggle to keep up with the services demanded by a larger economy, and to avoid budget deficits it will have to introduce new taxes or increase the existing ones (by increasing tax rates, for example).

A correct measure of tax elasticities requires the observation of changes in tax revenue arising exclusively from changes in the tax base. However, the observed changes in tax revenues often are the result of changes in the structure of taxes (such as tax rates or the definition of the tax base) or of changes in the tax administration (such as a stricter enforcement of the tax laws). When it is not possible to disentangle all these different effects, the ratio of the proportional change in tax revenues to the proportional change in the tax base of GDP is known as the buoyancy of the tax to differentiate it from the stricter concept of elasticity. Although some attempt has been made here to control for the impact of discretionary

changes in the tax structure, the values reported should be interpreted as buoyancy coefficients rather than elasticities.

This section examines the buoyancy of the Mexican tax system using two similar approaches. In the first case, we calculate the year-to-year buoyancy for overall revenues and each separate revenue source with respect to GDP. In the second case, we use regression analysis to estimate the average buoyancy of tax revenues over the period covering the past decades.

The average year-to-year buoyancy of total general government revenues with respect to GDP was 0.93 for the period 1980–99. For federal government revenues, which, unlike general government revenues, do not include social security contributions and subnational government tax revenues, the average year-to-year buoyancy for the period was 0.88. This buoyancy is a composite of the behavior of federal tax revenues (with an average buoyancy of 1.2 for the period), and of federal nontax revenues, with an average buoyancy of 0.7. The year-to-year buoyancy for individual sources of revenues revealed the impact of changes in the economic environment, including recessions,⁷ changes in the price of oil, and changes in tax structure (such as the lowering of the general VAT rate in 1992). The buoyancy coefficients for the separate taxes exhibited several interesting patterns. For the years 1997–99, the buoyancy of all major taxes (income, value-added, and excise) has been significantly greater than unity, which means that these tax revenues increased more than proportionally with GDP. This may reflect both the recovery from quite low performance in the previous years and a built-in elasticity of the current tax structure that can generate an increasing tax effort if no discretionary tax measures are adopted to offset this pattern. The periods 1993–97 and 1989–92 were both periods of low buoyancy—the first because of bad economic conditions and the latter because of discretionary changes in the tax structure. But note that, with just a few exceptions, the major taxes had not shown significant buoyancy in the 1981–86 periods.

Turning to the second approach for estimating the buoyancy of the tax system, we use regression analysis to derive the average buoyancy of the tax system over the period 1980–99. We regress the natural logarithm of the revenue series on the natural logarithm of the GDP series. The resulting coefficient for GDP provides an estimate of the average buoyancy of the revenue series over the period 1980–99.⁸ The most significant finding is that the estimated buoyancy for most revenue aggregates—including

general government total revenues, federal government total revenues, and federal tax revenues—is unitary or very close. The same is true for the major individual taxes. The only significant divergence is for hydrocarbon duties, which showed a buoyance over the entire period of 0.88. In short, Mexico's tax system, after many structural reforms, improvements in tax administration, and significant turns in the business cycle, managed to yield increases in tax revenues that just kept pace with GDP, neither surpassing nor lagging behind it. This should not be a surprising result, given that the ratio of tax revenues to GDP remained quite constant over the period. Of course, these results support (although do not prove) the hypothesis that Mexico's policy makers steered the system over the previous decades so as to maintain a given level of tax effort.

Revenue Stability

Another significant feature of tax systems is their relative revenue stability over time. We use the coefficient of variation⁹ to examine how the different sources of revenues varied relative to their mean over the period 1980–99. As the coefficient of variation increases, the relative dispersion or variability of the series increases. All aggregate measures of government revenues showed a high degree of volatility over the entire period, with the coefficient of variation for federal revenues of 1.16. Federal tax revenues showed more volatility (with a coefficient of variation of 1.22) than did federal nontax revenues (with a coefficient of 1.11). Correspondingly, the most important taxes (income, value-added, and excise) showed more volatility over the period than did revenues from hydrocarbon duties. Volatility of all tax sources was higher, often more than double, during the 1980s than during the 1990s; for the most part, this resulted from differences in inflation during the two periods.

Revenue instability may be a positive feature at the federal level of government if revenues move with the business cycle so that they expand more than proportionally during expansions and contract more than proportionally during contractions. Revenue stability, or lack of volatility, is a desired characteristic at the subnational level because state and local governments generally have less ability to borrow during business activity contractions, and many of the services provided at this level (such as education) require a steady flow of funds. All of this is true in Mexico, but subnational taxes in Mexico do not appear to have been less volatile than fed-

eral revenues for the period (1990–99) for which subnational data are available.

Has the volatility of federal revenues in Mexico worked as a built-in stabilizer to moderate the business cycle? This question has been studied (World Bank 2000) and the results of the analysis are summarized here. Whether tax revenues have moved with or against the cycle is approximated by the correlation coefficient between the revenue series and the cyclical component of real GDP.¹⁰ Over the period 1980–99, total federal revenues were not tightly correlated with real GDP. The correlation coefficient was only 0.2. This result is the composite of two elements. First, tax revenues moved positively with the cycle as expected because most tax bases are positively related to GDP. But, second, nontax revenues (which include hydrocarbon duties) were approximately acyclical, which means they did not show any pattern relative to GDP. Therefore, their overall impact on the business cycle is relatively weak in Mexico. One of the reasons for this weakness is that these taxes represent only a fraction of public sector revenues. Between one-third and one-fourth of federal government revenues still comes from petroleum, and these revenues moved independently of the business cycle. We may add to the observations in World Bank (2000) that there is also evidence that discretionary tax policy has been pro-cyclical. Often during the last decades, Mexico's government has decreased tax rates and taken other measures that reduced revenues during the expansion phase of the business cycle (such as reducing income tax rates in 1989 and 1994), and has increased rates or taken other measures that increased revenues during the recession part of the business cycle (such as the increase in the general VAT rate during the sharp downturn associated with the peso crisis in 1995). This behavior fits well, of course, with the hypothesis that the overriding objective—explicit or implicit—of Mexico's tax policy has been to maintain a constant level of tax effort.¹¹

Mexico appears to have followed a pattern common in many other Latin American countries when pursuing pro-cyclical discretionary tax policy (that is, tax rates are increased during recessions and decreased during expansions).¹² This behavior has been explained as quite rational, however (see Talvi and Végh 2000). Latin American countries, like many other developing countries, have large fluctuations in tax bases (larger than those in developed countries). Compensating for these large fluctuations will require obtaining large budget surpluses during expansions

and large budget deficits during contractions. Politically, it becomes too hard to run big surpluses in times of plenty, given all competing demands for expenditures rather than retiring national debt. Therefore, governments may lower tax rates rather than see the resources “wasted” on unnecessary public expenditures.¹³

Excess Burdens and Economic Distortions

A salient feature of Mexico’s tax system is the special treatment of particular sectors and sources of income. Because of the cost in revenues not collected and because of their effects on efficiency through the misallocation of resources and on horizontal and vertical equity, these special treatments should be a priority area for reform. Under the CIT, there is a special treatment for sectors such as agriculture and transport. Large companies benefit from the lack of oversight on consolidated returns. Insurance companies benefit from special treatment of income from interest and foreign exchange gains. Under the VAT, border areas benefit from a lower tax rate of 10 percent (compared to the general rate of 15 percent). Under the PIT, special treatment is granted to several sources of income, including fringe benefits, overtime pay and bonuses, pension income, capital gains from the sale of stocks, and copyrights.

The case for eliminating these special treatments is based on the costs imposed on taxpayers as a whole. The discussion of special treatment often overlooks the fact that the revenues lost to these treatments need to be made up with higher taxes in other activities or sectors in the economy. These additional taxes can distort production and employment more than does the lack of special treatments and can add to horizontal and vertical inequities in the distribution of tax burdens.

The issue of equal treatment of taxpayers, however, goes beyond equity concerns. To the extent that some activities are more heavily taxed than others, the allocation of resources is affected. Too many resources will be allocated in the lightly taxed sectors and too few in the more heavily taxed sectors. This misallocation produces an excess burden of taxation, which means that the economy produces less income from available resources. Other forms of excess burdens occur, for example, when the tax system induces a company to invest in buildings when it would have invested in machinery and equipment had there been no tax preferences, or when the tax system encourages companies to finance

their capital through debt rather than equity (leading to thin capitalization of businesses). As shown below, Mexico's tax system presents some important examples of distortions of business decisions.

Distortions in economic behavior and therefore excess burden losses are not exclusive to businesses. Individual taxpayers also are exposed to excess burdens when the tax system alters their savings and labor supply decisions. The fact that most of the distortions introduced by the tax system are unintentional does not suggest they are unimportant. Reforming the tax structure to minimize tax-induced distortions or the excess burden of taxation can increase taxpayers' welfare significantly without decreasing the taxes they pay.

Below, we try to quantify some of the current tax-induced distortions by estimating marginal effective tax rates (METRs). This approach looks at the impact of taxes on marginal or incremental decisions by economic agents (see, for example, McKenzie, Mansour, and Brulé 1998). The METRs estimate is the level of tax arising for a firm when it decides to invest one more unit of capital. When the METRs are positive, they indicate that investment activities are discouraged. Negative METRs also are possible, however, when the economic activity in question is being encouraged through a subsidy. Taxes on capital income (especially the CIT), can affect not only the level of investment but also its composition. Differences in METRs, therefore, lead to distortions in the allocation of resources, reducing output and, by reducing investment, slowing economic growth.

This section focuses on the computations for METRs of the Mexican corporate tax system for domestic investment.¹⁴ For domestic firms, METRs are calculated for eight sectors: agriculture, manufacturing, construction, transport and storage, communication, public utility, wholesale trade, and retail trade. The simulation for the Mexican system is expanded to include the tax preferential treatments for exporters, small-size firms, and related simulation for optional changes.¹⁵

Table 7.1 provides marginal effective tax rates on domestic capital investment in Mexico, combining the three preferential tax regimes, respectively, with the general one. The intersector METR dispersion illustrates the intersector tax distortion within each of these three tax combinations. As a reference, we also provide a simulation for METR on capital and the related intersector METR dispersion in the United States.

The first column of the U.S. section of table 7.1 shows that, with a simplified tax regime or cash-flow tax applicable to agriculture and the land

Table 7.1. Marginal Effective Corporate Tax Rates on Domestic Capital Investment
percent

	<i>Cash-flow tax for agriculture/transport</i>	<i>Gross-receipts tax for small firms</i>	<i>50% of CIT rate for agriculture</i>
<i>Mexico</i>			
Agriculture	-37.7	3.1	9.3
Manufacturing	22.1	19.4	22.1
Construction	21.9	10.1	21.9
Transport	-7.0	15.7	19.4
Communications	14.1	14.0	14.1
Public utility	18.5	17.6	18.5
Wholesale trade	23.7	13.6	23.7
Retail trade	25.0	12.5	25.0
Intersector dispersion	12.8	3.0	2.8
	<i>Current scenario</i>	<i>Applying Mexico's tax rates and inflation-adjusting rule</i>	
<i>United States (large firms only)</i>			
Agriculture	18.3	20.1	
Manufacturing	19.3	20.0	
Construction	20.9	22.1	
Transport	18.7	17.8	
Communications	10.1	9.9	
Public utility	13.2	13.8	
Wholesale trade	18.2	21.1	
Retail trade	21.5	22.4	
Intersector dispersion	2.9	2.3	

Sources: Secretaria de Hacienda y Crédito Público and staff calculations.

Note: CIT = corporate income tax.

transport industry,¹⁶ the METR varies significantly from -38 percent for the agriculture sector (which represents a hefty subsidy rate) to more than 24 percent for the trade sector. Note that the land transport industry also has a negative METR, which indicates a tax subsidy on the capital investment made by this sector, but at -7 percent the rate of subsidy is markedly lower than the rate for agriculture. The variation in METRs among other sectors is mainly caused by the variation in the tax depreciation allowance. As a result, the intersector tax distortion, measured by the METR dispersion, is at the rather high level of 13 percent.

Alternatively, if we assume that the cash-flow tax regime is not available and that all qualified small taxpayers take advantage of a very low

tax of 0.25 (or 2.5 percent on gross income), the METRs for all sectors except agriculture and land transport would drop significantly (table 7.1, column 2) compared with the “cash-flow tax case” (column 1). Of course, now both agriculture and transport face positive METRs. Notice that by unifying the tax regime, the intersector tax distortion measured by the intersector METR dispersion could be reduced from 18.0 percent to 3.0 percent.¹⁷

We assume that all firms are taxed equally, regardless of size, and that all farming enterprises are subject to a lower CIT rate of 17.5 percent (presently, 50 percent of the regular CIT rate). The simulation shows that, in such a scenario, the intersector tax distortion would be reduced further, as indicated by a lowered intersector METR dispersion of 2.8 percent.

The main tax factors contributing to the intersector tax distortion include the levels of various tax rates and the variance in tax rates and tax allowances across sectors.¹⁸ It is obvious that the higher the statutory tax rates and the wider the gap in rates and allowances between sectors, the higher the intersector tax distortion. In table 7.1 we further illustrate this observation with the same simulation for U.S. domestic firms. We use a combined CIT rate of 39.5 percent to simulate the U.S. case, a rate much higher than the general CIT rate (35.0 percent) in Mexico. Furthermore, the United States does not allow for inflation indexation, which certainly would tend to inflate the intersector tax distortion. Despite these factors, the intersector METR dispersion in the United States is only 2.9 percent. By applying the Mexican CIT rate of 35 percent and its inflation-adjustment rule to the U.S. simulation, we found that the intersector METR dispersion would be further lowered to 2.3 percent. This simulation indicates that other tax factors in the Mexican CIT system cause additional intersector tax distortion (for example, the tax depreciation allowance varies significantly by sector). To illustrate, our simulation shows increasing the capital allowance from 10 percent to 15 percent for most assets used by manufacturing, transport, public utility, and trade sectors would reduce the intersector METR dispersion in Mexico to 2.3 percent.

Distribution of Tax Burdens

Two basic principles are commonly used to judge how equitably tax systems perform. One is the principle of *vertical equity*, or how tax burdens are distributed among taxpayers with different levels of income. The verti-

cal distribution of tax burdens can be progressive, proportional, or regressive with respect to income. Typically, it is assumed that a desirable distribution of tax burdens is (1) one that shows some degree of progressivity with respect to income (so that people with higher incomes pay proportionally more in taxes), and (2) one in which the poorest households pay little or no tax. The second principle is that of *horizontal equity*, which simply says that taxpayers with the same income or tax base should pay equal taxes. The discussion here addresses these two main topics.

Vertical Distribution

With the exception of one study (GEA 1999),¹⁹ no estimates existed on the vertical and horizontal incidence of the tax system in Mexico at the time of this study. The lack of information on the actual distribution of tax burdens appears to have led to diametrically opposed perceptions that range from the tax system being too punishing to the poor to the tax system being too redistributive because only a few people among higher income groups pay taxes. In some important way this lack of serious information on the actual distribution of tax burdens has contributed to the lack of voluntary compliance because of the generalized perception that many people are not contributing their fair share of taxes.

The issue of vertical equity goes beyond the lack of information. Even if information existed, it is often hard to find consensus on the desirable degree of progressivity for the tax system. This suggests that vertical equity, in essence, is not an economic or technical question, but rather a political or value-loaded one.

Even if there is some consensus on what the proper vertical distribution of tax burdens should be, several common mistakes often are made in designing tax policy in the pursuit of vertical equity. First, vertical equity should be viewed from the perspective of the entire tax system rather than an examination of particular taxes in isolation. The effective administration of some taxes or the achievement of other desirable objectives (such as minimizing economic distortions) may require sacrificing the objective of a progressive distribution of tax burdens. Second, measures taken to make taxes more progressive in hopes of protecting the poor often simply backfire by making taxes less progressive or even regressive. A case at hand is the use of zero rating for some domestic goods such as food and medicines in Mexico.²⁰ The equivalent amount of tax

expenditures (or forgone revenues) could be used much more efficiently to redistribute income or increase the welfare of poor people through the expenditure side of the budget that specifically targets the funds to the truly poor population. Third, redistributive policies on the expenditure side of the budget have the greatest potential to help poor people—that is, government funds spent on education, health care, and social assistance programs.²¹ This is particularly true in countries like Mexico where the overall tax effort, measured by the ratio of tax revenues to GDP, is relatively low and social spending programs are below international norms. From this perspective, it may be much more redistributive to have tax systems that are less progressive in themselves but collect more revenues that may be spent on social programs (see IDB 1999, ch. 8).

So the agenda for vertical equity in Mexico is first to identify the actual distribution of tax burdens implied by the current system. Second, before embarking on the next round of tax reform, some national consensus must be found on what is the desirable level of progressivity. On reaching this consensus, it needs to be remembered that progressivity should not be measured on a tax-by-tax basis, and that higher progressivity (or a more effective redistribution income) can be achieved through expenditures instead of taxes.²²

To address that first agenda item, we have estimated the incidence of the main taxes in Mexico. The taxes actually analyzed include personal income tax (wages only), payroll taxes earmarked to social security accounts, corporate income tax, value-added tax, excise taxes, and import duties. These taxes account for approximately 95 percent of the taxes collected by the federal government.

The methodology used to assign tax burdens assumes households ultimately pay all taxes, so these payments must equal receipts. Therefore, we ignore the existence of “excess burdens” or the welfare losses suffered by taxpayers as a consequence of the distortions in economic behavior induced by taxes. To proceed with the incidence estimations, we need a database of information on household expenditures and sources of income. The database used here is the Encuesta Nacional de Ingresos y Gastos de los Hogares (ENIGH, the National Survey of Income and Expenditures for Households) for 1996 (latest data available).²³ This longitudinal survey of 14,000 households provides detailed information on their sources of income, expenditures, housing conditions, and person-

al characteristics of the members. The survey also contains a weighting variable that allows replicating the statistics on a national scale.

The sources of income reported in the ENIGH include income from wages, business activities, fringe benefits, interest, rental income, transfer payments, capital income, income in kind, and imputed income from owner-occupied housing. On the expenditure side, this survey contains information on monetary and nonmonetary expenditures on food, transport, house maintenance, personal items, education, rent, clothing, health, transfers, and capital expenditures, among others.

It should be noted that the methodology followed here to analyze tax burdens has several limitations. First, we do not have a measure of the permanent income of each household. This problem is directly linked to the use of a single observation in time. In using the 1996 survey, a bias on results may arise with respect to a “normal” situation because in 1996 the country was still recovering from the 1994 peso crisis. Second, income categories are reported on an after-tax basis, so to estimate the burden we must first estimate income on a pretax basis. Finally, this methodology does not allow for the existence of excess burdens or deadweight losses, and it leaves out the imputation of tax arrears.

The analysis of direct taxes includes the personal income tax (on wages and salaries only), the corporate income tax (on assets, on income from business activities, and on rents and interest primarily),²⁴ and payroll taxes earmarked to social security funds. To arrive at the incidence of these taxes, we made several calculations to provide a pretax measure of income.

For personal income tax, it is assumed that the burden is fully borne by the supplier of inputs—in this case, labor. This is a reasonable assumption based on the evidence of inelastic labor supply in Mexico. The taxation of wages and salaries includes progressive tax rates, “subsidies” (credits that work as a percent reduction of the tax liabilities), and a “credit” (a negative tax or transfer) to salary that decreases as taxable income increases. Given that we do not have income reported on a pretax basis, we gross up the reported net income on wages and salaries by developing a tax calculator based on 1996 tax income parameters. Following Casanegra de Jantscher et al. (1995), the tax liability is estimated by this formula:

$$T = t_1 + (t_2 / 100) * (Yg - x_1), \quad (7.1)$$

where t_1 and t_2 are tax parameters for a given bracket, x_1 is the lower limit to the bracket, and Yg is the gross taxable income. For the subsidy, we have

$$S = s_1 + (s_2 / 100) * (t_2 / 100) * (Yg - x_1), \quad (7.2)$$

where s_1 and s_2 are the subsidy's parameters.²⁵

If we define net income as

$$Yn = Yg - T + S + C, \quad (7.3)$$

where Yn is net income and C is the salary credit, then we can use these three equations to estimate gross income as

$$Yg = \frac{[Yn + t_1 - s_1 - x_1 * (t_2/100) * (1 - s_2/100) - C] * 10,000}{10,000 - (100 * t_2) + (s_2 * t_2)}. \quad (7.4)$$

To estimate gross income, we must first determine the corresponding net income brackets, but the presence of a credit impedes this estimation (overlapping and blanks between brackets are some of the problems that arise). Therefore, we apply only the tax and subsidy rates to obtain a "first-step" estimator of Yg , which, in turn, will be used to estimate the corresponding credit, C , that will be subtracted to obtain the final gross income.

To estimate the incidence of the PIT, we calculate a collection factor (a) that matches total tax liabilities estimated from the survey (expanded at a national scale) (Ts) to the collected revenue (C):

$$Ts * a = C. \quad (7.5)$$

This factor is applied to each individual imputed tax liability to obtain the effective individual liabilities:

$$T'_i = a * T_i. \quad (7.6)$$

Note that the presence of a credit to salary in the system generates the possibility of negative taxes or refunds to the individuals, based on income level. Therefore, the burden of collected revenues must be assigned only to those taxpayers with *positive* payments. For the other households, the refunds are calculated from the imputation process.²⁶ In the event

that final gross income obtained is negative because of the credit imputation, then it is assumed that these people are not actually paying personal income tax, and no gross-up process is undertaken on their income.

For the payroll tax earmarked for social security funds, the estimation takes into account the rules of the social security system as of 1996. The structure used to gross up income is based on the Instituto Mexicano del Seguro Social (IMSS) rules.²⁷ Under this scheme, contributions amounted to 8.5 percent of the “base salary,”²⁸ with 5 percent paid by the government, 90 percent paid by the employer, and 5 percent paid by the employee. The assumption used to estimate the incidence of this tax is, again, that labor bears the entire burden (in this case, 95 percent). This burden is assigned in proportion to the share of total income from the base salary. One problem underlying this estimation is that we cannot identify with precision the individuals who actually contribute to the social security system, so there may be a bias for wage earners in the lowest deciles because some are in the informal sector. For the sake of consistency, those people whose incomes were not taxed in the estimation of the PIT are assumed not to pay taxes at this stage either.

In tax burden estimation, perhaps the most controversial estimate is that of the CIT. In studies of tax burden estimation, there is no consensus on who bears the final burden (capital owners? labor? consumers?). In Mexico the law on income tax for business activities gives the taxpayer the possibility of choosing between paying a flat 34 percent rate (in 1996) or accumulating this income to pay an individual tax with progressive rates. This system avoids double taxation on dividends. For the present study, the tax liability was estimated as if taxpayers chose to pay the individual income tax on income from businesses,²⁹ rents, and interests from the non-financial sector. For interest from savings accounts, fixed-term investments, and equity instruments, a schedular treatment is made. To estimate the tax liability in this case, we estimate the level of capital generating such interests. In other words, interest (I) would equal, on average,

$$I = K * r_n, \quad (7.7)$$

where K is capital, r_n is the net interest rate (that equals $r_g - t$), and the tax liability would be

$$t * K = K * r_g - I, \quad (7.8)$$

where the gross interest rate r_g is an average of interest rates for each kind of investment considered.³⁰

The estimations of CIT are made under two scenarios. The first assumes that capital owners bear the entire burden. The second scenario assumes that capital owners bear half of the burden and the other half is shifted to consumers in the form of a final sales tax. To estimate the latter scenario, the CIT rates are reduced by 50 percent, and half of the burden is assigned to capital owners. The other half of the burden is distributed among consumers, proportionate to their share of goods and services consumption.

For indirect taxes, the general assumption underlying the estimations is that consumers bear the entire burden according to their share of consumption of the taxed goods and services. In the case of VAT, the estimation takes into account the assorted exemptions and zero-rates in the system. For simplicity, exempt and zero-rated goods are treated alike, that is, they are excluded from the bundle of taxed goods.³¹ The presence of exempt and zero-rated goods leads to a more or less flat tax incidence on the VAT, given that expenditures on food and medicine for households in the lower deciles represent a large proportion of their total expenditure. Unaccounted for in the estimations is the 5 percent difference in VAT rates between border regions and the rest of the country, a difference that may introduce some bias in our results.

For excise taxes, the burden was distributed according to shares of gasoline, tobacco, alcohol, bottled water, and telephone service consumption. In the particular case of gasoline, the estimate took into account both direct expenditures on gasoline and expenditures on transport services that use gasoline, so our estimates allow shifting part of the burden to users of transport by means of higher prices. This explains why the incidence of the excise tax on gasoline is more or less flat rather than progressive.

Finally, for import products it is very difficult to make a precise estimation with the information contained in the ENIGH because the data do not provide sufficient information to clarify the origin of each product (imported or produced domestically), and we do not know the component of imported inputs in domestically produced goods and services. In light of this, we simply have distributed the burden from import duties according to the household share of cash expenditures on all goods and services without any additional distinction. Further exploration on the incidence of this tax should take into account information on the origin of

final and intermediate consumed goods in the economy and their distribution by sectors of production.

The final incidence results are presented in table 7.2 for the base case scenario, where it is assumed that the burden from the CIT is fully borne by capital owners, and in table 7.3 for the alternate scenario, where it is assumed that the burden from the CIT is equally divided between capital owners and final consumers.³²

The distribution of tax burdens for indirect taxes (VAT, excise on gasoline, and other excise and import duties) is the same in both scenarios and mildly regressive. In particular, the highest income decile of the population (those with incomes greater than Mex\$96,689) tends to pay a smaller share of its gross income in indirect taxes than any other population decile. The reason, of course, is that the highest income group saves a higher share of its gross income. Also noteworthy is the fact that despite the zero-rating and exemption of many basic commodities, the lowest income deciles pay a share of their incomes in VAT that is similar to that paid by higher income deciles.

In the base case scenario, the incidence of income taxes (PIT and CIT) is progressive. The incidence of the PIT is particularly progressive because of the negative tax received by eight of the population deciles (as a result of “credits” and “subsidies” in the current law), and the much higher share of gross income paid by the highest population decile. The progressivity in the distribution of tax burdens for the CIT also lies in the higher share of gross income paid by the two highest income population deciles, especially the latter. For social security taxes, the incidence follows an inverted U-shape. Taxpayers in middle-income deciles, who are more likely to earn their income in wages from the formal sector, pay a higher share of their gross incomes than do those at the top and bottom of the income distribution. This effect also is helped by that the capping of social security contributions at some income levels.

Distribution of the total tax burdens in the base case scenario is progressive overall. The lowest income decile pays about 4 percent of its gross income in taxes, whereas the highest income decile pays 27 percent. The share of gross income paid by the in-between deciles rises smoothly from the bottom to the top.

In the alternate case scenario, the main difference is in the distribution of tax burdens for the CIT. The incidence of other taxes as a share of gross

Table 7.2. Tax Burden by Income Decile: Baseline Scenario
percent of income

<i>Income decile (1996 Mex\$)</i>	<i>VAT</i>	<i>Gasoline excise</i>	<i>Other excises</i>	<i>Import duties</i>	<i>PIT (wages only)</i>	<i>CIT</i>	<i>Social security</i>	<i>Total burden</i>
0–11,206	7.14	1.82	1.03	2.25	–14.54	0.46	6.03	4.20
11,207–15,621	6.81	2.29	0.90	2.00	–8.71	1.01	7.25	11.55
15,622–19,906	6.85	2.31	0.92	1.94	–7.63	1.01	9.16	14.54
19,907–24,584	6.89	2.38	0.87	1.86	–6.54	1.10	9.11	15.67
24,585–30,339	7.05	2.46	1.08	1.83	–5.50	1.22	9.86	17.99
30,340–37,571	6.94	2.74	1.07	1.76	–4.37	1.30	10.61	20.05
37,572–47,299	7.26	2.57	1.04	1.69	–2.95	1.46	10.67	21.74
47,300–63,823	7.13	2.36	1.13	1.58	–0.64	1.94	9.59	23.11
63,824–96,688	7.17	2.22	1.10	1.47	1.93	2.40	7.63	23.92
More than 96,689	6.93	1.75	0.84	1.28	7.54	5.70	3.04	27.08
Total ^a	7.07	2.00	0.91	1.46	4.23	5.29	6.24	27.20

Source: Staff calculations.

Note: CIT = corporate income tax; PIT = personal income tax; VAT = value-added tax.

a. Total expresses the total revenues collected by each tax as a percentage of total pretax income of all the households in the economy. Given that each scenario leads to a different estimated pretax revenue, there may be a divergence on totals between scenarios.

Table 7.3. Tax Burden by Income Decile: Alternate Scenario*percent of income*

<i>Income decile (1996 Mex\$)</i>	<i>VAT</i>	<i>Gasoline excise</i>	<i>Other excises</i>	<i>Import duties</i>	<i>PIT (wages only)</i>	<i>CIT</i>	<i>Social security</i>	<i>Total burden</i>
0–11,186	7.16	1.82	1.05	2.26	–14.46	4.41	5.95	8.19
11,187–15,591	6.83	2.30	0.89	2.01	–8.78	4.24	7.30	14.78
15,592–19,876	6.84	2.29	0.91	1.94	–7.64	4.13	9.06	17.53
19,877–24,529	6.96	2.42	0.89	1.88	–6.53	4.09	9.13	18.83
24,530–30,252	7.07	2.48	1.09	1.83	–5.47	4.05	9.82	20.86
30,253–37,402	6.98	2.72	1.07	1.76	–4.48	3.96	10.68	22.70
37,403–47,072	7.32	2.60	1.03	1.70	–2.96	3.98	10.62	24.30
47,073–63,469	7.12	2.38	1.15	1.59	–0.67	3.99	9.71	25.27
63,470–96,191	7.23	2.23	1.10	1.48	1.94	4.05	7.64	25.67
More than 96,192	7.07	1.78	0.86	1.30	7.58	5.46	3.12	27.17
Total ^a	7.21	2.04	0.93	1.49	4.32	5.39	6.36	27.75

Source: Staff calculations.**Note:** CIT = corporate income tax; PIT = personal income tax; VAT = value-added tax.

a. Total expresses the total revenues collected by each tax as a percentage of total pretax income of all the households in the economy. Given that each scenario leads to a different estimated pretax revenue, there may be a divergence on totals between scenarios.

income differs in some cases from the baseline scenario because of slight differences in the computed gross incomes (see tables 7.5 and 7.6 later in this chapter for the two distributions of gross incomes). Now the distribution of tax burdens for the CIT is basically proportional. This, of course, reflects the alternate-scenario assumption that 50 percent of that tax is paid by consumers. The effect of this alternate assumption on the overall distribution of tax burdens (table 7.3) is to reduce the degree of progressivity. Part of the tax burden of middle- to high-income groups is shifted to lower income groups. Nevertheless, the overall incidence of taxes in Mexico remains progressive.

An important part of estimating the incidence of taxes is the derivation of income distribution among taxpayers. Here we present three distributions of income: income net of taxes (table 7.4), gross (pretax) income in the base case scenario (table 7.5), and gross (pretax) income in the alternate case scenario (table 7.6). As already mentioned, the distributions of gross income in the two scenarios differ because of the different assumptions made in the grossing-up procedures discussed above.

Several things are notable in these distributions of income. First, Mexico's tax system starts with a very unequal distribution of income across population deciles. Although the top decile receives 40 percent of total gross income, the bottom decile receives less than 2 percent. Another way to illustrate the inequality in the distribution of income is to note that the two top deciles (one-fifth) of the population receive two-thirds of total gross income, and all the rest (four-fifths) of the population receives the remaining one-third of total gross income. Second, the effect of the tax system on income distribution, despite being quite progressive, is very limited. The distribution of net (after-tax) income becomes more equal than the two distributions of gross (pretax) income, but the changes are quite small. This illustrates well the principle discussed above that the most effective way to redistribute income is not through the tax system but through the expenditure side of the budget.

Horizontal Distribution

There is some evidence that Mexico's tax system does not tax individuals with the same income level equally. The most important source of horizontal inequities, and the hardest to measure, is tax evasion. The large, and growing, size of the informal sector means that businesses with equal

Table 7.4. Distribution of Net Income among Income Deciles*percent*

<i>Income decile</i>	<i>Total net income</i>	<i>Salaries and wages</i>	<i>Fringe benefits</i>	<i>Business income</i>	<i>Interest income</i>	<i>Other monetary income</i>	<i>In-kind income</i>
I	1.89	1.61	0.12	1.58	0.02	1.71	2.86
II	3.01	2.58	0.37	3.11	0.37	2.90	3.98
III	3.90	3.94	0.70	3.49	0.30	3.45	4.65
IV	4.82	4.72	1.37	4.49	0.93	4.45	5.73
V	5.88	6.09	1.74	5.01	3.69	5.61	6.65
VI	7.14	7.74	3.99	6.14	0.79	5.79	7.87
VII	8.78	9.48	6.18	7.18	3.21	7.72	9.62
VIII	11.20	11.99	8.57	9.40	4.98	9.77	12.22
IX	15.74	17.22	19.81	12.70	11.11	14.57	15.89
X	37.65	34.64	57.15	46.89	74.60	44.02	30.53
Total	100.00	100.00	100.00	100.00	100.00	100.00	100.00

Source: Staff estimates.

Note: Net income is after-tax income. The income categories are based on the divisions made during the incidence study (see the annex). The business income category also includes income from leasing activities and interest from the nonfinancial sector. Interest income takes into account only interest from savings accounts, equity instruments, and fixed-term investments; other categories are included in other monetary income. The deciles are not exactly the same between the base and the alternate scenario because of the different underlying gross-up process. For net income, estimations are made using the base scenario deciles to control for the same population.

Table 7.5. Distribution of Gross Income among Deciles: Base Scenario
percent

<i>Income decile</i>	<i>Total gross income</i>	<i>Salaries and wages</i>	<i>Fringe benefits</i>	<i>Business income</i>	<i>Interest income</i>	<i>Other monetary income</i>	<i>In-kind income</i>
I	1.61	1.11	0.13	1.37	0.02	1.71	2.86
II	2.69	2.04	0.38	2.73	0.40	2.90	3.98
III	3.55	3.35	0.74	3.07	0.29	3.45	4.65
IV	4.43	4.10	1.45	3.96	0.95	4.45	5.73
V	5.48	5.47	1.83	4.46	3.77	5.61	6.65
VI	6.74	7.17	4.19	5.48	0.84	5.79	7.87
VII	8.42	9.03	6.49	6.47	3.33	7.72	9.62
VIII	10.93	11.83	8.98	8.62	4.95	9.77	12.22
IX	15.63	17.48	19.99	11.89	10.95	14.57	15.89
X	40.52	38.42	55.82	51.94	74.48	44.02	30.53
Total	100.00	100.00	100.00	100.00	100.00	100.00	100.00

Source: Staff estimates.

Note: Gross income is pretax income. See note to table 7.4.

Table 7.6. Distribution of Gross Income among Deciles: Alternate Scenario*percent*

<i>Income decile</i>	<i>Total gross income</i>	<i>Salaries and wages</i>	<i>Fringe benefits</i>	<i>Business income</i>	<i>Interest income</i>	<i>Other monetary income</i>	<i>In-kind income</i>
I	1.63	1.09	0.13	1.55	0.02	1.69	2.84
II	2.74	2.05	0.38	2.93	0.38	2.92	3.97
III	3.60	3.31	0.74	3.39	0.30	3.44	4.68
IV	4.49	4.09	1.45	4.34	1.21	4.42	5.66
V	5.55	5.42	1.80	4.82	3.45	5.64	6.68
VI	6.85	7.21	4.22	5.81	1.42	5.81	7.87
VII	8.53	8.93	6.34	7.18	2.56	7.59	9.65
VIII	11.06	11.88	9.22	9.09	5.07	9.64	12.15
IX	15.80	17.47	19.60	12.36	11.04	14.57	16.00
X	39.75	38.56	56.14	48.54	74.55	44.29	30.52
Total	100.00	100.00	100.00	100.00	100.00	100.00	100.00

Source: Staff estimates.*Note:* Gross income is pretax income. See note to table 7.4.

incomes pay very different taxes, and some pay none at all. Similarly, under the individual income tax, employees subject to withholding tend to bear a disproportionate share of the tax because professionals and other self-employed workers are more able to underreport income or escape tax altogether. A second important source of horizontal inequities is the tax law itself. Individuals with the same income pay unequal shares of tax because some forms of income are tax exempt (such as previously untaxed capital gains from the sale of securities), some forms of consumption are treated differently (such as zero-rating of some goods under the VAT), and different sectors pay different effective tax rates (such as corporate income tax for the transport, agriculture, and publishing sectors).

Horizontal inequities also can arise when the tax laws are explicitly used to protect poor people or bring more equity among taxpayers. This is true with Mexico's negative income tax for low-income taxpayers who receive no fringe benefits in their compensation packages. The actual credit received by a household depends on the number of its members that work in the formal sector. In particular, the credit has no adjustment for the number of dependents in the household. As a result, the fiscal credit can go to households that are above the poverty line, with each of the employed members receiving a subsidy, whereas poorer households can be entirely excluded from this benefit even when a household's only employed member is in the formal sector. The discussion assumes that the final incidence of the credit is to benefit employees. However, this credit generally is not perceived by employees as a special benefit to them because typically it is subsumed in the overall salary of the employee. Given the labor market conditions in Mexico, it is possible that the credit is captured by employees via lower effective wages.

Weak Tax Administration and High Tax Evasion

There is little doubt that a major problem in Mexico's tax system is a weak tax administration. This weakness appears to yield high levels of tax evasion across practically all taxes. Tax evasion not only lowers receipts, but also contributes to an unfair distribution of actual tax burdens and to the perception that the current tax system is unfair. Tax evasion also leads to an allocation of economic resources that can be very different from that intended in the tax laws. The perceived unfair distributions of taxes, horizontally and vertically, appear to be an important factor in Mexico for

explaining the private sector's general resistance to any increase in the overall level of tax effort.

The weakness of the tax administration is obvious in many different ways. It is most evident in the drastic decreases in compliance that typically have followed economic crises in Mexico. For example, in the aftermath of the Tequila Crisis, Casanegra de Jantscher et al. (1997) found that the level of tax evasion for the VAT increased from 43 percent in 1994, to 54 percent in 1995, and to 59 percent in the first half of 1996. These are high levels of evasion by international standards.³³

One aspect of the tax system that needs to be emphasized in any strategy for the modernization of Mexico's tax administration is the high concentration of revenues among very few taxpayers. The tax administration needs to find better ways to take advantage of this feature. According to information provided by the Secretaria de Hacienda y Credito Público (SHCP), in the case of the PIT about 12 percent of taxpayers (with taxable income above Mex\$90,690) paid 112.5 percent of revenues in 1994.³⁴ In the case of the CIT, the level of concentration was much higher. Again, according to SHCP, less than 3 percent of enterprises paid very close to two-thirds of CIT collections in 1995. Although Mexico already has a large taxpayer unit in the SAT, it is clear that enforcement measures will need to concentrate more heavily on large taxpayers to yield significant increases in revenues.

Even though Mexico's tax administration does present shortcomings, it would be unfair to lay all the blame for lack of compliance at the doorstep of the SAT. Over the last decades, the task of tax administrators has been complicated considerably by tax policy design. As a result of frequent changes in tax policy, taxpayers are confused and tax administration has been made more difficult (see, for example, Tornell and Esquivel 1995). A well-observed phenomenon worldwide is that tax system instability (too-frequent changes in policy) makes tax enforcement more complicated and can lead to decreased revenues. In addition to frequent changes in Mexico, tax policy design often has imposed on tax administrators complex rules and, at times, rules that were known at the outset to be unenforceable. A prime example is the legislation on consolidation, which requires accounting skills and training far beyond those available at the SAT. As a consequence, there is no one in the tax administration capable of auditing the tax returns submitted by these taxpayers. This puts certain (powerful) taxpayers in a situation where they are paying volun-

tary taxes that may or may not be close to what they actually owe. Frequent changes in tax policy also create uncertainty among taxpayers and increase compliance costs. Even well-intentioned taxpayers may find it difficult or impossible to comply with the new rules. Of course, taxpayer uncertainty can affect both domestic and foreign investment negatively.

A Potential Tax Reform Package: Feasibility, Content, and Revenue Effects

The problems affecting Mexico's tax system are deep rooted and complex. In this section, we provide a sketch of a comprehensive reform package organizing the discussion around three main themes: feasibility of the reform, the content of the reform, and the expected revenue effects.

Feasibility and Strategy

Mexico has had too many and too frequent tax reforms. The next round of tax reform should be thought out carefully, and the resulting tax system left in place for the longest period of time possible.

To be successful, a tax reform package must gain consensus among the main stakeholders (including those at the highest level of government), tax administrators, the business sector, labor unions, and the public at large. Such consensus will require small-group discussions, presentations to large groups, and publicity campaigns. Berensztein's (1998) study of the political factors determining the success of Mexico's reform in 1988–94 emphasized several factors, including the opportune use of an economic crisis, formation of a coalition in support of the reform, and prevention of coalitions formed to oppose the reform. But the late 1980s reform was revenue neutral while it pursued visible gains in efficiency. A new tax reform, while pursuing gains in efficiency and equity, would have as its main goal a significant increase in the level of tax effort. In the past, Mexico's business elites appear to have been successful in blocking any permanent increases in the overall level of tax effort.³⁵ What can be done now to make a revenue-increasing reform feasible? Perhaps the answer is to make the benefits of increased government services clear to decisive majority coalitions. The political strategy needs to capitalize on the growing national consensus about the need to increase public services.

To be successful, a tax reform package also will need to be comprehensive, covering all aspects of the tax system, including policy and adminis-

tration. A comprehensive reform may be the only politically viable way to address the difficult aspects of the current tax system involving privileges and special treatments. Taking a comprehensive approach also facilitates desirable objectives of tax reform other than revenue adequacy.³⁶ Similarly, tax administration reform should accompany tax policy reform, and a lot of care should be taken to ease problems for tax administration arising from tax policy.

Content of a Tax Reform

There are some general objectives that should guide tax policy reform together with the modernization programs for the SAT and customs services. The general objectives of a comprehensive reform should include

1. *Revenue adequacy*: Revenue adequacy should be of paramount importance in this reform because the share of the public sector in GDP is inadequate to provide the increased level of public services desired by government.
2. *Elastic revenues over time*: Taxes should be designed so that the government's share in GDP at least keeps pace with the growth of income in the entire economy. Elastic revenues are needed to keep government away from introducing ad hoc new tax measures to simply keep up with ordinary increases in the demand for public services.
3. *Simplicity*: The tax structure should be kept simple while an effort is made to eliminate current provisions that either are unenforceable (consolidated returns) at the present time by the tax administration or those that increase both administration and compliance costs for taxpayers (such as a VAT-like structure for excise taxes).
4. *Fair distribution of tax burdens*: The new tax structure should attempt to increase the progressivity of the tax system, bearing in mind that the most effective progressivity must take place from the expenditure side of the budget. The tax system also should increase its horizontal equity by eliminating special treatments and privileges and by significantly improving tax compliance.
5. *Reduction in distortions*: The tax reform should strive to increase the efficiency of the tax system by minimizing existing distortions and providing equal treatment to all taxpayers. This will mean getting rid of special regimes under the CIT and eliminating special treatment

for certain sources of income under the PIT and certain forms of consumption under the VAT.

6. *Modernization of tax administration:* The rationalization of taxes and tax administration should have the goal of increasing the public's confidence in the tax system and its perception of fairness. Taxpayers have a harder time complying with a system that seems unreasonable or capricious and that they believe is unfair. This may occur if the system appears arbitrary in its enforcement by reaching only taxpayers subject to withholding.

In pursuit of these goals, the major elements of tax reform would include

- Increasing the general rate of the VAT from 15 percent to allow enough increase in overall revenues after the revenue effect of all other measures is taken into account.
- Expanding the VAT tax base by eliminating all zero-rating for domestic transactions (only exports will continue to be zero-rated) and applying the general rate to all transactions, including those in the north border zone. Basic foodstuffs and medicines will be exempt but not zero-rated. Small farmers also will be exempt by the general threshold exemption under the VAT.
- Expanding the PIT base by including capital gains not previously taxed as enterprise profits.
- Disallowing the deduction of fringe benefits at the enterprise level and keeping fringe benefits exempt at the individual level, while discontinuing any credits and subsidies under the PIT.
- Increasing the minimum exempt level from three minimum salaries to four or five under PIT to achieve a higher rate of progressivity.
- Eliminating the cash-flow regime for agriculture and transport in the CIT.
- Eliminating the reduced rate regime under the CIT, possibly keeping only the reduced (half) rate for agriculture.
- Keeping the small enterprise regime but reducing the threshold from 20 million to 10 million pesos.
- Offsetting the impact on the lower income groups.
- Introducing one single-stage taxation for excise taxes at the level of imports or ex-factory, and eliminating the multi-stage taxation with credits now in place.

- Introducing a petroleum product excise with a specific rate (*ad rem*) indexed for inflation, and doing the same for electricity, gas, and phone services.
- Increasing all existing excise rates by 25 percent.

Revenue Impact

The lack of appropriate data and sufficient time makes it impossible to derive the revenue impacts of the proposed reform. However, we can make a rough approximation of the most significant revenue implications by using previous estimates of the tax expenditures connected with the reform proposals above. Here are our rough approximations:

- Taxing fringe benefits by disallowing their deduction at the enterprise level could bring additional revenues of up to 0.82 percent of GDP (see World Bank 1989). Note that this figure is understated because it does not include the actual costs of the subsidy and negative income tax associated with the exemption of fringe benefits. If these are included, a conservative estimate of the revenue implications of taxing fringe benefits may be approximately 1 percent of GDP.³⁷ The final figure may be lower than that, however, because only enterprises in a profit position will pay taxes on fringe benefits paid to their employees.
- Eliminating the special cash-flow regime for agriculture and transport sectors would yield 0.72 percent of GDP (see World Bank 1989). Eliminating the special rate (half) regime could increase collections close to 1 percent of GDP.
- Eliminating zero-rating for domestic transactions and substituting the exemption of basic food, medicines, and small primary sector producers could increase collections by more than 1 percent of GDP. In addition, the credits paid out because of zero-rating can cost in revenues as much as 1.1 percent of GDP (see Casanegra de Jantscher et al. 1997).
- Increasing the VAT by approximately 4.5 percentage points (to a general VAT rate of 19.5 percent) would increase revenues by 1 percent of GDP (figured at the 1999 VAT efficiency of 0.218).³⁸ This is an underestimate if zero rating is eliminated and other reforms are introduced. In such a case, the VAT revenue efficiency should increase significantly.

Annex: Estimating Marginal Effective Tax Rates on Investment

The Concept

The effective tax rate on capital calculated in our study is an effective *corporate* tax rate on capital, which combines all the taxes that would affect the capital investment at the corporate rather than personal level. Personal income taxes, however, may be incorporated into our calculation when they affect the capital investment at the corporate level. For example, the withholding tax on dividends certainly affects the cost of capital invested at the corporate level through its effect on the rate of return to equity required by shareholders.

The marginal effective tax rate measures the impact of a tax system on an incremental unit of capital investment. It incorporates the effects not only of statutory tax rates and related tax treatments (such as tax depreciation, tax credit, tax deductibility, tax holidays, and the like) but also of various economic factors interacting with these tax treatments (such as financial costs, the inflation rate, and the structure of investment). In other words, the effective tax rate is a summary indicator of the overall tax burden imposed by a tax system on an investment within a certain economic environment.

We calculate effective tax rates based on the assumption of profit maximization. Profit-maximizing firms base their investment decisions on the present value of foreseeable incremental net revenues. Taxes reduce the portion of the profits accruing to the investor, and tax allowances mitigate such a reduction in accrued profits. Owing to the interaction between these statutory tax provisions and actual economic/industrial conditions (such as financing conditions, capital structure, input structure of production, and so forth), effective tax rates can vary by industry even under the same tax regime. Furthermore, for a cross-jurisdiction comparison, differences in effective tax rates may reflect not only national variations in tax regimes but also different economic and financial climates in the various countries.

For profit-maximizing firms, the gross rate of return on capital (net of economic depreciation) must be equal to the financing cost of capital, adjusted for taxes. The size of this adjustment for taxes on a new investment is the effective tax rate on capital. For example, if the gross-of-tax rate of return to capital is 20 percent and the net-of-tax rate of return is 10 percent, then the effective tax rate on capital is 50 percent.

It should be noted that the analysis of effective tax rates in this study deals only with “profitable” firms. By “profitable” we mean those firms that have taxable income and are not in a loss-carryover position. Calculating METR for “tax-loss” firms would require data on average number of years for these firms to write off their losses and become taxable, which is beyond our policy concern at the current stage.

Methodology

The standard method used to estimate effective tax rates has been extensively documented (Boadway, Bruce, and Mintz 1984). The formula based on this method has been modified by incorporating some miscellaneous taxes, such as capital tax, property tax, and tax on the transfer of property (Chen and Mintz 1993; Chen and McKenzie 1997). The following are general formulas used in this study.

Effective Tax Rate

The effective tax rate (t) on a given type of capital is defined as the proportional difference between the gross-of-tax rate of return required by a firm (r^G) and the net-of-tax rate of return required by an investor (r^N). The former is the difference between the marginal revenue product (or user cost, in equilibrium) and economic depreciation. The after-tax rate of return is the weighted average of the return to debt and equity securities held by the investor. Thus, the effective tax rate (t) is defined as

$$t = (r^G - r^N) / r^G. \quad (7A.1)$$

Real Cost of Financing

For domestic investors, the real cost of financing (r^f) is defined by the following formula:

$$r^f = \beta i(1-U) + (1-\beta)\rho - \pi, \quad (7A.2)$$

where β = debt to assets ratio, i = cost of debt, U = the statutory corporate income tax rate, ρ = cost of equity, and π = inflation rate. That is, the cost of financing for an investor is the weighted-average cost of financing net of inflation rate.

For foreign investors, the real cost of financing (r^f) is defined by this formula:

$$r^f = [\beta' i' (1-U') + (1-\beta') \rho'] * (1-\gamma) / (1-x) + \gamma * [i(1-U) - \pi + \pi'] - \pi', \quad (7A.3)$$

where β' = debt to assets ratio in the home country, i' = cost of debt in the home country, U' = the statutory corporate income tax rate in the home country, ρ' = cost of equity in the home country, γ = the ratio of debt raised in the host country to the total investment fund, x = weighted average withholding tax rate in the host country, i = cost of debt in the host country, U = statutory corporate income tax rate in the host country, π' = inflation rate in the home country, and π = inflation rate in the host country.

As equation 7A.3 states, the cost of financing to a foreign investor is the weighted average of the costs of its investment fund taken from the home country and the debt raised in the host country. The former is the weighted-average cost of financing at home, net of withholding tax payable in the host country; and the latter is the cost of debt in the host country, adjusted by income tax deductibility and the difference in inflation rate between the home and host countries.

Net-of-Tax Rate of Return on Capital

For domestic investors, the net-of-tax rate of return on capital (r^N) is defined by the following formula:

$$r^N = \beta I + (1-\beta)\rho - \pi. \quad (7A.4)$$

This is the rate of return on capital required by supplier of investment funds.

For foreign investors, the formula is

$$r^N = [\beta' i' (1-U') + (1-\beta') \rho' - \pi'] (1-\gamma) + \gamma (i - \pi). \quad (7A.5)$$

This is the net-of-tax rate of return on capital required by fund suppliers, including foreign investors themselves and the creditors in host countries.

Applying equations (7A.4) and (7A.5) to equation (7A.1) results in the effective corporate tax rate on capital for domestic investors and that for foreign investors, respectively.

Gross-of-Tax Rate of Return on Capital

Capital Goods

For domestic investors, the gross-of-tax rate of return (r^G) is defined by the following formula:

$$r^G = (1+tm)(r^f + \delta)(1-k)[1-A + \tau(1-U) / (\alpha + r^f + \pi)] / [(1-U)(1-tp-tg)] - \delta \quad (7A.6)$$

where tm = tax on transfer of property, or transaction tax (for example, import duty) on capital goods where applicable; δ = economic depreciation rate; k = investment tax credit rate; A = present tax value of the accumulated capital cost allowance; τ = capital tax rate; α = tax depreciation rate; tp = property tax rate; and tg = gross-receipts tax rate, or presumptive tax.

For foreign investors, the formula is

$$r^{G'} = (1+tm)(r^{f'} + \delta)(1-k)[1-A + \tau(1-U) / (\alpha + r^{f'} + \pi)] / [(1-U)(1-tp-tg)] - \delta \quad (7A.7)$$

Inventory

For domestic investors, the formula is

$$r^G = (1+tm)(r^f + U\pi\zeta) / [(1-U)(1-tg)] + \tau \quad (7A.8)$$

where tm = sales tax on inventory where it is applicable, and $\zeta = 1$ for the first-in-first-out accounting method and 0 for the last-in-first-out method.

For foreign investors, the formula is the same except that the financing cost should be the one relevant to the foreign investors. That is, r^f should be replaced by $r^{f'}$.

Land

For domestic investors, the formula is

$$r^G = r^f (1+tm)[1 + \tau(1-U)/(r^f + \pi)] / [(1-U)(1-tp-tg)]. \quad (7A.9)$$

For foreign investors, the formula is the same except that the financing cost should be the one relevant to the foreign investors. That is, r^f should be replaced by $r^{f'}$.

Aggregation

The effective tax rate for a given industry is the proportional difference between the weighted average of the pretax rate of return by asset type and the after-tax rate of return (which is the same across asset type within the industry). That is, the marginal effective tax rate for industry $i(t_i)$ is calculated as follows:

$$t_i = (\sum_j r_{ij}^G w_{ij} - r_i^N) / \sum_j r_{ij}^G w_{ij} \quad (7A.10)$$

where j denotes asset type (that is, investments in buildings, machinery, inventories, and land), and w_{ij} denotes the weight of asset type j in industry i .

Notes

1. It should be clear that this statement does not represent any normative judgment of Mexico's fiscal performance. There is no absolute scale against which one can assess how good or bad is a country's relative public sector size. Among other things, the share of government in GDP reflects a country's collective preferences for public goods and services compared with private consumption. From an economic standpoint, these preferences clearly cannot be judged right or wrong. Rather, it is a positive statement being made here: the current level of revenues is not adequate to support all the expenditure programs that are desired.
2. General government revenues consist of central government revenues, revenues from social security and extra budgetary funds (if applicable), and the own-source revenues of subnational governments. Using general government revenues (as opposed to central government revenues, for example) is desirable in that it provides a more balanced perspective because countries differ in their level of fiscal decentralization and the consolidation of social security and other extrabudgetary funds in the central government budget.
3. Note that this international average is based exclusively on the countries included in the sample. In particular, we should note that the sample does not contain any high-income countries.
4. The measurement of social security revenues during the last decades is clouded because of changes in reporting and definitions.
5. According to Gil Diaz (1995) the CIT showed decreasing revenues during the 1980–87 period in part because of high inflation and the Oliveira-Tanzi effect of inflation on tax collections. With more frequent filing and adjustment for both liabilities and assets, the effect supposedly disappeared thereafter. For the PIT, the lack of indexation until 1988 worked to produce more revenues, but after indexation this advantage was lost. On the whole, Mexico's tax system does not appear to have gained or lost as a result of inflation over the years. The regression of real revenues from income taxes on the inflation rate is not statistically significant after controlling for serial correlation and real GDP.
6. The elasticity property is more important because it gives government the ability to respond to increases in the demand for public services without having to interfere continuously with the tax system via ad hoc revenue-raising measures.

- Elasticities are more difficult to estimate because it is necessary to control for the impact of changes in the tax structure and changes in enforcement.
7. During the 1980–99 period, Mexico suffered four recessions: 1982–83, 1986–87, a mild one in 1988, and a sharp but short recession in 1995.
 8. This analysis was refined by using dummy variables as proxies for major changes in the structure of the taxes and by substituting GDP by variables that could match more closely the actual tax base of the revenue source in question. As an example, for the VAT we proxy by introducing dummy variables for each of the major structural changes in the VAT and by replacing GDP with private consumption. Because the resulting estimated coefficient for buoyancy did not differ much from those estimated with a simple regression and GDP as the tax base, only these latter results are discussed.
 9. The coefficient of variation is defined as the ratio of the standard deviation of the series to its mean value.
 10. The latter can be interpreted as deviation of GDP from its long-term path.
 11. During the past decades, one can find examples to counter the assertion that discretionary changes in tax policy have been pro-cyclical. But, in fact, it appears that the Mexican government, prior to the failed reform attempt by President Fox in 2000–02, never set out on tax reform with the explicit objective of increasing revenues as a percentage of GDP. The main objectives of these reforms were efficiency and some time equity. Occasionally, the objective was clearly one of increasing revenue—as when the contribution from the petroleum sector decreased in the late 1980s—but this increase in revenues was only to bring actual tax effort back to the average level and not to increase it as a percentage of GDP.
 12. This pattern is common to other developing countries but not among OECD countries. See Gavin and Perotti (1997).
 13. Allegedly, this was the budget philosophy publicly espoused by Domingo Cavallo, minister of finance in Argentina from 1991 to 1996 (Talvi and Végh 2000).
 14. The annex provides a description of the methodology used for METR calculation. Computations of METRs for foreign capital investment in comparison with those in Canada and the United States are discussed elsewhere in this report.
 15. Under the current Mexican tax regime, firms in Mexico are taxed differently according to the nature of business and the size and location of the firm. Refer to the annex to this chapter for details.
 16. We assume that the land transport sector accounts for the majority of the transport industry in Mexico in order to ignore the difference in tax treatment

between the “land transport” and other transport sector. A more accurate estimate can be accomplished when the data are available to break down the transport industry into these two sectors.

17. This simulation is undertaken by applying the Canadian proportion of small firms within each sector and assuming the average gross-receipt tax rate is 1.35 percent (= $1/2 [0.25\% + 2.5\%]$). We first estimate METR for small and regular taxpayers, respectively, and then estimate the weighted-average METR by sector using the proportion of small firms by sector as weight.
18. Nontax factors such as inflation rate, interest rate, financing structure, and the capital structure also have an impact on the intersector tax distortion. For example, with a higher (lower) discount rate (which is determined by the inflation rate, interest rate, and financing structure), a given depreciable asset could be taxed at a higher level because the present value of its tax depreciation allowance may be worth less (more). When such a higher (lower) taxed asset accounts for a bigger share of a capital used by a given sector, it may contribute to a higher (lower) METR in this sector, compared than in other sectors. In the Mexican case, the inflation rate does not matter in our METR estimate because Mexico has adopted practically full indexation for inflation.
19. These results are discussed in greater detail later in the text.
20. As noted by Casanegra de Jantscher et al. (1997), the distribution of the tax expenditures implied by the zero-rating of food items is quite unequal and significantly regressive. For 1994, using the National Consumer Expenditure Service for that year, Casanegra de Jantscher et al. (1997) found that more than 33 percent of the total subsidy accrues to the two highest income deciles of taxpayers, whereas less than 9 percent of the total subsidy accrues to the two lowest income deciles of the population.
21. Of course, more government spending does not necessarily translate into effective redistribution of income. Expenditure programs need to be effective and efficient.
22. If we allow for the fact that the redistributive impact and the welfare of the poor may be more effectively addressed through the expenditure side of the budget, decreasing the progressivity of Mexico’s tax system may be acceptable strategy if a significant increase in tax collections is effectively spent on social programs that more than proportionally benefit the poor.
23. The ENIGH database is from Instituto Nacional de Estadística Geografía e Informática.
24. This composition of categories included in PIT and CIT is guided by Ministry of Finance estimates of the split of the revenue collected under the personal income tax (Impuesto Sobre la Renta, ISR).

25. This subsidy *should* be adjusted downward by the average level of fringe benefits received as a proportion of Y_g . However, because this adjustment is made at the average company level rather than on an individual basis (and we lack that kind of information in the survey), this adjustment is not taken into account in the estimations.
26. The estimated refunds for individuals in the first eight deciles due to the salary credit amounts to 10 percent of total tax revenues (without social security funds) and 25 percent of ISR collected revenues.
27. IMSS is the social security institute that covers workers in private sector enterprises. By 1996 IMSS provided coverage to about 80 percent of the insured population, so the bias of assuming their rules for the entire population is negligible.
28. The “base salary” includes the contractual salary plus some fringe benefits. The upper limit to contributors is 10 minimum wages.
29. Agriculture, livestock production, forestry, and fishery businesses with revenues below 20 minimum wages are exempt from this tax.
30. The categories considered are interests paid on equity instruments, savings accounts, and fixed-term investments.
31. This mainly included food, water, medicines, public transportation, some expenditure on education and health care, house rents, books and magazines, tickets for lotteries and games, inheritances, jewelry, and the like.
32. The deciles are not exactly the same between the baseline and the alternate scenario because of the different underlying gross-up process.
33. There are not many formal estimates of tax evasion in Mexico. The SHCP has estimated the level of tax evasion for the VAT from 1985 to 1998. According to those estimates, tax evasion has represented between 30 and 46 percent of actual collections. For 1998 the estimated level of evasion was 37.5 percent. In May 2000, the Federal Procurement Unit (Procuraduría Fiscal de la Federación) announced that the overall level of evasion and avoidance represented 35 percent of potential collections. This figure would seem to be low, especially if it includes tax avoidance practices.
34. Remember that Mexico’s PIT has an important negative income tax component; hence, a group of taxpayers can pay more than 100 percent of collected revenues.
35. Tax reforms—quite a few of them major—took place in 1978–80, 1983, 1985, 1986, 1988, 1989, 1990–91, 1993, 1994, 1995–97, 1998, and several minor reforms under President Fox in the period 2000–2006.
36. Fiscal systems are interconnected systems. It is incorrect, for example, to consider the progressivity or regressivity of single taxes. Getting rid of a certain

degree of regressivity in indirect taxation may be quite costly in terms of administration costs or other objectives, but this regressivity can simply be re-dressed in some other areas of the tax system. What should matter is the performance of the entire system, not what happens with individual taxes.

37. According to the information provided by the SHCP, about 20 percent of PIT revenues were rebated as negative income taxes to the lowest groups in the income scale in 1994.
38. The revenue efficiency is defined as the ratio between VAT revenues in GDP and the general VAT rate.

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CHAPTER 8

Measuring Targeting Performance through Public Expenditure Tracking Surveys

Peru

José R. López-Cálix, Lorena Alcázar, and Erik Wachtenheim

Several local governments of Peru have committed themselves to increase social spending while improving the efficiency of their social programs and the quality of the social services provided at the local level, including nutritional programs. They have recognized that increased social spending needs to be decentralized and that this need implies delegating more budgetary responsibilities to the regional units of ministries (particularly education and health) and devising efficient mechanisms to transfer resources to local governments. These improvements are important, but they may not translate into actual increases in the public funding that ultimately reaches the intended beneficiaries. Inefficiency problems, such as poor targeting, deficient financial management, and funding leakage, may undermine pro-poor public spending severely. In a context of extremely scarce fiscal resources for social programs, addressing these shortcomings is critical to the success of the country's poverty reduction agenda.

We have structured this chapter in three sections following this introduction. First we assess the level at which Peru's public spending targets poverty. Following a broad analysis of geographic targeting patterns, we quantify the extent to which safety net programs actually do reach their intended beneficiaries on the basis of household surveys. We estimate the

overall progressivity or regressivity of the main social programs and, finally, address the poverty focus of the principal nutrition, health care, and education programs.

In the subsequent section, we deal with the efficiency shortcomings of Peru's main financial transfers from the central government to local governments, assessing the following aspects: poverty targeting; the volatility of financial flows as a reflection of their predictability; the transparency of the criteria that determine transfers and their actual delivery; procedures for auditing the use of funds; and leakage as revealed by the public expenditure tracking survey (PETS).

In the fourth section, we narrow our focus to a PETS of the Vaso de Leche (VDL; Glass of Milk) program. After describing PETS methodology, we review the transfer process and then estimate the level of leakage occurring in each of the five steps of the process that transfers funding from the top (central government) to the bottom (direct beneficiaries in households). We finish the chapter with a few recommendations for the VDL program and with broad conclusions regarding public expenditure.

Central Government Targeting of Social Spending

The Peruvian government's proactive policy of targeted programs for poor people has been fundamental to the poverty reduction achievements of the past years. As a percent of gross domestic product (GDP), total social spending increased from 3.6 percent in 1993 to 6.9 percent in 2002. Commitment by the authorities to a comprehensive safety net has been reflected in the many social programs that specialize in development and relief components. The development component provides permanent access to improving human capital accumulation of the poor in the form of health care, education, and basic infrastructure services. The relief component provides a consumption floor for the poor through two types of mechanisms: temporary employment programs, like *A Trabajar* (urban and rural), and direct transfer programs usually in the form of food. Although much effort has been made to improve the extent to which universal programs addressing health care, education, and infrastructure actually benefit poor people, most food programs are designed explicitly to serve the most vulnerable populations.

As a point of departure, by end-2001 we noted that the elected authorities of the then incoming Toledo administration were not increasing

the resources of existing safety net programs, but rather were attempting to improve efficiency in the administration and targeting of those programs. The budget share assigned to programs aimed at reducing extreme poverty as a percentage of GDP increased from 1.1 percent in 1994 to about 1.7 percent in 1998, and remained constant up to 2002. That share was considered adequate for existing needs (World Bank 2000). Striking the right balance between the two types of safety nets, however, requires further assessment of their performance. Indeed, up to the creation of *A Trabajar* in 2002, direct transfers dominated the landscape of safety net programs in Peru. Later, however, such a temporary employment program had to compete for scarce resources. Furthermore, ongoing unification of rural infrastructure projects—such as those financed by PRONAMACHS and INADE—under one administration is an initial step to reduce administrative costs and overlaps or gaps in coverage.¹ Targeting is left as a major issue requiring efficiency improvements. It is fortunate that Peru has a well-developed poverty map.²

Broad geographic regional targeting remains regressive in Peru. Although adequate targeting in social programs is a critical component of efforts to optimize scarce resources and deal with prevailing heterogeneity in program resources to reach the poor, such targeting also is needed to offset broad mistargeting in regional public expenditure. Simple correlation coefficients between per capita spending by department (and by the regional administration councils) and poverty and extreme poverty rates produce negative results, whereas they would be positive had they been allocated to the department with the highest poverty rates. Furthermore, correlation coefficients are positive between per capita spending by department and poverty rankings ordered from poorest to richest, whereas they should be negative (table 8.1). Such misallocation is explained by the rigid components of the budget, particularly in current expenditure.

Broad geographic targeting of public expenditure should be reviewed carefully, particularly in light of the incoming process of regional decentralization, giving greatest weight to departments with the poorest populations.

Poor people's access to social programs is generally progressive, but there are important differences among individual programs. Progressivity is not a deliberate result. Indeed, most nontransfer social programs are universal—that is, not intended to target specific groups. In practice, however, poor households have good access to social programs. In 2000, a to-

Table 8.1. Correlation between Expenditure and Poverty, by Department, 2001

<i>Department</i>	<i>Correlation</i>	<i>Expected direction if targeted at poverty</i>
<i>Department expenditure to poverty, per capita, by definition</i>		
Poverty rate	-0.522	Positive
Extreme poverty rate	-0.463	Positive
MEF poverty ranking	0.265	Negative
INEI poverty ranking	0.458	Negative
INEI extreme poverty ranking	0.507	Negative
<i>CTAR expenditure to poverty, per capita, by definition</i>		
Poverty rate	-0.207	Positive
Extreme poverty rate	-0.130	Positive
MEF poverty ranking	0.397	Negative
INEI poverty ranking	0.202	Negative
INEI extreme poverty ranking	0.135	Negative

Source: World Bank estimates, based on Ministry of Economy and Finance data.

Note: CTAR = Regional Administration Council; MEF = Ministry of Economy and Finance; INEI = Instituto Nacional de Estadística e Informática.

tal of 82 percent of poor households had such access (84 percent for those in extreme poverty), and 69 percent had access to at least two social programs (73 percent for those in extreme poverty) (table 8.2). This apparent contradiction is explained by a self-selection process (that is, nonpoor populations prefer to pay for private services of higher quality). In transfer programs, however, targeting the poor is extremely relevant because these programs have intended beneficiaries in well-defined vulnerable populations. For that reason, measuring their performance—in terms of resource deviation (leakage) to nonpoor people—is highly relevant when the transfers are compared with alternative policies, such as cash grants.

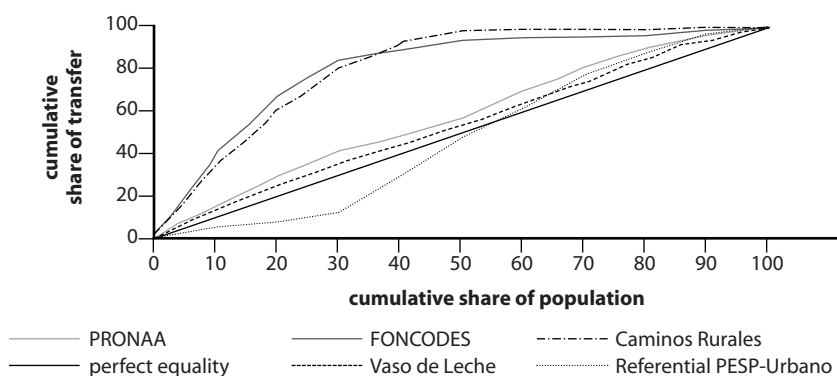
Proportionally speaking, poor rural households have been reached more adequately by social programs than have urban households. Among major social programs, Fondo Nacional de Compensación y Desarrollo (excluding A Trabajar) and Caminos Rurales have the best record in progressive spending, adequately reaching poor beneficiaries (figure 8.1).³ PRONAA, the government food agency, has lost ground, however, and joined VDL in a mild progressivity of its programs. Finally, the Emergency Social Productive Program's A Trabajar Urbano started on the wrong foot.

Table 8.2. Household Access to Social Programs, by Poverty Level, 2001
percent

Households by location	Total households	Extremely poor households	Poor households	Total households in poverty	Nonpoor households
Total (n)	5,632,815	1,161,588	845,355	2,006,943	3,625,872
Beneficiaries	59.1	83.9	79.7	82.1	46.4
One program	13.4	10.5	17.2	13.3	13.5
More than one program	45.7	73.4	62.5	68.8	32.9
Nonbeneficiaries	40.9	16.1	20.3	17.9	53.6
Urban (n)	3,607,764	266,243	607,221	873,464	2,734,300
Beneficiaries	50.8	81.9	78.8	79.7	41.6
One program	14.9	19.1	19.1	19.1	13.5
More than one program	36.0	62.7	59.7	60.6	28.1
Nonbeneficiaries	49.2	18.1	21.2	20.3	58.4
Rural (n)	2,025,051	895,345	238,134	1,133,478	891,573
Beneficiaries	73.9	84.5	81.9	84.0	61.1
One program	10.8	7.9	12.3	8.9	13.3
More than one program	63.1	76.6	69.6	75.1	47.8
Nonbeneficiaries	26.1	15.5	18.1	16.0	38.9

Source: Ministry of Economy and Finance.

Figure 8.1. Lorenz Curves in Selected Social Programs



Source: World Bank estimates, based on data from the Ministry of Economy and Finance and Instituto Nacional de Estadística e Informática's 2000 Household Survey.

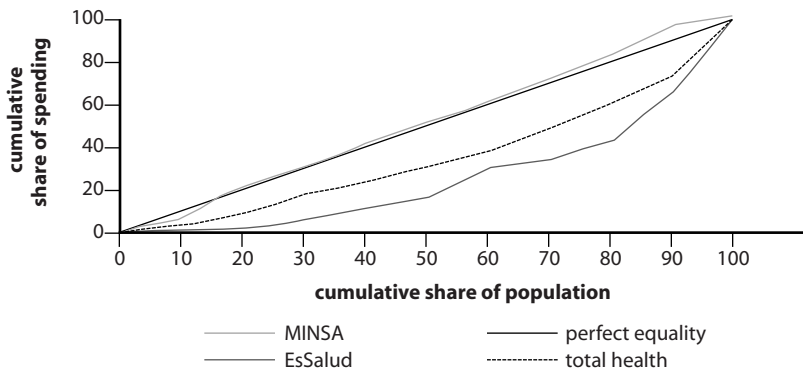
Note: FONCODES = Fondo Nacional de Compensación y Desarrollo; PESP = Emergency Social Productive Program; PRONAA = Programa Nacional de Asistencia Alimentaria; VDL = Vaso de Leche.

Its overall progressivity, particularly at the first four poorest deciles of the populations (which go beyond the population in extreme poverty), reveals that self-targeting of the most needy beneficiaries is failing. The reason for this is to be found in the seemingly too high wage rate being paid to attract workers from only the poorest deciles.⁴

A Trabajar should offer a wage rate that makes it only attractive to poor households. To do this, the government of Peru should undertake an evaluation study, including assessment of household targeting outcomes, and lower the wage if the study indicates poor urban targeting outcomes. A similar study should be done regarding A Trabajar Rural. The study should be disseminated widely to support the government's subsequent decisions.

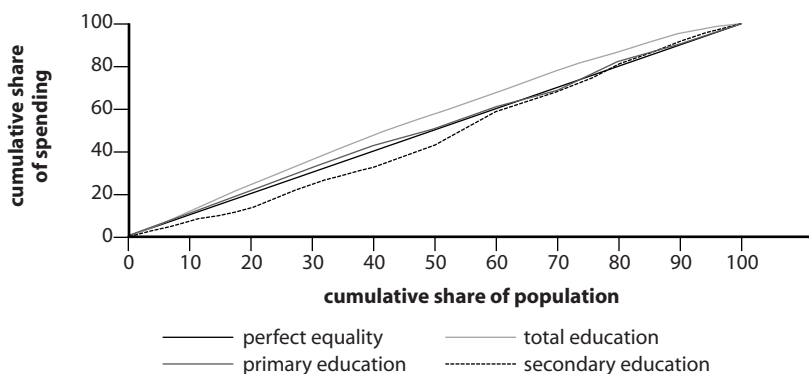
The main social sector programs also present a mixed picture in terms of the progressivity or regressivity of their resources allocated nationwide. On the one hand, health care expenditure appears to be significantly regressive, especially for EsSalud whose services clearly focus on the population located in the nonpoor deciles. On the other hand, the Ministry of Health (MINSa) programs show mild progressivity thanks to a few local service delivery programs that clearly target most-needy beneficiaries (figure 8.2). On the other hand, education expenditure shows some de-

Figure 8.2. Lorenz Curves for Health Care Expenditures



Source: World Bank estimates, based on data from the Ministry of Economy and Finance and Instituto Nacional de Estadística e Informática's 2000 Household Survey.

Note: MINSa = Ministry of Health.

Figure 8.3. Lorenz Curves for Education Expenditures

Source: World Bank estimates, based on data from the Ministry of Economy and Finance and Instituto Nacional de Estadística e Informática's 2000 Household Survey.

degree of progressivity, certainly in primary education, although there is regressivity of expenditure in secondary education (figure 8.3).

In general, safety net programs reach less than 40 percent of their intended extreme-poverty beneficiaries. We found this to be true of both the VDL and the Comedores Populares programs in 2000 (table 8.3). Desayuno Escolar and the school textbook and materials program, however, were the exceptions, with acceptable beneficiary totals of 51 percent and 44 percent, respectively, belonging to the three poorest deciles. Seguro Escolar ranked relatively better among health programs, whereas Planificación Familiar was among the worst-targeted programs. That ranking also broadly corresponded to the level of access (measured by the ratio of beneficiaries to the total population) that these programs had. Comedor Popular and the family planning program had the lowest rates of access (figure 8.4).

There are several measures that could be taken to improve targeting. In the short term, applying a common poverty-targeting method and criteria in all social programs, based on a poverty map updated every three years, should be made more explicit, transparent, and focused on populations that are extremely poor. That application should be accompanied by complementary training, information campaigns, community mobilization, and nutrition education.

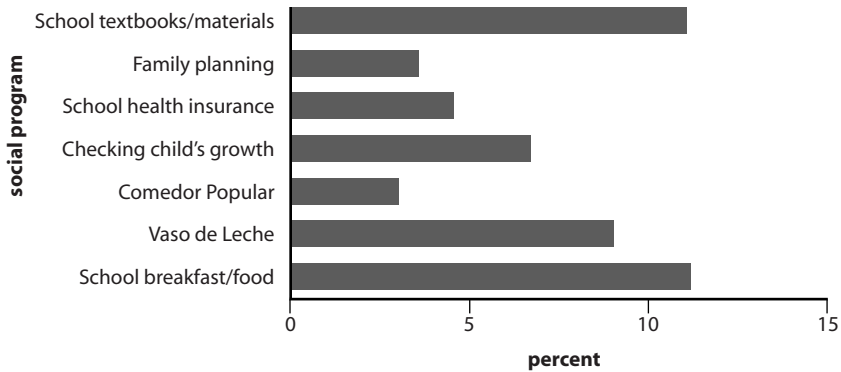
Table 8.3. Targeting of Individual Beneficiaries by Food Assistance, Health Care, and Education Programs, 2000

<i>Social program</i>	<i>Number of beneficiaries (100% of total)</i>	<i>Extreme poverty (% of total)</i>	<i>Nonextreme poverty (% of total)</i>	<i>Total poverty (% of total)</i>	<i>Nonpoor (% of total)</i>
<i>Food assistance</i>					
Desayuno Escolar	2,972,859	51.1	18.7	69.8	30.2
Vaso de Leche	2,283,919	40.1	24.1	64.2	35.8
Comedores Populares	746,134	40.2	14.5	54.7	45.3
<i>Health care</i>					
Checking child's growth	1,729,899	33.7	18.4	52.1	47.9
School health insurance	1,157,912	36.8	20.6	57.4	42.6
Family planning	870,942	22.1	24.8	46.8	53.2
<i>Education</i>					
School text and materials	2,970,567	44.4	19.7	64.1	35.9

Source: Ministry of Economy and Finance.

Programs with substantial mistargeting should be redesigned, merged, or closed. To evaluate targeting performance regularly, benchmarks of the share of expenditure reaching extremely poor beneficiaries (the lowest four quintiles) should be set explicitly at least for the 10 main social programs, and progress toward meeting those benchmarks should be monitored on an annual basis with support from Peru's Integrated Financial Management System (SIAF). When such evaluation indicates that programs do not meet their objectives or overlap, immediate restructuring will be necessary. Those programs, such as VDL, that show significant leakage and do not meet nutritional objectives in any meaningful way might require a major restructuring in the future.

In the medium term, a comprehensive restructuring of the main social programs dealing with extreme poverty is needed, perhaps following the example of Mexico's PROGRESA program (which addresses education, health, and nutrition). Given very limited fiscal resources, budget rigidities, and low levels of efficiency for a substantial amount of resources already devoted to extreme-poverty programs, this seems rather an urgent task. The restructuring of social programs in Peru should have several

Figure 8.4. Access to Social Programs, 2001*percent of total population*

Source: World Bank estimates, based on data from the Ministry of Economy and Finance and Instituto Nacional de Estadística e Informática's 2000 Household Survey.

goals: (1) improve the quality of service delivery; (2) expand the coverage of social programs, particularly among the most vulnerable rural groups; and (3) generate fiscal savings that could be used to increase coverage of the most effective programs at the local level.⁵

One very promising option that Peru might consider is to restructure the country's various feeding programs into a unified intervention program (and, more ambitiously, to fold education and health programs as well into a multifaceted structure like that of PROGRESA).⁶ PROGRESA's structure offers the poor broad coverage under a single program structure, with proper targeting and very powerful positive impacts on poor families. Rough calculations based on PROGRESA's 2002 costs per beneficiary (\$80 per year) indicate that covering Peru's entire rural poor population (4.5 million people in 2002) with a similar unified intervention (primary education, basic preventive health care, and food supplement) would entail a maximum cost of \$360 million—or 1,200 million nuevos soles (0.6 percent of 2002 GDP). It is interesting to note that this amount represents about a third of the total budget expenditure devoted to extreme-poverty programs, just slightly more than three times the cost of the combined sum of the VDL, Comedores Populares, Desayunos Escolares, and Seguro Materno-Infantil programs that year. Obviously, if the selected target population would be the extremely poor people, then the cost would be considerably lower.

Funding Transfers from Central to Local Government: Efficiency Problems

Public resources in Peru are distributed by one of two mechanisms: they are centrally allocated and administered through branch offices of the central government or they are transferred to and administered by local governments (municipalities). The education budget is an example of the former; the VDL program is an example of the latter. In both cases there is a considerably long chain of intermediaries between the original central government budgeting office and the intended recipient. Findings presented here focus on the latter mechanism.

It is difficult to overstate the importance of transfers to municipal governments. For the districts outside of Lima, transfers represent, on average, 72 percent of municipalities' total income. Among the districts of the poorest stratum, transfers can represent more than 90 percent of municipalities' total income. The central government's main four transfer programs are the Municipal Compensation Fund (FONCOMUN) and VDL for all municipalities, and the Canon Minero and Canon/Sobrecanón Petrolero for provinces and districts in regions where mining and petroleum products are extracted or the mining and petroleum company headquarters are located.

In 2001, those four major central government transfers totaled 1.9 billion nuevos soles (roughly \$560 million).⁷ The largest of the four transfer programs is the FONCOMUN, which accounted for 1.4 of the 1.9 billion nuevos soles transferred in 2001. The second-largest central government transfer is the VDL transfer, which totaled \$97 million in 2001. By law, approximately 7 percent of public social spending in Peru is dedicated to nutrition programs. Much of this effort involves the VDL program. These funds form part of the overall transfers of central government resources to local governments, and, in turn, 100 percent of these funds are to be delivered to local milk committees, and from there to households and individuals. Unlike others, this transfer is earmarked specifically for purchase of VDL products. This program is very important: excluding Lima, the municipalities in our 2002 survey reported a total of 645,346 beneficiaries. Expanding that to the national population yields a total of 3,693,406 (2,207,209 being children aged 0–6), which suggests a rough coverage of 92 percent of children aged 0–6.

The third-largest of the four major transfers is the Canon/Sobrecanón Petrolero program, which totaled 128 million nuevos soles (roughly

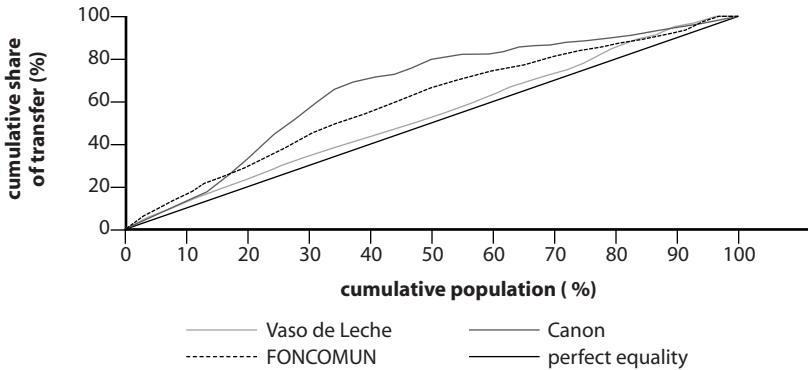
\$37 million) in 2001. However, the importance of the total figure is misleading at the local level. For municipalities eligible to receive this transfer, it can represent an amount of resources equal to (in some cases, more than) the FONCOMUN transfer.

Of the four transfers, only the Canon Minero is not variable month-to-month. It is the fourth-largest transfer, with about \$24 million distributed in 2001.

How meaningful are these transfers to the individual Peruvian? On a 2001 per capita basis, FONCOMUN transfers averaged \$8.57 in Lima and \$18.61 in the rest of the country. In an economy in which the per capita gross national product (GNP) in purchasing power parity terms is approximately \$2,080, FONCOMUN amounts to no more than four-tenths of 1 percent of per capita GNP. A similar comment applies to the *canons*. These calculations, however, are somewhat misleading because the funds are designated for the poor—not for the entire population—and because the poor are receiving a higher share of them on a per capita basis. In addition, such comparisons are misleading in the case of VDL transfers. Its expenditure would be better compared with social spending than with total spending. Furthermore, the cash value of those funds is not the only factor to consider because, at least in theory, the transfer provides key nutritional supplements for children, whose nutritional status during childhood could affect their future health and productivity.

Targeting Performance of the Four Principal Transfer Programs

Expenditure on intergovernmental transfers shows a significant degree of progressivity. Using Lorenz curves, the highest degree of progressivity happens with the distribution of the Canon Minero. That is followed by FONCOMUN and VDL, which exhibit a distribution similar to that of a social program with universal coverage (figure 8.5). These results are consistent with the laws that govern them, as well as with the findings of our survey. The legislation states that all but Canon Petrolero transfers are to be distributed according to per capita population, adjusted for poverty levels.⁸ This adjustment is largest for the FONCOMUN allocation formula, which counts each rural resident (usually the poorest people in the country) twice as much as each urban resident. Doing so should mean that the transfers would be higher in the rest of Peru than in Lima, and higher in the more impoverished areas than in the areas where poverty is not as great. In practice, the FONCOMUN per capita contributions clear-

Figure 8.5. Lorenz Curves for Intergovernmental Transfers*percent*

Source: World Bank estimates, based on data from the Ministry of Economy and Finance and Instituto Nacional de Estadística e Informática's 2000 Household Survey.

Note: FONCOMUN = Fondo de Compensación Municipal.

ly are far higher in the rest of the country than in Lima. The same pro-poor poverty bias appears in the Canon Minero and, to a much lesser extent, in the VDL program (table 8.4). Thus, the formula (and criteria) used for determining the Canon Minero and FONCOMUN transfers do not need any major modification and should be preserved.

Unpredictable Volatility of Central Government Transfers

One of the most serious long-term challenges faced by local governments in Latin America is the irregular flow of central government transfers—that is, their volatility. This flow is often unreliable. Because these flows often are the main source of a local government's income in many countries, such irregularity frequently results in local government arrears.⁹ Although volatility is not directly a leakage-related issue, it is mainly associated either with central governments' discretionary decisions or with unstable earmarked tax resources, like *canons* or other taxes. In the particular case of food programs, volatility does make planning difficult and does cause suffering when milk and other foodstuffs are not delivered on time. Our survey results showed that, with a new financial management system in place in 2002, volatility was minimized but not eliminated, in Peru. In the worst case, volatility for the VDL transfer, outside of Lima,

often exceeded 10 percent, with the poorest districts averaging more than 15 percent. It would be worthwhile to reduce the volatility of central government transfers, particularly among the poorest recipient municipalities. SIAF should continue to be expanded among municipalities, but other measures to diminish the remaining volatility of transfers should be explored as well. Structural volatility in the Canon Minero transfers (related to international mineral prices) may require a stabilization fund.

Transparency Problems

At the local government level, there is an inadequate understanding of the amounts of the transfers and knowledge is poor concerning what day a transfer will arrive. Overall, most of the officials we interviewed in the municipalities surveyed claimed to have a reasonable understanding of the

Table 8.4. Per Capita Transfers to Municipalities, 2001
U.S. dollars

<i>Program location, by demographics</i>	<i>FONCOMUN</i>	<i>Canon Minero</i>	<i>Canon/ Sobrecanón Petrolero</i>	<i>Vaso de Leche</i>
Peru	15.35	1.20	12.51	3.73
Lima	8.57	0.09	—	3.99
Urban	8.33	0.09	—	4.00
Rural	25.24	0.19	—	3.33
Observations (n)	177	171	—	177
Rest of Peru	18.61	1.89	12.51	3.60
Less poor	14.38	1.55	10.97	2.96
Poor	18.94	2.07	11.16	3.54
More poor	22.54	1.99	19.47	4.35
Urban	15.46	1.54	10.22	3.14
Rural	22.73	2.25	17.37	4.21
Small	31.97	1.84	48.15	4.37
Medium	20.05	1.77	19.40	4.13
Large	16.28	1.92	10.62	3.39
More accessible	17.33	1.81	9.81	3.39
Less accessible	23.72	2.15	20.90	4.47
Nonprovincial capital	16.98	1.48	11.95	3.73
Provincial capital	21.60	2.69	13.09	3.41
Observations (n)	1,641	1,296	142	1,641

Source: Ministry of Economy and Finance.

Note: — = not available; FONCOMUN = Fondo de Compensación Municipal.

various transfer programs. However, the same was not true at the committee level. For example, the survey found that 90 percent of the municipalities in the Lima area and 79 percent in the rest of the country claimed to know the allocation criteria used for the FONCOMUN program. But the survey also found that, when questioned, only 11 percent of the municipal officials in Lima—who earlier claimed to have knowledge of the criteria—actually did know them. In the rest of Peru, there was a greater amount of knowledge among those who claimed to know: 67 percent actually did know the criteria. As for the amount of transfers expected from FONCOMUN, the knowledge base was more reasonable: only 5 percent in Lima and 15 percent in the rest of Peru claimed not to know. In poor and rural areas outside Lima, however, this percentage of uncertainty increased to nearly one third. In the case of Canon/Sobrecanón Petrolero transfers, there was considerable uncertainty about the expected amounts, with the majority outside Lima not knowing. Knowledge of transfer arrival dates was far weaker in Lima, with 40 percent of the municipalities not knowing. In the rest of Peru, 33 percent did not know the dates. Similar percentages were found for FONCOMUN and Canon Minero (table 8.5).

The Peruvian government's decision to begin in 2002 to include monthly transfers to each municipality in a user-friendly format and to explain the methodology used for their estimates, should have been complemented with adequate training and information supplied to major and local authorities (for example, the VDL committees).

It would be worthwhile to increase the transparency of transfers to municipalities through a monthly report by SIAF, accompanied by thorough dissemination of its redistribution criteria. This increase also would require building and strengthening local capacity to manage the transfers. The central government authorities also should make information about these transfers fully available to the public and to the direct beneficiaries through SIAF and the transparency budget Web site.

Insufficient Auditing and Supervision

The central government lacks a solid baseline against which to evaluate the quality, efficiency, and efficacy of public expenditure below the national level. In fact, very little is known about how resources are channeled (particularly outside of Lima), and even less is known about how much of these resources initially allocated actually are spent for their

Table 8.5. Municipalities That Did Not Know the Transfer Arrival Dates
percent

<i>Municipality location, by demographics</i>	<i>FONCOMUN</i>	<i>Canon Minero</i>	<i>Canon/Sobrecanón Petrolero</i>
Lima	40		
Urban	42	—	—
Rural	38	—	—
Observations (n)	20	—	—
Rest of Peru	33	35	40
Not Poor	27	29	2
Poor	49	63	94
Extremely Poor	38	30	40
Urban	61	87	35
Rural	28	28	47
Small	30	30	38
Medium	39	36	31
Large	45	62	44
More accessible	18	21	15
Less Accessible	66	66	64
Nonprovincial capital	34	33	41
Provincial capital	28	50	29
Observations (n)	99	74	32

Source: Authors' survey of municipalities.

Note: — = not available; FONCOMUN = Fondo de Compensación Municipal.

original purpose, what percentage really reaches their intended beneficiaries, and what are the magnitudes of transfer delays. Supervision also is very poor. For instance, in 2002 we found that the central government had carried out no supervision regarding the use of VDL program resources in 78 percent of the municipalities visited. Moreover, only 14 percent of the municipalities in rural areas had any supervision.

On average, in 2002, only 60 percent of the municipalities were audited with regard to FONCOMUN and Canon Minero, and barely a third of those eligible for the Canon/Sobrecanón Petrolero transfers were supervised by some central government entity. Furthermore, the central government audits were reaching only the more accessible districts, leaving the poorer, rural, and more remote districts wholly unsupervised (table 8.6). Central government supervision was not only rare, but also irregular, with the bulk of audits in about 80 percent of FONCOMUN and Canon Minero cases (43 percent for the Canon Petrolero) done on a yearly basis.

Table 8.6. Municipalities Subject to Central Government Supervision, 2002
percent

<i>Municipality location, by demographics</i>	<i>FONCOMUN</i>	<i>Canon Minero</i>	<i>Canon/Sobrecanón Petrolero</i>
Lima	40		
Rest of Peru	61	61	34
Not Poor	75	75	34
Poor	27	29	16
Extremely Poor	52	42	58
Urban	32	31	21
Rural	67	65	55
Small	67	67	0
Medium	30	28	31
Large	58	50	51
More accessible	78	79	23
Less accessible	26	19	46
Nonprovincial capital	62	61	30
Provincial capital	58	56	65
Observations (n)	100	73	33

Source: Actual survey.

Note: FONCOMUN = Fondo de Compensación Municipal.

High priority should be given to upgrading the auditing of municipal governments, not only by the Comptroller's Office, but also by means of internal audits by the municipal administrations themselves. Auditing procedures applied to local governments should be overhauled, including training, management reform, and periodic internal and external audits by the Comptroller's Office. Such reform is particularly urgent in the case of the Canon Petrolero transfers.

One example of a problem related to insufficient auditing and supervision is illustrated by the lack of control over how much of central government funding municipalities devote to current expenditures, rather than to capital expenditures. In 2001, FONCOMUN law required a ceiling of 30 percent devoted to current expenditure (100 percent devoted to capital expenditure and milk products in the cases of Canon Minero, Canon Petrolero, and VDL). In 2002, the FONCOMUN restriction was eliminated, and the central government left each municipality to decide how best to combine its resources. Survey findings showed that the percentage of FONCOMUN resources assigned to current expenditure varied between 27 and 41 percent; such evidence, however, is inconclusive be-

Table 8.7. Percent of Transfers Used for Current Expenditure, 2002

Program	Nonrestrictive definition ^a		Restrictive definition ^b	
	Percentage	Obs (n)	Percentage	Obs (n)
FONCOMUN	41	61	27	61
Canon/Sobrecanón Petrolero	35	16	27	61
Canon Minero	8	45	29	16

Source: Actual survey.

Note: FONCOMUN = Fondo de Compensación Municipal; obs = observations.

a. Employee payrolls (white-collar and blue-collar), pensions, road maintenance, sanitation, other current expenditures.

b. Employee payrolls (white-collar and blue-collar), pensions, other current expenditures.

cause a significant number of respondents (more than half in the case of the *canons*) did not know how the transfers were used; other respondents accounted for more than 100 percent of the transfer, and yet approximately another one third of respondents could account for less than 70 percent of Canon Minero/Petrolero funds (in implicit violation of the law) (table 8.7). However, these findings showed an important shortcoming in transfer mechanisms—that is, how unprepared municipalities were to comply with legally mandated current/capital expenditure ratios in their use of funds. If those ratios are to be respected, procedures for auditing and accountability should be upgraded; otherwise, because the central government lacks enforcement capacity, ratios should be eliminated and municipalities should decide how best to allocate their own resources. In any case, the central government should devote more resources to supervise these transfer programs and should allow municipalities to generate their own revenues to co-fund their own programs (thus getting them more motivated to manage them responsibly).

Leakage of Public Funds from Transfer Program, as Revealed by the PETS

This section focuses on the leakage of public funds through municipalities (districts) in Peru. *Leakage* is defined as the portion of public funds that does not reach its ultimate targeted beneficiaries, but instead is diverted for other purposes, including private gain or other potentially legitimate but clearly unintended purposes. This particular study of leakage is different from studies of corruption per se. Corruption studies examine the diversion of public funds and the taking of bribes by public officials—actions

that are both clearly illegal and fraudulent in intent (Rose-Ackerman 1999; Treisman 2000; Seligson 2002). Research on leakage begins instead by asking the question, why do public expenditures often not produce concomitant increases in social outcome indicators?¹⁰ Although there are many factors that go into answering that question, another possible explanation lies in the fact that institutional factors, as well as local organization constraints or private gain, prevent some public funds from reaching their intended targets. This leaking away of public funds in Peru is the subject of the investigation reported here.

The approach taken to measure leakage in this study was to employ survey instruments at each level in the process of transferring government funds from the central authority down to the household. The study used data on 120 of the 1,828 municipalities in Peru. Data were obtained from the central government on transfers of funds from the four principal transfer programs to municipalities. All transfers were managed by the central government. Because only the VDL program is intended to reach beneficiaries directly below the level of the municipality, our research concentrated on the VDL program.

Leakage in the transfer of FONCOMUN and the Canon Minero appears very small. That leakage is defined as the percentage of transfer reported by the MEF that is unaccounted for by the recipient municipality. Leakage of transfer funds from FONCOMUN amounts to 1.5 percent in Lima and 0.5 percent in the rest of Peru. Leakage of Canon Minero funds rises to 7.1 percent in Lima (essentially driven by two outliers), but amounts to only 0.7 percent in the rest of Peru¹¹ (table 8.8). These so-called small leakages are tolerable and safely can be assumed to result mainly from reporting errors (rounding off) or simply from bad recollection because of poor or no records at the municipality. The proposed expansion of SIAF at the municipal level should be able to trace these leaks on a regular and virtual basis.

Leakage in the VDL Program, as Revealed by the PETS

We used and here report on a PETS to detect, analyze, and quantify the leakage and delays in the transfer of public funds for the VDL program. We also explore the effects of some service delivery deficiencies on the quality of the associated services. We chose this program because it is the only one of the four main transfers to municipalities that can be traced from the top of the transfer chain to the bottom—the actual VDL bene-

Table 8.8. Leakage for FONCOMUN and Canon Minero Transfers

<i>Location, by demographics</i>	<i>Leak 1</i>	
	<i>FONCOMUN</i>	<i>Canon Minero</i>
Lima	1.52	7.12
Urban	0.15	5.88
Rural	3.66	8.90
Observations (n)	18	17
Rest of Peru	0.45	0.70
Less poor	0.00	0.00
Poor	1.11	0.03
More poor	1.02	2.47
Urban	0.00	0.00
Rural	0.89	1.13
Small	1.56	2.76
Medium	0.35	0.06
Large	0.00	0.00
More accessible	0.39	0.40
Less accessible	0.65	1.38
Nonprovincial capital	0.83	1.10
Provincial capital	0.00	0.00
Observations (n)	96	64

Source: Actual survey.

ficiaries. The public expenditure tracking survey collects both qualitative and objective information that, heretofore, either has not been gathered or has been scattered and difficult to obtain. The information is collected at the different levels involved: central government, decentralized government unit (if any), final service units, and any intermediate units. It also gets to the household level.

The survey findings, described in more detail below, send up an important warning signal: leakage of public funds in Peru is significant and far more pervasive and extensive near the bottom of the chain than at the top. From the entire amount of public funds intended for the VDL program in 2002, barely 29 percent got to the intended beneficiaries. That finding does not mean that 71 cents from each dollar were fully lost in corruption costs. Rather, the rest of the resources leaked away through a combination of administrative costs, ineligible products and beneficiaries, fees for overpriced items, and other modalities of corruption. These results also challenge the predominant view of the early 2000s that organizations situated closer to the people they serve are inherently better in

delivering service. That view has justified bottom-up programs, producing a specific and strong emphasis on nongovernmental organizations and local participation. The core premise of the theorizing and research was that local organizations could overcome one of the central weaknesses of official institutions in developing countries—namely, their lack of accountability. Citizens who could observe, talk to, and even argue directly with the people providing them key services would be able to hold those individuals and institutions accountable for their actions. In contrast, remote and faceless central governments were seen as beyond citizen reach, and thus dominated by self-serving, rent-seeking elites.

Our research showed that the relationship between accountability and development may not always be linear and positive, especially when asymmetric information, poor transparency, or low management capacity exists at different levels—that is, when intermediate or final beneficiaries have limited opportunity to know the amount of resources they should receive from authorities and what procedures they should follow to secure those resources. Too little transparency, beyond a certain point, can lead to what we term *perverse accountability*. In such a scenario, citizens so dominate development programs at the local level that they may divert resources from their original purpose, without being held accountable or sanctioned for doing so. Citizens can do so because the principal agents—the official authorities, central or municipal in this case—do not know about the diversion and may vitiate their effects (even involuntarily). We found that citizens placed in direct control of a development program with severe design and implementation problems may distort the program's goal or become rent-seekers benefiting not the collective but their own interests. Even though following their own rules is presumed to benefit their own community, such behavior mimics the actions of official authorities they are supplanting. The evidence amassed in this study enabled us directly to estimate diversions (leakage) of public resources for private gain or for a distorted purpose at each level of the public assistance “food chain.” The evidence also revealed that the lower down the chain we go, the greater the diversion.¹²

Work on identifying and correcting leakage of public expenditure is in its pioneer stage worldwide. It builds on the seminal work developed by the World Bank in Africa, more particularly in Uganda (Reinikka and Svensson 2001). That study found that only 13 percent of the nonwage education expenditures made by the central government were received by the local schools. Our study in Peru deepens the methodology fol-

lowed in the Uganda study, mainly because it traces leakages at *each* level in the chain, from the first disbursement of public funds at the central level, down to the consumer at the household level. The Uganda study looked only at the national-to-individual leakage and thus was unable to attribute leakage to each stage in the chain. As a result of our more comprehensive and disaggregated focus, surprising findings emerged, especially because it was possible to identify and quantify the specific steps at which main leakage occurred. Moreover, because the Peru PETS pinpointed the locus and key causal factors responsible for leakage, it offers policy makers clear direction for dealing with the problem.¹³

In this section, we also will look at how resources are procured and distributed, and examine both provider and household behavior so that we can identify how much the government spent on the wrong goods or wrong people, and infer about those places on the chain where a reasonable presumption of corruption could be pinpointed as “worst offenders.”

It is in tracing the flow of funds in the VDL program that the survey research attempted to make its most innovative contribution. Using survey data at the municipality level, the level of the local milk distribution committees, and the beneficiary household level, it was possible to trace the flow and leakage of central funds from the top of the chain to the last link at the bottom. The methodology is very complex, not only because it involves multilevel comparisons, but also because the input itself is transformed from cash to commodities as the funds move from the top to the bottom and as “the commodity itself” actually becomes “commodities themselves” (that is, the program is not limited to milk or milk products alone, despite its name). The products are then transformed at the household level as they are mixed with other foods before being served. Despite this complexity, however, it was possible to determine the relative magnitude of leakage at each level.

At the time of the survey, the VDL program targeted children age 6 or younger, as well as pregnant and nursing mothers. The law under which the program operates also permitted leftover resources to be used for children aged 7–13, elderly men and women, and people with tuberculosis. The transfer criteria from the central government to the municipality were based on per capita poverty formulas. At the municipal level, the local government was required to use 100 percent of the funds for milk products, the vast majority of which had to be produced nationally. Transfers were made through special committees set up for the purpose. The survey

showed that, in 2002, the committees were nearly ubiquitous, with 98 percent of the urban municipalities and 95 percent of the rural municipalities having them. The products were purchased through competitive bidding, which was supposed to help ensure that the lowest price was paid. But the study found that although bidding was the predominant means of purchase, 19 percent of the product purchases were made through other mechanisms, and some purchases were made at excessively high prices.

As mentioned above, the Glass of Milk program includes milk, milk products, milk substitutes, as well as oatmeal, quinoa, and other grains. Such flexibility produces the unfortunate effect of reducing the beneficiaries' protein and calcium intake because milk and milk products contain higher levels of these nutrients than do milk substitutes or grains. The survey fieldwork in 2002 determined that only 15 percent of all municipalities distributed milk alone, with the vast majority "diluting" the nutritional benefits of milk with the distribution of cereal or a combination of milk and cereal.

When VDL products were purchased by the municipalities, they were transferred to the next level down the chain: the local committees or mothers clubs, which were neighborhood- or village-based volunteer groups. Those local groups then distributed the "milk" on some sort of regular cycle (daily, weekly, monthly, bimonthly), depending on local circumstances, presumably predicated on the legal criteria mentioned above and on locally determined criteria for need. Within the recipient household, presumably the "milk" was then consumed by the children and mothers for whom it was designated. Our fieldwork found, however, that much of this flow description is more theoretical than real.

We found that leakage occurred at many levels in the VDL program. Measurement of leakage, however, is an extremely complex task. Perhaps the major complexity emerges from the law itself. According to the law, the foods must be distributed to beneficiaries in prepared form. Such mandated preparation could mean, for example, the mixing of powered milk into a cereal or other cooked product. It would be all but impossible for any study then to measure exactly how a given amount of milk input arrives in the stomach of the beneficiary. But, more important from a practical point of view, distribution committees often cannot prepare the food because the beneficiaries are preschool children whose parents cannot transport them on a daily basis to a central distribution point. Consider the mother who is nursing two preschoolers and whose partner

works outside the home. She cannot reasonably be expected to visit a central kitchen each day to feed her children. Moreover, and more significant by our findings, the overhead costs of preparing the food, including distance, time, materials, and spoilage for unconsumed food, deter many committees from trying to follow the law. As a result, 60 percent of the committees in the sample did not prepare the food and distributed it unprepared. For the purposes of the study, this lack of preparation was a plus: it enabled us to measure distribution more precisely, because we could count cans of milk, pounds of cereal, and so forth. However, it brought an additional challenge in that many of these products were marketed in units that were not easily divisible. For example, if a household was entitled to 1.5 cans of milk, the committee could not reasonably open a can and divide it, pouring the remaining 0.5 can into a glass for another beneficiary family. As a result, individual families received more or less than their exact ration of milk and other products, a factor that made household-level leakage calculation even more complex.

The problem of food distribution and preparation is exacerbated by the widespread absence of knowledge about the amounts of transfers (and criteria defining them) to municipalities and committees, as well as by the lack of effective training for the mothers. The survey found, for example, that only 20 percent of the municipalities in the areas of the country outside Lima (and 43 percent within Lima) were familiar with the central government's "milk" allocation criteria. At the committee level, barely 2 percent of committees outside Lima (and 5 percent within the capital city) had knowledge of the allocation criteria used by municipalities. At the beneficiary level, only 27 percent of mothers reported having received training in the preparation of the "milk," and 26 percent inside Lima reported receiving training on its proper allocation within the household. The most disturbing finding was that the level of training and information declined as poverty levels increased (table 8.9), so that training was lowest where it was most needed.

"Milk" Leakage Stage 1: Transfer from Central Government to the Municipality

A first and very small leakage occurs during the transfer of public funds for this program from the central government to the municipalities. In 2002, this initial leak averaged 0.06 percent in Lima and 0.02 in the rest

Table 8.9. Beneficiary Households That Received Training/Information on “Milk” Preparation and Allocation, 2002

percent

<i>Household demographics</i>	<i>Yes</i>	<i>No</i>
Urban	34	66
Rural	20	80
<i>Stratum</i>		
Least poor	36	64
Poor	20	80
Most poor	19	81
<i>Accessible</i>		
Less accessible	15	85
More accessible	32	68

Source: Survey of households in the rest of the country, February 2002.

of Peru. The leak was so small that it might have been the result of rounding and recording errors. Thus, at the top level, where one often expects to find the greatest degree of corruption (and therefore the greatest leakage), the leakage is virtually nonexistent. This is a major accomplishment for the SIAF system. However, considerable volatility remains in VDL transfers outside Lima. Volatility in 2001, calculated as the standard deviation of monthly percent changes of VDL transfers, was virtually zero in Lima, but in the rest of Peru it averaged 11.6 percent—with a high of 15.4 percent in the poorest areas. Hence, the less accessible the area, the more volatility there was at this top level. Despite this volatility, none of the municipalities in Lima and only 1.7 percent in the rest of the country were unsure of the amount of VDL funds that they would be receiving. Among the municipalities of Lima, however, 40 percent had no knowledge of the date on which they would receive the transfer; 31 percent of the districts outside of Lima claimed the same problem. We found this result surprising, given the relative simplicity of the transfer mechanism at the central government. In Lima, 21 percent of the municipalities experienced delays of seven or more days; in the rest of Peru, the level reached 25 percent. Furthermore, given that these delays suggest that children and other beneficiaries were kept expecting food—a major basic need—the large percentage of municipalities suffering long delays was quite serious (table 8.10).

Table 8.10. VDL Presence of Significant Transfer Delays
percent

Location, by municipality demographics	Municipalities with no knowledge of next arrival date	Arrival time delays		
		1–2 days	2–7 days	7+ days
Lima	40	26	53	21
Urban	42	27	55	18
Rural	37	25	50	25
Observations (n)	20	20	20	20
Rest of Peru	31	43	32	25
Not poor	25	0	29	71
Poor	45	49	51	0
Extremely poor	35	45	23	33
Urban	57	0	43	57
Rural	26	47	31	21
Small	29	58	0	42
Medium	30	47	43	10
Large	42	17	64	18
More accessible	67	45	33	22
Less accessible	13	41	32	27
Nonprovincial capital	31	42	32	26
Provincial capital	32	48	33	19
Observations (n)	100	n.a.	n.a.	n.a.

Source: Survey of municipalities.

Note: n.a. = not applicable; VDL = Vaso de Leche.

“Milk” Leakage Stage 2: Unaccounted-for Conversion of Transfer to Products

When the transfer reaches the municipality, the funds are converted to products to be given to the local committees. From the municipal level downward, the transfer of resources for the VDL program becomes in-kind transfers. No subsequent stages receive money; rather, they receive the transfer as products. Our fieldwork team was instructed to get prices and quantities of VDL product purchases made by the municipality in December 2001, and to verify that information through signed contracts, purchase orders, or receipts. In most cases, the quantities were obtained from the municipality’s distribution roster (*padrón municipal*), which included the amounts allocated and distributed to each mothers committee within the municipality’s jurisdiction. Leakage at this stage was de-

defined as the percentage of the amount transferred to the municipality from the central government for the month of December 2001 that is unaccounted for by the municipality's total expenses for products purchased for the VDL program during that month.

Leakage found at this stage was quite small. In Lima, it appeared to have amounted to 3.03 percent of the total funds transfer; in the rest of Peru, it amounted to 0.63 percent. We say "appeared" because most of the larger urban districts surveyed in the province of Lima (districts with populations exceeding 200,000) refused to give our team any price information or price-related documentation. That refusal supported the qualitative information collected by our team at later stages of the transfer path, which suggested there was considerable misuse of funds at the municipal level within these districts. We were able, however, to document a number of worst-case offenders. We found one municipality in Lima in which the leak was 18 percent of the transfers, and another where it was 15 percent—again keeping in mind that most larger municipalities refused to cooperate with us on obtaining the data. In the rest of Peru, we found four municipalities out of 76 surveyed in which the leakage at this stage was greater than 10 percent, with one reaching 15.5 percent. Thus, although the national averages were low, these isolated cases in which the leakage at this point exceeded 10 percent of the total transfer amount were serious. Without taking into consideration any of the leaks at subsequent transfer stages, the beneficiaries—mainly children aged 0–6—already were receiving less than 90 cents on the dollar. About one-tenth of all municipalities surveyed were found to have leaks exceeding 5 percent. In addition to that, one would have to consider the possibility of overpricing reflected in two facts: the high price variability on similar products found among districts, and the premium identified when comparing those prices with leading retail supermarket prices, even when adjusting for quality and transportation costs. For instance, (1) the price of generic *Enriquecido Lácteo*, a milk substitute distributed in 32 of 100 districts visited, varied from 1 to 15 nuevos soles per kilogram; and (2) the price of cans of milk outside Lima sometimes were more than twice the price being charged in a Lima supermarket.

Private gains are not the only possible reason of leaks at this stage. One explanation could be a diversion of VDL funds to cover the program's operating expenses (personnel, bookkeeping materials, transportation costs, and warehousing fees). Although prohibited by law, that kind of di-

version is not a corrupt act. Indeed, the leakage at this stage was found to be more significant in small, rural, and less accessible districts. In many cases, small rural districts were under severe budget and personnel limitations that made the operating costs of the program prohibitive. Moreover, given the large and organized network of VDL mothers representing a unified and powerful faction of the constituency that exerts great pressure on the mayor, that there may be many cases in which the municipality supplements the central government transfer with municipal resources. Indeed, we found that leaks at this stage were negative (that is, the municipality spent more in December 2001 than was allocated to it by the MEF), although operationally the leaks were truncated at zero.

“Milk” Leakage Stage 3: Transfer from the Municipality to the Local Committees

Leakage found at this transfer stage was more significant than leakage at the earlier stages. In Lima, leaks averaged more than 10 percent, but were far lower (only 2.6 percent) in the rest of Peru (table 8.11). However, it is obvious from the results that the poorer, more remote areas had far greater leakage at this level. Every municipality had an allocation formula based almost entirely on the size of the target population each VDL committee served. Thus, criteria of *relative* poverty did *not* play a role here; only the actual number of poor people counted. The roster of beneficiar-

Table 8.11. Leakage at Transfer Stage 3, from Municipality to Local Committees
percent

<i>Location, by demographics</i>	<i>Percent of total transfer</i>	<i>Location, by demographics</i>	<i>Percent of total transfer</i>
Lima	10.06	Rest of Peru, <i>cont'd.</i>	
Urban	6.83	Small	2.83
Rural	18.77	Medium	4.23
Observations (n)	37	Large	2.25
Rest of Peru	2.59	More accessible	2.31
Less poor	0.54	Less accessible	3.70
Poor	5.67	Nonprovincial capital	3.10
More poor	5.22	Provincial capital	1.97
Urban	1.26	Observations (n)	320
Rural	4.52		

Source: Actual survey.

ies was centralized at the municipal level and provided detailed information on the quantities distributed to each committee within the district. That roster was used to select four VDL committees at random to check the veracity of the municipal distribution roster. This information was compared with the quantities that the visited committees said they had received from the municipality in the same period for every product distributed. Such a process enabled us to calculate leakage associated with the transfer from the municipality to each of four randomly selected committees. Leakage at this transfer stage was defined as the percentage of the amount listed in the municipal roster that was not accounted for by the VDL committee, and it was estimated using municipal and committee data computed at the committee level.

The national averages hide very important information. A clearer picture of the magnitude of the leakage problem that occurs in the transfer from local government to civil society emerged when we identified and examined the worst offenders inside Lima and in the rest of Peru. In our study, 27 district–VDL committee pairs in areas outside the capital city (about a tenth of the total number surveyed) had leakage in excess of 20 percent, and 10 pairs had leakage of 40 percent or more. Outside Lima, the worst offender had a leakage rate of 63.7 percent; inside Lima, the worst offender’s rate was 84.5 percent. The beneficiaries of the worst offenders received between 15 and 36 cents of every dollar available at this transfer stage. That share does not take into consideration all the leakage in prior segments of the chain of distribution!¹⁴ A possible explanation for the very high leakage rate is that some municipalities may change allocations to every committee, retaining one product already assigned for later distribution, but such informal arrangements significantly diminish program transparency of the program and should be prohibited.

“Milk” Leakage Stage 4: Transfer from Committee to Beneficiary or Household

Estimation of leakage at this point in the distribution chain became very challenging. When evaluating the situation inside a committee, we found it quite difficult to quantify what happened to the products distributed to the committee’s direct beneficiaries: children aged 0–6, pregnant women, and breastfeeding mothers. Direct beneficiaries were those effectively used to define the amount of the rations to be distributed by the

committee. This complication arose because the committee representatives did not follow the criteria established by the program regulations. Instead, they made discretionary decisions about how to distribute the product. In most cases, the committee representatives had been elected democratically and mostly relied on community approval. Therefore, our original methodology, which contemplated comparing rations per direct beneficiary at the household level with the total rations per direct beneficiary at the committee level, was not workable. Committees distributed multiple products to beneficiaries, and the only way to aggregate them was to use a common measurable indicator. To further complicate matters, there was no way to gauge whether the servings-per-container directive was followed when “prepared” products were distributed, so there was no way to measure the amount of raw product a household actually received. To accommodate these problems, we eliminated from the sample the cases in which the product was not distributed in raw form.

We estimated leakage by calculating the monetary value of each product (using municipal price figures) and totaling those values. This enabled us to compare the monetary value of all the products received by the VDL committee per direct beneficiary with the monetary value of the amount received by the individual households per beneficiary (excluding the committees that distributed prepared products). The first variable was obtained from the quantities declared by the mothers committee representative in the VDL survey of four committees in each municipality). The second variable was obtained from the quantities declared by the direct beneficiaries’ household representative in the survey of four households served by each VDL committee.

Although the implementation of the proposed formula faced several operational problems, it provided very important insights regarding the distribution process to individual households. Some of the problems that made it impossible to quantify the rations received by the direct beneficiaries were the result of the very large variation in types, units, and frequencies of distribution and products—which made the program less transparent and thus more difficult to evaluate and supervise. Also contributing to the quantifying problems was the distribution of already prepared products (approximately 40 percent of the committees distributed prepared items). Although in most cases the municipality reported the number of rations that could be obtained from each package of product, the VDL committees did not necessarily follow the recommended recipes.

Many committee representatives said their objective was to try to serve the largest possible number of recipients. Furthermore, the rations a household received were measured in a large variety of ways—as a cup, a glass, a handful, or just a “ration.” Therefore, we standardized frequencies, units, and products, and eliminated all cases in which the products were distributed in prepared form by the committee or were distributed by committees with unclear target beneficiaries.

The leakage at this level was quite high. On average, more than a quarter of the product was lost at this stage in Peru outside of the Lima area (table 8.12). Leaks were markedly more serious in urban districts (34 percent), in provincial capitals (40 percent), and in large districts (29 percent). To further understand the subtleties of the program, which made this leakage difficult to quantify, one must look at the law itself. It provides for an unnecessarily broad definition of the program’s target beneficiaries. According to the law, beneficiaries need not be exclusively young children, pregnant women, or breastfeeding mothers; they may include indirect beneficiaries such as children aged 7–13, the elderly, and others in need—if there are enough resources. This open-ended definition permits such a broad interpretation of eligibility that leakage seems inevitable, and that causes confusion in the committees and in the general population regarding who the intended beneficiaries are. This problem is further complicated by the indivisibility of the formula chosen and the ad hoc

Table 8.12. Leakage at Transfer Stage 4, Household Level
percent

<i>Household location, by demographics</i>	<i>Percent of total transfer</i>	<i>Household location, by demographics</i>	<i>Percent of total transfer</i>
Lima	—	Rest of Peru, <i>cont’d.</i>	
Urban	—	Small	24.41
Rural	—	Medium	22.83
Observations (n)	—	Large	29.63
Rest of Peru	26.70	More accessible	25.71
Not poor	26.67	Less accessible	28.32
Poor	19.21	Nonprovincial capital	22.72
Extremely poor	32.91	Provincial capital	40.31
Urban	34.53	Observations (n)	488
Rural	25.01		

Source: Actual survey.

Note: — = not available.

decisions made at the discretion of committee representatives concerning the criteria of distribution. These decisions include the number of household members; the number of children; equal quantity for each household; or other criteria that the study was unable to identify, many of which alter the originally estimated quantities per beneficiary in each household in the same municipality and under the same committee.

“Milk” Leakage Stage 5: Dilution of the Ration within the Household

We estimated this leakage using household-level data. As a final stage of the research effort, the fieldwork team visited four households per committee to quantify the amounts of the in-kind VDL transfers that actually reached the intended direct beneficiaries. Because of the complications concerning the target population mentioned in the previous section, our analysis was restricted to direct beneficiaries. The leakage attributed to “beneficiary dilution” is defined at the household level as one minus the percentage of household members who consume VDL products, who are official direct beneficiaries (table 8.13).

Results made clear that there was significant dilution when transfers reached the households. On average in 2002, target beneficiaries received only 41 percent of the ration that arrived at the household (not taking into

Table 8.13. Leakage at Transfer Stage 5, Beneficiary Household Level
percent

<i>Household location, by demographics</i>	<i>Percent of total transfer</i>	<i>Household location, by demographics</i>	<i>Percent of total transfer</i>
Lima	—	Rest of Peru, <i>cont’d.</i>	
Urban	—	Small	59.01
Rural	—	Medium	61.46
Observations (n)	—	Large	57.90
Rest of Peru	58.89	More accessible	60.75
Not poor	59.93	Less accessible	56.11
Poor	57.89	Nonprovincial capital	58.69
Extremely poor	59.15	Provincial capital	59.32
Urban	59.26	Observations (n)	985
Rural	58.70		

Source: Survey of municipalities.

Note: — = not available.

account all the losses associated with earlier leakage). This dilution effect might have occurred because most beneficiaries do not receive their rations directly from the committee; rather, the children receive the rations filtered through their mothers (and, in some cases, fathers), who pick up the total rations allocated to the household for later distribution. Consistent with evidence in studies of other nutritional assistance programs worldwide, the official distribution criteria are very difficult if not impossible to enforce. In most cases, it was de facto impossible to exclude nontargeted members of the household. Furthermore, in about 60 percent of the committees visited, the products were distributed in unprepared forms (understandable because the transaction costs of receiving daily prepared rations could be too high); nonprepared products, however, frequently resulted in mixing the nutrition ration with the families overall food intake. In such cases, considerable variation appeared in their final use.

In sum, the PETS survey revealed that targeted beneficiaries received an average of 29 cents of each dollar initially transferred by the central government! The survey surprisingly indicated that leakage was much greater at the bottom of the distribution chain (that is, at the VDL committee and household levels) than at the top (that is, at the central and municipal government levels) of the ladder. That outcome not only demonstrated significant improvements in the MEF's official financial management of resources, but also challenged the predominant view that local private organizations are more accountable in managing resources than are official organizations. Transfers also appeared compounded by the generalized lack of audit controls, poor transparency, and volatility. Finally, leaks clearly affected the poorest, urban, and provincial municipalities more than others, but their levels appeared similar among districts of different sizes and distances to the province (table 8.14).

Conclusion

This chapter describes key features of intergovernmental transfers in Peru during the early years of the Toledo administration, while focusing on the VDL program through a PETS. Overall, significant leaks are found as transfers move near the bottom of the ladders and approach the direct beneficiaries, thus raising valid questions about the effectiveness of the program.

Table 8.14. VDL Leakage at Various Transfer Stages
percent

<i>Location, by demographics</i>	<i>Stage 1</i>	<i>Stage 2</i>	<i>Stage 3</i>	<i>Stage 4</i>	<i>Stage 5</i>	<i>Stages Combined</i>
Lima	0.06	3.03	10.06	—	—	—
Urban	0.03	2.73	6.83	—	—	—
Rural	0.11	3.58	18.77	—	—	—
Observations (n)	20	14	37	—	—	—
Rest of Peru	0.02	0.63	2.59	26.70	58.89	70.84
Not poor	0.00	0.13	0.54	26.67	59.93	70.81
Poor	0.00	1.36	5.67	19.21	57.89	68.34
Extremely poor	0.12	1.30	5.22	32.91	59.15	74.39
Urban	0.00	0.42	1.26	34.53	59.26	73.77
Rural	0.05	0.85	4.52	25.01	58.70	70.70
Small	0.11	0.05	2.83	24.41	59.01	69.94
Medium	0.00	0.59	4.23	22.83	61.46	71.68
Large	0.00	0.84	2.25	29.63	57.90	71.29
Accessible	0.00	0.54	2.31	25.71	60.75	71.67
Remote	0.09	0.82	3.70	28.32	56.11	69.98
Municipal	0.04	0.87	3.10	22.72	58.69	69.35
Provincial capital	0.00	0.21	1.97	40.31	59.32	76.25
Observations (n)	95	76	320	488	985	—

Source: Actual survey.

Note: — = not available.

Conclusions Specifically Regarding the VDL Program

A major lesson to be learned from the VDL experience is that a poorly designed social program, with a presumed high degree of participation by community leaders grouped in a committee, can be inefficient—voluntarily or involuntarily—and unaccountable to both its agents (constituent beneficiaries) and its principal (municipal authorities), thereby missing the original purpose or intention of the program. Suggested actions can be grouped in the following ways:

- In the short term, suggested priority actions should focus on amending regulations to enforce accountability to the municipalities and committees: (1) review VDL regulations, particularly regarding products to be distributed and the form of distribution, so as to shorten the list of selected milk derivatives and make it more homogeneous, thereby rais-

ing chances of improving the nutritional impact of the program; (2) establish a proper registry of VDL beneficiaries, supported if possible by SIAF; (3) undertake information campaigns and training sessions for VDL committees and individual beneficiaries to raise their awareness of new information and existing rules; (4) perform surprise audits of worst offenders (municipalities and committees) so as to eliminate excessive overpricing and major deviations; and (5) establish a policy of no annual budget increases in real terms for the VDL program. The implementation of those actions requires a significant overhaul of the system, and should be accompanied by the design of a new comprehensive framework for food supplement programs in Peru.

- In the medium term, given the VDL program's failures and defective design, the first question is, should the program be transformed to a cash transfer program? The answer is *yes*. Mexico's PROGRESA, which successfully moved its food supplement program to an integrated and better-targeted model of social assistance involving direct cash transfers, could offer a good example of ways in which VDL might be transformed.

Broader Conclusions

We conducted this PETS survey in a country that, in the early 2000s, underwent an analysis of the way public expenditures were managed and controlled by the SIAF. For that reason, our central finding may not easily be replicated elsewhere. The integrated financial management system ensured that nearly all central government expenditures got to the municipalities for which they were intended, and our findings confirmed that most transfers arrived without extensive delays, although their volatility and supervision remained somewhat of a problem in some instances. Leakage was extensive, however, below the level of the municipality for the VDL program. In that particular case, the leakage increased exponentially as central funds moved away from the capital and down the distribution chain to the committees and families. This finding suggests that a similar situation might have been happening in Peru's other social programs. Future studies in other countries in which central funds are not as well controlled may find that leakage remains extensive at the local level, but perhaps is far greater at the upper levels than it was in Peru. In both cases, leakage was extensive and had serious negative implications

for development. Hence, a tracking survey was needed because a municipal SIAF was not installed in all municipalities at the time of the survey. Even though transfers from the central government to municipalities were well recorded at the center, there was no further virtual control on what happened inside the municipality when it received its transfers and moved them downward. PETS methodology does not allow direct measurement of other types of leaks, such as inflating the prices of milk products, but it does allow indirect measurement through comparison of price variation for the same milk or milk-derived products, including overpricing with respect to supermarket retail prices.

The survey findings did send up an important warning on decentralization: leakage in Peru was significant and far more pervasive and extensive at the bottom of the distribution chain than at the top. From the entire amount of public funds intended for the VDL program, barely 29 percent get to their intended beneficiaries. This does not mean that 71 cents from each dollar are fully lost in corruption costs. The rest of resources get rather leaked away through a combination of administrative costs, ineligible products and beneficiaries, dilution of milk products among all members all of the household, and multiple modalities of corruption. Results represent a potential downside to decentralization, as they challenge the predominant view that organizations that are closer to the people they serve are inherently better in service delivery. Such approach has justified bottom-up programs, with a specific and strong emphasis on NGOs and local participation.

We have learned in our research that there may not always be a linear and positive relationship between accountability and development, especially when asymmetric information, poor transparency, or low management capacity exists at different levels—that is, when intermediate or final beneficiaries have limited opportunity to know the amount of resources they should receive from authorities and what procedures they should follow to secure those resources. Too little transparency, beyond a certain point, can lead to perverse accountability, whereby citizens so dominate development programs at the local level that they may divert resources from their original purpose without being held accountable or being sanctioned for doing so. Citizens can do this because the principal agents—the central or municipal authorities—do not know about the diversion and may vitiate their effects (even involuntarily). We found that citizens placed in direct control of a development program with severe design and implementation problems may

distort the program's goal or become rent-seekers benefiting not the collective but their own interests. Even though following their own rules is presumed to benefit their own community, such behavior mimics the actions of official authorities they are supplanting. The evidence amassed in this study enabled us directly to estimate diversions (leakage) of public resources for private gain or for a distorted purpose at each level of the public assistance "food chain." The evidence also revealed that the lower down the chain we go, the greater the diversion.

Another caveat regards the need to recognize that the final leakage partly might represent redirecting resources in good ways. As a matter of fact, the VDL law allows flexibility at the household level, permitting beneficiaries to make better-informed decisions, reaching all household people in need—including older children and elderly people—and thus overcoming rigidities in the central government guidelines. Rather than being a leak in negative terms, this diluting effect in some cases would be the local response to a poor program design. In this particular case, a "good-leakage" interpretation would rather support the conventional wisdom about lower-level organizations and communities being better able to identify and serve local needs.

Finally, the study conclusions leave the central and local governments of Peru facing a difficult policy trade-off. As one option, they recentralize the VDL program, eventually replacing it with a cash transfer program based on a well-defined central database of beneficiaries. That option does not necessarily solve the problem because the government ultimately would pass the decision-making and implementation process to subnational decentralized entities. As a second option, authorities strengthen the decentralized management of food programs, with proper implementation mechanisms in terms of eligibility, transparency, accountability, and local participation. The program could become linked to basic nutrition, education, and health care programs, and its implementation could be strengthened by restricting eligibility to children aged 0–6, improving procurement, ensuring supplies to cover a week, and distributing ready-to-use daily rations instead of bulk distribution.¹⁵

Notes

1. Other important infrastructure projects remain to be unified or merged, such as those from the National Office for Popular Cooperation.

2. Peru has an excellent second Foster-Greer-Thorbecke (FGT2)–based poverty measure, which takes into account both the number of people below the poverty line and the severity of their poverty (that is, the gap between their incomes and the poverty line). The Ministry of Economy and Finance (MEF) map combines information from the 1993 census with a household survey conducted in 2000 by Peru’s Instituto Nacional de Estadística e Informática (INEI) that mixes the consumption of households in the census. In turn, that combination was aggregated up to the district level and combined with information on the poverty line to estimate (1) the number of households in each district that fell below the poverty line (headcount index), (2) the poverty gap, and (3) the FGT2 (square poverty gap).
3. Lorenz curves are built in terms of the cumulative share of per capita income deciles (x-axis) crossed by the cumulative share of household spending (y-axis). Because these are progressive distributions, curves are above the 45-degree perfect equality line. The upward curve indicates that spending is more equally distributed than is expenditure per capita. Standard regressive Lorenz curves would fall below the 45-degree line.
4. In 2002, the wage rate appears even more generous in A Trabajar Rural, but that is less alarming because of the income-sharing mechanism often employed *de facto* by rural communities. In such situations, community members are assigned to a project but actually share the working time, the monthly wage, or both. Therefore, in rural communities the wage rate does not work as a tool for individual self-targeting the way it does in urban areas. Notice that the success of the program is not measured only by the share of beneficiaries found in the poorest income quintiles, but also by the income gains received as a result of participating in the program, the coverage of the program with a proportion of unemployed poor people having access to the program, and the efficiency with which it operates (ratio of wages to administrative costs and material inputs) (Schady 2002).
5. Francke (2004) found that the educational effect of *Desayunos Escolares* is small but not negligible in terms of the rate of attendance, rate of repetition, and dropout rate: about 10 percent increase in attendance, a 1–3 percent decrease in grade repetition, and a dropout rate reduction of 0.3–1.6 percent.
6. Mexico’s PROGRESA is a single, integrated social assistance intervention that replaced a series of disparate food subsidies, education, health care, and other social programs. PROGRESA’s unified approach provides immediate financial transfers to the rural poor while promoting investment in children’s human capital (future earnings) via increased schooling and improved health and nutrition status. The program provides cash transfers to poor rural families selected by household surveys updated every three years, conditioned on

their keeping children in school and providing them with basic preventive health care and nutrition. A key feature of the program is the provision of the cash transfer to registered mothers, a mechanism designed to ensure that the money is well invested in children and to serve as an incentive to empower women in rural communities. In 2001, the program covered 3.2 million rural families (well over half of the rural poor population), at a cost of 2.3 percent of the government's social expenditures, or 0.2 percent of GDP. The program is highly efficient, with administrative costs of about 4 percent; therefore, more than 95 percent of its expenditure is transferred as cash directly to poor households.

7. A billion is 1,000 millions.
8. The Canon/Sobrecañón Petrolero is distributed by other criteria, except for the introduction of an urban/rural factor, which indirectly includes poverty as part of the criteria.
9. Volatility is calculated as the standard deviation of the annual percentage changes in the transfer amounts.
10. A parametric model (Simulations for Social Indicators and Poverty [SimSIP]) has been developed by the World Bank to estimate the projected impact of fiscal inputs on selected social outputs, especially the Millennium Development Goals. This model does not take into account country differences in leakage of public spending in its estimates, and it assumes them to be constant in its projections. If developed regularly and in several countries, PETS could expand SimSIP in both directions, and set baselines for countries with similar levels of leakage.
11. Canon/Sobrecañón Petrolero figures provided by the MEF were not trustworthy and complete, so were not included.
12. What we have is a classical setting of asymmetric information (and influence) between successive stages of a so-called principal-agent problem. Depending on the level, the principal might be the voters and the government might be the agent; or the principal might be the official authorities and the agent might be the committee; or, in a given community, the principal might be the committee and the agents might be the beneficiary households. In all cases, the agents may behave in a way that diverts resources from the principal's original intentions because they have little knowledge of the original transfer received by the principal and are neither accountable for nor sanctioned because of the diversion. Thus, agents lack information about the exact amounts and management of resources by the principal and, conversely, the principal lacks the capacity to assess and hold agents accountable for such diversion.

13. The study identified the entities presumed to be “worst offenders” in producing leakage and the estimated amount of funds diverted.
14. It is important to note that this leakage was computed at the committee level with 320 observations. A lot of committees had zero leakage, so their average was much lower than that of the worst offenders.
15. This is the proposal that the World Bank advanced to Alan Garcia’s new government (see World Bank 2006).

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CHAPTER 9

Benefit Incidence Analysis and Social Protection

Uruguay

Edmundo Murrugarra

The experiences of Brazil, the Russian Federation, and some countries in East Asia during 1997 and 1998 indicate that, despite sustained growth and sound macroeconomic policies, adverse shocks may have an important and lasting impact on the population's poverty level and standards of living. Risk management programs such as income support, in-kind transfers, and active labor market instruments are crucial to buffer shocks affecting the most vulnerable population during a crisis. Uruguay is no exception because the effects of the 1997–98 Latin American crises (particularly the Brazilian financial crisis) had a direct impact through budget freezes or reduction of some programs. This chapter examines the programs used in

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Uruguay to provide support and opportunity for the most vulnerable people, and it discusses why some of those programs may not have produced the desired effects. Other policies, however, have achieved substantial results, and those are discussed here as examples of good practices in social protection programs.

A major issue regarding social protection mechanisms in Uruguay is that a number of these programs were designed and implemented in the early and middle 20th century, based on a demographic composition, an employment structure, a state size, and international trade patterns that no longer exist. In the 1980s and 1990s, the government was faced with increasing social demands and it expanded the coverage of some programs and implemented new ones. As a result, some social services—such as education and health care—have achieved almost universal coverage. Those services, however, display evidence of significant efficiency and institutional problems. Social assistance programs evince very different performance indicators—some of them actually excel in targeting and delivery procedures but have somewhat limited coverage.

In a context of binding budgetary constraints, social expenditures face the challenge not of spending more but of spending better. The Uruguayan Constitution—approved in 1997—explicitly states that the government should deliver certain basic services to society, especially to the poor. Therefore, it offers an opportunity to redefine the role of the government in providing social protection and in focusing public intervention on those people who need the most assistance. This chapter uses the 1995 Income and Expenditure Survey and the 1998 Continuous Household Survey to examine the coverage, targeting, and incidence of some social protection programs.

Following this introduction is a description of the demographic groups and their social risks, together with more detailed information on specific socially excluded groups. The third section describes the social risks faced by each group and the appropriate risk-reducing and risk-coping strategies used. The fourth section provides an overall discussion of the social programs in Uruguay, identifying those risks that have not been addressed properly. A more detailed discussion of major social protection programs provides some lessons about the efficiency and incidence of these mechanisms. The fifth section discusses several cross-cutting issues that must be addressed to improve the existing programs and concludes the document.

What to Target? Basic Needs, Poverty, and Social Exclusion

Social assistance programs are intended to provide means either to cope with adverse socioeconomic events or to mitigate the effects of such events. Those adverse events range from household-level indicators (such as being poor or not having proper access to water), to individual-specific shocks (like being unemployed or children with lagging growth for their age). Identifying risks, targeting the affected population, and funding the intervention are critical steps in designing effective social assistance programs.

A first look can reveal socioeconomic risks across age groups (described in table 9.1). For a country with one of the most equitable income distributions in Latin America, Uruguay shows significant differences in several dimensions of risk exposure and use of risk-bearing mechanisms. Among preschool children, for example, enrollment rates for the nonpoor are more than double the enrollment rate of the poor.¹ For youth between 15 and 18 years, other social risks are present. A lack of motivation for formal education and for future labor market participation is observed in youth inactivity: not studying, not working, and not looking for a job. In Montevideo, inactivity among the poor people ages 15–24 is three times that observed for nonpoor people in the same age group. The lack of incentives to pursue higher education and the diminished expectations on labor market outcomes are somewhat corroborated by the unemployment rate of poor people between 19 and 24 years: it is three times the rate for nonpoor members of the same age group.

Besides individual-specific indicators, household-level indicators have been used extensively in Uruguay. A standard basic needs index that combines individual- and household-level information also has guided program eligibility.² In Montevideo, 46 percent of the children in poverty have at least one basic need that is not satisfied, whereas that is true for only 9 percent of nonpoor children.

A third alternative is to identify socially excluded groups. Social exclusion has been characterized in Uruguay as the weakening of the economic, social, and institutional links between individuals and society. Previous participatory work in Uruguay identified six groups (Reynoso 1999). These groups are (1) female heads of household with low income, low educational attainment, and in precarious situations; (2) inactive youth ages 15–24 who are not studying, working, or looking for a job; (3) unemployed adults ages 40–50; (4) women age 50 or older, especially wid-

Table 9.1. Scope of Social Protection Programs, 1999

<i>Age group</i>	<i>Social risks</i>	<i>Program areas</i>	<i>Available programs (institution)</i>	<i>Type</i>
0–5 years	<ul style="list-style-type: none"> • Health/mortality^a • Stunting (height for age) 	<ul style="list-style-type: none"> • Maternal-infant health • Food programs • Early childhood development • Preschool 	<ul style="list-style-type: none"> • Maternal-infant health (MSP) • PNCA–M (INDA) • CAIF (INAME) • Mandatory preschool (ANEP) 	<ul style="list-style-type: none"> IKT F IKT IKT
6–11 years, primary school	<ul style="list-style-type: none"> • Poor education quality • Poor cognitive skills 	<ul style="list-style-type: none"> • Conditional transfer programs • Food programs 	<ul style="list-style-type: none"> • TNPA (ANEP) • PAE (ANEP) 	<ul style="list-style-type: none"> IKT F
12–18 years, secondary school	<ul style="list-style-type: none"> • Poor education quality • Inactivity^a • Teenage pregnancy^a • Street children 	<ul style="list-style-type: none"> • Remedial education • Transfers conditioned on attendance • Reproductive health education • Technical education 	<ul style="list-style-type: none"> • Quality Improvement in Secondary Education (ANEP) • Teenage pregnancy (MSP) • Universidad Técnica (UTU) 	<ul style="list-style-type: none"> IKT IKT T
19–24 years, university	<ul style="list-style-type: none"> • Low human capital • Unemployment • Inactivity^a 	<ul style="list-style-type: none"> • Youth labor programs • Reproductive health education 	<ul style="list-style-type: none"> • ProJoven (INJU/MTSS) • PEL (INJU) • Incentivos (IMM) • Maternidad-Paternidad Elegida (MSP) 	<ul style="list-style-type: none"> LT LT LT IKT IKT
25–59 years	<ul style="list-style-type: none"> • Unemployment • Employment vulnerability • Female household headship^a 	<ul style="list-style-type: none"> • Unemployment insurance • Workfare programs • Training/retraining • Income support 	<ul style="list-style-type: none"> • Seguro de Paro (BPS) • Reconversión Laboral (MTSS) • Asignaciones Familiares (BPS) • Maternity subsidy (BPS) 	<ul style="list-style-type: none"> CT LT CT CT
60+ years	<ul style="list-style-type: none"> • Pension coverage • Low income among women^a • Precarious health status 	<ul style="list-style-type: none"> • Pension system • Income support for widows • Health coverage • Food programs 	<ul style="list-style-type: none"> • Jubilaciones y Pensiones (BPS) • Health insurance (BPS) • PNCA–P (INDA), SAAC (INDA) 	<ul style="list-style-type: none"> CT CT F

Overall	<ul style="list-style-type: none"> • Poor housing • Poor health 	<ul style="list-style-type: none"> • Health insurance • Housing support 	<ul style="list-style-type: none"> • Health insurance (BPS) • Health care (MSP) • Credimat, SIAV, MEVIR (MVOTMA) 	<ul style="list-style-type: none"> CT IKT IKT
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Source: World Bank 2001.

Note: ANEP = Administración Nacional de Educación Pública; BPS = Banco de Previsión Social; CAIF = Centros de Atención a la Infancia y a la Familia; Credimat = credit program for housing improvements; CT = cash transfers; F = food; IKT = in-kind transfers; IMM = Intendencia Municipal de Montevideo; INAME = Instituto Nacional de Menor; INDA = Instituto Nacional de Alimentación; INJU = Instituto Nacional de la Juventud; LT = labor and training; MEVIR (MVOTMA) = Mejoramiento y Erradicación de la Vivienda Rural Insalubre; MSP = public health care; PAE = Programa de Alimentación Escolar; PEL = Primera Experiencia Laboral; PNCA–M = Programa Nacional de Complementación Alimentaria–Materno-Infantil; PNCA–P = Programa Nacional de Complementación Alimentaria–Pensionistas; ProJoven = Programa de Capacitación Laboral de Jovenes; SAAC = Servicio de Asistencia Alimentaria Colectivizada; SIAV = Sistema Integrado de Acceso a la Vivienda; T = training; TNPA = Todos los Niños Pueden Aprender; UTU = Universidad del Trabajo del Uruguay.

a. Risk associated with selected socially excluded groups.

ows, with no children and in precarious situations; (5) teenage mothers ages 15–19; and, (6) children ages 0–18 years living on the streets.

These different population targets (poverty, basic needs, or social exclusion) are closely linked.³ As has been true of other countries with rapid changes in their economies, Uruguay (implicitly) has combined different targeting criteria in its social assistance programs. That combining has resulted in a heterogeneous social assistance system, but one that still fails to address some social risks. This heterogeneity is somewhat a reflection of the changing socioeconomic profile of the Uruguayan population: from concerns about basic needs to poverty and social exclusion. In a society with universal coverage of social services, those people without access to basic services (basic needs) were once the focus of policies. The economic developments during the 1980s and 1990s introduced new dimensions of poverty, and the worsening conditions after the Brazilian crisis in 1998 pointed to emerging patterns of social exclusion in what once was a very integrated society with a very strong middle class.

Overview of Existing Social Protection Programs

This section provides a general discussion of the social programs in Uruguay in several dimensions. First, programs are grouped according to their risk management role. Then their basic characteristics (coverage, costs, and incidence) are presented to link program design and performance.⁴ Finally, the characteristics of the programs for each demographic group are described to illustrate the best practices in some programs.

In the context of risk reduction, mitigation, and coping, most social protection programs in Uruguay have been designed either as risk mitigation or as coping strategies. Even though some programs may have a risk reduction effect in later stages of the life cycle, their main objective has been to remedy some existing problem. Table 9.1 identifies the programs, including the institutions that manage them, and the social risks they are intended to address. As can be observed, most social risks have been addressed in some way in Uruguay.

There are some risks, however, that have not been covered properly in Uruguay. First, teenage pregnancy is a major social risk that has not been handled appropriately through reproductive health education. Only some remedial strategies were observed, such as programs targeted to pregnant teenagers and delivered at hospitals. Second, labor market inser-

tion among the youth is addressed by a number of isolated interventions, which, in some cases, are delivered by the same government agency. These programs play different roles in the social risk framework.

Risk Mitigation and Coping Programs

Some of the programs are designed to mitigate the effects of potential social risks (see table 9.2). For example, the unemployment and health insurance programs provide income support in case of an adverse event (job dismissal or sickness), the pension system provides income transfers when productivity declines or retirement occurs, and the maternity subsidies program transfers income to pregnant women. The family allowances program provides income support for dependent children in lower-income households to reduce the effects of poverty on child development. In general, these programs are not targeted explicitly to the poor and are managed by the social security institution (Banco de Previsión Social [BPS]). The necessary enrollment in the BPS represents an important obstacle in reaching the poor because the BPS actually covers only formal sector workers in the private sector. Whereas public sector workers are covered by public services, most self-employed people are not covered.⁵

Table 9.2. Risk Mitigation and Risk Coping

	<i>Risk mitigation</i>	<i>Risk coping</i>
	<i>CAIF (INAME)</i> <i>MEVIR (MVOTMA)</i>	
Program (institution)	Seguro de Paro (BPS) Health insurance (BPS) Asignaciones Familiares (BPS) Maternity subsidy (BPS) IVS (BPS)	PNCA, SAAC (INDA) PAE (ANEP) TNPA (ANEP) ProJoven (INJU/MTSS) PEL (INJU) PRL (MTSS)
Program type	Cash transfer	In-kind transfer, food, training
Targeting	Nontargeted BPS enrollment required	Geographic–BNI Means- and proxy means-tested

Source: Based on information in the annex to this chapter.

Note: IVS = Jubilaciones y Pensiones; BNI = basic needs index; PRL = Programa de Reconversión Laboral; for additional definitions of acronyms used in this table, see the note to table 9.1.

Other programs were designed as coping mechanisms to help households face the effects of adverse situations, especially among children and youth. These programs include some food programs that operate through the school system (Programa de Alimentación Escolar [PAE], run by the National Administration of Public Education [ANEP]) or through the National Institute of Feeding (INDA). A variety of labor market training (ProJoven) and recycling programs (Programa de Reconversión Laboral [PRL]) also are observed. Finally, some housing programs have been implemented in urban areas (Sistema Integrado de Acceso a la Vivienda [SIAV]) and in rural areas (Mejoramiento y Erradicación de la Vivienda Rural Insalubre [MEVIR]).

Overall, these coping programs are better targeted than the mitigation programs and some have been implemented with a degree of institutional autonomy. Most programs created in the late 1980s and early 1990s used geographic targeting based on an indicator of unsatisfied basic needs that proved effective until infrastructure and basic services were expanded enough. Other targeting schemes included means- and proxy means-tested techniques to screen individuals at the local level.

There are two programs that play an important role in both mitigating and coping with some social risks. First, Centros de Atención a la Infancia y la Familia (CAIF) is an early childhood development program for children who are less than 4 years of age. The program is targeted to poor households. CAIF mitigates risks by buffering children's human capital from household shocks, such as unemployment of the household head. It also serves as a coping mechanism because the coverage is targeted to those children who already have been exposed to some of the main effects of poverty (malnutrition, poor education, weakened health, and the like) to alleviate those effects. Second, MEVIR is a housing program targeted to poor households in rural areas. A mitigating effect is seen because improved rural dwellings may reduce the effects of exogenous community shocks, such as epidemics. At the local level, MEVIR is also a risk-coping mechanism because it provides a means to deliver support in case of community-level shocks (such as health or natural disasters).

Overall Performance: Coverage, Costs, and Incidence

Social protection programs in Uruguay vary substantially in coverage, costs, and incidence. Before discussing what we can learn from those pro-

grams, an overall discussion of the coverage, costs (table 9.3) and incidence (table 9.4) is presented.

Early Childhood Development

Although the CAIF program had a very limited coverage, even among the poor (table 9.3), and had relatively high costs per beneficiary (about

Table 9.3. Social Protection Coverage and Costs, 1998

<i>Program (institution)</i>	<i>Total covered population</i>	<i>Coverage of the poor^a (%)</i>	<i>Cost per beneficiary (US\$)^b</i>
<i>Early childhood development</i>			
CAIF (INAME)	10,860	2.1	1,000
<i>Food</i>			
PNCA–Materno-Infantil (INDA)	135,000	23.2	50
PNCA–Pensionistas (INDA)	34,000	8.0	65
School feeding—PAE (ANEP)	137,000	23.1	44
SAAC (INDA)	8,696	0.7	24
AIPP, AUPI, PAEC (INDA)	41,017	—	65
<i>Cash transfers</i>			
Asignaciones Familiares (BPS)	350,000	54.7	180
Maternity subsidy (BPS)	4,116	8.6	342
Health subsidy (BPS)	10,785	7.0	1,884
Unemployment insurance (BPS)	42,365	44.4	1,255
<i>Other in-kind transfers</i>			
Maternity and pediatric care (BPS)	11,978	19.8	3,228
Health insurance (BPS-IAMC)	593,601	7.0	177
TNPA (ANEP)	20,849	—	105
ProJoven	1,000	—	1,037
<i>Pensions</i>			
Jubilaciones y Pensiones (BPS)	730,000	43.2	277
<i>Housing</i>			
Cooperativas (MVOTMA)	—	—	—
SIAV (MVOTMA)	—	—	—
Rural housing (MEVIR)	1,374 ^c	—	15,720
Credimat (MVOTMA)	—	—	—

Sources: Encuesta de Ingresos y Gastos (1995); Encuesta Continua de Hogares (1998); author elaborations.

Note: — = not available; AIPP = Apoly a Instituciones Públicas y Privadas; AUPI = Asociación Uruguaya de Protección a la Infancia; IAMC = Mutual Health Care System; for additional definitions of acronyms used in this table, see the note to table 9.1.

a. Coverage of the poor is the fraction of the poorest-quintile-eligible population that actually received program benefits. Target population may vary across programs—children, elderly, pregnant mothers, and so forth.

b. Defined as average annual transfer to each actual beneficiary.

c. Number of households, not individual beneficiaries.

Table 9.4. Social Protection Incidence and Expenditures, 1998

<i>Program (institution)</i>	<i>Share of transfers</i>					<i>Transfers (US\$ millions)</i>
	<i>Poorest quintile (%)</i>	<i>Second quintile (%)</i>	<i>Third quintile (%)</i>	<i>Fourth quintile (%)</i>	<i>Richest quintile (%)</i>	
Early childhood development—CAIF	80.7	19.3	0.0	0.0	0.0	11.3
Food	72.5	16.9	7.0	2.4	1.2	21.0
PNCA—Materno-Infantil (INDA)	84.2	9.6	6.2	0.0	0.0	7.7
PNCA—Pensionistas (INDA)	40.4	47.5	5.8	6.3	0.0	2.2
School feeding—PAE (ANEP)	75.3	16.5	7.7	0.5	0.0	6.0
SAAC (INDA)	57.9	13.4	9.1	10.9	8.7	2.5
AIPP, AUPI, PAEC (INDA)	—	—	—	—	—	2.7
Cash transfers	20.0	22.2	19.9	23.3	14.5	159.1
Asignaciones Familiares (BPS)	32.8	28.0	16.4	18.6	4.2	63.9
Maternity subsidy (BPS)	8.2	15.1	21.6	23.4	31.6	12.7
Health subsidy (BPS)	3.0	9.4	16.5	24.8	46.3	20.3
Unemployment insurance (BPS)	14.9	22.0	24.3	27.6	11.2	62.2
Other in-kind transfers	6.7	13.7	20.5	26.7	32.5	413.4
Maternity and pediatric care (BPS)	8.7	16.2	22.1	27.2	25.8	38.7
Health insurance (BPS-IAMC)	6.5	13.4	20.3	26.6	33.2	374.7
Housing	24.0	21.0	25.6	18.9	10.4	86.3
Cooperativas (MVOTMA)	7.5	14.5	30.7	29.8	17.5	23.9
SIAV (MVOTMA)	11.2	21.7	32.3	22.8	12.0	39.8
Rural housing (MEVIR)	68.1	26.7	4.7	0.5	0.0	20.9
Credimat (MVOTMA)	14.2	27.5	53.3	3.1	1.9	1.7
Total	15.1	16.8	20.2	23.8	24.1	691.1
<i>Memo items:</i> Jubilaciones y Pensiones (BPS)	2.5	7.0	14.7	23.7	52.1	2,331.3
Total (including pensions)	5.4	9.2	16.0	23.7	45.7	3,022.4

Sources: Incidence numbers obtained from the Encuesta de Ingresos y Gastos (1995), the Encuesta Continua de Hogares (1998), or estimates based on evaluation studies.

Note: — = not available; AIPP = Apoly a Instituciones Públicas y Privadas; AUPI = Asociación Uruguaya de Protección a la Infancia; IAMC = Mutual Health Care System; for additional definitions of acronyms used in this table, see the note to table 9.1. Budget information corresponds to 1998. See the annex for further details.

\$1,000) in 1998, it was quite well targeted. About 80 percent of the transfers were captured by the children in the poorest population quintile (table 9.4). Officials consider that coverage to be underestimated because CAIF activities involved additional beneficiaries, such as mothers and siblings in the same household. Even though a better estimated coverage would reduce the average cost per child, the CAIF costs were within the cost range of similar programs in Latin America.⁶

Food Programs

In 1998, most food programs transferred between \$25 and \$65 to each beneficiary. The Programa Nacional de Complementación Alimentaria–Materno-Infantil (PNCA–M) and the PAE had the largest coverage and were targeted to poor infants and school-age children, respectively. Both programs used targeting mechanisms and were delivered on the basis of public services. PNCA–M was targeted through public health care attendance, and the PAE transfers were targeted to selected public schools by an index that combined enrollment rates, basic needs, and mother’s education. These strategies resulted in an impressive benefit incidence among the poor—at least 75 percent of the program transfers were made to the poorest quintile (table 9.4).

The rest of INDA programs (Servicio de Asistencia Alimentaria Colectivizada [SAAC], PNCA–Pensionistas [PNCA–P], and others) had a more limited coverage. In some cases, that was because of the small targeted population (such as those who were chronically sick); in other cases, the limited coverage resulted from the eligibility criteria (such as receiving a formal retirement benefit). The smaller coverage, especially among the poor, resulted in a progressive incidence but one with an important leakage to nonpoor people. Most INDA programs, however, still need to be evaluated to assess their nutritional impact. Finally, some local governments also ran food programs for the poor. In certain areas, however, those programs duplicated programs discussed above.

Cash Transfers

In 1998, the cash transfer programs were mainly risk-mitigating programs and had extensive potential coverage to work as an insurance mechanism. The actual coverage, however, was rather limited because only pregnant women and people who were unemployed or sick were eligible for benefits. The family allowances mechanism was the only exception because it

targeted the dependent children of people who were formally employed. Because most of these programs were managed by the BPS, the coverage among the poor was less extensive than the coverage among the nonpoor population. For instance, whereas 44 percent of the unemployed poor were covered by unemployment insurance (UI), approximately 60 percent of the middle-income classes were covered. Similarly, between 7 percent and 9 percent of the poor were covered by the health subsidy and the maternity subsidy because those programs covered only formally employed individuals. The family allowances program was the only exception since it was based on the number of dependent children per household, usually a greater number in poorer families.

These programs—except family allowances—were very regressive in absolute terms, allocating only between 3 percent and 15 percent to the poorest population quintile. Transfer regressivity mimicked that of wage earnings because the benefits themselves were related directly to previous salaries. Only family allowances showed a more progressive pattern by allocating one third of the transfers to the poorest quintile. This progressivity was partly the result of simple rules regarding benefits based on the number of children and the household income.

Other In-Kind Programs

Other programs in 1998 distributed maternity care through BPS, health care insurance, and labor training for the youth. The coverage of maternity care reached about 12,000 births, a large number of them in the poorest population. The cost was very high, but it included prenatal care and pediatric attention as well as delivery service. This larger coverage among the poor was explained by the family allowances mechanism that enabled housekeepers, unemployed people, and their spouses to receive maternity attention. Health care insurance had a large coverage, but it did not cover workers' family health insurance, which partially explains why only 7 percent of the poor were covered by that program. Because these programs are related to formal employment enrollment and one did not cover the worker's family, the incidence was regressive, with only 6 percent to 9 percent of the resources transferred to the poorest population quintile.

A youth training program (ProJoven) had a very limited coverage but used a proxy means-tested targeting procedure that effectively captured the intended population. ProJoven was costly but effective at placing youth in the labor market. It also generated an important informal labor group among its graduates. A school materials program (Todos los Niños

Pueden Aprender [TNPA]) used geographic targeting similar to that of the PAE, but it focused only on first-grade students. Although the annual cost per beneficiary was twice the cost of the PNCA–M food program, it had an important impact on attendance at primary school.

Pension Programs

Retirement and other transfers for elderly people in Uruguay had a large coverage in 1998, but the fraction of poor people covered by the public pension system was only 43 percent. That compared unfavorably with coverage greater than 75 percent in the rest of the population. The elderly poor, then, were less protected than were those who had retired. The average transfer to elderly beneficiaries was about \$277, which exceeded Montevideo's estimated poverty line of \$235 annually (Melgar and Vigorito 2000). Such large pension benefits were explained by an indexing mechanism established in the country's constitution. Those benefits, however, differed substantially between poor and the nonpoor recipients. The retired elderly poor received a median \$157, whereas the richest quintile received a median transfer of \$516 (see World Bank 2001, annex table 9). The extreme regressivity portrayed in table 9.4 is explained by these pension differences and the lower coverage among the poor.

Housing Programs

During the 1990s, Credimat and SIAV were the main government programs that addressed the urban poor, but they were unable to satisfy poor people's potential demand appropriately. Credimat, a credit program, had to increase its income threshold to avoid exhausting its loan fund. Surveys among the poor have pointed to a lack of information about SIAV and to problems in accessing SIAV benefits. Despite their explicit targeting to lower-income households, those transfers have benefited mainly the middle-income classes.

The rural program MEVIR, under the Ministry of Housing and Transportation (MVOTMA), however, proved very effective in reaching the poor, partially because of effective geographic targeting, a clear institutional and budget autonomy, and a decreasing rural population.

Generally speaking, most risk-mitigating programs can be characterized as costly, ostensibly covering the overall population but showing a lack of coverage among poor people. In addition, the incidence of such programs is mostly regressive. Among the programs discussed above, some leakage attributed to administrative mismanagement was observed in the past,

suggesting that substantial improvements had to be made in the information management of the BPS.

On the other hand, coping programs are better targeted. They generally have a more limited coverage with fewer transfers per beneficiary but they show a diversity of institutional arrangements. That diversity is a context from which several lessons can be drawn. The challenges are to increase coverage among the poor and to improve and coordinate their targeting mechanisms. In 1998, most of the coping programs (except those linked to the labor market and housing) were funded through general revenues, evincing a budgetary vulnerability that needed to be addressed. Although some programs gained enough reputation to reduce the likelihood of budget cuts, during 1998 funding for proposed expansions of those programs was limited.

Overall, the programs that reached the poor effectively were those that have developed some of the following strategies:

- Establishing formal links with other government institutions for conditional delivery of transfers, such as requesting a health care exam to receive in-kind benefits (PNCA-M).
- Exploiting resources from local governments and community-based organizations, such as unused space, land, or other resources (CAIF).
- Involving beneficiaries in the delivery process and making them accountable, such as requesting family work in housing projects (MEVIR).
- Involving the private sector in a competitive environment through open bidding for delivery or monitoring (PAE).
- Keeping the program relatively isolated from political pressures and strengthening its institutional autonomy (CAIF).

Social Exclusion and Social Protection

Despite reaching the poor population, the programs described above may not have addressed effectively demographic groups that show higher risks of social exclusion, such as female-headed households and inactive youth, among others (table 9.5). In addition to those groups, children in poverty were vulnerable in 1998. Despite the effective targeting by the PNCA-M and the PAE, coverage in 1998 was limited to about one-fourth of the targeted population. CAIF's coverage of only 2 percent of those targeted was a more extreme case. The introduction of mandatory preschool in the late 1990s increased coverage in the poorest quintile from 20 percent to

Table 9.5. Social Risk Coverage and Deficiencies

<i>Socially excluded group</i>	<i>Relevant program (institution)</i>	<i>Main deficiencies</i>
Children in poverty	<ul style="list-style-type: none"> • Maternal-infant health (MSP) • PNCA–M (INDA) • CAIF (INAME) • Mandatory preschool (ANEP) • School feeding, PAE (ANEP) 	<ul style="list-style-type: none"> • CAIF has very low coverage. • PNCA–M and PAE have relatively low coverage.
Inactive youth 15–24 years	<ul style="list-style-type: none"> • Quality improvement in secondary education (ANEP) • ProJoven, PEL (INJU/MTSS) • Incentivos (IMM) • Universidad del Trabajo (UTU) 	<ul style="list-style-type: none"> • School attendance incentives are lacking. • Training programs have low coverage.
Teenage mothers 15–19 years	<ul style="list-style-type: none"> • Teenage pregnancy (MSP) • Maternidad-Paternidad Elegida (MSP) 	<ul style="list-style-type: none"> • Programs are in the initial stages. • Program are delivered only at hospitals.
Female heads of household	<ul style="list-style-type: none"> • Asignaciones Familiares (BPS) • Maternity subsidy (BPS) • Seguro de Paro (BPS) • Other programs targeted to poor children—CAIF, and the like 	<ul style="list-style-type: none"> • BPS eligibility is restricted to formal workers. • Education programs need to be expanded.
Unemployed adult males	<ul style="list-style-type: none"> • Reconversión Laboral (MTSS) 	<ul style="list-style-type: none"> • Program is unable to provide broad coverage to adult males.
Elderly women	<ul style="list-style-type: none"> • Health insurance (BPS) • PNCA–P (INDA), SAAC (INDA) 	<ul style="list-style-type: none"> • PNCA–P coverage is deficient.

Source: World Bank 2001.

Note: For definitions of acronyms used in this table, see the note to table 9.1.

about 60 percent. In summary, children in poverty have been targeted effectively but more resources are needed to achieve better coverage.

Households headed by females have been targeted indirectly by some education sector programs. For example, the early childhood development (CAIF) and the full-time schools (Escuelas de Tiempo Completo) programs provided these female household heads with more time for employment. Other programs, such as family allowances, maternity subsidies, and unemployment insurance, required formal employment in the private sector or contributions to the BPS. Being a female head of household did not qualify a woman for additional benefits among BPS programs.

Teenagers facing pregnancy risk apparently were covered by the teenage pregnancy and the maternity-paternity choice programs managed by the Ministry of Health. As mentioned earlier, the design and delivery of those programs did not prevent teenage pregnancies, but did offer some coping measures.

Inactive youth were not addressed adequately in Uruguay in 1998. The program to improve the quality of secondary education did not offer a clear incentive for attendance and had limited coverage. On the other hand, some labor market programs (such as ProJoven) were effective (despite some duplication) but had a limited scope. The technical education institution Universidad del Trabajo del Uruguay (UTU) was not able to attract a substantial fraction of the poor youth and to prove effective in labor market success (employment). Policies for inactive youth should include transfers conditional on attendance at school or training classes.

Among unemployed adults, the PRL was designed specifically for recycling workers who had been laid off, but two problems appeared. First, PRL required that beneficiaries be covered by unemployment insurance with the limitations of formal labor market enrollment. Second, enrollment in PRL evinced a dramatic underrepresentation of adult males. PRL needed a redesign to cover that socially excluded group properly.

Elderly women benefited from the public pension system (*pensiones*), but had to be formally enrolled in the BPS as a beneficiary of a spouse. As a beneficiary of the old-age pension or survivor's pension, elderly women received health insurance coverage. Among the poor, access (distance to a facility) and high service costs were obstacles to actual health care provision. Nutritional and food programs were available (PNCA-P and SAAC provided by INDA), but they had limited coverage.

In summary, those socioeconomic groups facing social exclusion have been offered some social protection programs, but the eligibility criteria and design of some of those programs reinforced the exclusion already detected. On the other hand, some programs have been effective in reaching the poor and those who are socially excluded. In the next section, we'll draw lessons from successful—and unsuccessful—programs.

What Can We Learn?

This section summarizes the social programs that existed in Uruguay by 1998 and what we learned from those programs. The programs are organ-

ized below according to populations targeted and to each program's focal sector.

Programs for Children Ages 0–5 and for Pregnant Women

Three programs address the main risks facing this demographic bundle: an early childhood development program (CAIF), an in-kind (food) transfer program (PNCA–M), and a cash subsidy for maternity leave (maternity subsidy) administered by the BPS. Three aspects of CAIF and PNCA–M are worth noting: targeting, evaluations, and the institutional arrangements and collaboration (see box 9.1). The two programs target

Box 9.1

Interagency Collaboration in Beneficiary Identification and Delivery of Benefits

The performances of the PNCA–M and CAIF emphasize the importance of collaboration between government agencies in establishing beneficiary eligibility and in delivering benefits.

Uruguay's Ministry of Health supports the PNCA–M food program by appropriately identifying the poor through the *Carnet de Salud*. This task is in the ministry's interest because it later improves a cost recovery procedure. The *carnet* uses self-reported household income and occupation characteristics. The PNCA–M, therefore, uses an external device to target its resources, allocating 85 percent of its transfers to the poorest quintile. That outcome reveals the potential gains achievable by sharing information. This interaction has resulted not only in improved targeting, but also in increased health care among poor people.

In CAIF centers, an important collaboration occurs because the centers must provide infrastructure, preschool training, nutrition assistance, health care, and other services. The key elements in this collaborative effort are CAIF's institutional autonomy within the INAME and the multiagency composition of its board of directors. Each of the board members is entitled by his or her corresponding ministry or local *intendencia* to make decisions regarding resources. The CAIF board constitutes not only a coordinating body but also an effective decision-making space.

very differently but their targeting is equally effective. The CAIF targeting has a two-stage process. First, a CAIF center is created according to geographic poverty incidence and available infrastructure. Then children are self-selected by their mothers and screened through a socioeconomic evaluation. This procedure results in 80 percent of the transfers going to children in the bottom quintile (see table 9.4). The PNCA-M program has an eligibility process mimicking a conditional in-kind transfer, whereby the children must have a monthly medical exam in a public hospital to entitle the family to a basket of food. The public hospital requires a health identification (Carnet de Salud) that is obtained through a means-tested procedure and is used to determine medical care subsidies.

Regarding evaluation, CAIF and PNCA-M are very different. Whereas CAIF has been subject to detailed evaluations evincing its positive effects on child development, no study has analyzed the impact of the PNCA-M on the health and nutritional status of the children and mothers. The collaborative effort made in identification and delivery is not in evidence for evaluation, given that the Ministry of Health already has the health information on the children and mothers. On the other hand, the BPS-administered maternity subsidy replaces the unearned income for pregnant women six weeks before and after the birth. Because this program covers women in the private sector, the incidence of the transfers benefits those with middle-income; only 15 percent of benefits are transferred to women in the bottom quintile.

In summary, it is important to exploit the network of those services with extensive coverage (such as health care, education, or local administrative department) to improve identification or to leverage resources in the delivery of targeted programs.

Programs for Children Ages 6–14

The major risk facing poor 6–14-year-olds is low human capital accumulation resulting from late entry to school, grade repetition, and disadvantaged family background. Consistently, most of the programs are developed at the school level, mainly through school materials and school food programs (conditional in-kind transfer). The programs run by the education management office (ANEP) are the PAE, the first-grade school materials program (TNPA), and the full-time schools program (Escuelas de Tiempo Completo).

The PAE provides a calorie and nutrient contribution (including meat and fresh vegetables) to about 136,430 children attending primary school. This program plays a double role in the social protection strategy. As a risk reduction mechanism, the PAE and the incentives it poses reduce the likelihood of entering school late and dropping out before completion. As a risk-coping mechanism, the program is a corrective measure to assist those children who are not enrolled because of a disadvantaged background (low income) in entering or returning to school. The very progressive incidence results from the PAE are founded on school-based targeting that resembles geographic targeting (see table 9.4). The coverage still is limited to only 13 percent of children in the bottom quintile in Montevideo and 38 percent outside the capital city.

The PAE program shows that an effective program evaluation is needed, even if the program is well targeted to poor children, because efficiency problems can be identified in such an evaluation (see box 9.2). Con-

Box 9.2

Appropriate Evaluations Can Improve Program Impact and Efficiency: The Case of the PAE

In 1996, the PAE was subject to an extensive evaluation that included its coverage, targeting, nutritional content, costs, delivery mechanisms, and other externalities. The evaluation identified several problems in the program, especially regarding the delivery mechanism and the nutritional content of the transfer. Before the evaluation, the delivery required substantial amounts of school staff time to manage the PAE school budget, purchase food staples, prepare the meals, and select the eligible children. The resulting nutritional content varied among schools but, overall, it had a significant fat component. After the PAE evaluation, the delivery mechanism was redesigned to involve private sector providers. Firms were asked to provide a standardized meal with specific calorie and nutrient content. That new delivery, called *sistema de bandejas* or meal box, has improved the nutritional content and reduced the redirected school staff time to more appropriate tasks.

Source: ECLAC 1997.

tracting out the production and delivery process actually reduces the dispersion of efforts from the staff's main task (that is, education) and may improve the quality of the benefits when appropriate monitoring of nutrient and calorie intake is implemented.

Programs for Teenagers and Young Adults Ages 15–24

The major risks faced in this group are low human capital accumulation, unsuccessful transition to the workforce, and teenage pregnancy. Given high-grade repetition and dropout rates in secondary education, the government has started efforts to increase education quality and coverage: extended hours at school, revised curricula, and improved teacher training. These efforts need to be expanded.

The evidence on teenage pregnancies and labor market participation is not optimistic. The rise in the proportion of females in this age group giving birth (from 13 percent to 16 percent) indicates an increased incidence of teenage pregnancy. The response has been very limited and not clearly targeted. Some components of the Ministry of Health's programs are intended to address this issue either with risk prevention (*Maternidad-Paternidad Elegida* to provide reproductive health information) or with remedial strategies (*Embarazo Adolescente* to reduce the repetition of a teenage pregnancy). Because these programs are delivered only at Ministry of Health institutions, they become pure risk-coping strategies, with no preventive component. With Uruguay's relatively extensive education coverage, reproductive health education must be included in a way that makes the most of the school network's ability to reach teenagers of both genders. Adding reproductive health education does not demand additional efforts from the education sector. Rather, what is needed is a workable delivery mechanism for the existing Ministry of Health programs, emphasizing the collaborative efforts made by other agencies.

On the labor market side, the response has been effective but limited in scope. At the end of 1997, two-thirds of the 78,500 people younger than 25 who were looking for a job for the first time belonged to the poorest 40 percent of households (*Encuesta Continua de Hogares* 1998). The *Pro-Joven* program was created to address the unemployment and inactivity problems of people ages 17–24 who normally do not have unemployment insurance or have not been employed formally.⁷ The targeting mechanism is based on a self-selected list of potential participants screened with a

socioeconomic questionnaire. This procedure has been successful in selecting those with greatest needs, but the coverage remains low (1,000 per year—between 2 percent and 7 percent of the target population). Even though ProJoven had a positive impact on employment, its very limited coverage needs to be expanded. The duplication of efforts observed in other local governments (for example, Intendencia de Montevideo) or other agencies (such as the Primera Experiencia Laboral [PEL]) should be reduced by increasing coordination with and absorbing participants and information from smaller and local programs. Such coordination may produce gains in coverage, improvements in targeting, increases in knowledge of local labor markets, and reductions of some administrative costs.

The financial and institutional autonomy of ProJoven is an important feature that explains its success (see box 9.3). But an important weakness

Box 9.3

Institutional and Budget Autonomy Producing Success: ProJoven

Three important features of the institutional and budget autonomy of ProJoven must be mentioned. First, after initial funding by the International Development Bank, Uruguay's Ministry of Labor adopted the program using resources from the Fondo de Reconversión Laboral, which is funded by revenues from taxation on labor incomes. This adoption provided the program with substantial financial autonomy not enjoyed by similar programs in Latin America. Second, the program was managed by the youth-related office Instituto Nacional de la Juventud instead of the Ministry of Labor. This feature provided program managers with flexibility because program funding and execution were handled in separate areas. Third, ProJoven had a substantial participation by the private sector, both as training institutions and as labor demand. The contents of the courses supplied by training institutions (Empresas de Capacitación) were dictated by the needs of the hiring firms and by the capacity of the training institutions. This curriculum targeting resulted in a satisfactory outcome on the demand side. The final content of a training package also included some modules proposed by ProJoven on labor market regulations and job market strategies, among other topics.

is the self-selection eligibility mechanism that may not reach the poorest areas. As a response, ProJoven adopted innovative means of program diffusion and enrollment—means that need to be strengthened.

Labor Market Programs for Adults Ages 25–60

The major risk facing impoverished men and women ages 25–60 is low income resulting from unemployment or underemployment. Two major labor-related programs have been implemented in Uruguay—unemployment insurance and a labor recycling program—but both have serious problems in reaching poor and socially excluded populations. Other labor market programs include assistance with job searches and support in creating self-employment opportunities for people with marketable skills. (Those latter programs, however, have very little coverage and budget.) In 1998, the unemployment insurance (Seguro de Paro [UI]) constitutes the largest labor market program in Uruguay, with an annual budget of \$62 million (see table 9.4) covering about 20,000 individuals each year. That coverage represented about 52 percent of unemployed population (Encuesta Continua de Hogares 1998), but only about 34 percent of those in the poorest households in the bottom quintile. By design, the program covered those who were contributing to the BPS, and the unemployment subsidy depended on an individual's past earnings. Given that the BPS affiliation is not poor-targeted, the UI benefits mainly those in the middle of the income distribution, as shown in table 9.4. In 1998, only 14.9 percent of the benefits were transferred to the poorest quintile, and less than 7 percent went to the bottom decile. Although BPS is the major risk-coping mechanism for those in the formal sector who contribute to the BPS, it still does not represent an appropriate safety net for the very poor.

Those eligible for UI also are eligible for the PRL, which is designed as a labor recycling program. The PRL, however, actually worked as a basic refreshing intervention without much effective retraining because 80 percent of those enrolled in 1998 continued to work in the same occupation they had performed when fired. Although coverage seems to have been large (about 8,000), PRL enrollment levels suggest difficulties in reaching married males over 40 years of age and those who had less education. Even among those people covered by the UI, the PRL is not reaching some groups appropriately, thereby revealing potential access or targeting problems among those who are socially excluded.

Three characteristics are worth noting. First, the labor-related safety net in Uruguay is not covering adequately poorer individuals because programs implemented as part of the BPS system use it as an eligibility mechanism. Second, even within the BPS framework, some socially excluded groups have not been reached adequately, thus posing additional challenges for social safety net reform. Third, beneficiaries from Montevideo are overrepresented in the eligible population, which indicates a centralized pattern in the delivery of these programs. Other programs oriented to self-employed workers and to rural entrepreneurship have not been supported enough to have a significant impact. The increased fraction of self-employed people, especially outside Montevideo, demands an additional effort to strengthen those programs.

Programs for Senior Men and Women Age 60 and Above

The worsened health status of seniors has been addressed through nutritional support programs (PNCA-P) and health insurance, and administered through the BPS. The PNCA-P poses an interesting comparison with the PNCA-M discussed earlier. Both programs are managed by the same institution and transfer about the same benefit but one is directed to infants and mothers and the other is directed to the elderly (see box 9.4). The results indicate substantial differences in the incidence across population quintiles. Some lessons can be drawn from this comparison. When designing eligibility for a program (even within the scope of the BPS), the feasibility of such transfer must be pilot-tested to identify perverse incentives that distort the program from its original goals. Regular evaluations of both program operation and the impact on beneficiaries must be made. For example, neither PNCA program has been evaluated on the basis of beneficiaries' nutritional status (that is, the status of mothers, children, and elderly people). Finally, it may be necessary to try alternative identification mechanisms to better reach the elderly poor.

Despite the average incidence results for the PNCA-P program, marginal incidence analysis indicates that expanding the program may produce important gains for the poor population. Although basically this reflects the size of the elderly population not covered, program officials also should exploit other eligibility mechanisms for the elderly. For example, public health care could be used as it is in PNCA-M. Given their old-age pension coverage, health insurance is provided through the *Mutualista*

Box 9.4**How to Fail in Targeting the Poor When There Is a Good Example: The Case of PNCA-P and PNCA-M**

Many components of both these food programs are similar or identical. The benefits and nutritional contents are very similar—a basket containing food staples such as rice or sugar. The delivery for both programs occurs in a PNCA center where individuals collect their food baskets. Individuals in both target groups who live in the same area go to the same center. However, incidence results in 1998 indicate substantial differences between the programs. Although 84.6 percent of the PNCA-M was transferred to the poorest quintile, only 39 percent of the PNCA-P went to such quintile. The main difference is in the eligibility procedure for each program. Although PNCA-M employs public health care usage as the link for identifying beneficiaries, the PNCA-P uses the BPS system to provide a certificate that entitles an individual to receive the food basket. This shows several delivery problems. First, the BPS requirement already constraints the program's ability to reach the poor, as shown in the BPS coverage. Second, the additional effort to request a BPS certificate that entitles a person to the food basket does not provide other benefits, such as a medical exam. In addition, the burden of requesting a certificate and carrying a food basket is different for a mother than it is for an elderly man or woman. These factors reduce the incentives to request such a certificate. Third, public health care covers the population that could not be insured in a private health center, such as the *Mutualistas* (private health insurance mechanism that also provides health care). Conversely, retired people covered under the BPS system are covered by the *Mutualistas* and seldom would go to a public health care institution. These institutional arrangements regarding eligibility and service delivery generate a much lower transfer to the poorest quintile and even some leakage to the middle quintiles.

system (Mutual Health Care System [IAMC]). Among the poor, however, health care is sought in public health care facilities rather than in a *Mutualista* institution because of difficult access (distance) and higher marginal costs (co-payment). About a fourth of the IAMC-insured people who used public hospitals in 1998 were among the poor. This finding supports the potential use of public health facilities as an alternative eli-

gibility mechanism that also may increase health care use among the elderly (as it did among children).

***Programs for the General Population:
Cash, Food, and Housing Transfers***

The main cash transfer programs are family allowances, maternity subsidy, and health insurance that includes the health subsidy and health care. All of those programs are administered by the BPS. Although most of them are based on eligibility criteria that have no explicit targeting, their benefit distributions are very regressive. Those programs that have benefits linked to salaries (such as health subsidies) are the most regressive because of the regressivity of wages and coverage rates across quintiles. Other programs, such as the maternity subsidy or health care, that mainly transfer benefits through medical care at the *Mutualistas* are somewhat less regressive. Overall, these programs do not offer a substantial transfer to the poor.

Family allowance transfers based on dependent children represent a limited opportunity for progressive BPS programs. The family allowances program is the only targeted BPS program (table 9.4). It has these main features: (1) it is positively linked to the number of dependent children or pregnancy events; (2) its beneficiaries include unemployed, house-keeping, and rural workers, and were extended in the late 1990s to cover self-employed workers;⁸ (3) its benefits are in inverse relationship to the household salary; and (4) its benefits are fixed within each household income category. This design has covered more than 350,000 dependents, but leakage is observed at the richest quintile, probably reflecting administrative problems. The family allowance is the most progressive program among those administered by the BPS, but coverage of the self-employed and refinements in eligibility remain to be improved.

Food programs for the general population had unified targeting criteria, but they did cover the nonpoor. One set of programs was designed to address the nutrition needs of a wider population. This corresponded to the Comedores program managed by INDA that was used by university students, pregnant women, retired people, and others. Eligibility criteria to use these dining rooms were determined centrally by the INDA social service and then applied by the delivering institutions, which included local governments. Even though this was not a clearly targeted program by 1998, the selection made by INDA enabled it to achieve an important

transfer to the poorest households in the bottom quintile (about 58 percent of total transfers), despite the fact that the program showed some leakage to the top quintiles (almost 20 percent of transfers). The leakage can be explained by the institution's intention to cover university students, who were mainly from better-off households.

Urban housing programs need to reach the poor and they need a better-suited credit technology. The three most important programs to address housing risks are the SIAV, Credimat, and the MEVIR. Historically, the government also supports the housing unions with much less government participation. Uruguay's Ministry of Housing has been addressing the urban poor households delivering basic dwelling modules (*Nucleos Basicos Evolutivos*) that provides basic infrastructure that can be expanded and improved. The number of modules, however, has not been great enough to address the housing deficit in some Uruguayan cities (especially in Montevideo and Maldonado). Because most housing programs have been unsuccessful in reaching the urban poor, urban slums by 2000 constituted a major problem in terms of sanitary conditions, poverty, and social exclusion.

Regarding the urban programs, SIAV and the much smaller Credimat faced delivery problems that constrained the expected disbursements to the target population. The response to this inability to disburse available benefits to the poor was to increase the income threshold (eligibility criteria) so that it incorporated higher-income households—a response that solved the disbursement problem but that left the poor without coverage. Two other critical problems in delivering housing services to the poor have centered around information and access. Evidence from 1994 indicates that 53 percent of the households in urban slums in Montevideo did not know about SIAV, and 40 percent knew of it but were not enrolled (MVOTMA 1996).

An important strength of the housing programs is that they are funded by the Housing Fund, using earmarked revenues from salaries and retirement contributions. This funding isolates program budgets from unexpected fiscal cuts, but it poses another rigidity. The Housing Fund has separate funds for active workers and those who are retired, so money from active workers must be targeted to finance housing for active workers, and money from retirees must be targeted to finance housing for those who are retired. Given the typical family structure among the poor, the

elderly live with their families and have no personal need to own a house. If they choose to request housing benefits, they would end up living alone. Consequently, the elderly share of the Housing Fund is underused, and the active worker share is always spent.

The evidence from urban programs indicates substantial difficulties in reaching the poor. Because standard credit procedures do not offer adequate products for the poor, more suitable credit institutions and technologies need to be identified.

Finally, the rural housing program (MEVIR) has proved effective and well targeted and has become the most progressive housing program in Uruguay (see table 9.4). Several factors could explain this program's impact. Its most important characteristics are (1) explicit targeting to rural households; (2) autonomous institutional status, with a board appointed directly by the Ministry of Housing; (3) autonomous budgetary allocation with earmarked resources, which promotes a sound financial planning of the funds and their uses; and, (4) the participatory nature of the program's work, which is demand driven and helps build capacity and develop organizations in the community. These features need to be exploited for a better intervention in urban areas where other programs have not succeeded in reaching the poor.

To improve housing benefits for urban poor people, the features of the MEVIR may be emulated, but other factors are recommended as well: (1) program information and credit access need to be spread systematically, probably in a way that involves community participants (thereby offering better access); (2) the information system (that is, the *Registro Nacional de Postulantes*) needs to be improved to cross-verify basic indicators, such as income (and thereby promote better targeting); and, (3) the Housing Fund must have greater financial flexibility in managing both the active-worker and retired-worker funds. Finally, it must be mentioned that a comprehensive assessment of the problem of urban slums involves solving the legal problems occasioned by the occupation of private lands.

Recommendations for Social Safety Net Programs

This section discusses cross-cutting issues on the programs described above, including proposals for improving the situation of social safety nets as they existed in 2000.

Social Information Systems: Targeting, Monitoring, and Evaluating

The targeting mechanisms observed in Uruguay range from school- or community-based ones to more precise ones based on individual information.⁹ Some programs use means-tested mechanisms, but many use the basic needs index at the household and community levels for targeting. Although that index has a simplicity appeal, it also suffers from two major problems. First, there is an important leakage in the index because 46 percent of people in Montevideo with any uncovered basic need do not belong to the poorest 40 percent of the population. This number is only 23 percent in the interior. Second, there is a problem of undercoverage in that the index does not capture all (or most) poor people. Roughly only half of the poorest quintile has an uncovered basic need. In that sense, the index is not a sufficient indicator of poverty in Uruguay. Despite this lack of sufficiency, some programs have been successful in targeting resources by including such other indicators as type of health care or mother's education. Those indicators suggest that a more comprehensive information system may enable improvements in the targeting of these and other social programs.

Implementation of a socioeconomic information system is needed to generate common means-tested targeting procedures that would encourage interagency coordination, enable third parties to monitor targeting (that is, nongovernmental organizations or civic associations), and enhance benefit incidence for poor people. In 1999, a preelectoral agreement between the major parties included a commitment to implement a social information system for beneficiary identification, prioritization, investment allocation, and integral coverage of the family and community demands (Partido Nacional 1999). This bipartisan commitment could be used to improve the sources for targeting, monitoring, and evaluating social programs.

This information system could have been based on data collected by the education (ANEP) and health (Ministry of Health) sectors because those sectors provide the most extensive coverage in Uruguay. The health sector, in particular, already had produced (but not implemented) a Health Care User's Identification System in 1999. These data can be complemented with information from rural areas collected by the Ministry of Housing.

In addition, only a few programs have been subject to rigorous impact evaluation. The very progressive food program, PNCA-M, includes no

evaluation of the nutritional status of its beneficiaries, even though its eligibility is based on the information collected by the Ministry of Health. Similarly, other programs should be evaluated on the bases of their proposed objectives (nutrition, child development, health status, employment) to identify potential weaknesses.

Cost Effectiveness and Financial Sustainability

The effectiveness of some programs usually has involved interagency collaboration and private sector participation, a somewhat autonomous budget allocation, and effective targeting mechanisms designed by other institutions. What follows are recommendations for enhancing the cost effectiveness and the sustainability of program funding.

Strengthen Interagency Collaboration and Third-Party Involvement in Benefits Delivery

Whereas the major programs have been delivered directly in the form of cash transfers or subsidies (unemployment insurance, pensions, health benefits, and so forth), several programs have revealed the importance of interagency coordination to produce a significant effect on the target population. Moreover, some of those programs have involved the participation of the organized community and nongovernmental organizations in delivering services. The experiences of the MEVIR, CAIF, and PAE suggest that community involvement substantially strengthens a program, and nongovernmental organization and private sector participation avoids additional administrative costs if minimum quality standards and monitoring procedures are implemented. The number of nongovernmental organizations involved in service delivery in Uruguay indicates that the market for civic associations could be exploited for social protection programs. Additional elements in this process are a predefined targeting procedure, explicit output-based contracts (some programs have input-based arrangements), and technical support.

Improve Financial Autonomy and Provide Isolation Mechanisms

The success of some programs is related to a relatively stable budget horizon. Programs may not need increased funding as much as they need a less uncertain budget perspective. The CAIF program, after gaining a reputation for its benefits and its operational work, has an implicit budget

allocation that government would not change. Even though this implicit budget provides certain stability, the program remains vulnerable to major fiscal budget cuts. The housing programs also have benefited from a stable Housing Fund that have enabled better planning. Other programs, like ProJoven, have used the separation between the funding institution (Ministry of Labor) and the managing institution (Instituto Nacional de la Juventud) to design the program more effectively and to promote a more comprehensive view of the problems that youth face.

The budget law allocates a fixed amount for a five-year period corresponding to the presidential term, but it does not specify each year's allocation. Hence, some programs have faced significant variability in their budgets between years, and this variability has jeopardized planning and expansion activities. Given the limited coverage of some of the better-targeted programs, a stable budget horizon will help program designers create better expansion strategies to cover the poor.

The more effective social programs should be protected against budget cuts by a strengthening of their budgetary autonomy and the provision of a more stable financial horizon.

Exploit Reliable Sources of Information

The Carnet de Salud issued in public hospitals to those who are unable to pay for their medical care and are not covered by other medical insurance, has been used successfully for eligibility purposes in some social programs (such as PNCA-M). Similar programs with eligibility based on other institutions (such as PNCA-P based on the BPS) showed larger leakage and poorer targeting. An important lesson is that, in the absence of better social information systems, external identification can be useful if the objective is the same (that is, target the poor). Moreover, this information spillover is of much better quality when the institution generating the information (for example, the Ministry of Health) has an interest in the quality of such indicators (for example, cost recovery).

Improve Collaboration between National and Subnational Governments

A recurrent issue in the delivery of many of the program services described above is the presence of subnational governments, either as part of the distribution effort or as program administrators. Local governments in Uruguay are constitutionally entitled to tax revenues from property, public

events, and other activities. Revenues at the departmental level come mainly from their own resources, and, in 1999, about 11 percent came from federal transfers.¹⁰ Local government expenditures include the usual urban functions—roads, lighting, traffic control, and garbage collection. In addition, departments have been involved in primary health care, construction of schools and hospitals, dining facilities for the poor, direct cash transfer programs, emergency relief services, and other infrastructure projects.

Although decentralization has been explicit on the revenue side, formal expenditure responsibilities have not been decentralized. That has generated weak planning of departmental expenditures and disorganized interventions in areas of traditional federal action (Michelin 1999).

Such program duplication, noted in some of the programs described above, constitutes an issue that requires explicit expenditure decentralization and an organized collaboration between federal and local governments in the delivery of services. That coordination will enable programs to adapt themselves to the demands and preferences of the local population and to minimize service delivery costs. Such decentralization also may help in obtaining better information regarding targeted groups, involve organized community labor, and encourage local participation in the programs. Those successful programs that have followed this line, however, have accompanied it with a predetermined targeting criteria, clear budget and resource allocations, and performance goals stated at the outset.

Annex: Estimating the Incidence of Social Protection Programs

Centros CAIF

The Encuesta de Ingresos y Gastos (1995) reported whether children attended preschool and whether that preschool was a CAIF center. The incidence figures were computed using the population of children age 5 or less. According to CAIF officials in 1999, the program targeting and implementation procedures have not changed substantially since 1995, so incidence based on 1995 should approximate the current incidence.

Food Programs

The Encuesta de Ingresos y Gastos (1995) asked whether each member of the household received any in-kind subsidy in the form of food, or whether they had benefited from any food program. In particular, it asked

about PNCA, INDA food programs, school food programs, and other local government and nongovernment institutions. To estimate the incidence of the mother-infant component of PNCA in 1999, this chapter used the number of children age 11 or less who received food through the PNCA. Even though the PNCA's mother-infant program formally covers children up to age 5, children older than age 5 can benefit if they qualify by social risk. The fraction of children ages 6–11 who qualify because of their social conditions is relatively small, and the results are not substantially altered. The estimation of the PNCA–P used the same response among those individuals who declared themselves to be retired or receiving pensions and all other women and men over 60 years of age. This extensive definition of the population age 60 and older included those former workers from rural areas who also were eligible for PNCA–P. The incidence of food programs in schools was estimated on the basis of the fraction of children ages 6–13 who benefited such programs. That age range was selected because the PAE covers mainly primary education (formally up to 11 years), but grade repetition means that a fraction of children ages 12–13 are still in primary school. Finally, the incidence of INDA food programs was estimated for several categories: those receiving free benefits, retired people, students, and so forth. For many of these programs, the amount transferred to each beneficiary was not homogenous among beneficiaries, but because no additional information about the type of food transfer was available, a flat transfer was assumed.

Cash Transfers

Family allowances from the BPS were estimated using the information from section G of the Encuesta Continua de Hogares 1998 for all employment activities other than public service (which does not qualify for family allowances under the law).

Transfers from the maternity subsidy were estimated using the eligibility criteria determined by the BPS and household characteristics that indicated the program coverage. Individuals were considered eligible if they were females working in the private sector and they had a child age 1 or less in the household. The eligible population was reduced to those entitled to receive health care at any IAMC but paid by the Dirección de Seguros Sociales por Enfermedad (DISSE) because health care paid by DISSE indicates that people are covered by BPS health care insurance.

The maternity subsidy consists of two types of transfers: maternal medical care for the delivery, and the maternity cash subsidy that replaces wages before and after delivery. For the transfer of medical service, a flat rate was assumed because no additional information on the nature of deliveries or the specific institutions was available. The maternity cash subsidy was estimated using the estimated wage bill for each population group (decile) from the beneficiary population previously determined. Data on wages were provided by the survey. Because the maternity subsidy had a lower boundary on the benefit transferred (equivalent to one national minimum salary), monthly wages below the national minimum were replaced with the minimum. On average, the monthly national minimum salary was about \$95 in 1998.

As in the case of maternity subsidies, health care coverage through IAMC was based on worker characteristics: private sector employment, age, and health care affiliation. This initial population was later reduced using information on the presence of a sickness that required medical care at an institution. Although the initial incidence (based on potential health care users) was more equitable, the later incidence (based on actual users) was regressive because poorer people reported only two thirds of the morbidity that the richest people reported. Among those in the poorest quintile, about 20 percent reported being sick during the year before the questionnaire was answered; 30 percent of the richest quintile reported sickness during the same period. The actual costs for medical care were assumed constant across quintiles.

Health subsidy is a transfer made conditional on the presence of a disabling sickness event, and the amount depends on the recipient's salary at the time of the event. An estimation of the wage bill of the population that needed medical care was used to estimate these transfers. These eligibility criteria were imposed in the sample: private sector workers enrolled in the BPS and covered by the IAMC.

Labor Market

As with the other cash transfer programs, unemployment insurance involves coverage in two dimensions: receiving benefit (extensive margin), and the amount of benefit (intensive margin). Among those people who reported they were unemployed during the prior week, a fraction reported to be receiving unemployment insurance. The amount transferred to

each covered person was estimated using the amount of income received either as transfers and other subsidies or as wages in the main job. No person covered by unemployment insurance reported both at the same time.

Housing Programs

A difficult issue was faced in estimating the incidence of housing programs. The Encuesta de Ingresos y Gastos 1995, the more complete survey on social protection in Uruguay, was performed before many of the housing programs were implemented. Moreover, an important rural housing program (MEVIR) was not captured because the survey was conducted only in urban areas (despite the fact that MEVIR was an answer to the question regarding government subsidies). Hence, direct incidence estimates were available only for the self-help and housing cooperatives (*Cooperativas de Ayuda Mutua* and *Vivienda*) and partially for SIAV and Credimat.

Notes

1. For detailed indicators for poor and nonpoor people, see Murrugarra (2000).
2. There are six indicators of basic needs satisfaction corresponding to different dimensions of socioeconomic status: (1) type of dwelling, (2) *hacinamiento* (crowded dwelling), (3) access to drinking water, (4) available sewage, (5) school attendance, and (6) sustainability of the household. An aggregate indicator (total) takes the value of 1 if any of those six is other than 0 (that is, if there is any unsatisfied basic need).
3. In the background paper (Murrugarra 2000), I examined the correlates between these socially excluded groups and consumption-based poverty. Teenage motherhood and street children were not analyzed because of data limitations.
4. Monetary amounts reported in U.S. dollars were converted from Uruguayan pesos at the corresponding exchange rate. Annual average for 1998: \$1 = 10.468 pesos.
5. According to a December 1999 change in the family allowances rules, informal workers also could qualify as beneficiaries. However, no appropriate mechanism had been designed for implementation as of 1999.
6. In 1998, costs of the Chilean *Jardin Infantil Convencional* (\$888.50 per child), the *Hogares de Cuidado Diario* in the República Bolivariana de Venezuela (\$1,125–1,443), and the Brazilian *Cocoon Units* (\$1,078) were very close to those of CAIF (Waiser 1998).

7. Three out of four of these people are school dropouts.
8. According to BPS officials, it is not clear yet how self-employed (uncovered) workers are going to be reached.
9. Among these are Ficha Familiar (CAIF), Formulario de Selección (ProJoven), Ficha Socioeconómica Unica (SIAV), BPS payment stubs, and the Ministry of Health's Carnet de Salud.
10. For comparison purposes, municipalities in Argentina rely on federal and provincial transfers for more than one third of their revenues. For a detailed discussion of departmental finances, see Michelin (1999).

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PART THREE

Case Studies from Africa

CHAPTER 10

Analyzing Debt Sustainability

Concepts and Tools Applied for Guinea, Rwanda, and Senegal

Bernhard G. Gunter and Quentin Wodon

It is now widely recognized that a sustainable debt is a precondition for sustainable development. Indeed, levels of debt that are not sustainable may have significant negative implications not only for the ability of governments to provide basic services to their populations, but also for investment and growth, in what is commonly referred to as a *debt overhang*.¹ The existence of a debt overhang in many of the poorest countries was the main rationale for debt relief under the Heavily Indebted Poor Countries (HIPC) Initiative. Furthermore, the importance of achieving sustainable debt is also reflected in the addition of debt sustainability to the set of Millennium Development Goals.

As described in the first chapter of this book, the analysis of a country's debt sustainability is a complex task that many times encounters problems related to (1) establishing the actual debt outstanding and future debt-service obligations;² (2) defining appropriate sustainability indicators; and (3) projecting future macroeconomic variables like gross domestic product (GDP), exports, interest rates, inflation rates, and exchange rates. These projections are crucial because any serious debt sustainability analysis is necessarily forward-looking and highly sensitive to changes in macroeconomic variables.

This case study illustrates the key concepts and complexities of any practical debt sustainability analysis (DSA) for three West African countries: Guinea, Rwanda, and Senegal. Following this introduction, we begin with an overview of the main debt sustainability indicators as they typically are used in practice. We then provide a brief historical review of previous and current debt relief initiatives and illustrate how they have been applied in each of our three countries. The main debt sustainability analyses will be provided in the fifth and sixth sections where we will use a recently developed, Excel-based simulation tool, SimSIP Debt.³ In the fifth section we project a variety of debt indicators for each of the countries using SimSIP's Debt Projection Module, and the subsequent section explains the rationale behind SimSIP's Deficit-Debt Consistency Module and applies it to our countries. The various assumptions used and the results presented are for illustrative purposes and should not be interpreted as the authors' projections. Finally, the chapter ends with some concluding remarks.

Review of Previous and Current Debt Relief Initiatives

This section provides a brief review of the main approaches used to implement debt relief in developing countries. We start by reviewing traditional debt relief initiatives through Paris Club arrangements, and continue with the debt sustainability criteria used in the HIPC framework.

Traditional Debt Relief

Traditional debt relief refers to that provided to low-income countries through three Paris Club arrangements, named after the city in which the Group of Seven met.⁴ At or shortly after that meeting, the Paris Club agreed to new terms of debt relief: (1) debt relief under *Toronto terms*, providing a 20–33 percent net present value (NPV) debt reduction on eligible debt-service flows (October 1988 to June 1991); (2) debt relief under *London terms*, providing a 50 percent NPV debt reduction on eligible debt-service flows (December 1991 to December 1994); and (3) debt relief under *Naples terms*, providing a 50 percent NPV debt reduction on eligible debt-service flows and/or debt stocks for developing countries with a GDP per capita above \$500, and a 67 percent NPV debt reduction on eligible debt-service flows and/or debt stocks for developing countries with a GDP per capita below \$500, (in effect since January 1995).

The periods shown in parentheses above indicate the planned time in which the terms were supposed to be implemented. However, implementations of Paris Club debt relief is not automatic; rather, it is based on case-by-case decisions of the Paris Club, usually conditional on a variety of economic performance criteria. Although each Paris Club agreement (Toronto, London, and Naples terms) provided a different set of options for the delivery of debt relief, there are some broad similarities among the three:

- The debt reduction (DR) option implies an NPV debt reduction through cancellation of either some part of eligible debt stock or some eligible flows of debt service, and a rescheduling of the remaining to market rates.
- The debt-service reduction option implies an NPV debt reduction through the rescheduling of either eligible debt stock or eligible flows of debt service to a reduced interest rate.
- The long-maturities option implies no NPV reduction, but rather a rescheduling of eligible maturing flows of debt service to market rates with a relatively long grace period.

Debt relief under London and Naples terms provided one additional option, capitalization of moratorium interest. This option implies that some interest payments could be rescheduled over some years, including a grace period. Whereas debt relief under Toronto terms was provided only on eligible debt-service flows (usually for the three years following a Paris Club agreement), debt relief under London terms introduced the cancellation or rescheduling of eligible debt stock, although no such stock-of-debt operation took place under London terms. Stock-of-debt operations, however, are in effect under Naples terms. The details of the debt reductions on the stock of debt and on debt service (flows) for countries with a GDP per capita below \$500 are provided in table 10.1. For developing countries with a GDP per capita above \$500, appropriately adjusted terms provide an NPV debt reduction of 50 percent.

Debt relief provided by the Paris Club covers external bilateral debt that (1) is public and publicly guaranteed (PPG), (2) is not official development assistance (non-ODA), and (3) has been contracted before the cut-off date (COD; usually the date a debtor country has been granted Paris Club debt relief for the first time). All three conditions (PPG, non-ODA, and pre-COD) are summarized and referred to as “eligible” debt. In other words, debt contracted post-COD is not eligible; neither are

Table 10.1. Naples Terms “Two-by-Two” Matrix

	<i>Stock</i>	<i>Flow</i>
DR option	NPV reduction of 67 percent of eligible debt through an appropriate debt stock cancellation. The remaining eligible debt stock will be rescheduled at market rates over a period of 23 years, including 6 years of grace.	NPV reduction of 67 percent of eligible debt through an appropriate debt-service cancellation. The remaining eligible debt service will be rescheduled at market rates over a period of 23 years, including 6 years of grace.
DSR option	NPV reduction of 67 percent of eligible debt through an appropriate debt stock rescheduling at reduced rates over a period of 33 years, including 3 years of grace.	NPV reduction of 67 percent of eligible debt through an appropriate debt-service rescheduling at reduced rates over a period of 33 years, including 0 years of grace.

Source: Authors' construction.

Note: DR = debt reduction; DSR = debt-service reduction; NPV = net present value.

ODA debts, although they are usually rescheduled at the original interest rate over a long period of time, including a grace period. All private debt that is not publicly guaranteed and all multilateral debt is excluded from traditional debt relief. Formally, Paris Club debt relief is conditional on non-Paris Club bilateral creditors providing the same (or better) terms of debt relief, though this condition has never been enforced strictly.

Debt Sustainability Criteria of the Original HIPC Framework

The International Monetary Fund (IMF) and World Bank launched the HIPC Initiative in autumn 1996 (see chapter 1). It was the first comprehensive approach to reducing the external debt of the world's poorest, most heavily indebted countries, and it represented an important step forward in placing debt relief within an overall framework of poverty reduction. HIPC debt relief is available for the group of heavily indebted poor countries—defined as countries that satisfy both of these conditions: (1) they rely on highly concessional financing from the World Bank's concessional lending-arm (the International Development Association),⁵ and (2) they face an unsustainable external debt situation after the full application of traditional debt relief mechanisms (the 67 percent NPV reduction on eligible debt stock, regardless of what the country's GDP per capita is). Whereas views on what debt levels constitute debt sustainability have evolved over time (see below),

there are a couple of key elements of the HIPC framework that were adopted with the goal of providing a fair amount of assistance across countries.

First, as a result of the relatively small amount of external private and domestic public debt for the group of HIPCs and the difficulties related to establishing the correct amount and repayment terms of these categories of debt, the HIPC framework has excluded external private and domestic public debt from its DSA. In the cases of Guinea and Rwanda, there is no private external debt that is not publicly guaranteed, although both countries have some small amount of public domestic debt. Senegal has a small amount of private external debt (that is not publicly guaranteed) and a considerable amount of public domestic debt.

Second, the DSA reference point is usually determined to be the end of the fiscal year before the decision point of each HIPC. Because Guinea and Rwanda reached their decision points in December 2000 and use the calendar year as the fiscal year, Guinea's and Rwanda's reference point for the decision point DSA was the end of December 1999. Because Senegal reached its decision point in June 2000 and uses the calendar year as its fiscal year, the proper DSA reference point should have been the end of December 1999. However, because reliable debt data for end-December 1999 were not available and the debt data for end-December 1998 had just been reconciled, it had been decided to use end-December 1998 as Senegal's DSA reference point.

Third, exports exclude workers' remittances⁶ and are calculated based on a three-year backward-looking average. In the cases of Guinea and Rwanda, workers' remittances are highly volatile (possibly because of data constraints), but average less than 1 percent of the exports of goods and services. In the case of Senegal, workers' remittances average about 7 percent of goods and services exports. Thus, the inclusion or exclusion of workers' remittances can make a difference in calculating HIPC debt relief.

Fourth, discount rates are the currency-specific commercial interest reference rates (CIRRs), averaged over a six-month period before the DSA reference point as they are published on the Organisation for Economic Co-operation and Development Web site. For currencies without a published CIRR, the HIPC framework uses either the CIRR of the pegged currency or the CIRR for the IMF's special drawing right. The discount rates used for Guinea's, Rwanda's, and Senegal's Enhanced HIPC Decision Point DSAs are provided in each country's HIPC document (available on the HIPC Web site). The rates range from 1.98 percent (for the Japanese yen) to 7.04 percent (for the U.S. dollar).

Under the original framework of the HIPC Initiative (1996–99), sustainable debt-to-export levels were defined at a ratio ranging from 200 to 250 percent (on an NPV basis) at the completion point. The main idea behind this threshold was that it would be detrimental for economies to service foreign debts at higher levels, with resulting pressures on their currency, among other things. For very open economies, however, where the exclusive reliance on external indicators may not adequately reflect the fiscal burden of external debt, an NPV debt-to-export target below the 200–250 percent range could be recommended if the country concerned met two criteria: (1) an export-to-GDP ratio of at least 40 percent and (2) a 20 percent minimum threshold of fiscal revenue in relation to GDP. For countries meeting those criteria, the NPV debt-to-export target was set at a level that achieves 280 percent of the NPV debt-to-revenue ratio at the completion point. Consistent with the HIPC Initiative, the Paris Club extended its previous agreements for HIPCs through the adoption of *Lyon terms* (1996).

Whereas the original framework of the HIPC Initiative yielded some progress, multilateral organizations, bilateral creditors, HIPC governments, and civil society have engaged in an intensive dialogue about its strengths and weaknesses since the inception of the initiative. A major review in 1999 resulted in a significant enhancement of the original framework to provide more and faster debt relief.

Under the enhanced framework (adopted in September 1999), sustainable debt-to-export levels are defined at a fixed ratio of 150 percent (on an NPV basis) at the decision point. For very open economies, an NPV debt-to-export target below 150 percent can be recommended if the country concerned meets two criteria at the decision point: (1) an export-to-GDP ratio of at least 30 percent and (2) a 15 percent minimum threshold of fiscal revenue in relation to GDP. For countries meeting these thresholds, the NPV debt-to-export target will be set at a level that achieves a debt-to-revenue ratio of 250 percent of the NPV at the decision point.

Furthermore, the enhanced framework provides the option to consider additional assistance at the completion point, beyond that committed at the decision point, if there has been a fundamental change in a country's economic circumstances at the completion point, and if the change clearly was occasioned by exogenous developments.⁷ Consistent with the Enhanced HIPC Initiative, the Paris Club once again extended its previous agreements for HIPCs through the 1999 adoption of the *Cologne terms*.

Outlook beyond the HIPC Initiative

A number of bilateral creditors have indicated that they would provide additional debt forgiveness for HIPCs when those countries reach their Enhanced HIPC completion points. Nevertheless, given that the HIPC Initiative cannot guarantee long-term debt sustainability, the IMF and World Bank have started to shift the task of achieving debt sustainability away from the HIPC Initiative and toward the Poverty Reduction Strategy Paper (PRSP) approach (adopted in 1999) “within which the authorities should seek to maintain a sustainable debt burden” (IDA and IMF 2002, p. 39). Furthermore, related to recent debt problems in middle-income countries, we see an increasing interest in the adoption of a much broader international debt workout mechanism. The IMF has called for a sovereign debt restructuring mechanism, but most international advocacy groups have called for a fair and transparent arbitration procedure.⁸

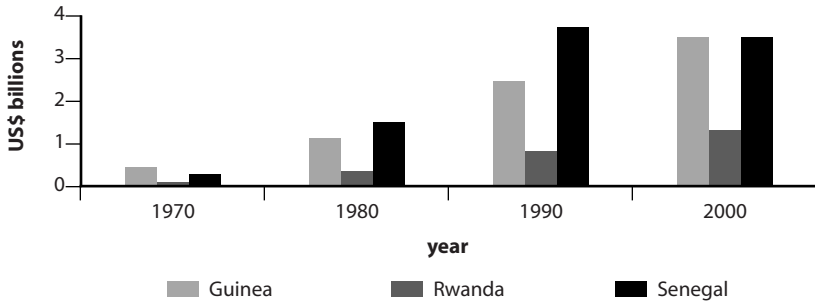
At the time this chapter was written, it was not clear how the HIPC Initiative would be related to these broader suggestions, although it is likely that HIPCs will be covered under such debt workout mechanisms if they continue to face debt-service problems after completing the HIPC process. Since that time, the Multilateral Debt Relief Initiative (MDRI) has been adopted, and it has reduced substantially the debt burden of the countries participating in the initiative (including Rwanda and Senegal).⁹ We do not analyze the effect of the MDRI here, however; rather, we focus on an analysis of data before the initiative was adopted.

Debt Accumulation, Stagnation, and Debt Relief

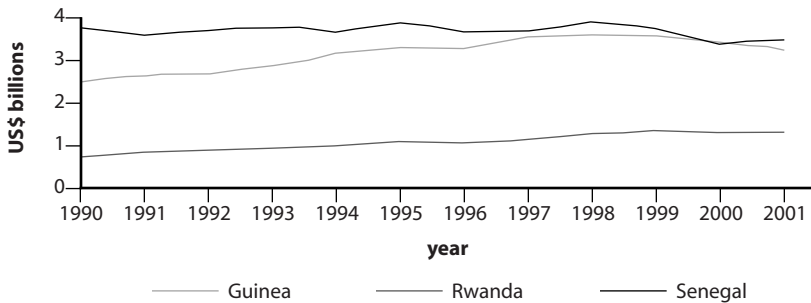
This section provides an analysis of the debt profile of Guinea, Rwanda, and Senegal, using data from 2001—well before the MDRI was adopted. We present first the long-term trends in total external debt for the three countries, before analyzing both traditional debt relief under the Paris Club arrangements and the debt relief granted under the HIPC Initiative.

Long-term Trends in Total External Debt

The long-term developments of Guinea’s, Rwanda’s, and Senegal’s total external debts up to the year 2001 are illustrated in figures 10.1 and 10.2. Figure 10.1 shows the debt levels for 1970, 1980, 1990, and 2000; figure 10.2 traces the more detailed and recent developments for each

Figure 10.1. Total External Debt, by Decades, 1970–2000

Source: World Bank 2003.

Figure 10.2. Total External Debt, Annually, 1990–2001

Source: World Bank 2003.

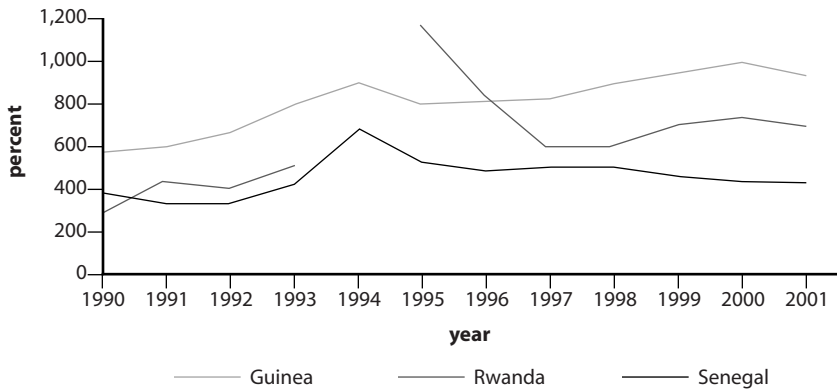
year since 1990. Among the three countries, Rwanda's debt grew most rapidly, followed by that of Senegal—although Senegal's debt grew less than that of Guinea during the 1990s.

In 1970, Guinea's stock of total external debt was \$0.3 billion. Ten years later, it was more than three times that value (\$1.1 billion). It then doubled during the 1980s (to \$2.5 billion in 1990), and reached a maximum of \$3.5 billion in the late 1990s. The developments of Rwanda's external debt are even more dramatic. Starting with only \$2 million in 1970, it grew exponentially during the 1970s and 1980s to reach \$190 million in 1980 and \$712 million in 1990. Although it continued to grow sharply during most of the 1990s, it seems to have stabilized during the last few years at around \$1.3 billion. Senegal's debt also grew sharply during the 1970s and 1980s—although not as dramatic as that of Rwanda—

increasing from \$145 million in 1970 to \$3.7 billion in 1990. It remained around \$3.8 billion during most of the 1990s and has shown some small ups and downs since then.

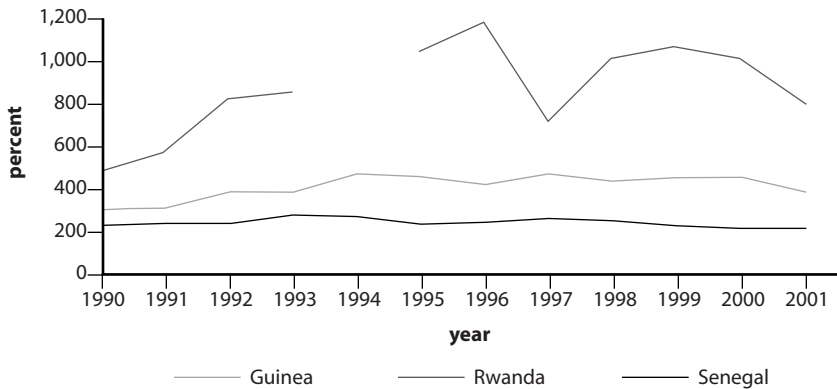
Figures 10.3 and 10.4 show the more useful developments of Guinea's, Rwanda's and Senegal's external debt expressed as a percentage of government revenues (figure 10.3) and as a percentage of exports of goods and services (figure 10.4). Rwanda's 1994 ratios (each amounting to

Figure 10.3. Total External Debt as a Share of Government Revenues, 1990–2001



Source: World Bank 2003.
 Note: Government revenue does not include grants.

Figure 10.4. Total External Debt as Share of Exports, 1990–2001



Source: World Bank 2003.

about 3,000 percent) are not included in the graphs because both government revenues and exports were extremely low in 1994 as a result of the civil war and genocide. It would have been preferable to use NPV debt ratios, but no such time-series data are available.

Debt-Service Problems and Traditional Debt Relief

Given the sharp increases in external debts during the 1970s and 1980s, which far more than outpaced the growth rates of income and exports, it is not surprising that all three countries have been experiencing severe debt-service problems since the 1980s, and have thus been granted traditional debt relief (although with considerable delay and far below levels needed to eliminate the debt overhang and end the stagnation in growth and development). The debt relief granted to these countries includes the following:

- In 1986, the Paris Club agreed to reschedule Guinea's eligible debt-service payments due between January 1, 1986, and February 28, 1987, that were related to non-ODA loans with a maturity of more than one year, contracted pre-COD (January 1, 1986). Rescheduled debt service was to be paid over a 10-year period, including a 5-year grace period. Subsequent agreements rescheduled eligible debt-service payments on Toronto terms in 1989, on London terms in 1992 and 1995, and on Naples 50-percent-terms in 1997.
- Rwanda has benefited from one Paris Club flow rescheduling agreement signed in May 1998 on Naples terms, covering outstanding arrears as of the end of June 1998 and a consolidation period from July 1998 to end-May 2001, with an NPV reduction of 67 percent on eligible debt. Although Rwanda obviously faced debt-servicing problems a long time before 1998, the previously precarious conflict and postconflict civil situation prevented Rwanda from receiving traditional debt relief.
- Between 1987 and 1998, Senegal benefited from 12 Paris Club rescheduling operations on debt contracted with the Paris Club group of creditors before the January 1, 1983, COD. In June 1998, Senegal benefited from a stock-of-debt operation on Naples terms, which brought the overall reduction of eligible debts to 67 percent in NPV terms.

Debt Relief under the Enhanced HIPC Initiative

Given that Senegal continued to face an unsustainable debt after the full use of traditional debt relief (agreed to in June 1998), and given that Guinea and Rwanda were projected to face unsustainable debts after a hypothetical Naples terms debt reduction,¹⁰ all three countries became eligible for debt relief under the Enhanced HIPC Initiative. Senegal qualified under the fiscal criterion (because its export-to-GDP and revenue-to-GDP ratios were above the minimum HIPC thresholds for the fiscal window), whereas Guinea and Rwanda qualified under the usual export criterion. Senegal reached its Enhanced HIPC decision point in June 2000; Guinea and Rwanda reached theirs in December 2000. As shown in table 10.2, at the enhanced decision points, debt relief under the Enhanced HIPC Initiative was projected to reduce debt levels in the three countries in the following ways:

- Guinea's external PPG debt service to all its creditors was reduced by about \$800 million, corresponding to about \$545 million in NPV terms, which is equivalent to approximately 32 percent of total debt outstanding after the full use of traditional debt relief mechanisms.
- Rwanda's external PPG debt service to all its creditors was lowered by about \$814 million, corresponding to approximately \$452 million in NPV terms, which is roughly equivalent to 71 percent of total debt outstanding after the full use of traditional debt relief mechanisms. Hence, consistent with the HIPC framework, the HIPC DSA calculated HIPC debt relief after the full application of traditional debt relief,

Table 10.2. Committed Debt Relief under the Enhanced HIPC Initiative

<i>Rwanda</i>	<i>Guinea Senegal</i>		
Target: NPV debt-to-export ratio (%)	150	150	(133)
Target: NPV debt-to-revenue ratio (%)	n.a.	n.a.	250
Reduction in NPV terms (US\$ millions)	545	452	488
Nominal debt-service relief (US\$ millions)	800	814	850
Common NPV reduction factor (%)	31.6	71.3	18.1

Source: International Monetary Fund and World Bank, Enhanced HIPC Initiative decision point documents.

which implied that it had to establish Guinea's debt after a hypothetical 67 percent NPV stock reduction on eligible debt.

- Senegal's external PPG debt service to all its creditors decreased by roughly \$850 million, corresponding to approximately \$488 million in NPV terms, which is equivalent to about 18 percent of total debt outstanding after the full use of traditional debt relief mechanisms.

Including the additional bilateral debt forgiveness promised by some bilateral creditors at the Enhanced HIPC completion point, the decision point DSAs (of June and December 2000) projected that the NPV debt-to-export ratios at Guinea's, Rwanda's, and Senegal's completion points will be 123 percent, 185 percent,¹¹ and 112 percent, respectively. However, given that the projections used at the Enhanced HIPC decision points were overly optimistic, the latest projections (autumn 2002) indicate that the NPV debt-to-export ratios are likely to be around 137 percent, 189 percent, and 158 percent, respectively, for Guinea, Rwanda, and Senegal. It is thus expected that HIPC debt relief for Rwanda and Senegal will have to be topped up at their completion points.

Using Debt Projections to Analyze Debt Sustainability

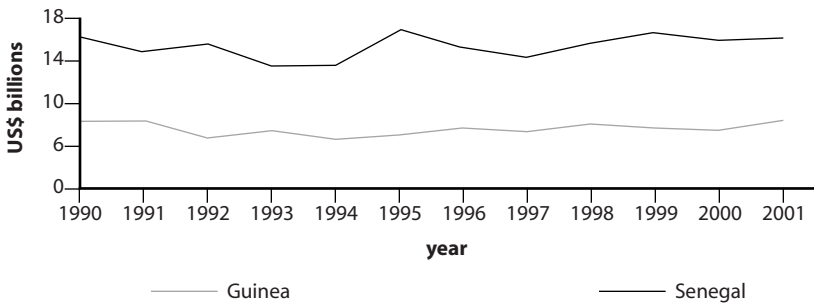
The Debt Projection Module of the SimSIP Debt simulation tool calculates the values for various debt indicators based on three elements: (1) the modeling of government expenditures; (2) the modeling of government revenues; and (3) the specification of the government deficit, which is financed by new borrowing after deducting grants and debt relief. Because the model has been explained in chapter 8 (devoted to a case study of debt sustainability in Paraguay) and to some extent in chapter 3 (devoted to methodology issues in analyzing debt sustainability), we will not repeat it here. In terms of data, the World Bank's *Global Development Finance 2003* provides most of the data on external debt and exports, and most of the other macroeconomic data come from the World Bank's African Development Indicators database. Domestic debt levels have been estimated on the basis of scarce and incomplete public information provided in IMF and government publications.¹²

Given that no information was available on domestic debt interest rates and maturities, we have assumed an interest rate of 6.5 percent and a maturity of two years for all three countries. Because of the relatively small

share of domestic public debt in total PPG debts, the results are not extremely sensitive to changes in these domestic debt variables. However, it should be pointed out that the fiscal burden of domestic debts is far more than proportional to its share in total debt because domestic debt is unlikely to be concessional.¹³ For example, although Guinea's public domestic debt constitutes less than 4 percent of its public external debt, 2001 interest payments on domestic debt were approximately 20 percent of the 2001 interest payments on public external debt.

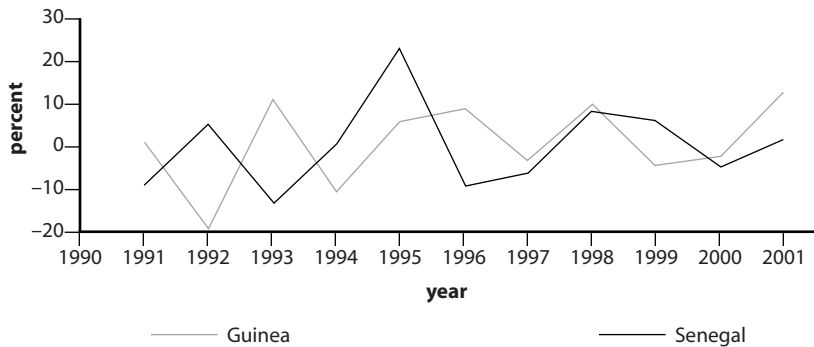
The high volatility of some key macroeconomic variables implies a considerable challenge. For example, figures 10.5, 10.6, and 10.7 illustrate

Figure 10.5. Exports of Goods and Services, 1990–2001



Source: World Bank Development Indicators.

Figure 10.6. Annual Growth Rates in Exports of Goods and Services, 1990–2001



Source: World Bank Development Indicators.

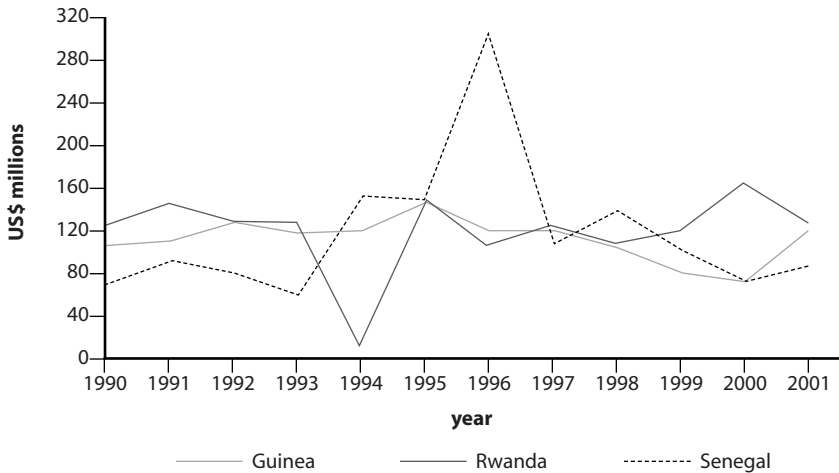
the high volatility in exports of goods and services, especially in Rwanda. Figure 10.8 shows the high volatility in donor grants to each of the three countries' federal budgets. We have excluded the 1994 outlier (\$7.5 million) for Rwanda and the 1996 outlier (\$307 million) for Senegal. Excluding those outliers, annual donor grants to the federal budgets vary between \$50 million and \$170 million. This large nominal volatility in grant financing of government budgets has serious budget implications, as we can see when we express grants as percentages of nongrant government

Figure 10.7. Exports and Annual Growth Rates in Exports, Rwanda, 1990–2001



Source: World Bank Development Indicators.

Figure 10.8. Grants Provided to the Government Budget, 1990–2001

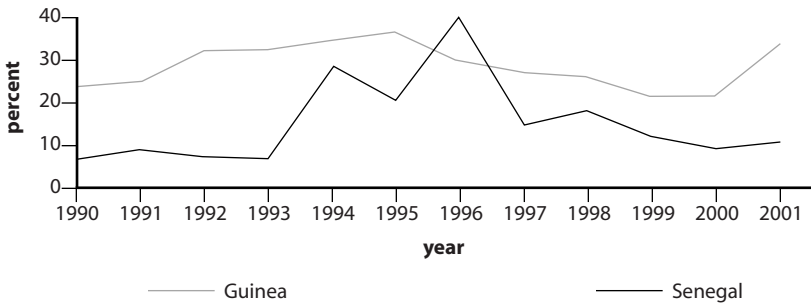


Sources: World Bank and International Monetary Fund data.

revenues (figures 10.9 and 10.10). It is obvious in those figures that fiscal sustainability of all three countries—but especially of Rwanda—is dominated by the provision of donor grants.

Finally, the amount of debt relief to be provided under traditional and HIPC debt relief efforts is also significant for each country’s budget, although we need to remember that some of the debt service due in the past has not been paid. In other words, the actual savings are much less than the calculated amounts of traditional and HIPC debt relief. Based on the data provided in the Enhanced HIPC decision point documents (especially the detailed delivery schedule of Enhanced HIPC debt relief from the IMF and the World Bank), we have projected the annual total

Figure 10.9. Grants as a Share of Nongrant Government Revenues, Guinea and Senegal, 1990–2001



Sources: World Bank and International Monetary Fund data.

Figure 10.10. Grants as a Share of Nongrant Government Revenues, Rwanda, 1990–2001



Sources: World Bank and International Monetary Fund data.

Table 10.3. Assumed Delivery of Traditional and HIPC Debt Relief, 2001–21*US\$ millions*

<i>Year</i>	<i>Guinea</i>	<i>Rwanda</i>	<i>Senegal</i>	<i>Year</i>	<i>Guinea</i>	<i>Rwanda</i>	<i>Senegal</i>
2001	59	49	60	2012	63	51	41
2002	58	48	62	2013	63	51	41
2003	63	45	67	2014	63	51	41
2004	68	47	71	2015	64	51	41
2005	68	53	71	2016	45	51	41
2006	64	55	65	2017	45	51	41
2007	63	55	62	2018	45	51	41
2008	62	54	63	2019	45	51	41
2009	63	52	41	2020	45	28	41
2010	64	51	41	2021	45	28	41
2011	63	51	41				

Sources: World Bank and International Monetary Fund data.

Note: HIPC = heavily indebted poor countries.

amounts of traditional and HIPC debt relief for the period 2001–21 (table 10.3).

We first analyze the fiscal sustainability of Guinea, Rwanda, and Senegal by looking at the impact of three alternative scenarios (that is, baseline, optimistic, and pessimistic) on the NPV public debt-to-GDP ratio, the NPV public debt-to-revenue ratio, and the public debt service-to-revenue ratio. Consistent with the concept of fiscal sustainability, we include both domestic and external PPG debt. The initial conditions for year 2001 and baseline macroeconomic assumptions are provided in figure 10.11, which presents a screen shot from SimSIP. Following our remarks above, the assumptions on each country's domestic PPG debt are shown in figure 10.12. Finally, although Guinea and Rwanda do not have any private external debt not publicly guaranteed, Senegal does have a small amount (\$51 million) and we will include it in our external DSA. We will assume that Senegal's private external debt always will grow at the same rate as does its GDP.

Under the baseline, pessimistic, and optimistic scenarios, we assume that for year 2016 all three countries will reach GDP growth rates of 4 percent, 3 percent, and 5 percent, respectively; export growth rates of 5 percent, 3 percent, and 7 percent, respectively; inflation rates of 3 percent, 4 percent, and 2 percent, respectively; and devaluation rates of 4 percent, 5 percent, and 3 percent, respectively. Furthermore, we assume that, because of the implementation of ambitious poverty reduction

Figure 10.11. Initial Conditions and Baseline Macroeconomic Assumptions

Guinea							Excha. rate
Initial Value	Public For. Debt		Nominal	Initial Value	Grants	Exports	1951.0
	Stock	Int. Pay.	GDP		Growth (t0)	Growth (t15)	
	3,254	65	2,900		2.0	5.0	7.0
					2.0	5.0	4.0
Value (2001)	Discount rate (%)	Interest rate (%)	Inflation rate (%)	Real GDP growth (%)	Rev. to GDP (%)	P.Spe.to GDP (%)	Average Maturity
Value (2016)	6.0	2.0	5.0	3.0	12.2	15.3	30
	6.0	2.0	3.0	3.0	16.0	18.0	35

Rwanda							Excha. rate
Initial Value	Public For. Debt		Nominal	Initial Value	Grants	Exports	443.0
	Stock	Int. Pay.	GDP		Growth (t0)	Growth (t15)	
	1,283	13	1,700		2.0	6.0	6.0
					2.0	5.0	4.0
Value (2001)	Discount rate (%)	Interest rate (%)	Inflation rate (%)	Real GDP growth (%)	Rev. to GDP (%)	P.Spe.to GDP (%)	Average Maturity
Value (2016)	6.0	1.0	4.0	5.0	10.8	19.4	38
	6.0	1.0	3.0	3.0	15.0	20.0	38

Senegal							Excha. rate
Initial Value	Public For. Debt		Nominal	Initial Value	Grants	Exports	733.0
	Stock	Int. Pay.	GDP		Growth (t0)	Growth (t15)	
	3,410	51	4,600		2.0	2.0	5.0
					2.0	4.0	5.0
Value (2001)	Discount rate (%)	Interest rate (%)	Inflation rate (%)	Real GDP growth (%)	Rev. to GDP (%)	P.Spe.to GDP (%)	Average Maturity
Value (2016)	6.0	1.5	3.0	4.0	18.0	19.2	30
	6.0	1.5	3.0	4.0	20.0	21.0	35

Source: SimSIP; assumptions provided by the authors.

Note: Excha. = exchange; For. = foreign; GDP = gross domestic product; Int. Pay. = interest payment; P.Spe. = public spending; Rev. = revenue.

strategies, the ratios of priority spending to GDP increase by 3 percent (cumulative over the next 15 years) in Guinea and Senegal, and by 2 percent (cumulative over the next 15 years) in Rwanda, reflecting the already huge gap between revenues and expenditures in Rwanda.

We will keep this assumption on the evolution of government expenditures fixed for all three scenarios to see the impact of this increased spending on debt. However, we make adjustments in the ratio of government revenues to GDP, whereby we also take into account the different initial conditions of the three countries. We assume that the lower the initial revenue-to-GDP ratio, the higher the cumulative percentage increase over the next 15 years. For Guinea, we assume an increase in the revenue-

to-GDP ratio from the current 12.2 percent to 16.0 percent in the base-line scenario, to 15.0 percent in the pessimistic scenario, and to 17.0 percent in the optimistic scenario. For Rwanda, we assume an increase in the

Figure 10.12. Assumptions on Public Domestic Debt

Guinea				
	Public Domestic Debt	Interest on Public Domestic Debt		
Initial Value	120	7.8		
	Share of Domestic Financing	Interest rate	Discount rate	Average Maturity
Value (t0)	10	6.5	6.5	2.0
Value (t15)	10	6.5	6.5	2.0

Rwanda				
	Public Domestic Debt	Interest on Public Domestic Debt		
Initial Value	125	8.1		
	Share of Domestic Financing	Interest rate	Discount rate	Average Maturity
Value (t0)	15	6.5	6.5	2.0
Value (t15)	15	6.5	6.5	2.0

Senegal				
	Public Domestic Debt	Interest on Public Domestic Debt		
Initial Value	500	32.5		
	Share of Domestic Financing	Interest rate	Discount rate	Average Maturity
Value (t0)	20	6.5	6.5	2.0
Value (t15)	20	6.5	6.5	2.0

Source: SimSIP; assumptions provided by the authors.

revenue-to-GDP ratio from the current 10.8 percent to 15.0 percent in the baseline scenario, to 14.0 percent in the pessimistic scenario, and to 16.0 percent in the optimistic scenario. For Senegal, we assume an increase in that same ratio from the current 18 percent to 20 percent (baseline), to 19 percent (pessimistic), and to 21 percent (optimistic scenario).

Following our previous discussion of the crucial impact of grants, we assume that grants will always grow at 2 percent under the baseline scenario, remain constant at the 2001 level under the pessimistic scenario, and grow at 4 percent each year in the optimistic scenario. Furthermore, given that growth rates alone will not appropriately represent the huge difference in the grant levels under the baseline, pessimistic, and optimistic scenarios, we also make adjustments in the 2001 level of grants for each country. Doing so could be seen as taking into account that none of our three countries has yet reached its HIPC completion point, so debt relief to be provided under the Enhanced HIPC Initiative is not yet guaranteed. Therefore, reflecting the baseline, pessimistic, and optimistic scenarios, respectively, we assume that Guinea's initial levels of grants would be \$100 million, \$60 million, and \$130 million; Rwanda's initial levels would be \$110 million, \$70 million, and \$130 million; and Senegal's initial levels would be \$90 million, \$50 million, and \$130 million.

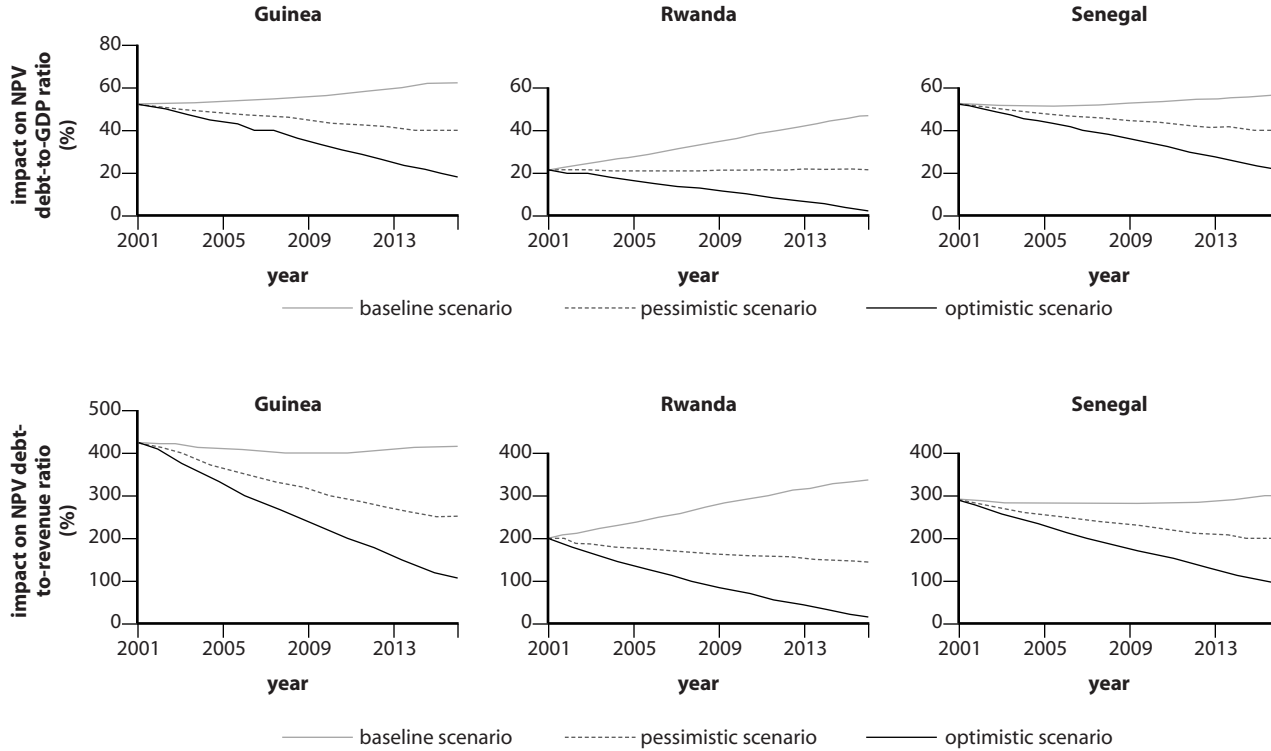
The results for these three scenarios are depicted in figure 10.13. Part (a) presents the results of the fiscal debt sustainability and part (b) illustrates the results of the external debt sustainability. We include all the graphs in one figure because it offers us a better overview and comparison. Overall, the results are pretty much what we would have expected them to be, given the initial parameters and different scenarios. However, some broad comments and explanations seem appropriate.

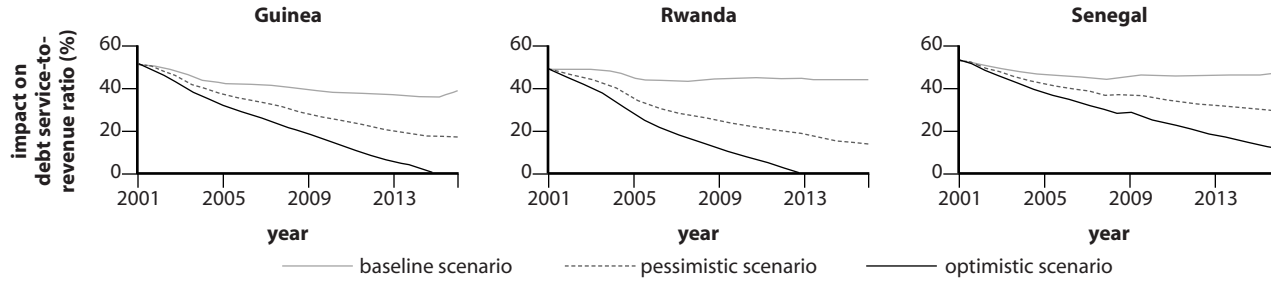
First, the different results for each of the three fiscal debt sustainability indicators are mainly prompted by changes in GDP growth rates, revenue-to-GDP ratios, and donor grants. The same applies for the different results reached in the external DSA, although those results are also heavily influenced by a fourth factor: the simulated changes in export growth rates. The debt service-to-revenue ratios results largely are prompted by debt relief, amounting to about 17, 27, and 8 percent of annual revenues for Guinea, Rwanda, and Senegal, respectively. When debt relief stops, the debt service-to-revenue ratios will jump upward again.

Second, when looking at the latter six graphs in part (a) of figure 10.13, we notice that there are no differences in the point of origin for each of the three scenarios because the definition of revenues excludes grants. If

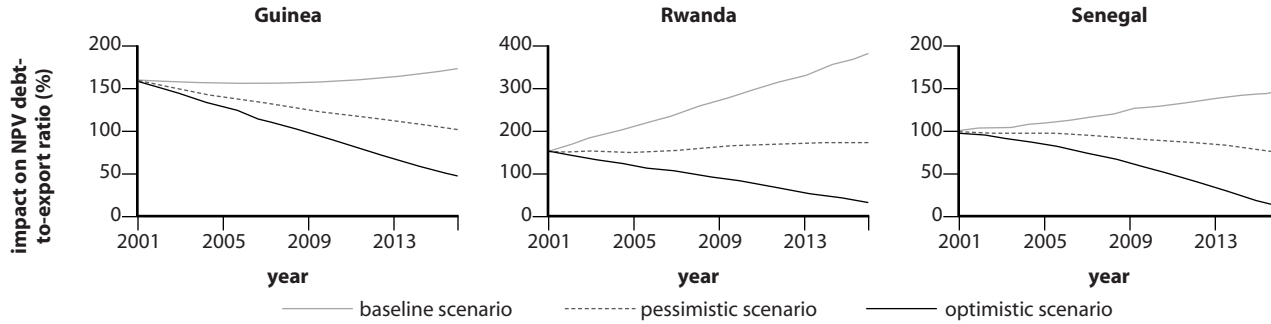
Figure 10.13. Results of the Baseline, Pessimistic, and Optimistic Scenarios, 2001–16

a. Fiscal debt sustainability analysis





b. External debt sustainability analysis



Source: Estimations by the authors, using SimSIP.
 Note: GDP = gross domestic product; NPV = net present value.

grants were included, we would see different points of origin. Note also that the range of the graphs for each debt indicator is not always the same across countries, so we have to be a bit careful when comparing levels.

Third, in the cases of Guinea and Rwanda, the graphs for the debt service-to-revenue ratio seem to become negative toward the end of the projection period in the optimistic scenario. This happens because debt service is always calculated after debt relief. In the optimistic scenario, the projected delivery of traditional and HIPC debt relief exceeds the amounts of projected debt service (excluding debt relief), so debt service after debt relief becomes negative. Looking at the trends for the optimistic scenario, we obviously would prefer a more frontloaded delivery of debt relief under the optimistic scenario. At this point, we also should note that the relatively uneven shapes in the debt service-to-revenue ratios are caused by uneven delivery of debt relief.

Fourth, we note that the initial NPV debt-to-export ratios for Guinea and Rwanda are around the 150 percent level—which is appropriate because we simulate the situation after the full delivery of debt relief. The reason why that ratio is considerably below the 150 percent level for Senegal is that Senegal had qualified under the fiscal window of the Enhanced HIPC Initiative, and that results in a 2001 NPV debt-to-export ratio of approximately 130 percent.

Fifth, we note that the optimistic scenario always results in clearly sustainable debt trends, whereas the pessimistic scenario usually implies clearly unsustainable debt trends. The baseline scenario also provides sustainable debt trends for Guinea and Senegal, but not for Rwanda where the NPV debt-to-GDP ratio remains stable and the NPV debt-to-export ratio increases. Although Rwanda's debt sustainability is clearly more fragile, reflecting the low initial values in revenues and exports (each around 10 percent of GDP), it does not mean that Rwanda is likely to be the least sustainable case. A different set of baseline assumptions obviously would lead to different debt paths. We tried to present similar assumptions for each scenario to see the different effects. There is no implicit assumption that the baseline scenario is the most realistic one for each country. Some people would argue that our baseline assumptions are too optimistic; others would argue that they are too pessimistic.

Finally, looking at the initial levels of the various debt ratios after the full application of traditional and HIPC debt relief, there are some concerns related to high debt service-to-revenue ratios (amounting to about

50 percent for all three countries) and to Guinea's high NPV debt-to-revenue ratio (starting above 400 percent). Although the trends of these two ratios clearly are decreasing in the baseline and optimistic scenarios, the high initial levels cast doubt on the HIPC Initiative's effective removal of the debt overhang, especially if domestic public debt is included. Conversely, Guinea's external debt sustainability (which excludes domestic public debt) is only threatened in our pessimistic scenario.

Using SimSIP Debt's Deficit-Debt Consistency Module

The Deficit-Debt Consistency Module of the SimSIP Debt software builds on the theoretical framework of the Debt Projection Module, although it abstracts from the details of the composition of revenues and expenditures and just looks at the difference between the current year's stock-of-debt and the previous year's stock of debt (by definition, the current year's budget deficit after grants and after debt relief). Because the conceptual framework also has been presented in chapter 8, we focus here on results. We have applied the three deficit-debt consistency matrices for all three countries, using more or less the same initial values and baseline macroeconomic assumptions as we described earlier. However, because not all variables are used in the Deficit-Debt Consistency Module and some different assumptions have been made to better illustrate the significance of some variables, we provide the exact inputs for Guinea's, Rwanda's, and Senegal's short- and long-term analysis in figures 10.14 to 10.16, respectively. The resulting short- and long-term matrices are presented in tables 10.4 to 10.6, respectively (pp. 336–38).

Note that we have increased Rwanda's public foreign debt from the actual \$1.3 billion to \$1.4 billion to avoid the display of a 0 percent NPV debt-to-GDP ratio in the first row of that matrix because the module is not defined for a 0 percent ratio. Using the correct amount of \$1.3 billion public external debt implies (1) an NPV total public debt-to-GDP ratio of about 20 percent, (2) an NPV total external debt-to-export ratio of about 150 percent, and (3) an NPV total public debt-to-revenue ratio of approximately 200 percent (all after taking into account full debt relief). Hence, in the case of Rwanda, we should simply concentrate our analysis on the first few rows of the three matrices.

The first major observation we make is that the values for the deficit-to-GDP ratios in each matrix are increasing as GDP growth rates increase

(as can be seen moving from the left to the right within each matrix). This is the trivial result of higher GDP growth rates allowing higher deficit-to-GDP ratios. Similarly, we can see in each matrix that the values

Figure 10.14. Inputs for Guinea

Guinea: Inputs for the short-term matrix.

GDP		Public Foreign Debt				Public Domestic Debt				
initial value	real growth	initial stock	maturity	average interest rate	old debt	new debt	initial stock	average interest rate	old debt	new debt
2,900	4.0	3,254	30	2.0	2.0		120	6.5	6.5	

Discount rate %	Inflation rate %	Deval. rate %	Exports		Revenues	
			ini. share to GDP	real growth	ini. share to GDP	real growth
6.0	5.0	6.0	29.0	4.0	12.2	4.0

Guinea: Inputs for the long-term matrix.

GDP		Public Foreign Debt				Public Domestic Debt				
initial value	real growth	initial stock	maturity	average interest rate	old debt	new debt	initial stock	average interest rate	old debt	new debt
2,900	4.0	3,254	30	2.0	2.0		120	6.5	6.5	

Discount rate %	Inflation rate %	Deval. rate %	Exports		Revenues	
			ini. share to GDP	real growth	ini. share to GDP	real growth
6.0	3.0	3.0	32.0	4.0	16.0	4.0

Source: SimSIP; assumptions provided by the authors.

Note: Deval. = devaluation; GDP = gross domestic product; ini. = initial.

Figure 10.15. Inputs for Rwanda

Rwanda: Inputs for the short-term matrix.

GDP		Public Foreign Debt				Public Domestic Debt				
initial value	real growth	initial stock	maturity	average interest rate	old debt	new debt	initial stock	average interest rate	old debt	new debt
1,700	4.0	1,400	30	2.0	1.0		125	6.5	6.5	

Discount rate %	Inflation rate %	Deval. rate %	Exports		Revenues	
			ini. share to GDP	real growth	ini. share to GDP	real growth
6.0	4.0	5.0	11.0	6.0	10.8	5.0

Rwanda: Inputs for the long-term matrix.

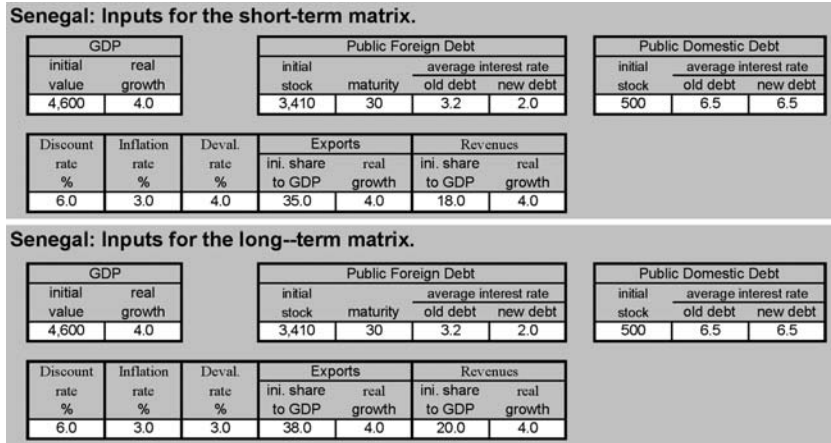
GDP		Public Foreign Debt				Public Domestic Debt				
initial value	real growth	initial stock	maturity	average interest rate	old debt	new debt	initial stock	average interest rate	old debt	new debt
1,700	4.0	1,400	30	2.0	1.0		125	6.5	6.5	

Discount rate %	Inflation rate %	Deval. rate %	Exports		Revenues	
			ini. share to GDP	real growth	ini. share to GDP	real growth
6.0	3.0	3.0	13.0	5.0	15.0	5.0

Source: SimSIP; assumptions provided by the authors.

Note: Deval. = devaluation; GDP = gross domestic product; ini. = initial.

Figure 10.16. Inputs for Senegal



Source: SimSIP; assumptions provided by the authors.
Note: Deval. = devaluation; GDP = gross domestic product; ini. = initial.

for the deficit-to-GDP ratios are increasing as the various NPV debt ratios increase (as can be seen moving from the top to the bottom of each matrix). This is the trivial result of higher debt levels allowing higher deficit-to-GDP ratios.

The second major observation we make is that the values for the deficit-to-GDP ratios consistent with various real GDP growth rates and various NPV debt ratios are always lower in the short-term matrices (the ones on the left) than the corresponding values for the deficit-to-GDP ratios in the long-term matrices (those on the right). This occurs because of three differences in the short- and long-term inputs for each country:

1. There is a higher short-term differential between inflation and devaluation compared with the long-term inputs (that is, in the short-term inputs, we always kept a 1 percent differential between inflation and devaluation, whereas we always kept a parity between inflation and devaluation rates in the long term).¹⁴
2. There is a lower short-term export-to-GDP ratio compared with the higher long-term export-to-GDP ratio, combined with no difference in the export growth rates between the short- and long-term inputs.¹⁵

Table 10.4. Short- and Long-Term Deficit-Debt Consistencies for Guinea

a. Deficit-to-GDP ratios (%) consistent with various real GDP growth rates (%) and various NPV of total public debt-to-GDP ratios (%)											
Short term						Long term					
<i>NPV debt/Y (%)</i>	<i>Growth of Y (%)</i>					<i>NPV debt/Y (%)</i>	<i>Growth of Y (%)</i>				
	2	3	4	5	6		2	3	4	5	6
30	0.3	0.6	0.8	1.1	1.4	30	0.6	0.8	1.1	1.4	1.7
40	0.4	0.7	1.1	1.5	1.8	40	0.8	1.1	1.5	1.9	2.2
50	0.5	0.9	1.4	1.8	2.3	50	1.0	1.4	1.9	2.3	2.8
60	0.6	1.1	1.7	2.2	2.7	60	1.1	1.7	2.2	2.8	3.3
70	0.7	1.3	1.9	2.5	3.2	70	1.3	2.0	2.6	3.2	3.9

b. Deficit-to-GDP ratios (%) consistent with various real GDP growth rates (%) and various NPVs of foreign public debt-to-exports ratios (%)											
<i>NPV debt/X (%)</i>	<i>Growth of Y (%)</i>					<i>NPV debt/X (%)</i>	<i>Growth of Y (%)</i>				
	2	3	4	5	6		2	3	4	5	6
120	0.3	0.6	1.0	1.3	1.6	110	0.7	1.0	1.3	1.6	1.9
140	0.4	0.8	1.1	1.5	1.8	130	0.8	1.2	1.6	1.9	2.3
160	0.4	0.9	1.3	1.7	2.1	150	0.9	1.4	1.8	2.2	2.6
180	0.5	1.0	1.4	1.9	2.4	170	1.0	1.5	2.0	2.5	3.0
200	0.5	1.1	1.6	2.1	2.6	190	1.2	1.7	2.3	2.8	3.3

c. Deficit-to-GDP ratios (%) consistent with various real GDP growth rates (%) and various NPVs of total public debt-to-revenue ratios (%)											
<i>NPV debt/R (%)</i>	<i>Growth of Y (%)</i>					<i>NPV debt/R (%)</i>	<i>Growth of Y (%)</i>				
	2	3	4	5	6		2	3	4	5	6
380	0.4	0.9	1.3	1.7	2.1	280	0.9	1.3	1.7	2.1	2.5
400	0.5	0.9	1.3	1.8	2.2	300	0.9	1.4	1.8	2.2	2.6
420	0.5	0.9	1.4	1.9	2.3	320	1.0	1.4	1.9	2.4	2.8
440	0.5	1.0	1.5	2.0	2.4	340	1.0	1.5	2.0	2.5	3.0
460	0.5	1.0	1.5	2.0	2.5	360	1.1	1.6	2.2	2.7	3.2

Source: Authors' calculations.

Note: GDP = gross domestic product; NPV = net present value.

Table 10.5. Short- and Long-Term Deficit-Debt Consistencies for Rwanda

a. Deficit-to-GDP ratios (%) consistent with various real GDP growth rates (%) and various NPV of total public debt-to-GDP ratios (%)											
Short term						Long term					
<i>NPV debt/Y (%)</i>	<i>Growth of Y (%)</i>					<i>NPV debt/Y (%)</i>	<i>Growth of Y (%)</i>				
	2	3	4	5	6		2	3	4	5	6
10	0.2	0.4	0.5	0.7	0.9	10	0.4	0.5	0.7	0.9	1.1
20	0.4	0.7	1.1	1.4	1.7	20	0.7	1.1	1.4	1.8	2.1
30	0.5	1.1	1.6	2.1	2.6	30	1.1	1.6	2.2	2.7	3.2
40	0.7	1.4	2.1	2.8	3.5	40	1.5	2.2	2.9	3.6	4.2
50	0.9	1.8	2.7	3.5	4.4	50	1.8	2.7	3.6	4.4	5.3

b. Deficit-to-GDP ratios (%) consistent with various real GDP growth rates (%) and various NPVs of foreign public debt-to-exports ratios (%)											
<i>Growth of Y (%)</i>						<i>Growth of Y (%)</i>					
<i>NPV debt/X (%)</i>	2	3	4	5	6	<i>NPV debt/X (%)</i>	2	3	4	5	6
130	0.6	0.8	1.1	1.3	1.6	100	0.8	1.0	1.2	1.5	1.7
150	0.6	0.9	1.2	1.5	1.8	120	0.9	1.2	1.5	1.7	2.0
170	0.7	1.1	1.4	1.7	2.1	140	1.1	1.4	1.7	2.0	2.3
190	0.8	1.2	1.6	1.9	2.3	160	1.2	1.6	2.0	2.3	2.7
210	0.9	1.3	1.7	2.1	2.5	180	1.4	1.8	2.2	2.6	3.0

c. Deficit-to-GDP ratios (%) consistent with various real GDP growth rates (%) and various NPVs of total public debt-to-revenue ratios (%)											
<i>Growth of Y (%)</i>						<i>Growth of Y (%)</i>					
<i>NPV debt/R (%)</i>	2	3	4	5	6	<i>NPV debt/R (%)</i>	2	3	4	5	6
200	0.8	1.2	1.5	1.9	2.3	130	1.1	1.4	1.8	2.1	2.4
220	0.9	1.3	1.7	2.1	2.5	150	1.2	1.6	2.0	2.4	2.8
240	1.0	1.4	1.9	2.3	2.7	170	1.4	1.9	2.3	2.7	3.2
260	1.0	1.5	2.0	2.5	3.0	190	1.6	2.1	2.6	3.1	3.5
280	1.1	1.6	2.2	2.7	3.2	210	1.7	2.3	2.8	3.4	3.9

Source: Authors' calculations.

Note: GDP = gross domestic product; NPV = net present value.

Table 10.6. Short- and Long-Term Deficit-Debt Consistencies for Senegal

a. Deficit-to-GDP ratios (%) consistent with various real GDP growth rates (%) and various NPV of total public debt-to-GDP ratios (%)											
Short term						Long term					
<i>NPV debt/Y (%)</i>	<i>Growth of Y (%)</i>					<i>NPV debt/Y (%)</i>	<i>Growth of Y (%)</i>				
	2	3	4	5	6		2	3	4	5	6
30	0.4	0.9	1.3	1.7	2.1	30	0.9	1.3	1.7	2.1	2.5
40	0.6	1.1	1.7	2.3	2.8	40	1.2	1.7	2.3	2.8	3.4
50	0.7	1.4	2.1	2.8	3.5	50	1.5	2.2	2.8	3.5	4.2
60	0.9	1.7	2.6	3.4	4.2	60	1.7	2.6	3.4	4.2	5.0
70	1.0	2.0	3.0	3.9	4.9	70	2.0	3.0	4.0	4.9	5.9

b. Deficit-to-GDP ratios (%) consistent with various real GDP growth rates (%) and various NPVs of foreign public debt-to-exports ratios (%)											
<i>NPV debt/X (%)</i>	<i>Growth of Y (%)</i>					<i>NPV debt/X (%)</i>	<i>Growth of Y (%)</i>				
	2	3	4	5	6		2	3	4	5	6
80	0.4	0.8	1.3	1.7	2.1	70	0.8	1.2	1.6	2.0	2.3
100	0.5	1.1	1.6	2.1	2.6	90	1.0	1.5	2.0	2.5	3.0
120	0.6	1.3	1.9	2.5	3.1	110	1.3	1.9	2.5	3.1	3.7
140	0.7	1.5	2.2	2.9	3.6	130	1.5	2.2	3.0	3.7	4.4
160	0.9	1.7	2.5	3.3	4.1	150	1.7	2.6	3.4	4.2	5.0

c. Deficit-to-GDP ratios (%) consistent with various real GDP growth rates (%) and various NPVs of total public debt-to-revenue ratios (%)											
<i>NPV debt/R (%)</i>	<i>Growth of Y (%)</i>					<i>NPV debt/R (%)</i>	<i>Growth of Y (%)</i>				
	2	3	4	5	6		2	3	4	5	6
250	0.7	1.3	1.9	2.5	3.1	220	1.3	1.9	2.5	3.1	3.7
270	0.7	1.4	2.1	2.7	3.4	240	1.4	2.1	2.7	3.4	4.0
290	0.8	1.5	2.2	2.9	3.6	260	1.5	2.2	3.0	3.7	4.4
310	0.8	1.6	2.4	3.1	3.9	280	1.6	2.4	3.2	3.9	4.7
330	0.9	1.7	2.5	3.4	4.2	300	1.7	2.6	3.4	4.2	5.0

Source: Authors' calculations.

Note: GDP = gross domestic product; NPV = net present value.

3. There is a lower short-term revenue-to-GDP ratio compared with the higher long-term revenue-to-GDP ratio, and no difference in the revenue growth rates between the short- and long-term inputs.

Third, we also can draw some conclusions from comparing the matrices across countries, although we must be somewhat careful when making such cross-country comparisons because the displayed ranges for the three debt indicators are not always the same. Anyway, we can see that, for a GDP growth rate of 4 percent and an NPV debt-to-GDP ratio of 30 percent, Rwanda can have the highest deficit-to-GDP ratio (amounting to 1.6 percent in the short term and 2.2 percent in the long term), followed by Senegal (1.3 percent in the short term and 1.7 percent in the long term) and by Guinea (0.8 percent in the short term and 1.1 percent in the long term). Moreover, Senegal can have the highest deficit-to-GDP ratios to maintain external debt sustainability at around 150 percent in both the short and the long term. Comparing the matrices with NPV debt-to-revenue ratios, we can see that Guinea would need to reduce its deficit-to-GDP ratio considerably to reach sustainable NPV debt-to-revenue ratios, especially for the short term, whereas Rwanda and Senegal have some more fiscal freedom—especially under the long-term assumptions.

Comparing the three short-term matrices of Guinea with each other, we can see that, for a GDP growth rate of 4 percent, the deficit-to-GDP ratios consistent with the initial debt ratios are all around 1.4 percent. The same is true for Guinea's three long-term matrices in which the deficit-to-GDP ratios consistent with the initial debt ratios under the long-term assumptions are all around 1.9 percent. This is no coincidence; rather, it is the result of having all three growth rates (GDP growth rate, export growth rate, and revenues growth rate) growing at 4 percent. When the three growth rates are equal to each other, there is no difference in the consistent deficit-to-GDP ratios for the initial debt ratios.¹⁶ In the case of Rwanda, the growth rates are not the same, so this does not apply. It does apply for our Senegal assumptions.¹⁷

Finally, we want to point out another important result. For countries that are in the process of obtaining increasingly concessional loan terms (as we have assumed for Rwanda and Senegal), the deficit-to-GDP ratios consistent with a specific NPV debt indicator and a given growth rate are higher than with a specific nominal debt indicator (and vice versa).

Conclusion

We have shown that the analysis of a country's debt sustainability is a complex issue. When analyzing a country's debt sustainability, it is important to differentiate between external and fiscal debt sustainability, whereby the first should include private external debt and the second should include public domestic debt. In any case, there is growing evidence that the more relevant debt sustainability criteria for the gravity of a debt overhang are fiscal criteria, especially in cases where there is a substantial amount of public domestic debt. Conversely, an unsustainable external debt can cause balance of payments crises, especially if a debtor country faces difficulties in securing new external loans.

We have shown that the results of any DSA are highly sensitive to differences in macroeconomic assumptions. In the cases of Guinea and Senegal, full debt relief and continuously growing grant financing seemed to be necessary conditions for achieving external debt sustainability around 2001. In Rwanda, our baseline assumptions were not sufficient to provide external debt sustainability because the NPV debt-to-export ratio continued to grow under the baseline scenario.

Looking at fiscal sustainability, our baseline scenarios are usually sufficient to result in decreasing long-term trends,¹⁸ although high initial levels remain to constitute a short-term debt overhang, especially in Guinea. The problem of a short-term debt overhang is that it may imply the assumed medium-high growth rates and medium-low inflation rates will never be realized. In other words, our baseline and optimistic scenarios may be highly unrealistic for countries in which debt overhangs remain after full debt relief. Looking at our three countries from this perspective, Rwanda actually seems to be the country with the best prospects for sustainable growth.

Although many of our results may look trivial, given the assumptions of our three scenarios, we presented them to give an idea of the type of debt and fiscal sustainability work that can be conducted using the SimSIP Debt simulation tool. For example, alternative macroeconomic assumptions could be used to check the sensitivity of expenditure programs on debt and fiscal sustainability. Finally, as mentioned previously, the results presented here do not take into account the MDRI adopted by the IMF and the World Bank in 2005. That initiative has drastically reduced the debt burden of two of the three countries included in this case study—namely, Rwanda and Senegal.

Notes

1. See the section titled “Is Debt Relief Needed and How Much?” in Gunter (2002), and the additional empirical evidence provided in Addison, Hansen, and Tarp (2004).
2. This requires a collection of all loan terms, including adjustments made in the repayment terms (agreed and/or hypothetical debt relief), which is not a trivial task because of possible disagreements between creditors and debtors on disbursements or repayments, and because of lacks in debt recording and debt management.
3. SimSIP Debt (Gunter et al. 2002) is part of a family of Excel-based SimSIP products designed to assist policy makers in analyzing poverty-related issues. All SimSIP products are available without cost on the Internet at <http://www.worldbank.org/simsip>.
4. The Paris Club is an informal group of official creditors whose role is to find coordinated and sustainable solutions to the payment difficulties experienced by debtor nations. Paris Club creditors agree to reschedule debts owed to them. Rescheduling is a means of providing a country with debt relief through a postponement and, in the case of concessional rescheduling, a reduction in debt-service obligations. For more information on the Paris Club, see <http://www.clubdeparis.org/en/index.php>.
5. Originally, Equatorial Guinea and Nigeria were considered to be HIPC, but they have been dropped from the list because they are no longer considered to be IDA-only countries. On the other hand, the Comoros, and the Gambia and Malawi have been added as it became clear that their debt is higher than initially estimated. For the current list of HIPCs and a more detailed description of the HIPC Initiative, see the World Bank’s HIPC Web site, <http://www.worldbank.org/hipc/>. As Gunter (2003) showed, the Enhanced HIPC Initiative covers neither the poorest nor the most indebted countries.
6. Workers’ remittances are current transfers by migrants employed or intending to remain employed for more than a year in another economy in which they are considered residents.
7. For more details, see the HIPC document “Enhanced HIPC Initiative—Completion Point Consideration,” available at <http://www.imf.org/external/np/hipc/2001/cpd/cpd.pdf>.
8. For example, see Herman (2003).
9. Rwanda’s and Senegal’s participation in the MDRI has substantially lowered their debt burdens. As we are focusing in this book of concepts and case studies on traditional debt analysis, we kept the two countries in the analysis to illustrate the use of standard debt and fiscal sustainability analysis.

10. Hence, consistent with the initiative's framework, the HIPC DSA calculated HIPC debt relief after the full application of traditional debt relief, which implied that it had to establish Guinea's as well as Rwanda's debt after a hypothetical 67 percent NPV stock reduction on eligible debt.
11. Note that this ratio is above the 150 percent decision point target because Enhanced HIPC debt relief is calculated based on the debt situation of the decision point DSA. HIPC debt relief is not due until the completion point. Depending on the loan profile, new borrowing, and the evolution of exports, the NPV debt-to-export ratio at the completion point easily can exceed the 150 percent target ratio.
12. For details on Guinea, see IMF (2002); the Rwandan data, based on Rwandan authorities and IMF staff estimates and projections, are posted at http://www.afrol.com/Countries/Rwanda/backgr_economic_performance.htm; and the Senegalese data, provided by the West African Economic and Monetary Union in December 2002, are available at <http://www.izf.net/izf/Guide/TableaudeBord/sénégal.htm>.
13. To avoid any distortions in the NPV calculation, we have set the discount rate on public domestic debt equal to the estimated average interest rate on public domestic debt.
14. More generally, the higher the inflation rate and the lower the devaluation rate, the higher the value of the consistent budget deficit-to-GDP ratio (and vice versa), although it should be stressed that the two variables usually are moving in the same direction because higher inflation rates usually imply higher devaluations.
15. Note that this result would not necessarily hold if the short-term export growth rates were higher than the long-term export growth rates because then we would have a situation in which the dynamics work against each other: higher export-to-GDP ratios allow for higher deficit-to-GDP ratios without increasing the NPV debt-to-export ratio, and lower export growth rates push the levels of consistent deficit-to-GDP ratios down. The same applies for the relationship between revenue growth rates and revenue-to-GDP ratios.
16. The small differences visible in the matrices result from rounding the initial debt ratios to the next interval—for example, Guinea's initial NPV debt-to-GDP ratio for a short-term 4 percent GDP growth rate is 52 percent; thus, the matrix shows an NPV debt-to-GDP ratio of 50 percent.
17. At this point, we should also note that Rwanda's deficit-to-GDP ratios displayed in the matrices are beefed up by relatively high growth rates of exports and revenues. More generally, the higher a country's growth rates of exports relative to its growth rates of GDP, the higher the ranges of consistent deficit-to-

GDP ratios for the debt-to-export ratios compared with the consistent deficit-to-GDP ratios for the debt-to-GDP ratios (and vice versa). Similarly, the higher a country's growth rates of revenues relative to its growth rates of GDP, the higher the ranges of consistent deficit-to-GDP ratios for the debt-to-revenues ratios compared with the consistent deficit-to-GDP ratios for the debt-to-GDP ratios (and vice versa). Finally, the higher a country's growth rates of exports relative to its growth rates of revenues, the higher the ranges of consistent deficit-to-GDP ratios for the debt-to-export ratios compared with the consistent deficit-to-GDP ratios for the debt-to-revenues ratios (and vice versa).

18. The exception is Rwanda's NPV debt-to-GDP ratio, which continues to increase under the baseline scenario.

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Analyzing the Potential Impact of Indirect Tax Reforms on Poverty with Limited Data

Niger

Saloua Sehili and Quentin Wodon

Many countries in sub-Saharan Africa are confronted with the need to raise tax revenues so they are able to provide a range of services to their populations. In the context of the Millennium Development Goals, the levels of need in such areas as poverty reduction, education, health care, and access to basic infrastructure services are extremely high, and the ability to finance provision of those services cannot rely solely or too extensively on limited foreign aid. Therefore, tax revenues are required, and it is in the countries with the lowest levels of per capita gross domestic product (GDP)—and so the highest need—that tax and other government revenues as a proportion of GDP are the lowest. In addition, because of the high level of informality in their economies, very-low-income countries obtain a large share of tax revenues through consumption-related taxes (such as the value-added tax [VAT] or taxes on imports), which also tend to be more regressive than the taxes on incomes that are levied in richer countries.

Such a situation poses a difficult dilemma. Very-low-income countries are trying to increase their tax revenues to provide services to their populations in need; but, because much of the taxation is based on household

consumption, part of the burden of increased taxes falls on the consumption of poor people. Furthermore, because the poor in very-low-income countries are really extremely poor, even small increases in the price of the goods they consume related to an increase in the taxation rates on those goods may have important negative implications for households' ability to meet their basic needs.

This dilemma is illustrated in the case of Niger, one of the poorest countries on earth. Among the eight countries belonging to the West African Economic and Monetary Union (WAEMU), Niger has the lowest ratio of government revenues to GDP. The WAEMU countries share a common currency, the CFA franc. To maintain price stability and promote economic growth, these countries are required to follow eight convergence criteria, as presented in table 11.1.

The convergence criteria are defined in the following terms: (1) budget deficit as a share of GDP (there should be no budget deficit); (2) inflation rate (it should be below 3 percent per year); (3) public debt-to-GDP ratio (it should be below 70 percent so as not to have debt-service obligations that are difficult to honor); (4) debt arrears (there should be no such arrears, domestically or externally); (5) public wage bill as a share of GDP (it should not be above 35 percent so as to not impose too high a burden on the budget); (6) share of tax revenues used for domestic-funded investment (it should not be below 20 percent, so as not to depend only on donor funding for such investments); (7) trade deficit-to-GDP ratio (the maximum allowable trade deficit is 5 percent of GDP); and (8) tax revenue-to-GDP ratio (it should be at or above 17 percent, so as to enable governments to use tax revenues to provide basic services and improve the well-being of the population). As shown in table 11.1, in 2005 Niger's tax revenues as a share of GDP were only 11.3 percent, versus 14.0 percent to 19.0 percent in most other countries in the union (except Burkina Faso and Guinea-Bissau, which also had very low tax revenue-to-GDP ratios). The target level for the tax revenues-to-GDP ratio in the WAEMU zone is 17 percent.

In this chapter, our objective is to demonstrate how to use very simple techniques of tax incidence analysis to analyze the potential impact on the poor of indirect tax reforms, or at least to shed light on these issues, with an application to Niger.¹ The techniques used here are similar to those employed for benefit incidence analysis (see chapter 4). As noted by Demery (2003),² benefit incidence analysis typically is obtained by

Table 11.1. Country Performance for WAEMU Convergence Criteria, 2005

Convergence criteria	Member-country								Countries responding to each criterion (n)		
	Benin	Burkina Faso	Côte d'Ivoire	Guinea-Bissau	Mali	Niger	Senegal	Togo	2005	2004	2003
Budget deficit as share of GDP $\geq 0\%$	-0.9	-1.9	0	-7.2	0	-2.9	0.9	0.6	4	4	4
Inflation rate $\leq 3\%$	5.4	6.4	3.9	3.4	6.4	7.8	1.7	6.8	1	8	8
Public debt-to-GDP ratio $\leq 70\%$	39.9	37.7	79.3	301.7	69.7	66.3	48.2	100.2	5	3	3
Debt arrears 0 (billion CFA)	0	0	333.9	21.4	0	2.2	0	20.1	4	4	5
Domestic arrears 0	0	0	22.6	8.4	0	2.2	0	5.2	5	5	5
External arrears 0	0	0	311.3	13.0	0	0	0	14.9	5	4	5
Public wage bill as share of tax revenues $\leq 35\%$	37.5	39.8	45.7	108.7	32.6	35.5	30.2	32.4	3	3	4
Domestic-funded investment as share of taxes $\geq 20\%$	21.3	37.6	8.3	8.9	22.7	52.1	30.6	9.5	5	5	5
Trade deficit-to-GDP ratio $\geq -5\%$	-6.6	-11.4	1.5	-18.4	-10.2	-11.6	-9.4	-10.9	1	1	1
Tax revenues-to-GDP ratio $\geq 17\%$	14.8	11.8	14.5	11.5	16.1	11.3	19.0	14.1	1	1	1
<i>Criteria respected (n)</i>											
2005	3	3	2	0	5	2	7	2			
2004	3	4	2	2	5	2	7	3			
2003	5	4	1	1	5	3	7	3			

Source: WAEMU calculations, 2005.

Note: GDP = gross domestic product; WAEMU = West African Economic and Monetary Union. The shaded areas represent convergence criteria that are being respected. Negative numbers (for example, for the budget deficit as a share of GDP) indicate that there is such deficit, thereby implying that the country does not respect the convergence criteria.

combining data on the use of government services from household surveys with data on the cost of providing those services from government budgets. Benefit incidence analysis involves three steps. First, the unit cost of providing a particular service is estimated using government budget data. Second, household survey data are used to allocate the benefits of public spending for specific services to the households using those services. Third, the data at the household level are aggregated into benefit incidence statistics for subgroups of the population to compare how the subsidy is distributed across those groups. The most common way to group households is on the basis of indicators such as income or consumption per capita or per equivalent adult, often according to quintiles. On the basis of comparisons of the incidence of public spending by quintile, suggestions are then made regarding the possibility of reorienting public spending to allocate a larger share of it to the poor (that is, in most cases, to households in the bottom two or three quintiles.)

Here we follow the same approach for tax incidence. As for benefit incidence, we combine data on household consumption with data on the taxes levied by the state on various consumption goods. The empirical estimation also involves three steps. First, the tax rates on particular goods and services are obtained from administrative information about the tax system. Second, household survey data are used to allocate the taxes paid for specific goods and services to the households consuming those goods and services. Third, the data at the household level are aggregated into tax incidence statistics for subgroups of the population to compare how the taxes are distributed across those groups. The results obtained for tax incidence are then compared with those for the benefit incidence of public spending in the social sectors to get an idea of an overall tax and spending package's impact on the poor. Although there are important caveats to the conclusions that can be reached with such simple techniques, the results are potentially useful for informing policy.

The rest of the chapter is structured as follows. The next section first provides a review of medium-term targets for generating public revenues in Niger, and a description of the current structure of tax revenues. In the third section, we rely on household surveys data to assess the potential distributional incidence of selected reforms that were under consideration in the country in 2004 and early 2005. In the fourth section, we briefly show how the overall effect of any tax reform partly depends on how new tax revenues are spent. A brief conclusion completes the chapter.

Medium-Term Targets for Public Revenues and Structure of Taxation

Niger's fiscal performance has improved since 2000, owing to the implementation of fiscal adjustment policies and an improvement in public finances. Policies were aimed at ensuring a sustainable fiscal position and complying gradually with the above-mentioned convergence criteria of the WAEMU. On the revenue side, revenue increased from 8.6 percent of GDP in 2000 to 9.9 percent in 2003. On the expenditure side, current expenditure declined as a share of GDP during the same period. Capital expenditure increased by about 1.6 percentage points of GDP—from 5.7 percent of GDP to 7.3 percent, in line with the implementation of the poverty reduction strategy and supported in part by resources freed by the Heavily Indebted Poor Countries (HIPC) Initiative.

The overall budget deficit (on a commitment basis, excluding official budgetary grants), which stood at an annual average of 9.0 percent in the previous two years, declined to 7.7 percent a year between 2001 and 2003. The primary budget deficit was reduced by 1.0 percentage point of GDP—from 3.0 percent of GDP in 2000 to 2.0 percent in 2003. In addition, the government has made efforts to clear domestic arrears. Implementing the reform program enabled Niger to reach the completion point under the Enhanced HIPC Initiative on April 12, 2004, and to receive additional debt relief (topping-up) in the amount of \$142 million. After three years of implementation of the program covering the period from 2000 to 2003, the sixth Poverty Reduction and Growth Facility review and the ex post assessment of performance under the International Monetary Fund (IMF)-supported program concluded that economic and financial management during this period was appropriate for macroeconomic stability and poverty reduction.

The macroeconomic framework for 2005–07 in table 11.2 calls for an increase in domestic revenue mobilization. Under scenarios discussed between the World Bank and the IMF, real GDP growth would increase by an annual average of 4.2 percent throughout the period 2005–07. This growth would be supported by an increase in investment and a strengthening of nonmining activities (agriculture and services), new gold mining activities, and improvements in the economic policies of Niger's regional partners (especially Nigeria). Gross investment would increase from an estimated 15.9 percent of GDP in 2004 to 17.3 percent in 2007. Gross

Table 11.2. Recent Economic Performance and Medium-Term Macroeconomic Framework, 1997–2007

<i>Macroeconomic Indicator</i>	<i>1997–99</i>	<i>2000–03</i>	<i>2004</i>	<i>2005–07</i>
<i>Growth, investment and savings</i>				
Real GDP growth (%)	4.2	3.5	0.9	4.2
Primary	8.0	3.2	—	—
Secondary	2.3	2.4	—	—
Tertiary	3.3	4.0	—	—
Gross investment (% of GDP)	11.1	13.0	15.9	17.3
<i>Public finance</i>				
Government revenue (% of GDP)	8.8	9.6	10.5	11.6
Government expenditure (% of GDP)	17.3	17.4	18.2	18.8
Primary balance (% of GDP)	–7.0	–6.3	–7.0	–6.6
Overall balance (% of GDP)	–8.5	–7.8	–7.6	–7.2
<i>External debt</i>				
Debt service-to-export ratio (before debt relief, %)	20.3	26.8	12.3	9.7

Source: Authors' calculations, based on World Bank and International Monetary Fund data.

Note: — = not available; GDP = gross domestic product.

national savings would increase by 1.3 percentage points of GDP—from an estimated 10.0 percent of GDP in 2004 to 11.3 percent of GDP in 2007—as a result of increases in public and private savings. Annual average inflation would remain contained at 2.1 percent during 2005–07, reflecting prudent monetary policy at the regional level, a stable real exchange rate, and strong and sustainable economic growth. Taking into account the financing prospects and the need to ensure debt sustainability, the overall fiscal deficit (on a commitment basis and excluding budgetary grants) would decline from an estimated 7.6 percent of GDP to 6.5 percent by 2007. To this end, fiscal policy would aim at ensuring continued reduction in fiscal deficits through improved expenditure management and measures to boost revenue collection, with government revenue reaching 11.6 percent of GDP over the period 2005–07.

To understand how this increase in tax revenues could be achieved, it is useful to review Niger's tax system briefly. The rate of public revenue mobilization in Niger, which reached 14 percent of GDP in 1980 (at a time when uranium exports were larger), has hovered around the 10.0 percent mark in recent years, with a slight improvement in 2003 to 10.7 percent of GDP. This rate is the lowest among WAEMU member-countries, well

below the WAEMU average of about 15.0 percent and its target rate of 17.0 percent. According to IMF data, the main taxes are as follows:

- *Direct taxes:* These taxes account for roughly 15–16 percent of total tax revenues and comprise mainly taxes on industrial and commercial profits (*bénéfices industriels et commerciaux* [BIC], for 9 percent of total revenues), and taxes on wages and salaries (*impôts sur les traitements, salaires et revenus assimilés*, for 5 percent of total revenues). The BIC tax rate currently stands at 35 percent and is levied on commercial, noncommercial, agricultural, and other formal sector activities. There is also a flat 1 percent tax (*impôt minimum forfaitaire*) levied on total revenues (*chiffre d'affaires*) but deductible from the BIC tax. The personal income tax is a progressive tax levied on wages and salaries, with a maximum marginal rate of 45 percent, after various deductions, including deductions for family dependents.
- *Import taxes:* Since 2000, Niger has applied the WAEMU *tariff extérieur commun* (TEC) on imports originating outside of WAEMU countries. The TEC includes both permanent and temporary taxes, whose rates vary depending on the types of goods. Permanent taxes comprise the *droit de douane* (at a rate of 0 to 20 percent depending on goods), the *redevance statistique* (at a rate of 1 percent), and the *prélèvement compensatoire de solidarité* (also at a rate of 1 percent). Temporary taxes allowed by WAEMU include the *taxe dégressive de protection* (TDP) and the *taxe conjoncturelle à l'importation* (TCI). The TDP was put in place for a temporary period of four years (2000–03, with a one-year extension) for certain industrial or agroindustrial products to compensate for important reductions in tariff protection linked to the implementation of the TEC. The TCI aims to compensate agricultural, agroindustrial, cattle, and fisheries (excluding fish) products for important reductions in tariff protection resulting from variations in world prices. Although Niger does not apply the TDP, rice imports were subjected to the TCI until 2003. Imports also are subject to indirect taxes imposed on domestic products (including excise taxes imposed *ad valorem* on tobacco, cigarettes, alcoholic drinks, coffee, cola nuts, cosmetics, vegetable oils, and petroleum products), and to the 19 percent VAT. Imports originating from WAEMU member-countries are subject only to domestic taxes. At customs, a downpayment on industrial and commercial profits (the BIC) is collected for the *Droit General d'Im-*

portation at the rate of 3 percent if the importer is matriculated and 5 percent otherwise. Overall, import taxes represent approximately 20 percent of tax revenues.

- *Export taxes:* In 1996 the *redevance statistique* tax base, which was already in place for Niger's imports, was expanded to encompass exports at the rate of 5 percent and subsequently reduced to 3 percent. Exports in transit to Algeria, Libya, and Nigeria—exports called "transit special"—are subject to a *taxe spéciale de réexportation* at a normal rate of 5 percent, increased to 10 percent on cigarettes reexported to Nigeria, and to 15 percent on cigarettes reexported toward Algeria and Libya. On average, total revenues from export taxation represent 10–11 percent of tax revenues.
- *Value-added tax:* The VAT has been levied at a unique rate of 19 percent since 2001—an amount just below the upper limit of the interval in the WAEMU VAT Directive (16–20 percent). In 2002, VAT receipts accounted for 32 percent of total tax revenues. Despite a more efficient administration and progress in the receipts of this tax, this tax represented only 3.2 percent of GDP, well below the average among WAEMU members (5–7 percent of GDP). The VAT efficiency rate (VAT receipts as a share of GDP divided by the VAT tax rate) was 17.9 percent in 2002, versus an average of 27.0 percent in sub-Saharan Africa. If the VAT efficiency rate were brought up to 27.0 percent, public revenues would increase by 1.7 percent of GDP. The shortfall in VAT collections in Niger is due in part to exemptions but, more important, to a high level of informality, including high levels of autoconsumption, and to weaknesses in tax administration.
- *Other taxes:* Excise taxes account for slightly less than 8 percent of total tax revenues (of which slightly less than 1 percent comes from alcoholic beverages and 3 percent comes from tobacco products). Because Niger's excise tax rates are already in the upper limit of the WAEMU Directive, no further increases in these tax rates can be contemplated. However, additional categories of goods might be taxed, including sodas, sugar-sweetened drinks, and tea. It has been suggested that the excise tax on vegetable oils be eliminated (and that these oils be subjected instead to the VAT) to improve the competitiveness of firms using vegetable oils as inputs. Finally, all other taxes combined account for about 13 percent of total tax receipts. This combination includes the *redevance minière*, which itself represents 5 percent of total revenues.

Assessing the Impact of Indirect Tax Reforms: VAT Exemptions

Government proposals regarding VAT reforms that were discussed in 2004–05 were focused largely on final consumption products exempted from the VAT. The list of exempted products in 2004 included grains other than rice, inputs bought or imported for the purposes of an industrial installation established in Niger, computer equipment purchased for technical or professional education establishments, health and education products, agricultural inputs, road transport of people and merchandise, and household consumption of water and electricity for a monthly total of less than 50 m³ of water and 150 kWh of electricity. In addition, the investment code, agreements with certain companies and nongovernmental organizations, and certain externally financed projects also allow numerous exemptions from the VAT.

For example, as an investment incentive in the agricultural sector, the investment code exempts agropastoral outputs, including outputs of industrial agriculture; the processing of vegetable or animal goods and production for the purpose of exporting agricultural products; and livestock and fisheries products. Because it is difficult to increase VAT collections by reducing autoconsumption or reducing the size of the informal sector, an alternative means of generating higher VAT collections is to limit the number of exemptions.

Among the reforms in this area that were considered in 2004–05 were (1) imposing an excise tax at the rate of 5 percent on sodas and sugar-sweetened drinks, which could raise an additional CFAF 0.1 billion; (2) imposing an excise tax at the rate of 12 percent on tea, which could increase revenues by CFAF 0.4 billion; (3) eliminating the excise tax on vegetable oil and replacing it with the VAT; (4) eliminating the *tranches sociales* exemption from the VAT, defined with respect to household consumption of water and electricity, which could add CFAF 1.6 billion (especially through electricity consumption); and (5) subjecting processed food products (mainly milk, flour, sugar, and the like) to the VAT, which could raise an additional CFAF 1.3, 1.9, and 1.6 billion on milk, flour, and sugar, respectively. All proposals and estimated amounts of tax revenues to be generated above are indicative only, and many of the proposed goods for taxation have remained exempt.

Household survey data can be used to assess the tax potential of various commodities, as well as the incidence of the tax burden. This section

analyzes the potential effects of the past proposals for VAT reform on poverty and inequality, using consumption data in household surveys. For Niamey, the capital of Niger, we rely on the 1-2-3 survey³ implemented in 2004, which includes a detailed consumption module. For the country as a whole, we rely on the 1995 Economic and Social Conjuncture Survey (EPCES) data, which include Niamey in its sampling frame. As discussed below, the aggregate statistics obtained from the household surveys and presented in table 11.3 suggest, despite issues regarding data quality, that we can make the case that the analysis of the proposed reforms' potential impact on poverty and inequality can be conducted with reasonable confidence.

Table 11.3. Aggregate Statistics on Consumption Categories Targeted for Indirect Taxation

<i>Consumption category</i>	<i>Niamey 1994–95</i>	<i>Niamey 2004</i>	<i>Niger 1994–95</i>	<i>Niger 2003–04</i>
<i>National accounts</i>				
GDP per capita (million constant CFA)	—	—	867,900	1,586,500
Household consumption (million constant CFA)	—	—	728,960	1,326,100
Share of consumption in GDP (%)	—	—	83.99	83.59
Survey consumption estimate (million CFA)	59,076	272,389	752,277	—
Population, Niamey survey (number of persons)	410,517	797,920	—	—
Population, Niger survey/ United Nations (number of persons)	8,762,875	11,692,179	—	—
Share of population in Niamey (%)	4.68	6.82	—	—
Share of consumption in Niamey (%)	8.10	20.54	—	—
<i>Household spending in survey (million CFA)</i>				
Electricity	987	6,828	1,828	—
Water (private connections)	358	1,139	847	—
Oil	1,762	7,159	19,690	—
Flour	—	2,073	—	7,585–8,035
Milk	—	1,489	—	7,512–7,951
Sugar	—	1,405	—	16,580–11,497
Condiments	5,830	—	43,252	—

Table 11.3, continued

<i>Consumption category</i>	<i>Niamey 1994–95</i>	<i>Niamey 2004</i>	<i>Niger 1994–95</i>	<i>Niger 2003–04</i>
Tea	—	674	—	—
Sodas	—	251	—	—
All categories above as percent of total consumption (%)	15.13	7.72	8.72	—
<i>Potential tax revenues (million CFA)</i>				
Electricity	—	1,197	—	542–1,600
Water	—	442	—	Low to 307
Oil	—	+1,360/ –1,074	—	Low
Flour	—	394	—	500
Milk	—	283	—	495–1,300
Sugar	—	267	—	665–1,600
Condiments	—	n.a.	—	—
Tea	—	81	—	400
Sodas	—	13	—	100
Total potential tax revenues as percent of total consumption (%)	—	0.93	—	—

Source: Authors' estimates. The first three columns in the table are estimates based on household surveys; the last column is based on administrative data.

Note: — = not available; CFA = Niger franc; GDP = gross domestic product; n.a. = not applicable. All values in millions of CFA.

Aggregate Statistics

Consider first key parameters from the 1995 national survey (table 11.3). Total consumption as measured in the survey using the expansion factors is CFAF 752.277 billion, which is very close to the national accounts value of CFAF 728.960 billion. In Niamey, however, the aggregate consumption estimates for 1995 are too low. In 1995, Niamey apparently had a consumption share of only 8.10 percent for a population share of 4.68 percent, which implies an average per capita consumption level in Niamey at less than twice the national aggregate. In the 2004 survey, Niamey's consumption share (versus the national accounts estimate) was much higher at 20.54 percent for a population share of 6.82 percent (also higher because of migration). This finding suggests for 2004 a level of per capita consumption in Niamey about three times higher than in the country as a whole, which is probably more realistic. The aggregates in

table 11.3 show that it is better for Niamey to use the data from 2004, not only because the data are more recent and detailed, but also because they are of higher quality (not surprising, given the higher level of detail in the 2004 questionnaire than in the 1995 questionnaire).

Consumption by Category of Goods

The data in the 1995 survey enable us to look at the consumption distribution of a subset of goods (oils, condiments, piped water, and electricity). The data in the 2004 Niamey survey are more detailed, so we have information as well on the consumption of flour, milk, sugar, tea, and sodas. A key finding in both the Niamey 2004 survey and the national 1995 survey is that the goods selected for taxation represent 8–9 percent of total consumption. In the Niamey subsample for 1995, the proportion is higher (15 percent), but that is likely to be overestimated because, as discussed above, total consumption in the Niamey subsample for that year seems to be underestimated. Now, if the goods targeted for taxation represent roughly 8–9 percent of total consumption, we can assume that additional taxes imposed on households through a reduction in exemptions for those goods should be around 2 percent of total consumption. That assumption seems valid because the VAT rate is at 19 percent, and some of the proposals under consideration call for lower (for example, excise) tax rates on the targeted goods. Still, for some households the burden of additional taxes would be much higher than the average of 2 percent. For those households, the increase in taxation is cause for concern.

Tax Revenues by Category of Goods

Table 11.3 finally provides estimates of the tax revenues that could be expected from various goods in the Niamey 2004 survey, as well as the tax revenues anticipated in various government estimates. Electricity and packaged foods would bring in the largest revenues if these goods were taxed, followed by water consumption, tea, and sodas. There are some differences between the survey estimates and the government's estimates (and the latter may be more precise because they rely on data from customs for imported goods); overall, however, the orders of magnitude seem correct, and Niamey as well as other urban areas are likely to account for a relatively large share of the total tax revenues to be generated.

The shares of new taxes paid by poor or vulnerable households are similar in the 1995 and 2004 surveys and could reach 40 percent for some goods. Table 11.4 provides estimates of consumption shares for various goods by decile, and thereby estimates the shares of taxes that would be paid by households according to their per capita consumption of those goods. On the basis of poverty statistics from the mid-1990s and projections-based growth in GDP per capita, we assume that, at the national level, *at least* 60 percent of the population is poor—versus, say,

Table 11.4. Consumption Shares of Comparable Goods by Income Decile, 1995 and 2004 Surveys

Consuming group	Cumulative share of consumption (%)				Total consumption
	Condiments and targeted packaged food ^a	Vegetable oils	Electricity	Water	
<i>Niger, 1994–95</i>					
Decile 1 (poorest)	1.15	0.67	0.14	0.37	1.06
Decile 2	3.21	2.59	1.06	1.46	3.04
Decile 3	5.78	5.25	1.71	2.02	5.84
Decile 4	9.56	9.10	1.81	2.04	9.59
Decile 5	14.23	13.62	2.31	3.72	14.17
Decile 6 (low poverty line)	20.06	20.29	3.72	6.88	20.01
Decile 7	27.56	28.77	7.26	10.84	27.57
Decile 8 (high poverty line)	38.19	39.29	15.66	20.40	37.89
Decile 9	53.64	56.22	28.54	31.79	52.68
Decile 10 (richest)	100.00	100.00	100.00	100.00	100.00
<i>Niamey, 2004</i>					
Decile 1 (poorest)	0.93	3.35	1.75	1.77	2.07
Decile 2	2.89	9.43	4.66	8.99	5.73
Decile 3	6.78	14.28	6.60	19.56	10.01
Decile 4 (low poverty line)	12.02	20.17	12.50	27.39	15.34
Decile 5	17.26	26.86	17.04	31.64	21.89
Decile 6 (high poverty line)	25.75	37.52	23.85	43.72	28.86
Decile 7	38.15	49.76	35.77	53.33	37.46
Decile 8	52.85	67.46	45.69	60.75	48.11
Decile 9	70.23	76.75	59.95	73.86	62.39
Decile 10 (richest)	100.00	100.00	100.00	100.00	100.00

Source: Authors' estimates, based on the national 1994–95 survey and the 1-2-3 household surveys for Niamey in 2004.

a. Data on condiments come from the 1995 survey; data on packaged goods come from the 2004 survey.

40 percent in Niamey.⁴ Under such an assumption, the cumulative share of consumption of a good by (*at least*) the bottom six deciles at the national level, and the bottom four deciles in Niamey, would represent the share of the taxes that will be paid by the poor. For the packaged goods targeted for taxation (or condiments as a proxy in the 1995 survey) and for vegetable oils, these shares vary between 12 and 20 percent, and they are similar to the shares of total consumption accounted for by the poor (at 20 percent nationally and 15 percent in Niamey). This finding would suggest that 20 percent of the taxation on these goods would be paid by the poor—provided, of course, that only 60 percent of the population is considered poor at the national level and 40 percent in Niamey. If, instead, we consider 80 percent of the country's population to be poor, or at least vulnerable to poverty, and the corresponding proportion for Niamey to be 60 percent, then the share of the new taxes to be paid by poor people would be much higher—close to 40 percent for many goods. This is also the case for consumption of electricity and piped water, at least in Niamey.⁵

The analysis of the more detailed information in the 2004 Niamey survey confirms that poor and vulnerable groups could pay a substantial share of new taxes. The share of total consumption accruing to the bottom four deciles in Niamey is 15.34 percent (table 11.5). For oil and flour, the shares consumed by the poor are higher—20 percent and 25 percent, respectively. For all the other goods targeted for taxation, the share is lower—0 percent for sodas to 14.29 percent for piped water. Overall, when taking the sum of taxes to be paid on the various goods, the share is very similar to the total consumption share—about 15 percent. Now, if we consider that 60 percent of the population in Niamey is poor, or at least vulnerable, the shares of new taxes paid by poor or vulnerable groups increases to about 30 percent (and up to 40 percent for some goods). Of all the categories considered for taxation, the analysis suggests that flour would have the largest proportional negative impact on the poor because the share of total consumption of flour is highest among the poor. Another statistic provided in the table is the total per capita average tax payment by decile. When the reduction in excise tax for vegetable oils is included (to partially offset the imposition of the VAT on these oils), the annual per capita tax payment varies from CFAF 800 in the poorest decile to CFAF 12,710 in the richest decile. As a share of per capita consumption, these tax payments are relatively similar in all deciles. Howev-

Table 11.5. Incidence Analysis for Proposed Tax Reforms, Niamey, 2004 Survey*CFA per day*

<i>Per capita consumption decile</i>	<i>Per capita consumption (n)</i>	<i>Impact of taxation on sodas</i>	<i>Impact of taxation on tea</i>	<i>Impact of taxation on vegetable oil (excise tax)</i>	<i>Impact of taxation on vegetable oil (VAT)</i>
Decile 1 (poorest)	76.37	0	0.05	-0.44	0.56
Decile 2	129.93	0	0.04	-0.78	0.98
Decile 3	164.48	0	0.04	-0.67	0.85
Decile 4 (low poverty line)	196.42	0	0.04	-0.78	0.99
Decile 5	230.99	0	0.06	-0.85	1.07
Decile 6 (high poverty line)	265.78	0.02	0.09	-1.46	1.85
Decile 7	322.24	0	0.14	-1.65	2.09
Decile 8	392.19	0.01	0.08	-2.35	2.97
Decile 9	527.15	0.01	0.29	-1.23	1.56
Decile 10 (richest)	1390.54	0.19	0.67	-3.09	3.92
Percent of total paid by bottom four deciles	15.34	0	11.33	20.08	20.08
Percent of total paid by bottom six deciles	28.79	8.70	21.33	37.44	37.41

<i>Per capita consumption decile</i>	<i>Impact of taxation on milk</i>	<i>Impact of taxation on flour</i>	<i>Impact of taxation on sugar</i>	<i>Impact of taxation on electricity</i>	<i>Impact of taxation on water</i>
Decile 1 (poorest)	0.02	0.37	0.03	0.1	0.1
Decile 2	0.14	0.27	0.07	0.4	0.2
Decile 3	0.12	0.21	0.15	0.3	0.2
Decile 4 (low poverty line)	0.09	0.42	0.19	0.9	0.3
Decile 5	0.04	0.43	0.18	0.7	0.4
Decile 6 (high poverty line)	0.17	0.51	0.32	1.2	0.7

continued on next page

Table 11.5, continued

<i>Per capita consumption decile</i>	<i>Impact of taxation on milk</i>	<i>Impact of taxation on flour</i>	<i>Impact of taxation on sugar</i>	<i>Impact of taxation on electricity</i>	<i>Impact of taxation on water</i>
Decile 7	0.36	0.72	0.46	1.9	0.7
Decile 8	0.35	0.50	0.53	1.6	0.7
Decile 9	0.45	0.66	0.63	2.4	0.6
Decile 10 (richest)	1.42	0.92	1.09	5.9	1.7
Percent of total paid by bottom four deciles	11.71	25.35	12.05	11.04	14.29
Percent of total paid by bottom six deciles	18.35	44.11	25.75	23.38	33.93
<i>Per capita consumption decile</i>	<i>Sum, including excise tax reduction on vegetable oil</i>	<i>Sum, excluding excise tax reduction on vegetable oil</i>	<i>Share of consumption, including excise tax reduction on vegetable oil (%)</i>	<i>Share of consumption, excluding excise tax reduction on vegetable oil (%)</i>	
Decile 1 (poorest)	0.80	1.25	1.05	1.63	
Decile 2	1.30	2.07	1.00	1.60	
Decile 3	1.15	1.82	0.70	1.11	
Decile 4 (poverty line)	2.21	2.99	1.13	1.52	
Decile 5	2.00	2.85	0.87	1.23	
Decile 6	3.39	4.85	1.28	1.83	
Decile 7	4.72	6.37	1.46	1.98	
Decile 8	4.42	6.77	1.13	1.73	
Decile 9	5.32	6.55	1.01	1.24	
Decile 10 (richest)	12.71	15.80	0.91	1.14	
Percent of total paid by bottom four deciles	14.36	15.84	—	—	
Percent of total paid by bottom six deciles	28.54	30.85	—	—	

Source: Authors' estimates, based on the 1-2-3 household surveys for Niamey in 2004.

Note: — = not available.

er, it must be stressed again that this is an average and for some households the cost may be much higher. Also, given that many poor households have limited cash revenues at their disposal, the share of the tax increase in their total available cash would also be higher.

Because the total value of the new taxes that were to be obtained by a reduction in selected VAT exemptions considered by the government was limited, the effect on poverty could have been limited as well, at least on average. However, for some households consuming the goods considered for taxation in higher amounts, the increase in costs was probably substantial. In addition, the proposed implementation of the measures under consideration took place at a difficult time, after a crop year marked by a drought. Therefore, the VAT reform measures combined with the increase in the price of some food items (probably resulting from the lack of supply caused by the drought) led to a rapid and substantial increase in the final consumer price for a range of goods—and that led to protests. In their subsequent dialogue, the government and civil society organizations agreed on a new package of measures that enabled the country to achieve the goal of higher fiscal revenues while protecting the poor from most of the impact of the tax reform originally proposed. Interestingly and appropriately, the main good on which the decision to apply the VAT was maintained—sugar—is also one of the goods with a comparatively lower share of total consumption, and therefore lower tax to be paid by the poor (tables 11.4 and 11.5).

To analyze alternatives to increases in indirect taxation, one must consider ways of increasing tax revenues other than indirect taxation. As members of WAEMU, countries such as Niger have only limited ability to raise trade-related taxes. Given that indirect taxes, such as the VAT, tend to be less progressive than other taxes, it is important to assess how higher tax revenues could be obtained from direct taxes. As mentioned earlier, direct taxes account today for roughly only 15–16 percent of total tax revenues, a relatively low total. Data from the new, nationally representative 2005 Questionnaire des Indicateurs de Base du Bien-Etre, as well as the 1-2-3 Niamey survey, could be used to simulate the impact of measures to increase revenues from direct taxes. For example, some segments of the informal sector could be “formalized” to raise additional tax revenues without having a potentially large negative impact on the poor.

Beyond the simple analytic tools presented in this chapter, more powerful tools are available to analyze the potential effect of tax reforms on

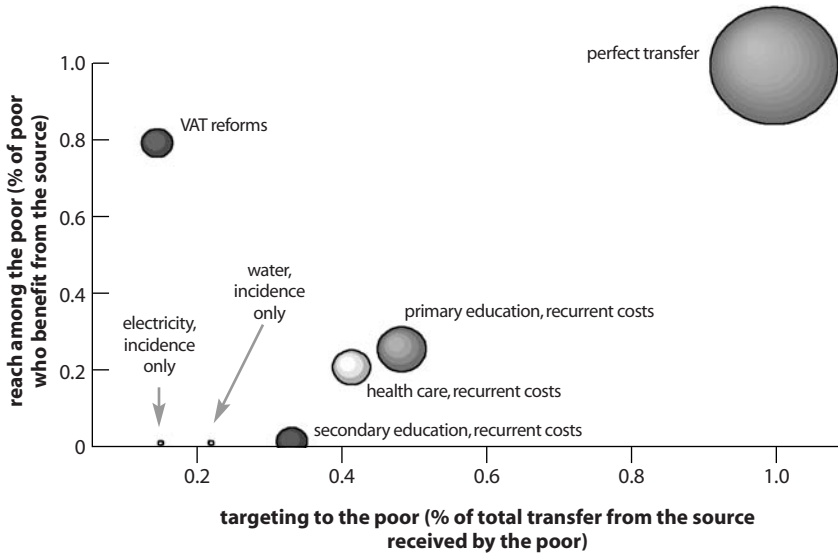
poverty. One possibility is to rely on so-called balanced budget tax reform techniques by which tax rates are raised on goods consumed more by the better-off population, while rates are lowered on goods typically consumed more by the poor population. Beyond the simple distributional analysis presented here, it is also feasible to conduct general equilibrium analysis of the impact of tax reforms when a social accounting matrix and computable general equilibrium model are available. (Such tools are under construction for Niger.) Finally, apart from assessing the impact of tax reforms on poverty, it also is essential to look at how additional tax revenues are used in providing services that benefit the poor in the social sectors and/or in implementing poverty reduction programs anchored in the poverty reduction strategy, as illustrated with the preliminary analysis presented in the next section.

Comparison of the Incidence of Taxation to the Incidence of Social Spending

A necessary but not sufficient condition for tax reforms to benefit the poor is that the proceeds from the reform be allocated to the poverty reduction expenditures. Consider the case of the VAT reform mentioned above. To assess whether such a reform would likely be pro-poor, one must make assumptions in terms of how the new tax revenues will be spent. If the new revenues are spent for the implementation of the Poverty Reduction Strategy Paper (PRSP)—that is, if they benefit the social sectors and/or rural development—the reforms could be pro-poor. In other words, to analyze the potential effect of tax reform, it is important to look at the potential benefit incidence of the additional spending implemented with the additional tax revenues. There is a large body of literature on the benefit incidence of various types of subsidies (among others, see Grosh 1994; Subbarao et al. 1997; Coady, Grosh, and Hoddinott 2004; Komives et al. 2005). Here we conduct a very simple indicative analysis of how additional tax revenues could benefit the poor if the revenues were spent in various areas, assuming that any increase in spending would have a benefit incidence similar to that of existing spending in any given area. (As noted by Lanjouw and Ravallion [1999] and Ajwad and Wodon [2007], that assumption might not be the case in practice.)

The analysis is illustrated in figure 11.1 and in table 11.6 (on which most of the data displayed in figure 11.1 are based). Three indicators are

Figure 11.1. Incidence of VAT Reforms Compared with Social Sector Spending



Source: Authors' estimates.

represented in the figure: the share of the poor who benefit from public spending (or pay taxes), on the vertical axis; the share of total spending (or taxation) that benefits the poor, on the horizontal axis; and the size of the benefits (or taxes), which is proportional to the size of the bubble—a larger bubble indicates a larger benefit (tax). Note that although it was straightforward to obtain (partial) benefit incidence estimates for education, water, and electricity from the 2000 Multiple Indicators Cluster Survey (MICS), we had to make some assumptions in the case of health care. There we computed separately the benefit incidence parameters for three categories of care: women receiving professional prenatal care, women receiving professional care at the time of delivery, and children receiving professional care when sick following an episode of cough or diarrhea. Then we simply summed those three sets of data to obtain an overall estimate of the use of health facilities by various population deciles, *assuming that the cost of providing services in various parts of the country is constant*. As will be discussed below, those assumptions certainly exaggerate the share of the benefits of public spending accruing to poor people; and the same is true for education, where the unit costs of providing services in poorer

Table 11.6. Benefit Incidence Analysis for Selected Categories of Public Spending, Niger, 2000
percent

<i>Assets decile</i>	<i>Education</i>		<i>Health care</i>			<i>Utilities</i>		
	<i>Share receiving primary education benefits</i>	<i>Share receiving secondary education benefits</i>	<i>Share of women receiving professional prenatal care</i>	<i>Share of women receiving professional delivery care</i>	<i>Share of children receiving professional care when sick (cough/diarrhea)</i>	<i>Share receiving health benefits</i>	<i>Share receiving water benefits</i>	<i>Share receiving electricity benefits</i>
1	1.94	0.16	0.82	0.28	0.18	1.28	0.00	0.00
2	2.60	0.17	1.06	0.34	0.33	1.73	0.06	0.01
3	2.41	0.42	1.19	0.47	0.33	2.00	0.12	0.18
4	3.15	0.13	1.41	0.54	0.17	2.12	0.22	0.07
5	2.84	0.35	1.47	0.57	0.34	2.38	0.44	0.14
6	3.02	0.29	2.04	0.86	0.59	3.49	0.55	0.81
7	3.50	0.35	1.65	0.76	0.52	2.93	0.71	1.17
8	4.09	0.56	2.06	0.80	0.47	3.32	1.08	1.87
9	4.39	0.83	2.98	1.23	1.05	5.25	1.20	1.47
10	5.82	1.13	3.59	2.01	0.89	6.49	1.76	1.97
Total	33.78	4.40	18.26	7.86	4.87	31.00	6.14	7.70
Cost (million CFA)	23,417	8,700	—	—	—	14,050	—	—

Source: Authors' estimates.

Note: — = not available. Benefit incidence is based on the 2000 Multiple Indicators Cluster Survey, with costs based on 2002 estimates of recurrent spending for education and health care using budget data and execution rates.

and rural areas are likely to be well below those of providing services in richer, urban areas, such as Niamey. Still, despite those weaknesses, the analysis does provide at least a first broad snapshot of the share of the benefits (that is, the number of beneficiaries) of social public spending that may accrue to the poor.

Size of Various Benefits and Taxes

For education and health care, the benefits are equated to total recurrent spending (that is, not taking into account capital expenditures that tend to be externally funded) in 2002 in the respective sectors—namely, primary education, secondary education, and health care as a whole. Spending on primary education, at CFAF 23.4 billion, is about three times the size of spending on secondary education (CFAF 8.7 billion). Health care spending is estimated at CFAF 14.05 billion. The proceeds from the VAT reform are estimated here at roughly 0.6 percent of GDP, or about CFAF 9.1 billion.⁶ In comparison to the current spending for education or health care, the increase in taxation from the VAT reform is not small—it could cover two-thirds of the health sector budget or 40 percent of the primary education budget. Note that for access to piped water and electricity we do not provide spending data because no direct connection or consumption subsidies for connected households are paid out of the budget.

Coverage

The vertical axis in figure 11.1 provides data on the share of the poor who benefit from various types of services (or pay indirect taxes). For benefits, the shares are low, at 26.6 percent for primary education, 2.5 percent for secondary education, 21.7 percent for health care, 2.0 percent for electricity, and 2.3 percent for piped water. All these estimates are based on data from the MICS 2000 survey. Given that substantial progress has been made to improve enrollment rates in education since 2000, and given that the coverage of health facilities and access to electricity and (to a lesser extent) piped water has improved since 2000, these estimates of the share of the poor who are likely to benefit from various types of expenditure are probably below the values for 2004. For taxes, we assume that up to 80 percent of the population could be affected, essentially because a large share of households consumes vegetable oils.

Targeting

The horizontal axis in figure 11.1 gives the share of various types of benefits or taxes that accrue to poor people. For simplicity, we assumed that the poor represent 60 percent of the population (that is, the first six deciles in table 11.6). Thus, a share lower than 60 percent would mean that, in proportion to their population size, the poor benefit less from the private transfers than do the nonpoor. If we consider, as we did above, that 80 percent of the population is poor, the qualitative conclusions obtained from figure 11.1 would not be affected because all the bubbles in the figure would shift to the right, with their relative positions on the horizontal axis remaining roughly the same. In all cases, targeting to the poor is below 60 percent, which means that poor people not only pay less than their population share of taxes, but also receive less than their population share of benefits from public spending in the social sectors. From the point of view of assessing the VAT reforms' potential redistributive impact, however, what matters is a comparison of the incidence of taxation to that of public spending in the social sectors, assuming that new tax revenues will be allocated to these sectors (or to other priority sectors of the PRSP, such as rural development). In figure 11.1, the fact that the share of the taxes paid by the poor is lower than the share of the benefits (or rather beneficiaries) in education or health care suggests that the reform *could* be pro-poor, provided that the tax revenues are fully allocated to these sectors. This statement, however, is based on rather strong assumptions to which we will return below. Note also in figure 11.1 that, given data on access to water and electricity, consumption subsidies allocated to these goods might largely benefit those who are better-off; said differently, an appropriate design of subsidies or inverted block tariff structures (as in the case of water) is important in properly targeting poor populations.

Eradicating Poverty

The large bubble in the upper right corner of figure 11.1 represents the size of a perfectly targeted transfer necessary to eradicate poverty (the coverage among the poor would be 100 percent, as would be the targeting among the poor, because the transfer would provide to each poor household exactly what is needed to lift the household to the poverty line). That transfer is estimated at approximately CFAF 148 billion. When looking at the size of the different bubbles, one immediately sees

that even pooling the resources from the various in-kind transfers to households through public support for education and health care, and then providing equivalent transfers in cash to households (assuming perfect targeting), would still supply insufficient resources to eradicate monetary poverty. This is just a reminder of the magnitude of the poverty eradication challenge in Niger; and it points up the fact that public resources and transfers, by themselves, cannot replace long-term growth to improve the population's living standards.

There are, however, many important caveats to be mentioned about the analysis offered above—caveats making it less likely that indirect tax reforms would be pro-poor. The analysis illustrated in figure 11.1 suffers from a number of weaknesses that must be highlighted and for which more work is required before a conclusion can be reached about the impact of reforms.

Upward Bias in the Estimates of Benefit Incidence Analysis

The share of public spending that reaches poor people is certainly lower than indicated in table 11.6 and figure 11.1. First, some of the revenues obtained from higher taxation are likely not to be used for the social sectors. Second, even when revenues are used for the social sectors, only a partial share of the spending is allocated to front-line service delivery that benefits the poor. Third, even when funding for the social sectors reaches villages and urban neighborhoods, the unit cost of providing services in rural areas where most of the poor live is lower than in urban areas. For example, because many schools in rural areas are staffed by contractual teachers whose wages are lower than the wages of other teachers, the share of education spending on a per student basis that benefits the poor will be lower than that spent for the nonpoor, even if the enrollment rates for the poor were equal to those observed for the nonpoor. This type of effect is not captured in our analysis because we are using data on beneficiaries rather than actual benefits or costs (see, for example, Wodon and Ye [2006] concerning the effect on benefit incidence analysis of taking into account differences in unit costs by area). The same is true for health care services, with unit costs lower in health posts than in hospitals. To better assess the share of social public spending actually reaching poor people, we would need to collect more data—for example, through public expenditure tracking surveys.

Need to Compare Tax Instruments Apart from the Incidence of Taxation and Spending

For virtually any tax reform we could conclude that the reform would be pro-poor because the share of the tax revenues paid by the poor would be lower than the share of the benefits from public spending received by the poor. That conclusion, therefore, should not prevent an analysis of alternative ways to raise taxes so as to provide social services because some taxes other than the VAT probably would affect the poor significantly less than the VAT itself would affect them.

Conclusion

In this chapter we have illustrated simple techniques to analyze the potential impact of indirect tax reforms on poor people, with specific attention to Niger. The analysis first provided a review of medium-term targets for generating public revenues in Niger, together with a description of the current structure of tax revenues. Then we relied on household survey data to assess the potential distributional incidence of selected reforms that were under consideration in the country in the first few months of 2005. Finally, the exercise briefly showed how the overall effect of any tax reform depends in part on how new tax revenues are spent.

The lessons presented in this chapter confirm that very-low-income countries, such as Niger, face a difficult dilemma. Although those countries are trying to increase their tax revenues to fund the provision of basic services for their population, they have limited means to do so (apart from increasing taxes on consumption goods simply because these taxes represent a large share of total government revenues). The problem is that a non-negligible share of consumption-related taxes is paid by poor people, and even small changes in the price of goods following an increase in taxation may be very difficult to absorb by a population with very low levels of income and consumption. One way out of this dilemma would be to raise other sources of tax revenues that do not affect the poor as much—but it is not necessarily easy to do so.

Another lesson from our analysis is that, although estimates of tax and benefit incidence can be obtained even when data sources are limited, it is important to be careful in their interpretation. For example, even if the poor are found to pay a lower share of tax revenues than the share of benefits they receive from public spending on education and health care,

there may be important caveats built into the estimates. To give one example, the poor population's share of the benefits from education and health care spending may be overestimated for a range of reasons. Furthermore, although some households may gain from higher taxes and from higher social spending funded by such taxes (say, because they have children going to schools), other households are likely to lose. Additional work and more information on the allocation of tax revenues to spending categories are needed to conduct a more detailed analysis.

Notes

1. There is a substantial and sophisticated literature on the impact of marginal tax reforms on poverty and inequality (for example, see Yitzhaki and Thirsk 1990; Yitzhaki and Slemrod 1991; Lambert 1993; Yitzhaki and Lewis 1996; and Makdissi and Wodon 2002). Although we are aware of this literature, simpler methods are often good enough to provide insights on the incidence of taxes and transfers, and those are the methods we rely on here.
2. Also see Subbarao et al. (1997) and Coady, Grosh, and Hoddinott (2004) for applications of the techniques to a large number of programs.
3. The 1-2-3 survey includes three different types of modules on employment, informal labor, and consumption that are fielded one after the other.
4. Estimates prepared by the National Statistical Institute with more recent 2005 data after this paper was written put the incidence of poverty at slightly below 63 percent nationally.
5. Connection rates outside Niamey were low in 1995, especially among the poor, but connection rates for electricity and water may have changed since 1995.
6. This estimate of 0.6 percent of GDP is based on IMF and government projections; in the analysis presented in the previous section, we obtained a slightly higher value, as the total tax was estimated at 0.9 percent of consumption, which itself accounts for about 80 percent of GDP.

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CHAPTER 12

Tracking Public Expenditure in Health and Education

Rwanda

Hippolyte Fofack

Over the past few years, especially since the 1995 genocide, the government of Rwanda has made improving social services delivery and outcome indicators one of its key policy objectives. This objective has been reflected in the steady increase in the budgetary allocation to the social sectors, particularly to education and health. The budget for education as a percentage of the total government budget increased from 12.1 percent in 1996 to 30.2 percent in 2000. The increase in the share of the budget for health was modest, from 2.5 percent to 3.1 percent during the same period (MINECOFIN 2001). The number of primary schools increased from 1,845 to 2,142 (16 percent) between 1995 and 2000; the number of secondary schools increased even more rapidly—from 111 to 177 (about 60 percent) during the same period. Budget support from the donors and multilateral agencies enabled the government to raise recurrent expenditures in the social sectors to improve service provision. Nevertheless, public spending on health and primary education, at the equivalent of \$1.2 per capita and \$17.3 per student, respectively, is very low by any standards (see MINECOFIN 2001).

The social indicators of Rwanda present a dismal picture. Table 12A.1 in the annex to this chapter provides recent estimates of some Rwandan

social indicators, along with estimates from neighboring countries and from sub-Saharan Africa as a whole for cross-country comparisons. Among the social indicators that are more sensitive to short-term changes, the infant and under-five mortality rates remain extremely high. In 2000, the infant mortality rate was estimated at 131 per 1,000 live births, the highest among countries in the subregion. This rate is also significantly higher than the sub-Saharan African average (92 deaths per 1,000 live births [World Bank 2000]) and highlights a deterioration compared with 1970, when it was established at 124 per 1,000 births.¹ Similarly, with an under-five mortality rate of 203 per 1,000 live births in 2000, Rwanda has one of the highest rates among neighboring countries (except Burundi, which has been involved in a protracted conflict). The maternal mortality rate was set at 810 per 100,000 live births in 2000, approximately the average for the subregion.² However, this rate is significantly above neighboring rates. The health sector has suffered also from chronic shortage of qualified health professionals. In addition to human resource constraints, the fiscal incidence of conflict might have affected the level of resources allocated to the health sectors. Inefficiency in the rate and amount of resources flowing to the system might have further compromised the performance of the system.

The negative fiscal incidence also has implications for the education sector, which has dismal indicators as well. In spite of the increasing enrollment rates at all levels of education, gross secondary enrollment rates remain markedly below sub-Saharan Africa's average—10 percent in Rwanda versus 27 percent across sub-Saharan Africa. Moreover, the quality of education is regarded as very poor, owing to the level of resources flowing to these institutions and owing to teacher qualifications. Educational institutions lack trained teachers, books, and other educational materials. Developing human resources, a key aspect of Rwanda's poverty reduction strategy, will require the commitment of more public resources to the education sector and, more important, progress will depend largely on the efficient use of those resources.

Because of concerns about security in the Great Lakes region (comprising Burundi, Kenya, Rwanda, Tanzania, and Uganda) and Rwanda's involvement in the civil war in the neighboring Democratic Republic of Congo, military expenditures have been high—about 4 percent of gross domestic product (GDP). The burden of military spending and external debt service constrained expenditures in the country's social and eco-

conomic sectors. Spending on the social sectors (education, health, gender, youth, and reintegration) in 1999 was 4.3 percent of GDP, compared with 4.2 percent for the military. With the rising needs and demands for essential social services and military expenditures as a result of conflicts, the government of Rwanda increasingly has relied on donor funding to cover the financing gap, especially with the constraints for domestic resources mobilization.

Indeed, the financing gap in 1999 was significant because it represented about half the budget. Government expenditure was approximately 19.7 percent of GDP (13.4 percent recurrent spending and 6.3 percent allocated in the form of capital expenditure to fund public investment). At the same time, government revenues amounted to 9.9 percent of GDP, so external aid funded roughly half the budget. In fact, during the transitional period following the genocide (1995–2000), the Rwandan government excessively relied on donor financing to deliver key social services. Relief organizations, such as the United Nations High Commissioner for Refugees, and international nongovernmental organizations (NGOs) funded the rehabilitation and operations of social infrastructure. The presence of many international NGOs in the health sector relieved the pressure on the government to fund health sector rehabilitation and operations. Rwanda's total public expenditure per capita is now among the lowest in the region, declining from \$73 per capita in 1990 to \$40 in 2000, although the civil war and genocide increased the need for public expenditures. The effective use of the available resources is essential. In 1998, the government introduced the prioritization of the budget, with the education and health sectors designated as priorities to receive increasing and protected budget allocations.

Since 1998, reviews of public expenditures in the social sector have provided the analytical basis for increasing budget allocations to social services. If one is to supplement these “desk” exercises that relied largely on data from the Ministry of Economics and Finance (MINECOFIN) and line ministries, it was decided to carry out a tracking survey of government expenditures on social services to determine the extent to which funds reach the facilities that provide services to final consumers. The objective was to assess, through the flow of funds, the extent of delays and scope of leaks (diversions to illegitimate uses) in resource transfers from the central administration, and so gain insight into the links between inputs and outcomes and the use of and accounting for those resources.

Findings from the study were intended to inform policy makers trying to improve the effectiveness of budget spending and its impact on the intended beneficiaries.

In that regard, a public expenditure tracking survey (PETS) was initiated in May 2000 to trace the flows and use of public expenditures from the MINECOFIN to primary facilities and beneficiaries. The PETS is not an audit of the public financial management system (see chapter 4); rather, it focuses on identifying areas of improvements in the efficiency of the administrative system. Hence, assessing whether the amount of funds appropriated actually reached intended beneficiaries was just as important as finding out whether the system in place consistently allowed for this amount to reach facilities in a predictable and timely manner and be accounted for. In the past, similar studies assessed the efficiency of public spending flows to the social sectors in a number of countries, including Ghana, Uganda, and Peru (see chapter 8 of this book; Ablo and Reinikka 1998; Ministry of Education and Sports 2000, 2001; and Ye and Canagarajah 2001). The study by Ablo and Reinikka found that budgetary allocation may be misleading in predicting outcomes and impact, especially in the context of weak institutions where the scope of leaks can be sizable.

This chapter is based on the data from a PETS survey of public services providers in the health and education sectors (health and education administrators). The focus on the supply side is at variance with traditional beneficiary assessment that relies on information from users of public services (see van de Walle 1998 and Demery 2000). It draws on previous studies, but also extends beyond the flows of public spending aspects to assess the welfare effects of public service delivery, exploiting the combination of the PETS and the Core Welfare Indicators Questionnaire (CWIQ).³ This particular design was in response to the demands of Rwandan authorities interested in assessing the nature and quality of the delivery of public services. Thus, in addition to the disbursement of funds at various administrative levels by quarter for 1998 and 1999, the enumerators collected information on sources of income for the facilities, expenditures on basic services, and the practices of accountability at various levels. Furthermore, the study surveyed administrators' and facility heads' perceptions of the problems they face, how those problems could be resolved, and the quality and impact of the delivery of public services. A parallel CWIQ collected information for the beneficiary assessment of

public social and other services.⁴ The PETS covered two fiscal years, 1998 and 1999, and was limited to primary schools and health centers.

The study points to delays in transfers of public resources from the central administration to primary beneficiaries, and possible leaks between regional and district health offices. The discrepancy between the amount transferred by the Rwandan central bank (Banque Nationale du Rwanda [BNR]) to regional health offices (RHOs) for local administration of health services and the total amounts recorded to have been received by the RHOs tended to be significant and variable across regions. The study also found a rampant lack of accountability, with poor bookkeeping and a lack of internal financial controls and auditing requirements. Thus, the discrepancies could be due to leaks in the system or the unreliable bookkeeping. The lack of accountability could have increased the scope of leaks and extent of mismanagement. During the years 1998 and 1999, less than 22 percent of district health offices (DHOs) carried out audits. For a given amount of resources allocated by the BNR, about 75 percent was recorded as received by RHOs.

Similarly, in the education sector, budgetary allocations were not commensurate with the needs and level of resources required for the sector. As a result, most schools and education facilities relied on household contributions and sporadic contributions from donors and NGOs. In the context of widespread poverty, the meager contributions from households were inadequate to meet the challenges of improving the poor education system. The relatively high pupil-to-teacher ratio (58:1) and even higher pupil-to-qualified teacher ratio (greater than 100:1) reflect the significant resource deficit of the sector, and illustrate some of the challenges facing the education system, with adverse implications for education outcomes.

The study finds significant delays and sizable leaks in the release and flow of funds to health centers and school facilities across Rwanda in the postconflict context of the late 1990s. The significant scope of leaks is largely explained by the lack of accountability in the use of funds, poor bookkeeping, and nonexistent financial management and auditing procedures to strengthen the checks and balances in a limited-resources context. The leaks are further exacerbated by systemic delays in the transfer of funds, with most resources appropriated in the budget disbursed in the last quarter of the fiscal year. This delay is partly the result of the prevailing cash budgeting system. Of course, in a context of limited absorptive

capacities, the massive transfer of funds toward the end of the fiscal year could enhance leaks, especially where there are no control mechanisms.

The implications of observed sizable leaks of funds and limited resources flowing to basic social services in the education and health sectors are significant for the quality and level of delivery to most households in Rwanda. In particular, the survey points to the relatively poor quality of social services and their prohibitively high costs as major constraints to access for the majority of poor Rwandese. In fact, in a context of continuously high poverty rates, the implementation of cost recovery policies under the Bamako Initiative poses a serious challenge to most households in Rwanda.⁵ After the 1990s, however, systematic attempts have been made to increase budget allocations to social sectors and services. At the same time, efforts have been made by the government to increase accountability and strengthen control and auditing systems. In particular, the Office of the Auditor General was set up in 1999 and since has undertaken major and regular auditing functions and responsibilities in many government agencies. The first financial accounts of government budgetary operations in the postconflict area were undertaken for the 2003 budget cycle.

This chapter is organized as follows. The next section provides a brief description of sampling methodology and fieldwork. The third section discusses budget processes and flows of funds to the health and education sectors. The fourth section traces the flow of funds in the health sector and the fifth section traces the flow of funds and its use in the education sector. The main findings of the study and the policy implications are presented next, and followed by a brief conclusion.

Methodology and Fieldwork

This section provides an overview of the sampling frame and design, survey methodology, and administrative arrangements within the postconflict context. Indeed, despite the relative progress on the political front, the coverage of facilities and administrative facilities could not be complete, especially in the education sector where the number of schools is substantially higher than the number of health facilities. Hence, whereas all health centers were surveyed, a multistage, stratified, random sampling was used in the selection of schools and education facilities. The stratification takes into account the distribution of facilities and administrative

regions to allow cross-regional comparisons in the access to and quality of social services.

Sampling

The instrument for this assessment was a nationwide survey of facilities and the relevant government offices and administrative services. In the health sector, the numbers of offices and health facilities were not very large, so all the administrative and subadministrative offices (11 RHOs and 40 DHOs) and the 351 heads of health centers were surveyed.⁶

A different approach was used in the education sector. Specifically, a dual approach differentiating administrative units from education facilities was used during the sampling to achieve the objective of national coverage, in light of a relatively large number of education facilities. All administrative units and province- and district-level offices were surveyed, but primary education facilities were sampled. Thus, the 12 provincial education offices (PEOs), 154 district education offices (DEOs), and a sample of 400 primary schools were surveyed out of the 2,100 schools. The 400 schools were selected using a two-stage stratified random sampling method. Following a complete listing of schools in urban and rural areas, 43 and 357 schools were sampled, respectively, with probability proportional to the number of schools in the area. For the urban area, 9 of 43 schools sampled were from Kigali; the remaining schools were sampled from “other urban” centers (essentially all provincial headquarters).

Table 12.1 shows distribution of the population, health districts and primary health facilities across administrative regions, indicating that health care facilities and population per health center were fairly evenly distributed throughout the country. Although all primary health care facilities were surveyed, some could not respond to the full range of items in the questionnaire. This lack was not because of any reluctance to share information; rather, it was because of the lack of information. The response rate (the number of facilities that were able to answer all the questions as a percent of all facilities) varied across administrative regions and over time. For 1998, it ranged from 39 percent in Ruhengeri to 85 percent in Kibuye; for 1999, it ranged from 60 percent in Kigali to 89 percent in Kibuye. The response rate was consistently higher across all administrative regions in 1999, with the national average increasing from 60 percent in 1998 to 75 percent in 1999. Table 12.2 provides the sampling

Table 12.1. Sampling Distribution of Health Facilities and Population across Administrative Regions, 1998–99

Region	Population as share of total	Health districts	Health centers	Average population by health center	Health centers responding fully	
	(%)	(n)	(n)		1998	1999
Butare	9.76	4	37	20,798	24	27
Byumba	8.93	2	25	28,171	21	21
Cyangugu	7.53	3	23	25,942	11	17
Gikongoro	5.58	2	22	20,013	14	17
Gisenyi	10.32	3	25	32,524	12	21
Gitarama	10.56	3	35	23,782	23	25
Kibungo	9.20	4	32	22,657	23	26
Kibuye	7.58	4	27	22,142	23	24
Kigali	13.71	5	52	20,779	22	31
Ruhengeri	12.86	4	33	30,708	13	20
Umutara	3.88	3	24	12,744	14	21
National	100.00	37	335	23,519	200	250

Source: Ministry of Finance and Economic Planning, Ministry of Health, and public expenditure tracking survey.

Table 12.2. Sampling Distribution of Educational Facilities and School-Age Population across Provinces

Province	School-age population as share of total (%)	Districts (n)	Primary schools (n)	Schools sampled (n)	Students per school (average n)
Butare	7.5	20	189	33	586
Byumba	8.6	15	170	31	748
Cyangugu	7.3	12	171	34	628
Gikongoro	6.5	13	161	31	593
Gisenyi	12.8	12	228	44	828
Gitarama	10.9	17	279	46	578
Kibungo	8.0	11	156	27	754
Kibuye	6.7	9	192	39	515
Kigali Rural	11.2	16	205	40	807
Kigali	3.7	3	54	8	998
Ruhengeri	12.6	16	229	45	810
Umutara	4.3	7	108	12	589
All provinces	100.0	151	2,142	390	689

Source: Ministry of Education.

distribution of educational facilities and district administrations across provinces.

Administrative Arrangements

Staff from the MINECOFIN, the Ministry of Education (MINEDUC), and the Ministry of Health (MINISANTE) were involved in the process from the start to ensure ownership and technical soundness of the findings. Because Rwanda was still in an early stage of postconflict institutional restoration, a good and shared understanding of the institutional dynamics was important for the credibility of the exercise. Before the questionnaire was designed, a review of the institutional framework for the flow of resources was undertaken. Prior to the fieldwork, a core group of staff from the MINECOFIN, the MINEDUC, and the MINISANTE met regularly and discussed the institutional framework, the design of the questionnaire, and the arrangements for collecting and analyzing data. The PETS steering committee discussed the recommendations of the core group and advised the survey team on technical issues related to sample design and selection procedures, content of the questionnaire, and scope of the expenditure tracking study.⁷ Through this process it was decided not to conduct a beneficiary survey as part of the PETS, but rather to modify the planned CWIQ to obtain information on beneficiary perceptions of social services.

On the recommendations of the steering committee, six different questionnaires were designed to collect information on the flow of funds, the use of funds, and the impact as perceived by service providers at the province, district, and facility levels in both health and education sectors. At the facility levels, the school headmasters and heads of the health centers provided the information. The questionnaires were designed to collect statistics on each of the facilities surveyed. For the education sector, this included data for calculating dropout and progression rates, number of qualified staff, number of classrooms and children per classroom, and some measures of the quality of facilities. For the health sector, the data included the number of qualified staff, number of households served by a health center, numbers of various pieces of standard equipment used for medical and logistical purposes, and number of fee exemptions. The survey also asked questions on compliance by administrative offices and facilities with any guidelines and procedures governing the use of funds, and good governance practices such as bookkeeping,

financial management accounts, and recordkeeping. In addition, the survey sought an assessment of the challenges in the sectors by the local administrators and facility heads.

Trained enumerators conducted the surveys. The data were complemented with statistics on education and health inputs and outcomes from the relevant ministries. Senior officials from the MINECOFIN, the MINEDUC, the MINISANTE, and the BNR were interviewed to obtain information on the flow of funds through their institutions. The funds were traced through all the nodes of the flow, except the commercial banks that naturally were unwilling to divulge to the public any information on their clients' accounts.

Budget Processes: Flows of Funds in the Health and Education Sectors

This section provides a brief summary of the process of elaboration of the education and health budgets and a review of the different channels through which the funds allocated for the two sectors flow to the ultimate user or facility. It also highlights the discrepancy between the amount of resources allocated to regions and the needs of the recipient population in the region. Whereas the resources allocated are not necessarily based on need assessments, the amount is generally considered very low and largely covers operational expenses in the form of wages. Although household contributions are used to make up for the shortfalls of resources, they are also a major source of inequality in a poverty-stricken environment.

Budget Elaboration and Funds Release Processes

During the period covered by the study, 1998–99, the elaboration of budget in the health and education sectors started with discussions at the sectoral level (central and peripheral services and administrations), followed by discussions between sectoral ministries and the MINECOFIN. The regional and district officers, including heads of public facilities, did not contribute to the elaboration of the budget in either the health or education sector. A relatively large share of the aggregate education budget (more than 90 percent) covered wages and administrative expenses.

The nonwage budget allocations in education to the province and district levels (covering operational expenses such as the purchase of basic

equipment and materials and the transportation of education officers) was not based on any assessments of the needs in different regions or districts. In the 1998 and 1999 budgets, a lump sum of RF 5 million was allocated to each provincial office, regardless of the number of schools, pupils, and district offices within its jurisdiction or the requests for additional resources by facilities prompted by increasing enrollments in the provinces. All heads of PEOs and DEOs interviewed indicated that they did not prepare a budget and that the equal lump-sum allocation to each province was a disincentive to formulating a budget at the province or district level. In the health sector, the budget preparation process recognized regional differences in needs and endowments; the total amount allocated to RHOs varied from about RF 10 million in Cyangugu to more than RF 20 million in Gisenyi and Ruhengeri (see table 12.3).

The approach to budgeting at the level of sector ministries reflected a host of factors connected to the challenges of postconflict recovery. In 1998 and 1999, Rwanda was in the early process of rebuilding its public

Table 12.3. Distribution of Education and Health Care Facilities and Resources across Administrative Regions, 1998–99

Region	Education sector			Health sector		
	Primary schools (n)	School-age population (n)	Amount received by each province (million RF)	Health care centers (n)	Population served by health center (n)	Amount received by each province (million RF)
Butare	189	110,680	5	37	192,379	17.42
Byumba	170	127,213	5	25	352,134	16.40
Cyangugu	171	107,467	5	23	198,891	10.02
Gikongoro	161	95,423	5	22	220,141	14.6
Gisenyi	228	188,753	5	25	271,034	20.42
Gitarama	279	161,239	5	35	277,461	16.72
Kibungo	156	117,568	5	32	181,255	15.76
Kibuye	192	98,843	5	27	149,460	16.73
Kigali	259 ^a	219,273 ^a	10 ^a	52	216,104	17.72
Ruhengeri	229	185,528	5	33	253,343	20.18
Umutara	108	63,585	5	24	101,954	13.91
All regions	2,142	1,475,572	60	335	212,942	179.90

Sources: Ministry of Education and Ministry of Finance and Economic Planning.

a. Kigali and Kigali Rural are combined.

institutions after the devastation of the genocide. The large turnover of staff following this tragedy led to the loss of institutional memory. Many of the key staff were not only new to government but also were newly arrived in Rwanda. Government revenues were low, and the donors financed a large part of public services that did not pass through the government's budget. Sector ministries did not have the capacity for budgeting and planning, and they lacked a rigorous institutional framework for intrasectoral budget preparation.

The government-initiated budget reforms began in 1998 and, in that context, the PETS was a useful intervention because it helped people understand the budget practices that had evolved and thus offered them a better grasp of the challenges facing the reform efforts.⁸ Since 2000, the government has adopted and is implementing a medium-term expenditure framework (MTEF) that requires a rigorous and program-based budgeting process in line ministries. In the 2001 budget, the central government introduced systematic education and health service transfers to local authorities. These transfers attempted to address the differences in needs and endowments across regions. Rwanda is also implementing a political decentralization program that has started to shift budgetary and legislative power and responsibility to district councils.

Operational Budget

Once the National Assembly approved the budget in the Annual Finance Law, the flow of funds process would start with a request from the sectoral ministry to the MINECOFIN for the release of funds from specific budget lines. A summary of this process of release of funds to RHOs/DHOs and PEOs/DEOs is as follows:

1. *Sector ministry*: The budget accounting officer in the ministry submits a formal request to the MINECOFIN for the release of funds, with clear indication of the amount to be paid to the commercial bank account of the provincial/regional office.
2. *MINECOFIN*: The Department of Budget reviews the request and verifies that it is consistent with the budget appropriations. Once cleared, the request is transmitted to the Office of the Treasurer to verify that funds are available. Delays at this point in the process are not the result of cumbersome administrative procedures but of non-availability of funds at the time of the request.

3. *BNR*: When the request goes through the internal clearance process within the MINECOFIN and is approved, the Office of the Treasurer authorizes BNR to credit the account of the provincial office at a commercial bank. BNR transfers funds to the Kigali headquarters of the commercial bank holding the account of the provincial office.
4. *Commercial bank*: The headquarters office of the commercial bank remits the funds to the relevant branch for the benefit of the provincial office. No delays occur at this point in the channel because the transaction is purely internal to the bank.
5. *PEOs and RHOs*: These administrative units remit funds to district-level offices.
6. *DEOs and DHOs*: This is the end of the flow chain because no funds are remitted to schools or health centers.

Wages and Salaries

The government paid the salaries and wages of staff in ministries and in province and district offices directly to the bank accounts of individual staff. The Ministry of Public Service and Labor managed the central payroll system for all the nonteaching civil servants while the MINEDUC managed that for teachers. Teachers and health staff regularly received their salaries through the banking system, but there was a problem in establishing the actual number of teachers and nonteaching staff. In 1999, a census of civil servants, including teachers, led to the removal of more than 6,000 presumably ghost teachers from the payroll. However, some of these ghosts were nonteaching staff or temporary/substitute teachers. Government policy was to pay only teachers.

Donor-Funded Projects

Capital expenditures in education and health were financed largely by donors, and the donor funds were channeled directly to the projects. However, donor-funded projects also financed the activities of education and health facilities through in-kind contributions, such as textbooks, medical equipment, and supplies. Foreign NGOs also provided direct assistance to local facilities, but such assistance was sporadic and difficult to trace and quantify systematically. Even with the external funding included in the budget, facility managers often did not know in advance whether they would benefit nor did they know the amount and delivery time of whatever assistance was coming to them.

Contributions from Households

This was a major source of financing for education and health facilities. It included payments of school fees directly to education facilities, and payments for health care services and for the purchase of drugs as part of the cost recovery mechanism that was standard practice in the health sector. In education, households also contributed directly to the schools through parent-teacher associations (PTAs).

Tracking the Flow of Funds in the Health Sector

The MINISANTE was responsible for defining and co-coordinating national health policy, providing pharmaceuticals, and designing and implementing special programs targeted at specific diseases (like malaria and HIV/AIDS) or preventive measures (such as vaccinations and maternal health care). At the province level, the 11 RHOs provided administrative, supervisory, and planning capacity regionally and supervised district health activities. DHOs (each covering, on average, one district hospital and about 10 health centers) provided similar services at the district level. Below this level were the health centers that provided primary care to the local population.

A district health management team (DHMT), headed by a medical doctor in the DHO, managed the district health delivery systems. The team organized planning, delivery, supervision, training, and accountability of health centers and the district hospital. A health committee that included community representatives managed each health center. The committee, accountable to the DHMT, managed health center funds and provided the link between the community and the technical practitioners and policy makers. No public funds were allocated to these health committees, even for salaries, because a seat on a committee was taken on an unpaid, voluntary basis. The committees relied on donations for any occasional expenditures they incurred.

The public funding for each health region and DHMT was determined in the MINISANTE's internal budget process, taking into account the needs of the region as well as the resources available from donor and NGO projects. Salaries for regional health officials in RHOs, for the DHMT, and for qualified health center staff were approved by the MINISANTE and paid centrally. The operational spending of the RHO, DHO, and DHMT was included in the MINISANTE budget and was paid di-

rectly by the MINECOFIN to the regional offices at the request of the MINISANTE. Beginning in 1999, the RHOs became involved in the MINISANTE budget process.

Flow of Funds

The flow of funds was initiated by the MINISANTE, with the process depending on the nature of the expenditure. Wage payments, the bulk of the central government expenditure in the health sector, involved two operations: the MINISANTE supplied its payroll to the MINECOFIN and monthly payments from BNR to staff accounts at commercial banks became the norm until requested otherwise by the MINISANTE. This transaction involving BNR and commercial banks suffered no observable systematic delays or leaks.

Nonwage transfers to RHOs were to be disbursed quarterly. The MINISANTE would authorize the release of funds through a simple request letter format sent to the MINECOFIN, indicating the amount and specifying the beneficiary office. When approved by the MINECOFIN, the funds would flow from the BNR to the commercial bank account of each RHO. For calendar year 1999, BNR transferred about RF 135 million to the 11 RHOs. There was no significant gap between the aggregate amount transferred by the end of the year and the amount allocated. However, the cumulative amount of flows up to the end of the third quarter showed substantial delays in the release of funds across regions. Table 12.4 shows that, on average, only about 20 percent of the budgeted funds was released in the first three quarters of the fiscal year, and 80 percent was released at the end of the year. These delays were largely attributed to the pattern of resource inflows to the treasury and the application of the cash budgeting system in the MINECOFIN.⁹

The processing time within each institution (except the MINECOFIN) averaged two working days between receipt of request and execution. At the MINECOFIN, the processing time was much longer and not predictable. If the funds were readily available, it took about five working days to process a request and approve the release of funds. The BNR, which generally transferred funds to commercial banks' head offices on receipt of an approved request, was the most efficient link in the chain. The amounts credited were identical to the amounts advised by the MINECOFIN, indicating complete compliance. Commercial bank managers indicated that it took, on average, less than three to five working

Table 12.4. Funds Transferred to Regional Health Offices, 1999

<i>RHO</i>	<i>Total amount transferred (RF)</i>	<i>Portion transferred at December year-end</i>	
		<i>Amount transferred in December (RF)</i>	<i>Amount as share of total transfers to RHO (%)</i>
Butare	14,581,152	12,081,152	83
Byumba	12,623,836	9,448,836	75
Cyangugu	9,303,074	6,803,074	73
Gikongoro	10,817,656	8,317,656	75
Gisenyi	16,640,052	10,667,252	64
Gitarama	12,076,564	11,361,464	94
Kibungo	12,925,822	10,425,822	81
Kibuye	14,354,800	11,174,800	78
Kigali	13,516,740	11,016,740	82
Ruhengeri	15,071,156	8,317,656	55
Umutara	12,246,228	9,746,228	80
Total	135,787,080	109,360,680	80

Source: Banque Nationale du Rwanda.

Note: RHO = regional health office. Gisenyi and Ruhengeri were exceptions because of the need to address the damage caused by violent insurgency of the militia operating from the neighboring country.

days to credit the accounts at provincial branches, once advised by the BNR. The whole process took an average total of 15 working days to close the loop.

Although, once approved by the MINECOFIN, the funds for the RHOs were released and credited to their bank accounts reasonably promptly, transfers from the RHOs to the DHOs were erratic. The study found not only delays in transfers but also possible leaks in the transactions between the RHOs and DHOs. District offices received funds only at the discretion of the regional offices. With no agreed budgets for the RHO and DHO, or even formal prior understandings on the amounts and timing of transfers to the DHO, and with the poor bookkeeping at both the RHOs and DHOs, a proper assessment of delays and leaks at this node was not possible.

Table 12.5 lists the transfers of funds based on information received from the BNR, the RHOs, and the DHOs in 1999. It shows a large gap between the amount transferred by BNR and the amount the DHOs acknowledged having received. There also are discrepancies between the

Table 12.5. Transfers of Operational Expenses to the District Health Offices, 1999

<i>Province</i>	<i>Amount transferred to RHO by BNR (RF)</i>	<i>Amount recorded as received by RHO</i>		<i>Amount transferred to DHO</i>		
		<i>Total amount (RF)</i>	<i>As share of amount transferred (%)</i>	<i>Total amount (RF)</i>	<i>As share of total transferred to RHO (%)</i>	<i>As share of amount received by RHO (%)</i>
Butare	14,581,152	11,006,750	75.5	3,800,750	26.1	34.5
Byumba	12,623,836	5,500,000	43.5	1,800,000	14.3	32.7
Cyangugu	9,303,074	3,000,000	32.2	4,250,000	45.7	141.7
Gikongoro	10,817,656	13,317,656	123.1	—	—	—
Gisenyi	16,640,052	6,000,000	36.1	3,087,500	18.5	51.5
Gitarama	12,076,564	11,785,716	97.6	—	—	—
Kibungo	12,925,822	7,500,000	58.1	—	—	—
Kibuye	14,354,800	13,674,800	95.3	4,275,772	29.8	31.3
Kigali	13,516,740	17,692,172	130.9	—	—	—
Ruhengeri	15,071,156	7,500,000	49.8	300,000	1.9	4.0
Umutara	12,246,228	6,000,000	48.9	—	—	—
Total	135,787,080	102,977,094	75.8	17,514,022	—	17.0

Source: Data collected from BNR, regional health offices, and district health offices.

Note: — = not available; BNR = Banque Nationale du Rwanda; DHO = district health office; RHO = regional health office.

amounts presumably transferred to the DHOs by the RHOs and the corresponding amounts received by the DHOs. As a percentage of total amount transferred to the RHO, the amount received by the DHO varied between 1.9 percent in Ruhengeri and 45.7 percent in Cyangugu. Similarly, as a percentage of amount recorded as received by the RHO, the amount transferred to the DHO varies between 4 percent in the province of Ruhengeri and 51 percent in Gisenyi.

These discrepancies could result from leaks in the system, from poor bookkeeping, or from both, indicating a failure of accountability. Regarding transfers to DHOs, the data were incomplete in many regions: Gikonoro, Gitarama, Kibungo, Kigali, and Umutara had no data. Regional health officials cited the absence of budgets for their activities and the lack of guidelines for the use of funds as the sources of major inefficiencies and causes of delays and potential leaks. A summary of problems encountered in the flow of funds from RHO to DHO includes the following issues:

- Releasing the bulk of the funds at the end of the year carried a higher risk of leaks.
- There were no guidelines on the use of funds by RHOs. The central authorities did not always monitor their use.
- When the MINECOFIN authorizes the release of funds, it does not formally notify the beneficiary parties, so the details or breakdowns of the releases were not always available. Generally, however, commercial bank managers promptly informed province officials by telephone following MINECOFIN's authorization to release the funds.
- RHOs did not formally notify DHOs of receipt and availability of funds. DHOs had to keep checking with the RHOs and with the banks.
- In all cases, administrators and facility heads viewed the levels of funding provided as grossly inadequate for RHOs and DHOs to carry out their responsibilities.

Financing of Health Centers

Except for salaries of qualified health staff working at the centers, no financial transfers were made from the central government budget to the health centers. The centers operated along the guidelines proposed by the Bamako Initiative, which stipulated, among other things, that the benefi-

ciary population should meet the cost of primary health care services. Thus, user fees and sales of medicines were the principal sources of funding for operations and maintenance of health centers. Average consultation fees were RF 200 per individual but consultation was free for children under 5 years of age. Table 12.6 shows estimates of receipts at health centers. The centers received sporadic material assistance from the government, donors, and NGOs in the form of medicines, medical supplies and equipment, and facilities rehabilitation.

With a poverty incidence of more than 60 percent, a large number of patients could hardly mobilize the required fees and could not afford the treatment. More than 81 percent of health center administrators stated that inability to pay for medical services was the main obstacle to the use of health centers. This was supported by results from the CWIQ. Among people who were sick, needed to consult a health practitioner, and did not do so, the high cost was the principal reason for not seeking service. Furthermore, 50 percent of those who consulted with the health system were dissatisfied with the cost of services. Because Rwanda has a system of exemptions from fees for vulnerable groups and very poor people, the health centers were obliged to offer services to a large number of customers free of charge, further increasing their financial burdens. Because the health centers bore the cost of implementing the policy of exemptions, the practice/implementation differed among regions and districts.

Apart from to poverty, the poor quality of health services was an important deterrent to the use of these services. More than three-quarters (78 percent) of primary health care administrators indicated that more people would use the health centers if the overall quality of services was improved and the centers were better staffed with qualified health personnel. Significant disparities in fee incomes existed between urban and rural areas, with the capacity to pay much lower in rural areas. Furthermore, the overall quality of staffing and services in health centers was much better in urban areas. The lower fee collections in rural areas compromised the quality of services offered in these poor regions. The survey asked health center administrators to rank the priorities of the health system. The top priorities, which reflect the costs and quality concerns, were ranked as follows, in descending order of importance:

- Reinforcing mutual health care insurance schemes.
- Taking steps to improve the quality of health care.

Table 12.6. Income Generated by District Health Offices, 1998 and 1999

<i>Health region</i>	<i>DHOs (n)</i>	<i>Health centers (n)</i>	<i>Calendar year 1998</i>			<i>Calendar year 1999</i>		
			<i>Health centers responding (n)</i>	<i>Availability of accounting records (n)</i>	<i>Fees collected (RF)</i>	<i>Health centers responding (n)</i>	<i>Availability of accounting records (n)</i>	<i>Fees collected (RF)</i>
Butare	4	37	24	23	70,695,499	27	26	93,033,856
Byumba	2	25	21	21	69,296,012	21	21	64,785,926
Cyangugu	3	23	11	11	84,424,944	17	17	103,264,689
Gikongoro	2	22	14	14	29,270,135	17	17	39,499,420
Gisenyi	3	25	12	9	29,253,080	21	20	47,938,288
Gitarama	3	35	23	23	84,424,944	25	25	103,264,692
Kibungo	4	31	23	23	61,155,837	26	26	62,682,547
Kibuye	4	27	23	22	72,708,659	24	23	79,369,317
Kigali	5	54	22	22	137,544,998	31	31	173,483,897
Ruhengeri	4	32	13	13	39,789,191	20	20	65,877,184
Umutara	3	24	14	14	28,124,529	21	20	46,210,881
Total	37	335	200	195	706,687,828	250	246	705,926,800

Source: Data collected from primary health centers in the regions.

Note: DHO = district health office.

- Reinforcing a preventive hygiene campaign.
- Continuing government assistance to vulnerable groups.

Financial Management

The study found that financial management in RHOs and DHOs was poor. The officials surveyed were not aware of any written instructions on how funds should be managed or of any formal requirements for accounting for the funds provided and for the preparation of audits and financial reports. Although more than 80 percent of DHOs produced financial and administrative reports in 1998 and 1999 (without clear instructions for creating those reports), it is difficult to assess the reports' quality and relevance. Furthermore, the RHOs and DHOs received no feedback from higher-level authorities. Internal controls and auditing were weak; less than 22 percent of DHOs carried out an audit during 1998 and 1999.

Unlike RHOs and DHOs, administrators at health centers generally kept financial accounts and produced financial management information over time. More than 97.5 percent and 98.4 percent of health center respondents indicated that they kept accounting records in 1998 and 1999, respectively, and that they updated these accounts regularly. Health centers that reported to local management committees and adhered to the basic rules of financial management did better than RHOs and DHOs that reported to Kigali. The management committees in these health centers functioned relatively well, and the health centers managed the funds collected with a greater sense of accountability.

Tracking the Flow of Funds and Its Impact in the Education Sector

The role of the MINEDUC was to supervise, coordinate, and plan education policy and activities. Administrators at the provincial and district levels assisted central authorities in implementing educational policies. The provincial education officer was responsible for implementing the policies of the MINEDUC in the province, organizing exams, assessing teachers' qualifications, and monitoring teachers' performance. The province-level education officer was assisted by an education specialist, a planning specialist, and a finance specialist. The district education officer reporting to the province education officer was responsible for supervising and assisting individual school management in service delivery, including responding to individual school staffing requests for quality control and the

distribution of textbooks. PTAs were the other key players at the school level. They were involved in supervising individual school affairs. PTAs also managed individual school funds and played a lead role in identifying families and individuals needing help with school expenses. These individuals and families were often exempted from payment of school fees.

Financing of Primary Schools

The central education budget paid for operational costs of provincial and district administration and for teachers' salaries and benefits (including housing allowances and health subsidies) and provided a small contribution for teachers' textbooks. The schools received no other funds from the central government's recurrent budget. Public schools occasionally received assistance from donor-funded projects in the form of textbooks and the building of classrooms, desks, and chairs. (Private schools represent about 5 percent of all schools and do not receive any public funds.) In the central government budget, RF 5 million was allocated to each province to cover provincial administrative costs (purchase of materials, per diems, fuel, and light repairs), regardless of the number of schools or number of pupils within the jurisdiction. That amount was for the use of PEOs and, to a lesser extent, DEOs.

School fees and other contributions from parents were the primary sources of funding for primary school operating expenses. The direct cost to parents of primary education was estimated to be RF 555 per pupil per year.¹⁰ This cost included the centrally stipulated school fees of RF 300 annually, charges of RF 100 per pupil for fifth-year exam papers, RF 7 per pupil per trimester for provincial exams, and RF 3 per pupil per trimester for fuel costs of the DEO. Some schools accepted in-kind payments. The amount collected in all districts, excluding the City of Kigali, in 1998/99 was RF 13.3 million, doubling to RF 27.1 million in 1999/2000.¹¹ These funds were retained by schools in their local bank accounts and primarily were used for the purchase of scholastic materials, construction and rehabilitation of school buildings, sports and leisure, and transfers to district offices to cover the transportation costs of DEOs for their occasional visits to the schools. The amounts of these transfers to DEOs varied between regions and increased significantly between 1998/99 and 1999/2000. Nationally, the overall amount transferred from schools to the DEOs increased from RF 0.66 million to RF 1.5 million—in the latter case, representing about 5.5 percent of the total amounts collected as school fees (table 12.7).

Table 12.7. Main Sources of Revenues in Primary Schools across Provinces, 1998/2000

Province	DEOs (n)	1998/99 (RF)			1999/2000 (RF)		
		A	B	C	A	B	C
Butare	20	734,647	101,325	41,920	668,439	143,445	36,105
Byumba	15	101,794	—	160,100	137,491	—	—
Cyangugu	12	1,576,456	42,312	—	1,810,491	619,586	—
Gikongoro	13	499,281	101,615	—	684,520	54,120	93,125
Gisenyi	12	806,833	—	127,290	1,331,004	—	208,717
Gitarama	17	1,088,495	76,165	24,114	1,335,971	474,805	16,847
Kibungo	11	1,012,373	—	81,667	725,001	—	231,332
Kibuye	9	2,990,614	—	57,800	16,349,904	—	162,800
Kigali-Ngali	16	2,927,160	380,287	29,300	1,798,647	—	442,676
PVK	3	—	—	—	—	—	—
Ruhengeri	16	1,539,384	167,735	120,025	1,419,229	296,398	179,005
Umutara	10	—	—	22,500	877,350	—	122,120
Total	154	13,277,037	869,439	664,716	27,138,047	1,588,354	1,492,727

Source: Data collected at the district level.

Note: A = fees collected by the schools; B = total of other funds; C = school fees spent on district education officers by primary schools; DEO = district education office; — = not available; PVK = City of Kigali.

Parents and the communities made ad hoc contributions to schools through specific fundraising activities co-coordinated by the PTA. These included financial and in-kind contributions in the form of manual labor for rehabilitation and construction work at the school. Many schools raised funds from the sale of the harvest from school gardens and from raising livestock. NGOs, churches, and the United Nations Children's Fund assisted a large number of primary schools by providing food, construction, and school materials. Externally financed projects also provided support for the rehabilitation of damaged school buildings and the construction of new ones, and, through the DEOs, for textbooks and other supplies. Unfortunately, recordkeeping at the schools and districts did not permit an assessment of the flows from these ad hoc sources.

Flow of Funds and Financial Management

The flow of resources to provinces in the education sector was similar to that in the health sector. The funds went through the same institutional nodes (MINECOFIN, BNR, commercial banks) to the province level. Wages were released on a monthly basis and paid directly to the bank account of each staff member. The operational costs of the administration of schools (province and district offices) in the MINEDUC's budget were paid directly to the bank accounts of provincial education authorities. The MINEDUC triggered the flow process through a simple letter, sent each quarter, requesting disbursement for release of RF 1.250 million to PEOs. Although these funds were supposed to be released quarterly, as in the health sector, authorization of the release of funds by the MINECOFIN was contingent on the availability of resources. Thus, although the budgeted amounts for the year were eventually released in full, actual releases did not follow the quarterly schedule and were often delayed. Furthermore, the provincial offices claimed that the little amount of money received only permitted them to provide the district education offices with a few office supplies. Primary schools did not receive any funds from this budget.

Most education officials interviewed (92 percent) indicated knowledge of instructions on the use of public funds; however, 25 percent found these instructions less than clear. Many of the school administrators could not provide any copy of the instructions during the survey. Only 2 of the 11 province-level officers indicated that they had elaborated any budget for their operations.

Implications for Educational Outcomes

The relatively low level of funding for education has implications for many aspects of the provision of educational services, including the quality and quantity of educational facilities, the affordability of education, the quality and quantity of the teaching staff, and the lack of scholastic materials. These have tended to restrict access, impair the provision of quality education, and undermine overall education attainment. The school environment was poor, with about 4,200 temporary classrooms in 1999/2000, lack of drinking water and latrines, and inadequate supplies of school materials, according to the headmasters. Despite the poor state of education facilities and infrastructure and poor education outcomes, however, a large proportion of headmasters interviewed (78 percent) indicated that their schools were offering services of good quality. This lack of despair was probably an indication that these officials were seeing some improvements in the system and expected more in the future.

School Fees

Many households could not afford the school fees. However, most schools surveyed (95 percent) provided fee exemptions for pupils from very poor households. In some provinces, such as Ruhengeri, all schools provided exemptions. Because exemption is a national policy, albeit an unfunded mandate, it is not clear why some schools did not have exempt pupils.

Teachers

The pupil-to-teacher ratio increased from 55:1 to 58:1, on average, between 1998 and 1999 for the total population of teachers. The ratio of pupils to qualified teachers was much higher, reaching more than 100:1 in 1998 and 1999. This implied that about 50 percent of pupils enrolled are most likely taught by unqualified teachers. The average number of untrained teachers per school even increased between 1998/99 and 1999/2000 in a number of regions (Gikongoro, Gisenyi, and Umutara). The lack of qualified teachers was especially desperate in some provinces; the qualified teacher-to-pupil ratio was 1:44 in the City of Kigali and 1:140 in Kibungo in 1999/2000.

Materials

School headmasters pointed out that a lack of books and teaching materials continued to be a major constraint for schools. The majority of pupils

did not have textbooks. The basic teaching aid available in most schools at the time of the survey was the chalk. However, even this basic material was not provided regularly by the DEOs, so most schools used PTA funds to purchase it. The situation was the same for stationery. PEOs often did not receive the promised scholastic and teaching materials from the MINEDUC, and what they received was not systematically distributed.

Facilities

Between 1998 and 1999, enrollment rates rose sharply but there was no increase in the number of schools and classrooms. Headmasters and district school officials expressed the urgent need for rehabilitation of school infrastructure, especially in the provinces of Byumba, Gisenyi, and Ruhengeri. The pupil-to-classroom ratio increased between 1998 and 2000—from an average of 54 pupils per classroom to more than 58. The provinces of Umurata (from the large increase in population caused by the influx of pre-1994 refugees), and Gisenyi (destruction and dislocation of the population by the insurgency in 1997/98) were the most affected by the shortage of classrooms, with ratios averaging 75 and 60 pupils per classroom, respectively.

The survey found that, in 1999, 3,270 children were not admitted to school because of a lack of space and a shortage of desks. In the sample of schools interviewed, an average of 8.6 pupils per school could not be admitted in the first year. In Ruhengeri, where all schools had provisions for exemption of school fees for children from poor families, the lack of space was cited as reason for not admitting 400 children to the schools sampled during the academic year 1999/2000 alone. The highest rate of admission denial was in the poor province of Kibuye, where about 580 children were not admitted. The rejection rate was also relatively high in other poor regions, including Kigali Rural (see table 12.8).

Key Findings and Policy Implications

This study is based on a survey of local administrators and managers of public facilities in the health and education sectors during the period 1998–99. Its primary objective was to assess the flows of public spending to facilities and primary beneficiaries with a view toward identifying possible delays and leaks and, to the extent possible, making recommendations to improve efficiency in the flows and use of public funds. Another

Table 12.8. Exemptions from Paying School Fees and Number of Children Not Admitted to the First Year of Primary School Because of Classroom Overcrowding, 1999/2000

<i>Province</i>	<i>Schools responding (n)</i>	<i>Schools with exempt children (n)</i>	<i>Schools without exempt children (n)</i>	<i>Children not admitted for lack of space (n)</i>
Butare	31	29	3	192
Byumba	30	28	2	252
Cyangugu	32	30	2	415
Gikongoro	27	23	4	0
Gisenyi	43	41	2	341
Gitarama	42	40	2	430
Kibungo	29	28	1	60
Kibuye	39	38	1	580
Kigali Rural	40	39	1	248
PVK	9	7	2	322
Ruhengeri	45	45	0	400
Umutara	12	10	2	30
Total	379	358	22	3,270
Percent of total	100.0	94.5	5.8	0.00221

Source: Data collected in the field.

Note: PVK = City of Kigali.

objective was to assess the performance of public service delivery and the constraints to its effectiveness from the point of view of the providers. In this context, the study assessed the roles of other stakeholders, parents, donors, and NGOs in managing and improving services in primary education and primary health.

Specific recommendations by field officials and facility heads are presented in tables 12A.2 through 12A.6 in the annex. Tables 12A.2 and 12A.3 summarize the recommendations on the health and education sector, based on the responses from the survey. Tables 12A.4, 12A.5, and 12A.6 summarize the problems identified and recommendations from province-level officers, district health and education officers, and facility heads, respectively. These recommendations cover a broader set of issues that are germane to the challenges that the government's administrators face. For instance, the recommendation to improve infrastructure is not an issue for health and education, but in many ways it affects the operation of the facilities. The major findings of the study include the following:

- The central government's very limited funding for primary education and primary health care.
- The existence of leaks in the flows of funds and resources to primary health care and education facilities.
- The leaks are sizable and they vary across the different administrative regions and sectors.
- The provision of supplies to education and health facilities from the government, through the districts, and from the donors and NGOs is sporadic and uncoordinated.
- The processes for releasing funds to the ministry level and the payments of salaries work in systematic and largely predictable ways through the banking system.
- The actual releases of funds were irregular and often delayed.
- The release of funds from the provincial/regional offices to the district offices was not systematic, and the amounts and timing appeared to be at the discretion of provincial/regional officers.
- There are no systems and requirements for accountability for the budgetary resources provided to regional/provincial and district health and education offices.
- Strong local involvement in managing education and health facilities bodes well for decentralization efforts.

The lack of accountability in the administrative offices is in contrast with efforts at the facility level, presumably because of local involvement. However, the almost total reliance on local efforts in education and health services creates community disparities in access to and quality of education and health services. Evidence from the parallel CWIQ completed by beneficiaries indicated the high cost of health care was limiting access of the majority of poor people to health services and prompting the underutilization of existing health care facilities.

The study's most startling finding is the very limited funding the central government allocates to primary education and health services. Although the budget allocations to the health and education ministries were relatively large and increasing rapidly, compared with allocations to other ministries, these budgets did not fund the operations and maintenance costs of primary education and health care at facility levels. As a result, the facilities relied on fees for services and, in the case of primary schools, other contributions by parents. The PTAs became a significant source of support

for primary schools. In the health sector, with the introduction of the cost recovery policy in accordance with the Bamako Initiative, the facilities have relied mainly on the consultation fees and sales of medicines. These contributions from households were supplemented by NGOs and donor agencies, particularly in the form of construction and rehabilitation of facilities; books and other school supplies for primary schools; and equipment, medical supplies, and medicines for health centers. Nevertheless, this support was sporadic, and often in quantities inconsistent with the needs and priorities of the facility. Government distribution of donor-funded textbooks to provincial education offices and the subsequent distribution to the schools did not seem to follow a systematic plan.

The facility heads and other health and education officials pointed to the low level of public funding as well as the systemic inefficiencies in funding and provision of public support as the causes of the poor quality of public services and the low level of service provision. The CWIQ found that beneficiaries regarded the lack of textbooks and teaching materials as the most serious constraint to improving the quality of primary education. The reliance on fees and household contributions tended to increase the disparities in the levels of access between poor and nonpoor households and between rural and urban communities.¹²

Poverty was cited as one of the leading causes of low levels of schooling and access to health facilities. The cost of health services was also a major deterrent to using them. Empirical evidence from the CWIQ suggests that about 95 percent of respondents who needed to see a health provider but did not do so cited the high costs as determinant; among those who consulted a health provider, 80 percent were dissatisfied with the costs. The government has responded to some of these concerns by introducing fee exemptions for poorer households, determined at local levels. The evidence is that the system is operational in many districts but does not appear to be working well for very poor people.

Funding and managing primary education at the local level is an appropriate approach, and the decentralized cost-sharing arrangement in Rwanda's health services is conceptually sound. However, evidence from the PETS and the CWIQ is that cost recovery for social services has been an obstacle to the recovery of the population impoverished by the genocide and its legacies. Thus, at the early stage of postgenocide recovery, the full cost-recovery policies were at odds with the government's objective of rapid socioeconomic recovery and reintegration of the population and

its priority on human resource development. Although a system of education and health care fee exemptions for very poor people was in place, it has been an unfunded mandate that has created an additional financial burden for the local authorities managing the facilities.

Health and education are among the budget priority programs and have continued to receive increasing budget allocations and spending.¹³ On a per capita basis, however, the recurrent expenditures on education and health remain very low, relative to those in comparable countries. Most of the recurrent spending is for the salaries of teachers and health care workers. As the survey has shown, primary education and health facilities receive no government funding for operations and maintenance, which forces the facilities to rely on the user fees to meet those expenses.

Rwanda's development budget, at 6 percent of GDP in 1999, was largely financed by external aid. Education and health accounted for about 28 percent of that budget. The survey found assistance to facilities from the development budget was through sporadic provision of in-kind assistance from donor-funded projects or international NGOs. Rationalizing the inputs from these external partners so that the assistance is available in a planned and predictable fashion and meets the priority needs is essential for improving service delivery. This would suggest financial assistance rather than in-kind support, and thus budget support for these sectors, would be most effective.

The outcome of the study is consistent across the two sectors; resource flows to primary schools and health facilities are limited to staff salaries. The central budget allocation to the provincial/regional education and health offices were to meet the operational and maintenance costs of provincial/regional and district education and health offices. Funds authorized and released by the MINECOFIN to the provinces flow through the banking system (BNR and commercial banks) to the accounts of the provincial offices in a commercial bank. This process worked relatively well, but delays occurred between the submission of a funding release request by the line ministry and authorization by the MINECOFIN. There was a tendency for most of the money to arrive in the fourth quarter of the budget year. These delays in the authorization were attributed to the unpredictable pattern of fund inflows to the government arising from the volatility of external budget support, the seasonality of revenues, and poor cash management in the MINECOFIN (which relied on a cash budgeting system to manage the uncertainty in resource inflows to the treasury).

When the money got to the provincial/regional offices, the control system broke down because those offices did not have budgets prepared and agreed in advance, and did not keep books and systematic records to account for their receipts and spending activities. These local offices did not seem to have been required by law or practice to account for their expenditures. Instructions governing the use of resources either did not exist or were not followed by officials. There did not appear to be any mechanisms for enforcing good accountability practices. For instance, RHOs were required to transfer funds to DHOs, but without budgets/financial plans agreed in advance stating the amounts to be transferred and without systematic records of transfers, it was not possible to determine the amounts transferred, when they were transferred, and whether the transfers were appropriate. It was not possible to determine conclusively the leaks and delays in the flow of funds at the district and province levels. However, the absence or the nonenforcement of a system of accountability presented the opportunity for leaks and prima facie evidence of the misuse of public funds.

Conclusion

This study primarily aims to assess the efficiency in the flows of funds to education and health facilities, and to assess the performance of service delivery in those two sectors. Empirical evidence from the study highlights delays in the flows and sizable leaks, largely resulting from the lack of accountability and the absence of control mechanisms. It is interesting that the failure of accountability was not limited to local education and health offices; it probably was pervasive in the departments of ministries and other government agencies. The PETS findings have simply highlighted the problems. The legitimacy, capacity, and institutional framework for financial management were destroyed by years of conflict and civil war. Auditing the operations of government agencies and the preparation of financial statements of government operations were not routinely carried out for periods before, during, and after the civil war and genocide. Until recently, the three institutions with the primary responsibility for financial management functions—the Inspector General of Finance and Audit, the Division of Public Accounting, and the *Cour des Comptes*—were dormant.

Within the framework of the reform and government accountability program, however, a number of measures are being implemented to

strengthen efficiency and improve public expenditure management and accountability. These measures include the introduction of the MTEF process for the budget; the decentralization of government and the fiscal framework; and efforts to strengthen budget execution, particularly accountability and control mechanisms. The Office of the Auditor General, set up in 1999, has taken over most of the functions of the *Cour des Comptes* and has carried out audits of many government agencies, revealing that the challenges of improving financial management are substantial. In 2001, the Inspector General of Finance and Audit and the Division of Public Accounting were revived and audit units were set up in key line ministries. The first financial accounts of government budgetary operations were produced in 2004 for the operations of the 2003 budget.

In a related vein, the decentralization introduced in 2001 has changed the institutional framework for budgeting and financial management. Elected district councils acquired the responsibility for local social services, and the central government representation and intervention in management and implementation of government programs were consolidated at the province level. Similarly, district councils have been given greater responsibility on taxation. District and province officials have been plugged into the MTEF system and are being trained by the MINECOFIN to prepare and implement their budgets in line with that framework.

Decentralization, however, does not change the fundamental issues of accountability, equity, and low funding for social services that were identified in this study. The locus and nature of these problems have changed and they must be addressed differently. District and other local authorities need enhanced and flexible financial assistance and capacity building to improve social services. Decentralization has brought the issue of public financial management to the fore, not only because the accountability of government to its people is one of the key goals of the decentralization, but also because of fears about the capacity of new local authorities to effectively manage the resources being transferred to them.

The emerging fiscal decentralization paradigm in Rwanda recognizes the need to address disparities in incomes and endowments across provinces and districts. Given the low revenue bases of most newly established local authorities, transfers from the central government will continue to be important for these entities to carry out their responsibilities. Budget support from the donors to the central government will enhance these transfers. The central government will have an important role in

monitoring the flows to the appropriate facilities and the impact of central and local public expenditures on service provision to the population. Under the decentralized structure, the PETS will be an important instrument that central ministries can use regularly to assess the effects of decentralization on the flows of resources to the facilities and on the delivery of services and on financial management by both the central and local authorities.

Annex

Table 12A.1. Comparison of Social Indicators

<i>Indicator</i>	<i>Burundi</i>	<i>Kenya</i>	<i>Rwanda</i>	<i>Tanzania</i>	<i>Uganda</i>	<i>SSA</i>
Infant mortality rate, 2000 (per 1,000 live births)	105	76	123	95	88	92
Under-five mortality rate, 2000 (per 1,000 live births) ^a	1763	118	203	152	162	159
Maternal mortality rate, 2000 (per 1 million live births)	130.0	59.0	130.0	52.9	55.0	84.4
Crude death rate, 1998	20	12	21	16	20	15
Life expectancy, 1998	42	51	40	47	42	50
Child immunization (DPT) rate, 1995–98 (%)	63	79	85	82	51	48
Population per physician, 1990–98 (n)	17,684	27,672	24,967	23,895	24,973	—
Adult male illiteracy, 1998 (% of total male popu- lation age 15 and above)	44	12	27	16	23	31
Adult female illiteracy, 1998 (% of total female population age 15 and above)	61	25	41	34	45	47
Gross primary school enrollment ratio, 1997 (%) ^b	51	85	88 ^c	67	74	78
Gross secondary school enrollment ratio, 1997 (%)	7	24	10 ^a	6	12	27

Sources: World Bank 2000, 2001; UNDP 2005.

Note: SSA = sub-Saharan Africa.

a. Under-five mortality rate is the probability that a newborn baby will die before reaching age 5, if subject to current age-specific mortality rates. The probability is expressed as a rate per 1,000.

b. Ratio of total primary enrollment, regardless of age, to the total population of the age group that officially corresponds to the level of education shown.

c. Rwandan estimates are derived from the 1999/2000 period.

Table 12A.2. Key Findings and Recommendations for the Health Sector

<i>Findings</i>	<i>Recommendations</i>
<p>1. <i>Access and quality of health care:</i> The majority of the population did not go to health centers when ill because of high costs and poor quality of medical infrastructure and services.</p>	<ul style="list-style-type: none"> • Reinforce mutual health schemes. • Examine the feasibility of creating a collective of mutual health schemes. • Provide budget resources to primary health care facilities to reduce fees and increase exemptions.
<p>2. <i>Financing and use of resources:</i> Public funds took very long to reach regional health offices.</p> <p>Public funds were transferred on the basis of resolutions adopted at meetings of the Ministry of Health, not on the basis of budgetary principles.</p>	<ul style="list-style-type: none"> • Release funds for regional health services on time in accordance with the policy of timely release of funds for priority programs. • Regional and district health offices and facilities should prepare budgets in consultation with the Ministry of Health and other related bodies, and ensure that these budgets are mutually consistent. Budgets will provide the basis for the assessment of financial and physical outputs and the flow of funds. • The Ministry of Health should establish clear policies and principles and prepare a manual of budgetary procedures to be followed by all the parties.
<p>There was a lack of accountability in the use of public funds.</p>	<ul style="list-style-type: none"> • Systems for accounting and related recordkeeping for the use of public funds should be introduced at all levels of the health system. This will require substantial training for staff at regional and district offices and facilities. • Undertake regular audits of these accounts. • The Ministry of Health should prepare a manual of procedures for accountability at regional and district levels and facilities. The manual also should require health offices and facilities to account for financial and in-kind contributions from all sources. The latter contributions are likely to be significant.
<p>Investment expenditures were supported largely by foreign assistance in the form of construction and rehabilitation, equipment, and logistics.</p>	<ul style="list-style-type: none"> • Establish a coordinated program of investment aimed at reducing the existing regional disparities in quality of and access to health services.

However, foreign assistance in the health sector did not take regional disparities into account.

Contact and supervision of health centers by district health officials were weak. Although the study noted an improvement in logistical support in 1999, supervisory visits to health centers by officials were few and infrequent.

Communication between health centers and district and provincial health services was a problem.

- Supervisory visits need to be regular and formalized, and should not be left entirely to the discretion of the district health officers.

- Create communication links between health centers and districts, and between districts and provincial health services.
 - Improve ambulance services for health centers.
-

Source: Author's conclusions.

Table 12A.3. Key Findings and Recommendations for the Education Sector

<i>Findings</i>	<i>Recommendations</i>
<p>1. <i>Access to education:</i> There were deficiencies in education facilities, including inadequate numbers of classrooms in many districts leading to overcrowding and denial of access.</p> <p>School environment and facilities were considered substandard, with inadequate sanitary facilities.</p> <p>The RF 300 charged for school fees kept children from poor households out of school.</p>	<ul style="list-style-type: none"> • Accelerate the construction, extension, and rehabilitation of primary schools in districts with inadequate or poor facilities. • Rehabilitate classrooms. • Provide adequate drinking water. • Build latrines. • Eliminate school fees and provide primary schools with funds to replace lost fees.
<p>2. <i>Quality of teaching:</i> The school system lacked qualified teachers, and the situation was especially desperate in some provinces; the qualified teacher-to-pupil ratio was 1:44 in the City of Kigali and 1:140 in Kibungo in 1999/2000.</p> <p>Materials and school manuals supplied by the government and sponsors remained insufficient.</p>	<ul style="list-style-type: none"> • Efforts to increase the number of qualified teachers need to take into account the unequal distribution of trained teachers between provinces and districts. • Provide regular budgetary resources for the purchase of scholastic materials and textbooks. • Rationalize the supply of scholastic materials now provided in an ad hoc, sporadic manner by the government, NGOs, and donors.
<p>3. <i>Financing and use of resources:</i> Except for wages, the ordinary budget allocated to the education sector did not reach the schools.</p>	<ul style="list-style-type: none"> • Provide budget allocations for textbooks and other scholastic materials and for operation and maintenance of primary schools.

The RF 5 million allocated to the provincial and district education offices did not take into account the differences in enrollments and administrative needs in the provinces.

There was limited supervision by school district education officers because of limited resources.

Budgeting systems do not exist at the provincial, district, and primary school levels.

There was a lack of accountability in the use of public funds and other resources contributed by parents, NGOs, donors, and other development agencies.

Committees for the management of primary schools were set up, but their organization remained weak.

- Provide budget allocations for school administration in the provinces that are based on the realities and needs in the districts and provinces, including adequate provision for supervision logistics.

- Introduce a system of budgets and establish guidelines and training in the preparation and implementation of budgets at these levels.

- Introduce systems of accounting and related recordkeeping for the use of funds at provincial and district education offices and in schools. This will require substantial training for staff at regional and district offices and facilities.

- Undertake regular audits of these accounts.

- Know that the Ministry of Education should prepare and enforce a manual of procedures for accountability at the offices and facilities, including accounting for in-kind contributions from all sources.

- Understand that the Ministry of Education should help organize the management committees and clearly define their roles.

Source: Author's conclusions.

Note: NGO = nongovernmental organization.

Table 12A.4. Summary of Problems and Solutions Proposed by Regional Health and Provincial Education Officers

<i>Problems identified</i>	<i>Solutions proposed</i>
Irregularity of public fund transfers	Institute a system of transfers for public funds.
Lack of standardized procedures for payments of public funds and funds from external assistance	Adjust systems of payments of funds allocated to health and education sectors.
Lack of qualified management personnel	Recruit qualified staff and ensure continuous training of personnel.
Lack of permanent control mechanisms	Install control mechanisms for the use of public funds.
Insufficiency of operational funds	Provide adequate operational funds.
Nonparticipation in the process of budgeting	Involve the regional health and provincial education services.
Lack of planning	Institute systems of planning at all levels of the health and education sectors .
Unplanned disbursement of funds	Respect the plans put in place for the disbursement of public funds in the health and education sectors.
Lack of transparency in the transactions between the regional health and provincial education services, the NGOs, and external development partners in the financial management of health and education programs	Install participatory methods in the choice of programs, as well as in their management and evaluation.
Very low wages of health personnel	Raise the wages of health care personnel and teachers.
Poor bookkeeping and an absence of accounting records	Institute and apply conventional standards for keeping accounting records.
Impunity of public fund embezzlers	Warn of and punish embezzlement of public funds.
Inefficiency of the disciplinary function in health and education sectors	Enforce existing disciplinary measures.
Lack of means of communication	Improve means of communication.

Source: Author's conclusions.

Note: NGO = nongovernmental organization.

Table 12A.5. Problems and Solutions Identified at District Health and Education Offices

<i>Problems identified</i>	<i>Solutions considered</i>
Lack of qualified and sufficient personnel	Assess, recruit, and upgrade personnel.
Lack of economic and administrative planning	Institute systems of participatory planning, integrating the population and all established structures of health and education services.
Lack of a concrete budgeting system that includes the district health and education services	Institute proper budgeting systems.
Distribution of funds and materials inconsistent with the needs of services	Make budget programs and plans of service activities, and respect their implementation schedules.
Irregularity of transfers and disbursement of public funds	Transfer and disburse public funds in conformity with plans and calendars of activities of the services concerned.
Lack of statute and proper attribution of duties within the district health and education services	Establish statutes that allow for participation and a role for health care and health partners at all levels, and set up a framework for collaboration.
Lack of accountability by the district health and education administrators in the management of public funds and equipment assigned to them or passing through them toward lower administrative structures	Institute systems of decentralization at all levels of health and education services, and harmonize a framework for collaboration among all subregional and local services.
Lack of proper procedures and control in the management of funds	Provide a simple, practical manual of management and control for all the structural levels of health and education, as well as for other intervening parties.
Lack of continuity in the programs supported by external sponsors	Elaborate strategies relating to the sustainability of projects.

Source: Author's conclusions.

Table 12A.6. Problems and Solutions Identified at Health Centers and Primary Schools

<i>Problems identified</i>	<i>Solutions considered</i>
The Bamako Initiative of self-sufficiency and autonomy in management of health centers has not worked very well in the particular context of Rwanda.	Put in place adequate monitoring and control measures to ensure access to health care for all.
Apart from paying the wages of the health and education personnel, the government did not support the running of health centers and primary schools.	Provide health centers and primary schools with the necessary financial, technical, and material resources to ensure the provision of the best possible medical care and education for the people.
Health centers and primary schools did not have a budgeting system or administrative and financial planning.	At all levels of the health sector and primary education, institute systems of timely planning and of budgeting to satisfy health and education needs, especially in the area of disease prevention.
Costs were incurred by health centers and primary education facilities for providing services to civil servants and prisoners.	The government should take care of its employees and its prisoners without burdening the meager resources of health centers and primary schools.
The ratio of population to number of health centers was growing fast, and the centers did not have resources for the needed rehabilitation, construction, and extension of facilities; recruitment of new medical and education staff; and upgrading of services.	The state should help solve these problems technically and financially through planned development of the health sector to meet the objective of "health for all."
The structural poverty made the population unable to meet the medical expenses.	Put in place systems of solidarity and insurance in the domain of health, notably, the mutual schemes and collective medical insurance.
Health centers were not allowed to take care of some illnesses for which they did not possess the technical and material capacity for intervention, but there were chronic and sometimes life-threatening cases that could be cared for at the health center level.	The Ministry of Health should redefine policies and strategies to rationalize collaboration between health centers and referral hospitals.

Some health centers and primary schools were poorly rehabilitated and didn't have adequate facilities to provide services (for example, some health centers lacked laboratory services, maternity care, or in-patient wards).

When not capable of providing the required medical care, health centers were often not able to transfer patients to referral hospitals because those hospitals were either too far away or because the ambulance system was not adequate.

There is a lack of lighting and refrigeration facilities for the preservation of medical products.

There is a lack of certain drugs for the treatment of serious and chronic illnesses.

Irregularity exists in the payment of wages to health centers and primary school support staff.

Health centers and schools function poorly because they lack financial, technical, and material resources.

Ignorance of the real problems in health centers and primary schools—and even of the problems of the population in general—exists on the part of central services.

There is a lack of management autonomy for health centers and primary schools functioning under the direct control of referral hospitals and district education offices.

The government should carry out extension work, construct new facilities, and provide required equipment to health centers and primary schools.

The government should quantitatively and qualitatively improve referral hospitals and deal with the problems of patient transportation.

The government should provide all centers with lighting, refrigerators, and an air-conditioned room.

The government should review the problem of medicine availability at health centers.

The government should regularize wages in general and pay support staff at health centers and primary schools.

The government should provide assistance to centers and schools structurally incapable of functioning, while looking for permanent solutions.

The government should work closely with its people to better understand their problems regarding health matters.

The government should enable these health centers and primary schools to regain their autonomy.

continued on next page

Table 12A.6, continued

<i>Problems identified</i>	<i>Solutions considered</i>
Poverty was paramount and has limited the capacity of poor people to afford access to education and health services.	The government should promote the creation of jobs and encourage people to develop the spirit of enterprise, and/or establish unemployment compensation schemes for the extremely poor as a short-term remedy.
There is poor management of health centers and primary schools.	The government should hire qualified accounting personnel, provide upgrading courses, and ensure the control of management.
There is a lack of staff housing, particularly in rural areas, is cited as a possible cause of regional disparities.	The government should provide in housing to health and education staff as an incentive to work in many rural areas.
The state of public infrastructure is poor.	The government should improve socioeconomic conditions of the people, especially by providing clean water, electricity, housing, transportation, communication, and microcredit.

Source: Author's conclusions.

Notes

1. A comparison with the 1970 baseline uses the UNDP (2005) data.
2. Note, however, that the rate is significantly higher in statistics provided by international reports. The *African Development Indicators* set the rate at 1,300 deaths per 100,000 (World Bank 2000) in 2000, whereas the UNDP (2005) *Human Development Report* has it at 1,400 deaths per 100,000. The Ministry of Finance and Economic Planning's 2001 "Rwanda Development Indicators sets the maternal mortality rate at 810 deaths per 100,000 (MINECOFIN 2001). The *World Bank African Development Indicators* are used in table 12A.1 to allow cross-country comparisons based on national statistics.
3. The Rwandan CWIQ draws on the prototype CWIQ and was adapted to include a household expenditure module to gain better insights on public spending allocation at the household level. See World Bank (1999) for further details on the prototype CWIQ.
4. The results from the CWIQ have been reported in *Core Welfare Indicators Questionnaire (CWIQ) Survey 2001*, prepared for the National Poverty Reduction Program, MINECOFIN, Rwanda.
5. Under the Bamako Initiative, it is stipulated that the beneficiary population should meet the costs of primary health care services.
6. Each region corresponds to a province, except that the City of Kigali (PVK) and Kigali Rural (Kigali-Ngali) are combined into one region (Kigali) in the health administrative system. In education, PVK and Kigali-Ngali have separate provincial education offices. However, some facilities were inaccessible either because of security reasons or very poor roads made impassible by rain. Differences in the total numbers of schools and health centers in the selected sample versus the totals shown in individual tables in this chapter are due to nonresponse in some facilities (because the head was absent or the information was not available or because of inaccessibility to certain zones as a result of insecurity in the still volatile postconflict context).
7. Members of the steering committee included senior-level staff from the three ministries and representatives from the U.K. Department for International Development and the World Bank.
8. The 1998 budget was the first after the genocide that was in line with the legal and institutional requirements for national budgets.
9. Funds generally were available in the third quarter, when the bulk of taxes were paid, and toward the end of the fiscal year, when donor budget support became available. The system should improve with the introduction of withholding taxes in 2000 and improvements in the programming of donor budg-

- et support. Nevertheless, MINECOFIN staff disputed the findings of the survey, insisting that the delays could not be so stark.
10. In 1998 and 1999, this amounted to \$1.80, with an exchange rate of approximately RF 300 per \$1.0.
 11. This information was obtained from district education offices. The data from the City of Kigali were not available for both years; for the province of Umurata, data were not available for 1998/99.
 12. The Rwandan Household Living Standards Survey conducted in 2001 indicated that income distribution has worsened considerably in Rwanda, with the Gini coefficient rising from 0.29 in a 1985 survey to 0.45 in the 2001 survey. Most well-off households live in urban areas. See MINECOFIN and National Poverty Observatoire (2002) for further details on the distribution of income.
 13. Recent surveys, including the CWIQ, indicate that health and education remain among the top five priorities of the population. Other priorities include addressing insecurity, tackling persistent widespread poverty, and creating opportunities or employment.

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CHAPTER 13

Assessing the Targeting Performance of Social Programs

Cape Verde

Diego Angel-Urdinola and Quentin Wodon

Budget constraints faced by governments in developing countries imply that effectively targeting performance of public subsidies and social programs (whether the subsidies are provided in cash or in kind) is important in reducing poverty. There are three main advantages to effective targeting. First, for programs not intended to offer universal coverage, better targeting helps reduce program outlay because there are fewer beneficiaries. Second, for any given level of outlay, better targeting suggests that the share of public expenditure that accrues to poor people typically will be higher and so will enable the programs to have a larger impact on poverty. Third, targeting may help reduce the potential negative incentive effects or distortions in economic behavior associated with transfers if fewer households are affected by the programs. For example, if fewer households benefit from subsidized water or electricity service, there will be less incentive to consume more than would be consumed normally if the full cost of the service were paid by the household. Too much targeting, however, can produce negative incentive effects. In some industrial countries, transfers may lead to poverty traps whereby the incentives for some households to emerge from poverty are lessened by high implicit taxation rates associated with increased income and decreased transfers.

In this chapter, our objective is not to discuss the incentive effects associated with social programs; rather, we intend to document the incidence or distributional properties of the programs under way in Cape Verde, a group of islands off the West African coast in the North Atlantic Ocean, and to analyze whether some systems of targeting could help improve targeting performance.¹

According to the Cape Verde poverty report prepared by the World Bank (2005), public transfers in Cape Verde represent, on average, between 5 percent and 13 percent of household income, depending on the consumption quintile to which a household belongs. Most social public spending is invested for education, health care, and pensions. As a result, school enrollment rates are high and the country has been successful in eradicating most communicable diseases and in achieving the best performance levels for basic indicators among sub-Saharan African countries.²

Cape Verde, however, needs to improve the efficiency of its spending because of budget constraints. The demands for education and health care have increased, with nearly universal access to primary education translating into a higher demand for secondary and tertiary education. Unit costs per student in primary school increased from \$60 in 1993 to \$128 in 2000. The increase at the secondary level was even larger, from \$125 in 1993 to \$334 in 2000 (World Bank 2005). Estimates suggest that the annual unit cost for a student in tertiary education circa 2004–05 could be as high as \$2,000 (because of investment in new university facilities and study-abroad programs promoted by the government).

Because overall life expectancy is high, the health care system faces the challenge of providing subsidized and affordable medical care to a growing and aging population in need of expensive and complicated treatments. Government expenditures on pensions also are substantial and the financial situation of the contributory pension system is not sustainable in the long run (see World Bank 2007).

Beyond an analysis of the incidence of public spending in Cape Verde, we also provide a framework for analyzing the factors that determine the targeting performance of social programs and transfers. Whereas most indicators of benefit incidence are silent as to why subsidies are targeted the way they are (that is, the indicators give only an idea of subsidies' targeting performance),³ we develop a simple decomposition that enables an analysis of both "access" and "subsidy design" factors that affect subsidies' overall targeting performance. Finally, we explore the potential for more effec-

tive targeting of social programs in Cape Verde by comparing the targeting performance that could be achieved either under a proxy means-testing system or under a geographic targeting system based on a poverty map recently completed.

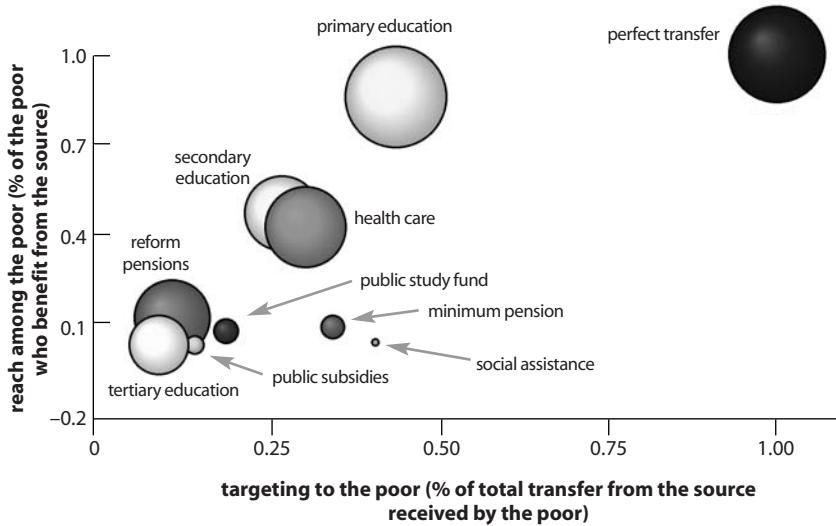
To sum up, to increase efficiency and limit costs, efforts must be made to allocate resources to those segments of the population that most need them. In this chapter, we analyze how public transfers are targeted using data from a 2001–02 national household survey, and study the incidence and coverage of public transfers. Because incidence analysis does not explain the rationale behind resource allocation, we look at the determinants of the system’s targeting performance following a framework developed by Angel-Urdinola and Wodon (2007). We also discuss alternative targeting mechanisms to improve performance.

Incidence of Public Transfers and Targeting Performance

This section provides an analysis of the incidence and coverage of public transfers in Cape Verde, using data from the *Inquérito às Despesas e Receitas Familiares* household survey conducted by Cape Verde’s Ministry of Finance and the National Institute for Statistics during the last trimester of 2001 and the first trimester of 2002. The survey collected general information on households and individuals (including data on demographics, education, assets, and health) and comprehensive information on income and expenditures. The stratified sample included 4,584 households (44 percent from rural areas) and was representative of the total population (approximately 95,257 households).

Our analysis covers all public transfers that could be identified in the household survey. Public spending for primary, secondary, and tertiary education is considered, as are outlays for public pensions (that is, reform pensions, which are traditional pensions, and minimum pensions, which target poor people).⁴ The survey also included information on school stipends (*bolsas de estudo*), other public subsidies (*abonos e subsídios diversos*), and social assistance (*prestações de assistência social pelas administrações públicas em género*).

Many assumptions have been made in using the survey data. One assumption is that the unit cost of providing basic in-kind public services—say, in education and health—is similar across geographic areas or household categories that use these services. As noted by Wodon and Ye (2006)

Figure 13.1. Incidence and Coverage of Remittances/Private Transfers, 2001–2002

Source: Authors' estimates.

in the case of Sierra Leone, when this assumption is not verified, it typically is because poor people benefit more than nonpoor people from lower-cost (and lower-quality) services. This means that the estimates of in-kind benefits accruing to the poor from the use of publicly provided services, as presented here, are probably overstated.

To present and visualize our results on the incidence of public transfers, we first rely on a diagram that provides three sources of information at once (figure 13.1). The three indicators are the percentage of the poor population that benefits from any given income source, the percentage of the total income from a source that is received by the poor, and the size of the income source (that is, the total income from the source obtained by the population as a whole). Here are the key results portrayed in the figure:

- *Sizes of various transfers:* Primary, secondary, and tertiary education; health care; and reform pensions all represent large public transfers to households (pensions are not purely public transfers, however; they are partly private contributions because workers have contributed to the pension scheme). Outlays for minimum pensions, school stipends, social assistance, and other public subsidies are much smaller.

- *Coverage*: For primary and secondary education and for health services, coverage levels are fairly high. For other transfers, coverage levels are in the 10–15 percent range or even lower. For example, coverage of tertiary education among the poor is virtually zero.
- *Targeting*: Given that poor people represent 36.7 percent of the country's population,⁵ a lower share than 36.7 percent would mean that, relative to their population size, poor people benefit less from transfers than does the population as a whole. As expected, the targeting indicators are more favorable for primary education than for secondary education and health, with virtually none of the spending on tertiary education benefiting the poor. The share of reform pension outlays that reaches the poor also is minimal. About a third of the outlays for the minimum pension schemes do reach the poor, but poor people still receive a lower share of these outlays relative to their proportion of the total population. That suggests weaknesses in the targeting system for these pensions. About 40 percent of social assistance outlays reach the poor, but the targeting indicator is lower for other public subsidies and schooling stipends.
- *Eradication of poverty*: The large bubble on the upper right corner on Figure 13.1 represents the size of a perfectly targeted transfer that would be sufficient to eradicate poverty (the coverage among the poor would be 100 percent, as would be the targeting among the poor, since the transfer would provide to each poor household exactly what is needed to lift the household to the poverty line). Pooling the resources from various types of cash transfers could go a long way in reducing poverty if all these resources were better targeted to the poor. Aiming for perfectly targeted transfers is obviously difficult in most cases (such as reform pensions, which are meant to replace income lost by retirement), and we do not recommend it because many of the transfers are meant to cover a larger population than the poor. Still, overall, only a small portion of the transfers typically reach poor people so the effect of those transfers on the reduction of poverty is relatively limited.

Following Angel-Urdinola and Wodon (2007), another way to look at benefit incidence is to define a simple indicator of targeting performance, Ω , which is the share of the subsidy benefits received by the poor (S_p / S_H), where S_p denotes the value of all subsidies accruing to the poor and S_H denotes the total value of the benefits received by the population as a

whole) divided by the proportion of the population in poverty (P/H , where P denotes the number of poor households or individuals and H denotes the number of households in the overall population. In mathematical notation, we have

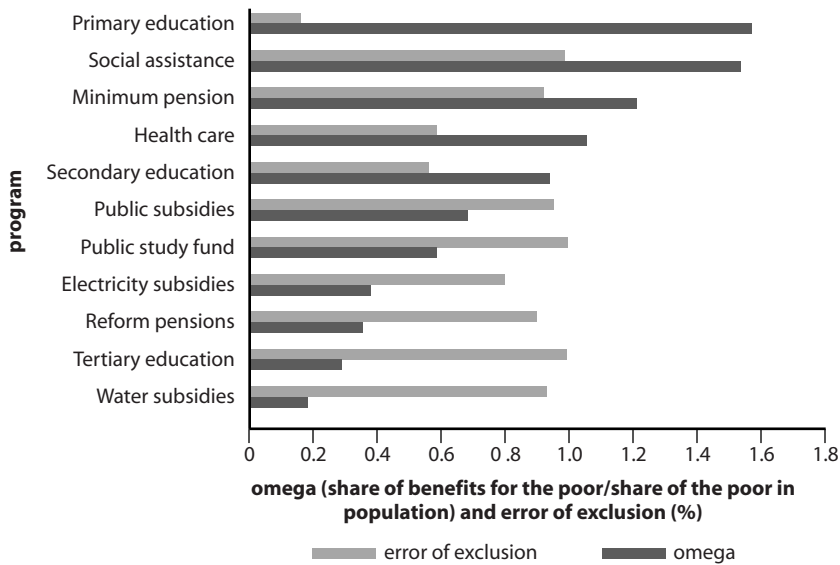
$$\Omega = \frac{S_p}{P} / \frac{S_h}{H}. \quad (13.1)$$

A value of 1.00 for Ω implies that the subsidy distribution is neutral, with the share of benefits going to the poor proportional to their population share. A value above (below) 1.00 for Ω implies that the subsidy distribution is progressive (regressive): the poor receive a larger (smaller) share of the benefits than their population share. The smaller the number, the more regressive it is—and vice versa.

In our analysis, we also provide data on the public transfer allocations' errors of exclusion. An error of exclusion occurs when a poor household does not benefit from a subsidy. Denoting by B_p the proportion of households who get the public transfer (that is, the beneficiary incidence or coverage level among the poor mentioned in the discussion of figure 13.1), the share of poor households excluded from the subsidy is

$$\text{Error of exclusion} = 1 - B_p. \quad (13.2)$$

Figure 13.2 displays the value of the targeting performance indicator, Ω , as well as the errors of exclusion for the public transfers described above and for subsidies for the consumption of water and electricity (these values are obtained from Angel-Urdinola and Wodon 2007). As before, the results suggest that public transfers related to primary education, social assistance, minimum pensions, and health care are the most pro-poor (that is, the value of Ω is greater than 1). With the exception of primary education and, to some extent, health care, however, program coverage is very limited because the errors of exclusion are often high. Other public transfers (secondary education, the public study fund that provides grants for schooling, electricity and water subsidies, reform pensions, and tertiary education) display values of Ω lower than 1, suggesting that resources are allocated more heavily to nonpoor households than to poor households. Most of the programs with low values for Ω also have very limited coverage, as suggested by their high errors of exclusion.

Figure 13.2. Indicators of Targeting Performance

Source: Authors' calculations.

Factors That Determine Targeting Performance

The data presented above suggest that many poor households in Cape Verde do not receive a range of public transfers and that the values of the targeting performance indicators Ω are often lower than 1. As Angel-Urdinola and Wodon (2007) described in detail for the case of water and electricity subsidies, there may be both “access” and “subsidy design” factors that contribute to low targeting performance and poor coverage.

Access factors can be divided into physical access (A) and usage or “take up” of subsidies or services (U). Let A_H represent the share of all households having physical access to (or being eligible for) a transfer or service. For example, access to primary education is available only in communities or geographic areas where there are schools. Given access, let U_{HA} be the share of households who have physical access to a public transfer or service and choose to use it or are eligible for it (this could not occur, for instance, if parents do not send their children to school because they can't afford the fees or if eligible households do not receive a cash transfer to which they are entitled because they lack information about the program).

Subsidy design factors are those that determine the final distributional incidence of the transfer, once we know who could benefit from the subsidy or transfer because the household has access to it and is using the service. A first subsidy design factor is the targeting mechanism used. $T_{H/U}$ is defined as the share of households among those using a service that actually get the public transfer (that is, the beneficiary population among the population that potentially can benefit from the transfer because it has access and is using the service).

A second subsidy design factor is the rate of subsidization, R . Denote the average unit cost of the service by C (such as the average annual unit cost per student in primary school). C is assumed to be constant across all households. The total cost of serving a customer is a function of C and of the quantity consumed (or the number of beneficiaries using the service), denoted by Q . If the average quantity consumed by *subsidy recipients* is $Q_{H/T}$, and the average private expenditure on the good (such as co-payments for health care or education) is denoted by $E_{H/T}$, then the average rate of subsidization is $R_{H/T} = 1 - E_{H/T} / (Q_{H/T} * C)$. As shown in Angel-Urdinola and Wodon (2007), the parameter Ω can be described as a product of five ratios, as follows (denoting by P the poor):

$$\Omega = \frac{A_P}{A_H} \times \frac{U_{P/A}}{U_{H/A}} \times \frac{T_{P/U}}{T_{H/U}} \times \frac{R_{P/T}}{R_{H/T}} \times \frac{Q_{P/T}}{Q_{H/T}}. \quad (13.3)$$

The first two ratios represent the service access rate among the poor divided by the access rate among the population as a whole, followed by the usage rate for a service (given access) for the poor compared with the rate for the population as a whole. Typically, one would expect that the ratio of access rates (A) would be lower than 1 because the poor tend to live in areas with lower access to public transfers and services than the population as a whole. Similarly, one would expect that the ratio of the usage rates for transfers and services (U) would be lower than 1 because a lack of information and, perhaps, a lack of funds makes poor people less likely to use public services than is the population as a whole where there is access. This “access-factors handicap” can be expected to work against the targeting of public transfers to the poor. Subsidy design factors will need to overcome the access handicap if the distribution of transfers is to be progressive, so that the value of Ω is larger than 1. This result could be observed among others if targeting is good (among those using the service, the poor are more likely to receive the public transfer than is the popula-

tion as a whole), if the unit reduction in price versus full cost received by the poor is larger than for the nonpoor, or if the poor are likely to consume more of the good than is the population as a whole when they have been found eligible for the transfer (for example, the poor may have more children enrolled in public schools than does the total population).

Table 13.1 provides the results of the above Ω decomposition to explain in more detail the key determinants of targeting performance for the various public transfers observed in Cape Verde's household survey. For primary education and health care, which present values of Ω greater than 1, access generally is high among the poor (that is, A_p is close to 1 in both cases), and usage rates are larger among the poor (that is, $U_{p|A} > U_{H|A}$). The latter finding probably arises because richer households can afford to choose to use private services for either education or health care. We find, for instance, that usage rates for primary education are 10 percentage points higher than average among poor households, and rates for health care are 3 percentage points higher. As expected, overall usage rates for education are higher than for health care (78–87 percent versus 35–38 percent) because households are more likely to have children in the education system than to have a member (presumably sick) actively using health services. In terms of quantity consumed, we find that the Q ratios for primary education and health care are close to 1. For education, the Q ratio is slightly above 1 for education because, on average, poor households are larger and thus more likely to have more children using education services on a yearly basis (thus, $Q_{p|T} = 2.03 > Q_{H|T} = 1.75$). For health care, the ratio is slightly below 1, which is not surprising because richer households usually have a higher average of effective health consultations per household each year ($Q_{p|T} = 33.6 < Q_{H|T} = 34.22$; these values are high because the number of recent visits is annualized). For secondary education, the value of Ω is also slightly lower than 1, mainly stemming from a high Q ratio ($Q_{H|T} = 1.6 > Q_{p|T} = 1.5$), which results from nonpoor households tending to have more children in secondary school. Users of minimum pensions and social assistance programs, which also display a value for Ω greater than 1, generally are poor households, and thus $A_p * U_p > A_H * U_H$. Q ratios for these two programs, on the contrary, are usually lower than 1, which suggests that, on average, richer households receive larger nominal benefits than do poor households.

Other programs (public subsidies, public study funds, and social assistance programs) display Ω values below 1. For example, it is striking to see that social assistance programs are not well targeted, and it would be

Table 13.1. Decomposition of Determinants of Public Transfers Performance

<i>Program</i>	<i>Ratio of share of households with community access to service (A)</i>	<i>Ratio of share of households with access who use service (U A)</i>	<i>Ratio of share of users who receive subsidy (T U)</i>	<i>Ratio of subsidization (R T)</i>	<i>Ratio of average quantity consumed (Q T)</i>	<i>Unit cost (C VEsc) (C)</i>
<i>Water subsidies</i>						
Poor households	0.52	0.20	1.00	0.40	3.36	350
All households	0.65	0.41	1.00	0.33	6.37	350
Ratio	0.79	0.49	1.00	1.19	0.53	350
<i>Electricity subsidies</i>						
Poor households	0.72	0.34	1.00	0.11	56.83	20.5
All households	0.82	0.54	1.00	0.06	111.72	20.5
Ratio	0.88	0.63	1.00	1.70	0.51	20.5
<i>Primary education</i>						
Poor households	1.000	0.877	1.000	1.000	2.032	31,370
All households	1.000	0.780	1.000	1.000	1.751	31,370
Ratio	1.000	1.124	1.000	1.000	1.160	31,370
<i>Secondary education</i>						
Poor households	0.984	0.399	1.000	1.000	1.514	27,552
All households	0.993	0.408	1.000	1.000	1.581	27,552
Ratio	0.991	0.978	1.000	1.000	0.958	27,552
<i>Tertiary education</i>						
Poor households	0.163	0.034	1.000	1.000	1.432	412,386
All households	0.272	0.091	1.000	1.000	1.106	412,386
Ratio	0.599	0.374	1.000	1.000	1.295	412,386

<i>Health care</i>						
Poor households	0.993	0.388	1.000	1.000	33.640	1,743
All households	0.994	0.358	1.000	1.000	34.215	1,743
Ratio	0.999	1.085	1.000	1.000	0.983	1,743
Program		(A x U)	(T U)	(R T)		(Q T)
<i>Reform pensions</i>						
Poor households		0.097	1.000	1.000		65,269.64
All households		0.102	1.000	1.000		175,155.30
Ratio		0.954	1.000	1.000		0.373
<i>Subsidies</i>						
Poor households		0.049	1.000	1.000		28,892.04
All households		0.071	1.000	1.000		29,415.58
Ratio		0.690	1.000	1.000		0.982
<i>Public study fund</i>						
Poor households		0.006	1.000	1.000		115,597.60
All households		0.010	1.000	1.000		126,327.50
Ratio		0.638	1.000	1.000		0.915
<i>Social assistance</i>						
Poor households		0.013	1.000	1.000		24,545.98
All households		0.006	1.000	1.000		32,721.84
Ratio		2.039	1.000	1.000		0.750
<i>Minimum pension</i>						
Poor households		0.070	1.000	1.000		31,734.90
All households		0.047	1.000	1.000		38,888.40
Ratio		1.486	1.000	1.000		0.816

Source: Authors' calculations.

useful to learn why this is true by examining the various subprograms in this category.⁶ In any case, contrary to what we observed for minimum pensions, users of these various programs and transfers are more likely to be nonpoor households and thereby $AP * UP < AH * UH$). Furthermore, Q ratios for these programs are lower than 1, which suggests that richer households receive greater benefits, on average. As for utility services, low Ω values for electricity and water subsidies result from a combination of different subsidy rates and quantities consumed by poor and nonpoor households. Although the rate of subsidization is greater for poor households than for all households ($R_{PT} = 0.11$ versus $R_{HT} = 0.06$), the average quantity (in kilowatt hours) consumed per month by poor households connected to the network is less than half the quantity consumed in the population as a whole ($Q_{PT} = 49.31$ versus $Q_{HT} = 111.72$). Indeed, because the system provides greater subsidies to households that consume less (the country implemented an inverted block tariffs scheme), this difference in consumption levels explains why the energy bills of poor households are more discounted than bills of other households. However, nonpoor households still receive a larger subsidy each month than do the poor households because they consume more electricity and almost all of their consumption is subsidized to some degree: the product of $R_{PT} / R_{NT} * Q_{PT} / Q_{NT}$ is 0.81.⁷

Improving Targeting Performance

Targeting is a relevant subsidy factor for improving the allocation of resources so that they become more beneficial for poor people. There are several targeting mechanisms that policy makers can design to define criteria for public transfer eligibility. Some of the more widely used mechanisms are geographic targeting (whereby benefits are allocated in localities with high concentrations of poverty), quantity targeting (through which benefits are allocated to users who consume smaller quantities of service), and proxy means testing (whereby benefit allocations are based on the prediction of a household's poverty level, reflected by certain visible characteristics). Targeting mechanisms are well designed to the extent they provide more accurate predictions of which households are poorer (and therefore in greater need of public transfers). In this section, we analyze the predictive power of means-testing and geographic mechanisms.

Proxy Means Testing to Predict Household Poverty

Proxy means-testing mechanisms rely on a method of predicting household welfare based on visible characteristics. Like the other targeting methods, proxy means testing may be used in combination with quantity targeting or may be the sole basis for identifying subsidy beneficiaries.

To design a proxy means-testing mechanism, we relied on linear regressions to predict household welfare. In particular, we used the natural log of per capita expenditure as the dependent variable, and we controlled for household characteristics that may predict per capita consumption and that are easily verifiable by a social worker. These household-level variables include the log of the household size (to allow for nonlinearity), whether the household head is female, the age of the head and the age squared, the literacy and education levels of the head (the excluded category is a household head who has no education), and other infrastructure variables (for example, household access to electricity, piped water, and a toilet; and a household dwelling's type of walls, floor, and ceiling). We also included a vector of geographic variables (a set of geographic dummies for every island) and dummies reflecting whether households possess a series of assets (television, radio, telephone, oven, refrigerator, washing machine, bicycle, motorcycle, and other motor vehicles). To maximize the predictive power of our regression, we relied on stepwise estimation. This method ensures that the set of available variables included in our model provides the highest possible fit as measured by the R^2 . When the model was estimated, we generated a predictor of the dependent variable. Additionally, we created a dummy variable (*poor*) that takes the value of 1 if the "observed" value of household per capita consumption is below the official poverty line (equivalent to CVEsc 43,249.8 per capita annually), and a second dummy (*predicted poor*) that equals 1 if the "predicted" value of the household's per capita consumption fulfills the same condition.

Regression results are available on request. In general, when making statistical predictions based on linear regressions, two errors arise (Type I and Type II errors). In our case, the Type I error (error of exclusion) would consist of excluding from a targeted program households that are poor but are predicted to be nonpoor on the basis of the proxy means-testing mechanism; and the Type II error (error of inclusion) would consist of allocating program benefits to households that are nonpoor. Findings of how well our model predicts poverty (and the size of the Type I and Type II errors) are presented in table 13.2.

Table 13.2. Errors of Exclusion and Inclusion in a Proxy Means-Testing Model

<i>Targeting indicator</i>	<i>All households</i>		
	<i>National</i>	<i>Urban</i>	<i>Rural</i>
Poor, predicted poor	0.175	0.095	0.295
Poor, predicted nonpoor	0.106	0.080	0.125
Error of exclusion	0.377	0.459	0.298
Nonpoor, predicted nonpoor	0.651	0.793	0.451
Nonpoor, predicted poor	0.069	0.032	0.129
Error of inclusion	0.095	0.039	0.222
Sample size (number of households)	4,583	2,463	2,120
Weighted sample size	95,237	54,283	40,954

Source: Authors' calculations.

In Cape Verde, 28.1 percent of all households are poor. As shown in table 13.2, our model rightly predicted as “poor” 17.5 percent of the actual 28.1 percent, and it wrongly predicted the remaining 10.6 percent (therefore, the Type I error is equivalent to approximately 38 percent, as a share of the predicted poor). Table 13.2 presents similar results for urban and rural areas. The Type I error is 46 percent in urban areas and 30 percent in rural areas. Although the share of incorrectly predicted poor households is somewhat high, more information should be collected before making a judgment of the model. In particular, the model still could be considered a good one to the extent that most of the households mispredicted as poor are borderline nonpoor households (that is, they are only marginally above the poverty line). Furthermore, by changing the poverty line, the magnitude of the errors also change. We will conduct more detailed analyses of this issue below. The Type II error of the model, measured by the poor households predicted to be nonpoor, is approximately 10 percent nationwide (4 percent in urban and 22 percent in rural areas).

We provide a more detailed analysis of the errors of inclusion and exclusion by using a prediction matrix based on population decile (rather than on household decile) of per capita consumption (table 13.3). Cape Verde's 28.1 percent poor households are equivalent to 36.7 percent of the population (25 percent urban and 51 percent rural). For simplicity's sake in identifying the poor population, we used the third, fourth, and fifth deciles of per capita consumption (weighted by the population weights) as our new poverty lines at the urban, national, and rural levels, respectively. According to the matrix, errors of exclusion are 10.0 per-

Table 13.3. Welfare Prediction Matrix

Per capita expenditure decile	100										Error of inclusion	
	1	2	3	4	5	6	7	8	9	10		
<i>National</i>												
1	4.48	2.54	1.73	0.70	0.35	0.14	0.05	0.02	0.01	0.00	0.00	0.57
2	2.52	2.43	1.99	1.36	1.04	0.46	0.15	0.04	0.00	0.00	0.00	1.69
3	1.46	1.67	1.90	2.22	1.18	0.84	0.42	0.28	0.01	0.00	0.00	2.73
4	0.38	1.07	1.52	1.99	1.63	1.57	1.27	0.45	0.13	0.00	0.00	5.05
5	0.57	0.89	1.26	1.53	1.78	1.69	0.93	1.03	0.25	0.03	0.03	0.00
6	0.42	0.70	0.67	0.92	1.67	1.76	2.15	0.99	0.71	0.03	0.03	0.00
7	0.13	0.20	0.37	0.67	0.98	1.77	1.63	2.21	1.68	0.35	0.03	0.00
8	0.03	0.37	0.31	0.38	0.94	0.95	1.96	2.18	2.14	0.73	0.03	0.00
9	0.00	0.10	0.16	0.15	0.31	0.39	1.15	2.11	3.41	2.24	0.03	0.00
10	0.00	0.02	0.10	0.08	0.14	0.41	0.29	0.68	1.66	6.60	0.03	0.00
Error of exclusion	1.15	2.28	2.87	3.73	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
<i>Urban areas</i>												
1	5.93	2.55	0.96	0.48	0.26	0.00	0.01	0.01	0.00	0.00	0.00	0.76
2	2.38	2.84	2.29	1.13	0.74	0.31	0.17	0.00	0.00	0.00	0.00	2.35
3	0.50	2.11	1.97	2.36	1.59	0.92	0.31	0.10	0.06	0.00	0.00	5.34
4	0.77	0.98	2.04	1.74	1.35	1.79	0.96	0.34	0.08	0.00	0.00	0.00
5	0.16	0.91	1.13	1.29	2.03	1.53	1.69	0.92	0.31	0.00	0.00	0.00
6	0.20	0.10	0.85	1.24	1.21	1.70	1.91	1.92	0.78	0.15	0.00	0.00
7	0.10	0.38	0.44	1.01	1.36	1.61	2.01	1.67	1.17	0.15	0.00	0.00

continued on next page

Table 13.3, continued

Per capita expenditure decile	100										Error of inclusion
	1	2	3	4	5	6	7	8	9	10	
<i>Urban areas</i>											
8	0.00	0.12	0.16	0.40	0.77	1.65	1.43	2.86	1.98	0.64	0.00
9	0.00	0.00	0.14	0.24	0.43	0.43	1.09	1.78	3.52	2.38	0.00
10	0.00	0.00	0.00	0.11	0.27	0.04	0.45	0.39	2.14	6.61	0.00
Error of exclusion	1.23	2.49	4.76	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
<i>Rural areas</i>											
1	4.20	1.86	1.35	0.87	0.94	0.37	0.23	0.17	0.02	0.04	0.83
2	2.11	1.54	1.88	1.41	1.32	0.71	0.58	0.40	0.00	0.02	1.71
3	1.79	1.51	1.88	1.24	0.94	1.29	0.67	0.51	0.14	0.06	2.67
4	0.87	1.34	1.70	1.15	1.38	1.29	0.85	0.63	0.55	0.22	3.54
5	0.38	1.11	0.94	1.29	1.56	1.40	1.31	1.39	0.46	0.22	4.78
6	0.48	0.95	0.91	0.97	1.28	1.46	1.48	1.05	1.20	0.21	0.00
7	0.24	0.95	0.53	0.89	0.82	1.24	1.32	1.66	1.70	0.59	0.00
8	0.00	0.56	0.63	1.08	0.62	0.75	1.44	1.48	2.08	1.37	0.00
9	0.00	0.12	0.11	0.55	0.83	0.90	1.58	1.88	2.14	1.90	0.00
10	0.00	0.00	0.14	0.49	0.28	0.59	0.56	0.82	1.76	5.32	0.00
Error of exclusion	0.72	2.58	2.32	3.98	3.83	0.00	0.00	0.00	0.00	0.00	0.00

Source: Authors' estimates.

Note: Values in cells indicate share of the total population. The shaded areas in the matrix account for the errors of inclusion or exclusion.

cent, 8.5 percent, and 13.5 percent at the national, urban, and rural levels, respectively. Almost half of the individuals excluded (poor but predicted nonpoor) are borderline poor. The magnitude of the errors of inclusion is similar to that of the errors of exclusion. Most of the nonpoor households “wrongly” predicted are also borderline nonpoor (that is, they are only a little above the poverty line).

Now we turn to exploring how sensitive the prediction model is to the choice of poverty line. To do so, we ranked our welfare predictor from the lowest to the highest. Using household weights and size (and conserving the ranking), we calculated the share of the total population represented by each household in the survey. We defined as “predicted poor” all households below our choice of poverty line (we used 20, 30, 40, and 50 percent of the cumulative population distribution of the predictor, respectively). The real “poor” (approximately 37 percent) are those households with observed per capita incomes below the official poverty line—that is, below CVEsc 43,249.8 per capita annually. Our results are summarized in table 13.4.

Table 13.4. Means-testing Performance under Different Poverty Lines

<i>Sample considered poor (%)</i>	<i>All households</i>			
	<i>Poor, predicted poor (%)</i>	<i>Poor, predicted nonpoor (%)</i>	<i>Nonpoor, predicted poor (%)</i>	<i>Nonpoor, predicted nonpoor (%)</i>
<i>National</i>				
20.00	16.00	20.69	3.98	59.32
30.00	22.69	14.01	7.29	56.01
40.00	28.39	8.31	11.59	51.72
50.00	32.06	4.64	17.91	45.39
<i>Urban</i>				
20.00	15.17	9.81	4.81	70.20
30.00	19.44	5.55	10.52	64.50
40.00	22.23	2.75	17.76	57.26
50.00	24.02	0.96	25.96	49.06
<i>Rural</i>				
20.00	16.65	34.42	3.31	45.62
30.00	24.48	26.59	5.51	43.42
40.00	30.66	20.41	9.33	39.60
50.00	36.97	14.10	12.94	35.99

Source: Authors' calculations.

As suggested in table 13.4, using a cutoff point of 40 percent of the predicted poor (the benchmark case because the actual poverty rate is 37 percent), the model gives a good prediction of poor households, especially in urban areas. Urban poverty predictions are more accurate mainly because urban households show a larger dispersion in terms of consumption as well as asset levels than do rural households, which increases the power of the proxy means-testing mechanism. Using higher (lower) cutoff points results in a higher (lower) share of the actual “poor” being predicted poor, especially in urban areas. Of course, a higher (lower) cutoff point increases (decreases) the probability that the model fails to exclude nonpoor households from the targeted program. That may contribute to an overinvestment (underinvestment) of social funds because the percentage of nonpoor households predicted to be poor becomes larger (smaller).

Geographic Targeting to Predict Household Poverty

Using census data and the Cape Verde poverty map (which predicts per capita expenditure for all households included in the census), we ranked all districts in the country, from the one with the highest average poverty rate to the one with the lowest rate. We then calculated the overall population share in every district. Keeping the rank constant, we calculated the cumulative population distribution. All households belonging to the provinces below 20, 30, 40, and 50 percent of the population distribution were predicted as “geographically poor.”

As suggested by table 13.5, geographic targeting, like proxy means testing, has a better predictive power in urban than in rural areas. By implementing this method and assuming poverty rates of 20, 30, 40, and 50 percent of the population, respectively, we could predict correctly only 28 percent of the poor households in rural areas (versus 47 percent in urban areas), 40 percent (versus 61 percent), 51 percent (versus 72 percent), and 62 percent (versus 82 percent). This result is not surprising because the urban poor population usually is concentrated in slum districts, whereas poor households are more widely dispersed in rural districts.

As table 13.6 suggests, proxy means testing offers a better targeting mechanism than does geographical targeting at the national, urban, and rural levels when all households in the survey and census are included in the analysis. This is true because both the errors of inclusion and the errors of exclusion are smaller using proxy means-testing mechanisms than using geographic targeting methods in all scenarios. This is to be expected

Table 13.5. Geographic Targeting Using Census Data

<i>Sample considered poor (%)</i>	<i>All households</i>			
	<i>Poor, predicted poor (%)</i>	<i>Poor, predicted nonpoor (%)</i>	<i>Nonpoor, predicted poor (%)</i>	<i>Nonpoor, predicted nonpoor (%)</i>
<i>National</i>				
20.00	14.26	21.91	5.72	58.11
30.00	20.01	16.16	9.89	53.93
40.00	24.96	11.22	14.88	48.95
50.00	28.92	7.26	20.94	42.89
<i>Urban areas</i>				
20.00	8.88	10.10	11.00	70.03
30.00	11.54	7.44	18.28	62.75
40.00	13.77	5.21	26.02	55.01
50.00	15.55	3.42	15.55	46.84
<i>Rural areas</i>				
20.00	15.47	40.55	4.52	39.46
30.00	22.21	33.82	7.68	36.30
40.00	28.59	27.43	11.30	32.67
50.00	34.55	21.48	15.34	28.63

Source: Authors' calculations.

Note: The actual "poor" are defined as those households having annual consumption below CVEsc 43,249.8 per capita (the official poverty line).

because the proxy means-testing model controls not only for locality factors but also for other variables that predict welfare, such as type of housing characteristics and demographics.

Conclusion

Cape Verde spends heavily on public transfers, especially for health care, education, and pensions. Although large government spending in the social sectors has made the country one of the best performers in West Africa regarding the delivery of services in those sectors, the system needs to improve the efficiency of its spending to ensure its sustainability. The country's expenditures on primary education and health care constitute a large share of overall public transfers in nominal terms, and they are quite pro-poor. However, other components of the social protection network (such as pensions, public subsidies, public study funding, utility subsidies, and higher education) are not reaching the poor adequately.

Table 13.6. Geographical Targeting Versus Proxy Means Testing

Share of the sample considered poor (%)	Geographical targeting using census		Proxy means testing using survey	
	Error of inclusion (%)	Error of exclusion (%)	Error of inclusion (%)	Error of exclusion (%)
	Full sample		Full sample	
<i>National</i>				
20	28.63	27.38	19.92	25.86
30	33.08	23.06	24.32	20.01
40	37.35	18.65	28.99	13.84
50	42.00	14.48	35.84	9.27
<i>Urban areas</i>				
20	55.33	12.60	24.07	12.26
30	61.30	10.60	35.11	7.92
40	65.39	8.65	44.41	4.58
50	50.00	6.80	51.94	1.92
<i>Rural areas</i>				
20	22.61	50.68	16.58	43.00
30	25.69	48.23	18.37	37.98
40	28.33	45.64	23.33	34.01
50	30.75	42.87	25.93	28.15

Source: Authors' estimation.

Note: The actual "poor" under means testing are defined as those households having per capita consumption below CVEsc 43,249.8 annually (the official poverty line).

The targeting performance of public transfers in Cape Verde has a natural distributional handicap because poor households usually have an access disadvantage: they are limited in access to infrastructure and information, and they still cannot afford the services. To overcome this handicap, policy makers must pay attention to the performance of subsidy-design factors (such as targeting mechanisms and rates of subsidization). Results for Cape Verde indicate that, apart from primary education and health care (services with high rates of access and use among poor people), public transfers are not being allocated in a pro-poor manner because of a combination of disadvantageous access factors among the poor and poorly performing design factors (especially involving targeting mechanisms).

Finally, proxy means testing generally has better predictive power than does geographic targeting, especially in rural areas where poverty is widespread. In urban areas, the predictive advantage of means testing over geographic targeting is lower, probably because urban poverty is concentrat-

ed in slums. This poses a natural trade-off because policy makers constrained by tight budgets may choose to implement geographic targeting, even when it sacrifices some predictive power.⁸

Notes

1. There is a large body of literature in this area. Several studies have been devoted to assessing the targeting performance of a wide range of programs in developing and transition economies (for example, Grosh 1994; Subbarao et al. 1997; Braithwaite, Grootaert, and Milanovic 2000; and Coady, Grosh, and Hoddinott 2004). In the case of utilities such as water and electricity, although subsidies are very widespread, it is not clear that they are well targeted (Wodon, Ajwad, and Siaens 2003; Komives et al. 2005; Angel-Urdinola, Cosgrove-Davies, and Wodon 2006; and Angel-Urdinola and Wodon 2007). This finding is problematic given that utility subsidies in developing and transition economies often are more costly than other transfer programs (Alderman 2002).
2. Life expectancy at birth is 70.1 years; child mortality is 42 per 1,000 live births among boys and 30 per 1,000 live births among girls; and the maternal mortality ratio was 150 to 100,000 live births in 2000 (see World Bank 2005 for more details). These figures reflect both the relatively high income per capita in Cape Verde and the high share of public spending devoted to health care.
3. For a good discussion of standard benefit incidence analysis, see Demery (2003).
4. There are two noncontributory social security schemes—one for people in the Food for Work (FAIMO) public works program and one for other elderly or disabled people. FAIMO is a labor-intensive infrastructure works program, financed with food aid counterpart funds, that employs approximately 15,000 to 20,000 people annually. The aim of this program is to provide some income security to the poor, especially those people who live in rural areas and women who are heads of household. In 1992, a noncontributory pension scheme was introduced for workers in FAIMO. All elderly people who have worked at least 10 years in campaigns funded by the government are covered (44 percent of the FAIMO workers have at least 10 years' tenure), and invalidity and old-age pensions are provided. All FAIMO pensioners receive a fixed annual pension equivalent to \$300. The Minimum Social Protection (PSM) scheme is a noncontributory, means-tested program set up in 1995 to provide income for people not covered by the other social protection program. The PSM is fully financed with resources from official development assistance. Approximately 7,000 families receive pensions from the PSM, pri-

- marily elderly people and families in economic distress who are not covered under other pension schemes.
5. Following the methodology used by the National Institute of Statistics in Cape Verde, a household is considered poor if its annual per capita consumption falls below the official poverty line (equivalent to CVEsc 43,249.8 per capita a year). With that poverty line, 36.7 percent of the population is poor (equivalent to 28.0 percent of households).
 6. Unfortunately, the requisite information for such a study is not included in the survey data.
 7. For a more detailed discussion on the targeting performance of utility tariffs in Cape Verde, see Wodon et al. (2007).
 8. The cost of implementing proxy means testing is usually higher because it requires the involvement of social workers and the use of data processing.

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Public Finance for Poverty Reduction examines public finance's role in reducing poverty through case studies from Africa and Latin America. The findings show that the most important instrument for providing the poor with opportunities, empowerment, and protection is not public revenue policy, but rather the resources channeled through public spending programs. Nevertheless, the authors consider that government budget revenues also have important efficiency and equity implications, and impact the dynamics of growth and poverty reduction.

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Policy makers in developing countries can learn from these examples and hopefully will be inspired to take a more active role in poverty reduction. Economists should be challenged to sharpen their analytical tools and to improve poverty reduction policies. Both will no longer be able to hide behind the argument that poverty reduction is a goal that can be ignored because growth alone will be sufficient to eliminate poverty."

—**Vito Tanzi**

*Former Director, Fiscal Affairs Department,
International Monetary Fund, Washington, DC*

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