

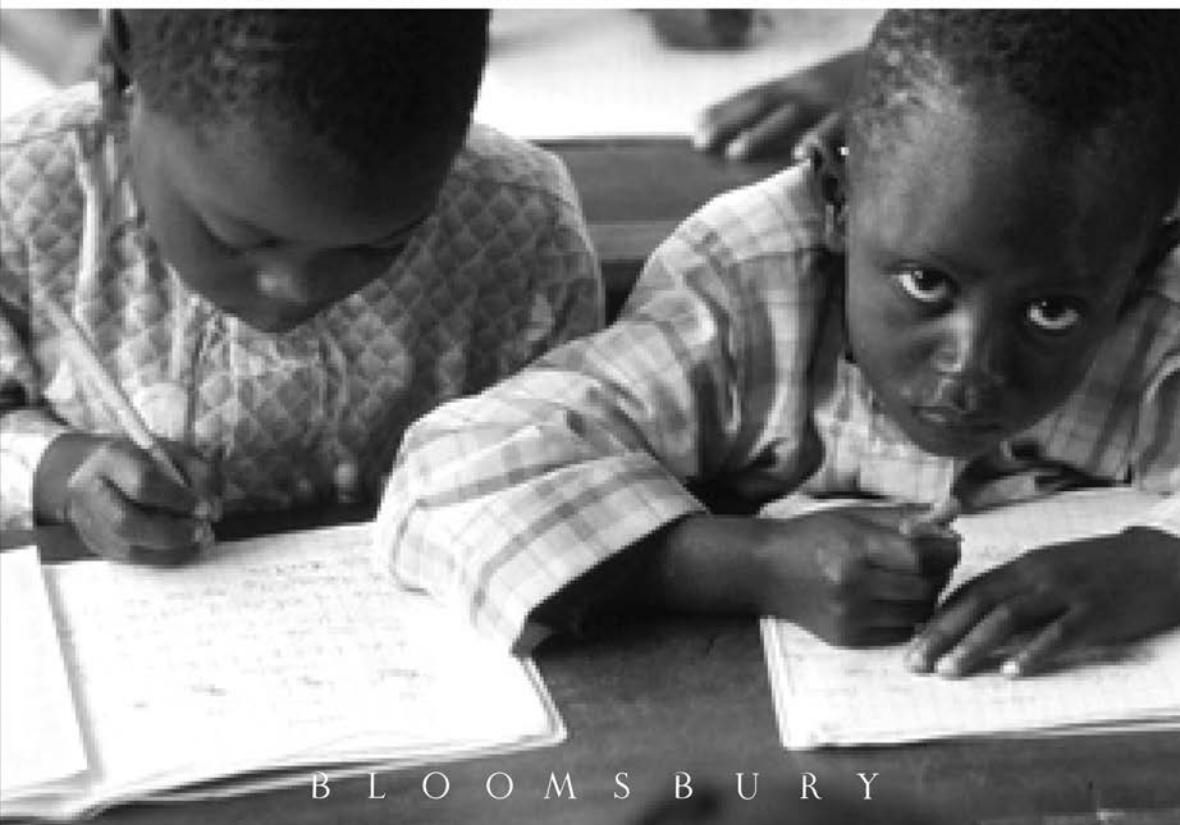
# FINANCING HUMAN DEVELOPMENT IN AFRICA, ASIA AND THE MIDDLE EAST

EDITED BY MARCO V. SANCHEZ AND ROB VOS



UNITED NATIONS

THE UNITED NATIONS SERIES ON DEVELOPMENT



B L O O M S B U R Y

**Financing Human Development in  
Africa, Asia and the Middle East**

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# **Financing Human Development in Africa, Asia and the Middle East**

*Editors*

Marco V. Sánchez

Rob Vos

Published in association with the United Nations

New York, August 2013

B L O O M S B U R Y  
LONDON • NEW DELHI • NEW YORK • SYDNEY

First published in 2013 by:

Bloomsbury Academic

An imprint of Bloomsbury Publishing Plc  
50 Bedford Square, London WC1B 3DP, UK  
and  
1385 Broadway, New York, NY 10018, USA

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CIP records for this book are available from the British Library and the Library of Congress.

ISBN 978-1-780932200 (Paperback)  
ISBN 978-1-780932194 (Hardback)  
ISBN 978-1-780935614 (ePub)  
ISBN 978-1-780935607 (ePDF)

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## SUMMARY

This book assesses feasible financing strategies for policymakers to follow in pursuance of human development, taking as reference the United Nations' Millennium Development Goals (MDGs) and their achievement by 2015. The contributors to this book analyze these strategies in the context of broader concerns of economic development with special reference to nine countries from Africa, Asia and the Middle East; that is, how to make macroeconomic policies support more effectively sustained growth while reducing widespread poverty and inequalities and other human development gaps in low- and middle-income countries, especially in times of global economic crises or external shocks. For Arab states in the Middle East and North Africa, in particular, recent political turmoil is posing new challenges for human development and social stability. In this sense, this book adds new evidence regarding the social deficits in these countries and suggests policy options to overcome these.

More specifically, the volume addresses how Governments can finance sufficient levels of public spending in support of improvements in human development ensuring that all children complete at least primary education on time, that child and maternal mortality rates are brought down substantially and that there is adequate access to drinking water and basic sanitation for all. In doing so, the study takes an economy-wide perspective as progress on human development and increased resources allocated towards social services will affect the composition of the labour supply, change relative prices, and may exercise macroeconomic trade-offs and financing constraints in different parts of the economy. Such economy-wide perspective is, in turn, supported by more micro or sectoral empirical evidence on socio-economic determinants that seem to matter most to generate positive human development outcomes, taking into consideration that the effectiveness of such determinants may dilute over time, as countries experience improvements in human development.

This integrated macro and micro perspective provides great value added over more sector-based needs assessments for achieving development goals. The analysis shows that macroeconomic repercussions of pursuing one financing strategy over another may strongly influence the cost estimates of the resources needed to achieve the goals in education, health, water coverage and sanitation, and, independently of the amount of public spending needed, may not be consistent with fiscal and debt-related targets of countries, or other macroeconomic objectives.

Important deficits remain in the countries under study, in spite of the fact that they have made much progress in human development in past decades. Country situations differ greatly, especially if political upheaval and its resulting economic and social effects present serious challenges to human development strategies and policies, as in the case of the Middle East, or if there are marked vulnerabilities to global financial crises or other external shocks. Hence, context-specific analysis is required. The present volume brings together the results of nine country cases, starting with an overview and a comparative analysis, followed by detailed analyses of each country.

A general finding is that for some countries (Egypt, Philippines, Tunisia, Uganda, Uzbekistan and South Africa), relatively high and stable economic growth and public spending have trickled down enough to reduce poverty and experience notable progress in human development. However, even for these countries, a continuation of current policies would leave them short of achieving the MDGs in primary education, health (child and maternal mortality) and sanitation (coverage of drinking water and basic sanitation), without scaling up public spending in the range of 5 to 7 percent of GDP. Other countries (Kyrgyzstan and Senegal) would have to scale up public spending by even more or have fallen so far behind that meeting the internationally-agreed targets has become unrealistic and financially unfeasible (as seems to be the case for Yemen). The recent global financial crisis has triggered counterproductive effects on the MDGs, except for countries that have managed some economic growth or maintained public spending countercyclical to the slowdown. In the Middle East, MDG achievement has been seriously threatened by political turmoil as this has temporarily paralyzed public spending, exacerbating the potential need of resources to achieve the goals. This is not unique to the Middle East, as some economies-in-transition (e.g. Kyrgyzstan) have not been able to take advantage of the relatively well-developed social service system that they inherited as mixed economic performance and a number of political turmoil episodes have slowed down progress toward the MDGs.

For most countries, achieving the MDGs appears to be affordable, but only if some hard choices are made. These include significant increases in social spending, paid from higher tax rates and collection efforts combined with borrowing that may compromise debt sustainability, on the one hand, and structural reforms to ensure more jobs for the poor and a reduction of income inequality, on the other. Such measures may face macroeconomic trade-offs (such as 'crowding out' of private consumption and investment

or real exchange rate appreciation that erodes export competitiveness). Some countries will not achieve the MDGs without increasing government tax collection and spending efficiency to allow for higher social returns to resources spent. The poorest countries of the group, especially those that are experiencing political turmoil and were seriously affected by the global financial crisis will have to rethink their priorities in terms of defining less ambitious MDG targets to pursue more realistically, perhaps in a timeframe beyond 2015. More importantly, they should implement structural changes that allow for diversification of production and higher productivity growth. Countries in the Middle East face the challenge of recovering quickly from recent political changes to return to more solid footing that would allow them to grow faster and more steadily, in order to increase space for public spending and financing for human development.

### *Readership*

The book contains applied policy analysis which should be of interest to policy makers in Africa, Asia, the Middle East and elsewhere, to experts in international organizations and donor agencies, and to students of economic development, inequality and poverty in general.

### *Unique points*

The book is a unique collection of applied policy analyses. It shows for a range of country cases how macroeconomic policies can be designed to support social and human development goals. It has a scholarly interest as it applies rigorous quantitative tools for assessing such policy coherence. This type of integrated analysis of macroeconomic and social policy options has not been conducted with similar rigour or country coverage. The policy findings transcend relevance for the studied country cases as they provide important lessons for students and policymakers in other Arab states, low-income Africa and emerging economies alike.



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## PREFACE

Over the years, the Development Policy and Analysis Division of the Department of Economic and Social Affairs of the United Nations (UN-DESA) has coordinated a number of comparative studies in the context of a number of projects aiming to strengthen the policy analysis capacity in developing countries.<sup>1</sup> Part of the work related to these projects involved the adaptation of a model-based toolkit to serve the policy needs in each country. The toolkit allows the assessment of the macroeconomic policy implications of development strategies oriented at the achievement of the internationally agreed Millennium Development Goals (MDGs). The MDGs comprise a set of basic human development objectives related to poverty reduction, universal primary education, maternal and child health, communicable disease control and access to water and basic sanitation. While much progress has been made on these fronts, large shortfalls remain in many countries, requiring major policy efforts. Those efforts are not restricted to the social policy arena, but involve the entire economy. Most poverty reduction efforts run through production, employment, wages and prices. Expansion of social services in education, health and basic sanitation require additional spending efforts that may strain public and private budgets. Adjustments in taxes and public and private credit demand to finance those spending needs, in turn, will have repercussions throughout the economy. Better education and health outcomes are expected to yield, over time, positive spinoffs on productivity and incomes. For these reasons, the capacity development projects have deployed economy-wide modelling tools to aid policymakers in assessing this complex set of interactions and the macroeconomic feasibility of achieving the MDGs in their specific country context.

The related tools for policy analysis have been applied in about 30 countries in the framework of projects coordinated by UN-DESA in close collaboration with other partners. A comparative analysis of findings from these applications for countries in Latin America and the Caribbean has been published previously.<sup>2</sup> The present book presents the findings of the assessments in the different contexts of nine countries in Africa, Asia and the Middle East. While the countries under study have made much progress in human development, severe deficits remain and achievement of the MDGs, in particular, will clearly require important additional efforts. This publication concludes that these efforts may be challenging for some of the countries as substantial amounts of public resources would have to be made

available to ensure the adequate supply and quality of social services. The challenge for policymakers is considerable. The more so if they are to adhere to the 2015 deadline set by the international community for achieving the MDG targets. The more so, also, when considering the setbacks caused by the global economic crisis of 2008-2009 and political unrest in several of the countries (notably, Egypt, Tunisia, and Yemen). The country studies provide clear policy conclusions as to how to take on the challenge.

This book and the project it builds on is very much the result of collaborative work. The United Nations' Development Account provided most of the funding for the capacity development activities in the nine countries. UNDP's regional bureaus for Africa and the Arab States, as well as the country offices of UNDP were critical partners in this endeavour. The World Bank provided the economy-wide modelling framework—the *MAquette* for MDG Simulations (MAMS); the central piece of the policy analysis tools developed further through the application for the countries studied in the project.

Importantly, without the inputs of national experts and policymakers, many of whom appear as chapter authors in this volume, this undertaking would not have been possible. These experts and policymakers were also the main beneficiaries of training activities aimed at strengthening their analytical capacities in the use of the project's modelling methodologies. Combining country expert knowledge with a common, rigorous modelling methodology to assess feasible financing strategies to achieve the MDGs ensured both a high degree of realism and policy relevance in the analysis and maximum comparability.

The coordinators of the project received invaluable technical support from Martín Cicowiez, research fellow at *Centro de Estudios Distributivos, Laborales y Sociales* (CEDLAS) of *Universidad Nacional de La Plata*, and Hans Lofgren, senior economist of the Development Economics Prospects Group of the World Bank. They were instrumental in the application of the modelling techniques to realize the country studies. We are also grateful to Cornelia Kaldewei and Keiji Inoue of UN-DESA for their valuable organizational and substantive support to the project activities in Asia and Africa. We also thank Giacomo Sbrana, former associate expert of UN-DESA, sponsored by the Italian government, for several background studies on the microeconomic determinants of human development achievements, which have been part of the training toolkits. Our appreciation also goes to Diyora Kabulova, associate expert of UN-DESA, funded by the Dutch government, for her technical support in the model applications and inputs

to the comparative analysis presented in Chapter 1. Elizabeth Coleman and Nancy Settecasi, respectively, provided excellent editorial and typesetting support in preparing this book.

The authors are most grateful to the hosting agencies, UN-DESA, UNDP, and the World Bank. These agencies provided all the institutional support required, while leaving all the intellectual freedom needed to conduct this research on issues so central to the well being of the populations in the development countries that were part of the project. It goes without saying that the opinions expressed in this volume are exclusively those of the authors.

*Marco V. Sánchez*  
*Rob Vos*

New York  
October 2012

## ENDNOTES

- 1 A description of the capacity development activities can be found at <http://www.un.org/en/development/desa/policy/capacity/index.shtml>.
- 2 See Sánchez, Marco V., Rob Vos, Enrique Ganuza, Hans Lofgren, and Carolina Díaz-Bonilla, eds. (2010). *Public Policies for Human Development: Achieving the Millennium Development Goals in Latin America and the Caribbean*. Basingstoke, U.K.: Palgrave Macmillan.

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# Chapter 1

## Financing Human Development: a comparative analysis

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MARCO V. SÁNCHEZ, ROB VOS, KEIJI INOUE AND DIYORA KABULOVA

### INTRODUCTION

Aware of enormous human development deficits, all member states of the United Nations resolved to pursue achievement of the millennium development goals (MDGs) in 2000. Concrete targets were set, and to be met by 2015, for a future of less poverty, hunger and disease, better education, gender equality, greater prospects of survival for infants and mothers, and a more sustainable environment. Much progress has been made since 2000, but it has been uneven across and within countries (United Nations, 2012). Sustained and robust economic growth, particularly in Asia, has been a major factor in meeting the global target of halving income poverty by the end of the 2000s. Nonetheless, the proportion of people who suffer from hunger has not declined, and still nearly one in five children under the age of five in the developing world are undernourished. Improvements in primary school enrolment have slowed during the past decade and the target of universal access to primary education is unlikely to be met in many countries without additional policy efforts. Gender gaps in access to education have narrowed, but girls remain at important disadvantage in many developing countries, especially in Oceania, Africa and West and South Asia. Significant gains in assisted child delivery and coverage of vaccination programmes and intensive control efforts for major diseases have contributed to declining child and maternal mortality worldwide, but in many countries, especially in Sub-Saharan Africa, rates are still very high and meeting the internationally agreed targets by 2015 will be most challenging.

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This volume analyses the challenges of nine countries (Egypt, Kyrgyzstan, Philippines, Senegal, South Africa, Tunisia, Uganda, Uzbekistan and Yemen) in improving human development in multiple dimensions. These countries' experiences are reflective of the varying degrees of human development progress and remaining challenges observed across the developing world. Consistent with global trends, all nine countries have made substantial progress in reducing income poverty (MDG 1) and, except for Senegal and Yemen, seem to be on track—assuming continued trends—to meet the target of having the poverty incidence by 2015 (Table 1.1). Also, progress in providing access to safe drinking water (MDG 7a) has been encouraging, although availability in rural areas still lags far behind. Seven out of the nine countries are well on track to meet the international target for increased access based on continued trends of the past two decades. Yemen, in particular, is not on track to achieve most targets owing to a lack of investment in basic infrastructure, among other constraints.

Table 1.1  
Achievement of MDG targets by 2015 based on continuation of past trends<sup>1</sup>

	MDG 1 <sup>2</sup>	MDG 2 <sup>3</sup>	MDG 4	MDG 5	MDG 7a	MDG 7b
Egypt	√	√	√	≈	√	
Kyrgyzstan	√	√			√	
Philippines	√		√		√	√
Senegal	≈		√		√	
South Africa	√	√			√	√
Tunisia	√	√	√		√	
Uganda	√				√	
Uzbekistan	√	√	√	√	≈	≈
Yemen						

Legend: √ = on track; ≈ = almost on track; blank = off track.

**1** Past trends refers to progress measured between 1990 and 2009 (or latest available year) and are projected forward linearly to 2015. For Kyrgyzstan and Uzbekistan the base year is 2000 for some targets.

**2** The poverty line used for the MDG 1 target of halving the poverty incidence is \$1.25 a day (PPP) for Egypt and Tunisia, \$1.00 a day (PPP) for South Africa, and a national poverty line in the case of the other six countries.

**3** The goal of universal primary education (MDG 2) refers to (near) 100 per cent completion rates in the cases of the Philippines, Senegal, South Africa, Uganda and Uzbekistan, 100 per cent net enrolment in primary education for Egypt, Tunisia and Yemen, and 100 per cent net enrolment in basic education (grades 1-9) for Kyrgyzstan.

**Source:** Authors, based on country studies referred to in this chapter.

Progress towards other MDGs has been sluggish in the nine countries, making timely achievement of the corresponding targets by 2015 challenging. For example, while there have been substantial improvements in access to education in Sub-Saharan Africa as a whole, individual country experiences differ. Despite more than doubling primary school completion rates over the past two decades, Senegal remains at some distance from meeting the target of all children finishing primary education. In Uganda, the completion rate actually dropped despite increasing enrolment, because classrooms have become overcrowded and the quality of education declined. The Philippines in South-East Asia and, especially, Yemen in Western Asia have seen little improvement in primary completion rates as a result of underinvestment in education, poor child health, and the continued high prevalence of child labour, among other problems. The remaining five countries seem on track to achieving universal primary education, though some, notably Egypt and Tunisia, still face pervasive gender gaps and regional disparities. Achieving the MDG targets in child and maternal health (MDGs 4 and 5) and basic sanitation (MDG 7b) seems more challenging in most of the country cases.

Projecting past trends into the future can be haphazard, however. Economic conditions tend to be volatile, of which the global financial crisis of 2008-2009 was but one manifestation. Persistent international financial market and commodity price instability have affected the economies of the nine countries to varying degree, and differences in policy responsiveness further explain varying impacts on human development. Economic uncertainty has been compounded by political conflict and instability. Five of the nine countries have been recently immersed in conflictive situations. In the context of the Arab Awakening, the governments of Tunisia and Egypt were toppled in the beginning of 2011, but discontent and political uncertainty prolonged in the aftermath of the regime changes. Paradoxically, Tunisia and Egypt had a good track record of economic performance and MDG progress prior to the outburst of political unrest. Yemen also witnessed a political uprising in early 2011 as a result of which the then-president signed a power-transfer agreement and eventually stepped down in favour of his vice-president in February 2012. The setbacks caused by the conflict have made achieving human development goals in Yemen all the more challenging. Kyrgyzstan and Uganda have also experienced episodes of conflict, despite remarkable progress in reducing poverty and improving access to basic social services. The problems in Kyrgyzstan began in 2005 when protests led to the ousting of its then-president and of his successor in 2010. Political instability continued with a coalition government, and

in November 2011 a new president was elected. Uganda has had a long history of conflict, but the most recent bout started in 2008 between anti-government forces in the northeast and the government until the present. Most of these episodes of instability unfolded and continued to linger as this publication was being completed. Only until their effects on the economy at large and the MDGs in particular are fully understood, will we be on more solid ground in including them as part of the analysis.

There is ample evidence that countries affected by major violence have slower poverty reduction rates than countries in more peaceful situations (World Bank, 2011, p. 60). In addition, conflict countries had higher poverty rates than countries without violence. Evidence also shows that compared to non-conflict countries, countries experiencing or coming out of conflict lag behind in school enrolment, child nourishment and mortality levels, access to water and most of the other MDGs (World Bank, 2011, p. 63). Nonetheless, one of the most striking issues is that for many of the nine countries studied here, it would have been very difficult to forecast that such episodes of conflict would ever unfold considering they were witnessing robust economic growth, substantial poverty reduction, and, in some cases, falling vertical income inequality as well. Hence, at the surface, things seemed to be on the right track in these countries. Underneath, however, problems were boiling: high rates of (youth) unemployment, perceived lack of economic opportunities for educated young workers, rising food inflation, perceived corruption and lack of political freedoms.

Macroeconomic and political uncertainties as just described make two things clear. First, that a broad, economy-wide analytical framework is needed to assess the feasibility of policies aiming to improve human development. Second, policymakers will be well served with the availability of scenario analysis that provides contingency assessments when conditions change and shows the macroeconomic feasibility and distributive consequences of alternative policy options. The studies in this volume provide such a framework and scenario analysis. This chapter provides a comparative perspective of the macroeconomic and human development challenges faced by countries like the nine studied in the rest of the volume and summarizes the analytical framework underlying the country assessments. The next section reviews some key issues in financing human development strategies. The third section outlines the contours of a rigorous integrated modelling framework designed to study the effectiveness of policy interventions and financing mechanisms aimed at enhancing human progress (as reflected in the MDGs) taking account of

the complex interactions between the macro-economy, sector trends, and household level dynamics. The fourth section highlights some key findings of the application of the framework for policy analysis as applied to the nine countries and draws some key policy conclusions.

#### MACROECONOMIC TRADE-OFFS WHEN FINANCING HUMAN DEVELOPMENT

Most economic studies of human development take a sector or micro approach typically using some version of the expanded human capital theory (see e.g., Glewwe, 2002). Decision making about sending children to school or access health care typically is seen to depend on a variety of factors, such as the cost, availability and quality of such social services and expected returns from the use of such services along with a range of household and individual circumstances. Investing in human capital and decisions on how to finance for the use and provisioning of education and health services are essentially seen as cost-benefit assessments in the light of the indicated, context-specific factors determining the supply of and demand for social services. Arguably, such an approach can provide useful insights about the cost-effectiveness of policy interventions trying to improve outcomes in education, health, and other dimensions of human development.

Assessing the feasibility of implementing a more ambitious strategy of reducing poverty and improving human welfare on a broad front, as entailed by the MDGs, requires a more ambitious analytical approach. It requires a framework for policy analysis that accounts for both the microeconomic determinants of needs satisfaction in education, health and drinking water and basic sanitation and macroeconomic trade-offs in the financing of public spending options directed at satisfying those needs. The pursuit of a strategy towards the achievement of the MDGs will likely have strong effects throughout the economy. It will undoubtedly affect the demand for and supply of different types of goods and services, labour and capital, and foreign exchange, and the related adjustments may imply important trade-offs. Such trade-offs may be strong, especially if the period to implement the strategy is relatively short (as is definitively the case for many countries if the goals are to be achieved by 2015). The trade-offs have intertemporal characteristics. In an economic sense, gains from investing in human development take time to materialize. For better education and health outcomes to translate into higher labour productivity and social outcomes takes time, if only because children need to go through one or

more educational cycles, and improved child and maternal health care today will pay off in terms of healthier students and workers several years from now. Given existing deficits, the cost of pursuing the MDGs in most, if not all, of the nine countries studied in this volume should be expected to be substantial in macroeconomic terms. The financing of a broad-based human development strategy thus may induce a number of short-term macroeconomic trade-offs since much of the social and economic payoffs come in the medium and long run.

Public policies are critical to human development, as markets by themselves are poor providers of social services and because of the positive externalities associated with quality education and health and less poverty and inequality (Sánchez and others, 2010). Public financing of the MDG strategy thus also will be critical. Even in most low-income countries, social service delivery and poverty reduction programmes are largely financed through domestic resource mobilization. Increasing taxes or public borrowing in domestic capital markets to finance the MDG strategy may create macroeconomic trade-offs as it may affect private consumption (by reducing disposable incomes through taxation) and investment (by crowding out private sector credit supplies in shallow domestic capital markets). A squeeze of private consumption and investment would hurt output and employment growth and may also affect private provisioning of and demand for social services. As a result, governments may need to further step up efforts to achieve human development goals as they may need to step in more in order to compensate for less private spending on social services.

Appreciation of the real exchange rate (RER) and possible erosion of export competitiveness poses another potential macroeconomic trade-off. The effect is likely to be stronger in the case of external borrowing or foreign-aid financing. One way to define the RER is as the price of “tradables” relative to “non-tradables”. Government services, including education, health, and infrastructure are typically seen as “non-tradable commodities”. Consequently, a large shift in domestic spending towards social services will push up demand for non-tradables. As a result, the price and cost of such services is likely to increase, since the government will, among other things, try to hire more teachers and medical personnel, and may have to increase their wages if such workers are in short supply. Rising costs of non-tradable services will, in principle, shift the relative price against tradables, thus inducing an appreciation of the RER as defined above. Financing human development through aid flows or foreign borrowing will likely

exacerbate the real appreciation of the exchange rate, as it will increase the supply of foreign exchange in the economy. In any case, the decrease of the RER results in a loss of competitiveness of exports and import-competing firms. This may have important implications for long-term growth, as the export sector in many developing countries is an important contributor to aggregate growth and has potential dynamic spillover effects for the economy at large. Real appreciation of the exchange rate may result in the so-called “Dutch disease”, when it leads to a resource allocation away from export industries, resulting in an undesirable structural change away from dynamic production activities—a shift that is typically difficult and time-consuming to reverse.<sup>1</sup> However, the impact on competitiveness will depend on, among other factors, how greater achievement of human development goals will affect the economy over time. Better infrastructure and a better-educated and healthier labour force may have important externalities in the form of productivity growth, attract foreign investors and thereby have a dynamic impact on economic growth. This presents an inter-temporal trade-off, as the real appreciation of the exchange rate would erode export competitiveness in the short run, while productivity gains and faster economic growth from increased human development levels would pay off only in the medium to long run. The question then is whether the negative short-run effects can be contained so as not to limit the resources available for long-term investments in human capital.

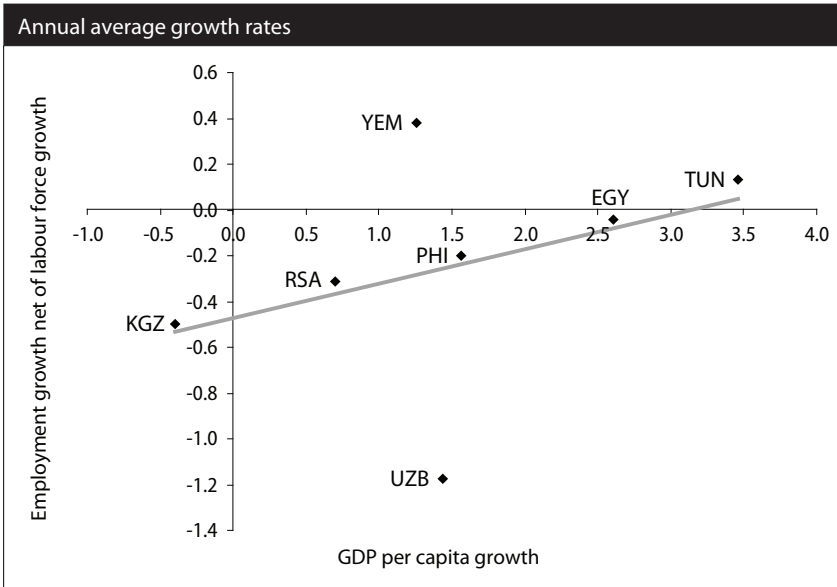
Emerging labour market constraints may pose another macroeconomic trade-off. For many of the countries under study, especially those with lower levels of income per capita, large-scale investments in pursuance of human development goals could overstretch the availability of skilled labour, as expanding health, education and other social services would increase the demand for teachers, nurses, doctors and other trained workers. This could lead to upward pressures on real wages of skilled workers, which in turn would increase the overall labour costs for the public sector and the cost of achieving the development goals. Bourguignon and Sundberg (2006) suggest that, for reasons such as these, a sequenced approach to expanding MDG-related social services may be needed in order to avoid disruptive pressures on labour costs owing to skill bottlenecks. Investing in specialized education and training for teachers and medical personnel should then precede or move in parallel with the expansion of the services themselves. Over time, other labour market constraints may be induced by the human development strategy. As more educated workers enter the labour market, the economy will also need to adjust to provide them with adequate job



opportunities. Insufficient creation of skilled jobs in the economy could jeopardize the achievement of the education MDG and could further result in high rates of (youth) unemployment and skill mismatches in the labour market that can be catalysts of conflict.

Such labour-market concerns and their implications for inequality and poverty are particularly pressing against the backdrop of recent conflict episodes in some of the countries under study. In all countries studied in this book, employment creation did not keep pace with GDP growth in the period from 1991 to 2009, indicating productivity growth has implied insufficient employment generation for these countries’ growing labour forces. Interestingly, for most countries, employment growth has been less than labour force growth, as reflected in the negative “net” employment growth rates in Figure 1.1. Uzbekistan witnessed the strongest net job loss at a rate of about 1.2 per cent per year, even as their per capita GDP growth remained relatively modest. Among the faster-growing economies of the group since 1991, Tunisia and Egypt did not manage to sustain a relatively labour-intensive growth pattern.

Figure 1.1:  
Net employment and GDP per capita growth,<sup>1</sup> 1991-2009



<sup>1</sup> Senegal and Uganda are not included as data on employment growth net of labour force growth were not available for these countries.

Sources: ILO, Key Indicators of the Labour Market (KILM); World Bank, World Development Indicators database; IMF, World Economic Outlook data.

Against this backdrop, it is then unsurprising that for Tunisia and Egypt, and perhaps also Yemen,<sup>2</sup> palpable economic growth and MDG progress (in Egypt and Tunisia at least), and even the ability of governments to shield social developments against the effects of the global financial crisis (in Tunisia and Egypt), a large part of the population has expressed discontent over high rates of (youth) unemployment and skill mismatches in the labour market—reflecting inequality of opportunities, among other factors mentioned in the introduction. This expressed discontent has ignited political conflict that will likely have unfavourable repercussions for future human development.

## ASSESSING HUMAN DEVELOPMENT STRATEGIES

### *An integrated macro-micro modelling framework*

Since such economy-wide interaction effects are likely to be pervasive, an integrated macro-micro modelling framework has been applied to understand these interactions in the specific context of each of the nine countries under study. The policy modelling framework integrates three analytical components.

First, a dynamic computable general equilibrium (CGE) model is at the core of the framework. The CGE framework applied for this purpose is called *Maquette* for MDG Simulations (MAMS), developed originally at the World Bank (Lofgren and Díaz-Bonilla, 2010ab) and subsequently improved in numerous country-specific applications in collaboration with the United Nations and national experts (see, e.g., Sánchez and others, 2010, for applications to a large number of Latin American and Caribbean countries). MAMS has been built from a fairly standard CGE framework with dynamic-recursive features,<sup>3</sup> but incorporates a special module which specifies the main determinants of MDG achievement and the direct impact of enhanced public expenditures on MDG-related infrastructure and services. MAMS considers specific targets for achieving universal primary education (MDG 2), reducing under-five and maternal mortality (MDGs 4 and 5) and increasing access to safe water and basic sanitation (MDGs 7a and 7b). In the case of MDG 2, the demand for primary and other levels of schooling is a function of student behaviour (enrolment, repetition, graduation). Student behaviour, in turn, depends on the quality of education (identified by a variable such as service delivery per student), income incentives (the expected wage premium from education), the under-five mortality rate (a proxy for the health status of the potential student population), household consumption per capita (a

proxy for the capacity to pay for education and for opportunity costs) and the level of public infrastructure (a proxy for the effective distance to school). Under-five and maternal mortality are considered to be determined by the availability of public and private health services, household consumption per capita, the level of public infrastructure (a proxy for the effective distance to health centres and hospitals), and the coverage of water and sanitation services. Access to water and sanitation, on the other hand, is modelled as a function of household consumption per capita, the provision of such services by public or private providers and the level of public infrastructure. Achievements in the reduction of income poverty are measured as the outcome of the overall general equilibrium effects from dynamic adjustments in production, employment, wages and other relative prices, as well as changes in the quality of human capital through MDG-related expenditures.

Second, microeconomic and sector analyses of determinants of outcomes for MDGs 2, 4, 5 and 7 were undertaken for each of the nine countries. Human capital models, along the lines referred to in the previous section, were estimated to identify the influence of both supply and demand factors on outcomes in, respectively, education, health and drinking water and sanitation. The findings of this analysis were used to calibrate the MDG module of MAMS for each country case.

Third, poverty and inequality indicators are estimated—for various MAMS scenarios—through a non-parametric microsimulation approach which, in turn, allows for the assessment of the extent to which the target for poverty reduction (MDG 1) is being met. This is done by taking the labour market outcomes (i.e., unemployment, employment structure, relative remunerations, and skill composition) of MAMS scenarios and imposing these on household survey data providing the full distribution of income. This procedure is followed because CGE models like MAMS typically only specify a limited number of representative households, providing insufficient detail regarding changes in the income distribution in order to be able to make robust statements regarding the poverty outcomes. The microsimulation approach applied to the country studies in this volume is that proposed by Vos and Sánchez (2010), which fits a recent tradition of combining economy-wide modelling instruments and micro-level data of the full income distribution.<sup>4</sup>

### *Policy scenarios*

As said, MAMS considers specific targets for key MDGs (2, 4-5, 7a and 7b). The related social services may be provided publicly or privately.

However, in the policy scenarios undertaken in the country studies it is assumed that governments will attempt to scale up interventions (reflected in higher current and capital spending on social services) in order to meet the targets for primary education, child and maternal health and drinking water and basic sanitation. Based on country-specific assessments, it is further assumed that the effectiveness of those interventions is subject to diminishing returns. That is to say, the closer one gets to the target, interventions tend to become more costly. This is realistic in the sense that one typically finds that, for instance, when child mortality rates have already come down to low levels, reducing them further typically requires more costly interventions as remaining cases of early child death tend to be caused by more complex health factors.

A business-as-usual (BAU) or baseline scenario is generated first to establish a benchmark for each country. Starting from a base year, around 2005, this reference scenario replicates actual economic performance under existing policies implemented in recent years (2005-2010) and then projects the observed trends to 2015. The BAU assumptions may vary depending on the country case, but the deceleration in GDP growth caused by the global financial crisis of 2008-2009 has been accounted for in most country cases. Government consumption and other components of recurrent spending evolve following certain rules (for example, that they grow at a given rate per annum or represent certain share of GDP), which is part of the model's closure rules. The spending rules were set to mimic unchanged expenditure policies of the recent past. Government investment spending depends on the demand for capital in the public services sector and this, in turn, varies as the government consumes to deliver services. Government spending can be financed from various sources: direct and indirect taxes, domestic and foreign borrowing, and foreign transfers from abroad (foreign aid). Alternatively, fiscal space can be created for social spending through reallocation of existing public expenditures. In the baseline for most countries, private investment is assumed to remain fixed as a share of GDP, while savings rates of private agents adjust endogenously to ensure the model consistency requirement that total savings equal total investment is met.

The baseline scenario also helps to identify whether the MDG targets would be met by 2015 under business-as-usual conditions and policies. Some of the country assessments presented in this volume consider various baseline scenarios; for instance, with more and less optimistic GDP growth assumptions (Egypt, South Africa) or assuming that public spending responds pro-cyclically or countercyclically to GDP growth (Tunisia).

In the MDG-financing scenarios, public expenditures are scaled up in order to meet defined targets for primary education, mortality rates, and water and sanitation, unless they were already met under the baseline scenario. These scenarios thus enable us to gauge how much it would cost the government to ensure that unmet goals under the baseline are effectively met by 2015. To achieve this, government spending by MDG sector becomes endogenous (or no longer evolves following certain rules as in the baseline scenario) and emerging fiscal deficits can be financed through increased taxation, domestic or foreign public borrowing and/or seeking more foreign aid. Another closure-rule change compared with the baseline is that overall investment is assumed to be savings driven. That is to say, the amount of private investment that can be realized at the end of the day depends on the total availability of savings. Generally speaking, it can be argued that the nine countries tend to face overall financing constraints, especially given their generally low initial levels of domestic savings and limited access to international capital markets.

In one case, Uganda, the alternative MDG-financing scenarios have also been assessed in combination with assumptions about possible improvements in the efficiency in the delivery of social services. In the case of Yemen, the scenario analysis also includes an assessment of the scope for reallocation of existing expenditures in favour of more spending for infrastructure and MDG-related social services.

#### MDG-FINANCING STRATEGIES: A COMPARATIVE COUNTRY ANALYSIS

This section provides a comparative analysis of the nine country studies of this volume which all applied the modelling framework described above as adapted to each specific context. The studies tried to answer the following key policy questions:

- How much progress would the countries make towards internationally and nationally set MDG targets under essentially unchanged public spending and financing policies?
- What, if any, would be the cost of additional efforts in order to meet the targets by 2015?<sup>5</sup>
- What would be feasible financing options to cover the cost of additional policy efforts to be made, considering potential macroeconomic trade-offs and fiscal and debt sustainability considerations?
- To what extent is progress towards the achievement of the MDGs for education, health and sanitation also helping meet the target for poverty reduction?

*Human development in the “business as usual” scenario*

Table 1.2 gives an overview of the expected degree of progress the countries would make towards the key MDG targets by 2015 under the assumptions of the BAU scenario. This scenario presents more realistic benchmarks for assessing whether countries would be “on track” or “off track” towards the targets compared to those presented in the introduction (see Table 1.1), because they are no simple linear projection of past trends. Instead, this scenario provides a counterfactual projection of what the progress could be under an expected path of economic growth and existing public spending priorities and budget financing policies. In addition, non-linearities in the effectiveness of social spending in achieving the targets are taken into account as explained above.

Table 1.2 measures the degree of progress towards the MDGs under the BAU scenario as the percentage of the target value to be met by each country by 2015. None of the nine countries would meet all targets under the baseline assumptions, although some would show remarkable progress. Egypt would show most progress and even would overachieve the targets for MDGs 4, 5 and 7a and the country would meet more than 90 per cent of the targets for MDGs 2 and 7b. It would only fall significantly short of meeting the poverty reduction target. Egypt’s BAU scenario is rather optimistic, however, as it was conceived prior to the eruption of the revolution in early 2011 and, at the time of writing, the economic and social costs of the difficult political transition were unknown. Egypt’s revolution likely has caused important setbacks in the progress towards the MDGs. Four other countries, Tunisia, Uzbekistan, Kyrgyzstan and the Philippines, also show remarkable progress, though would not meet several of the targets under the BAU scenario. Yemen and Uganda would show least progress under their respective baseline assumptions. Both Tunisia and Yemen were also affected by political conflict and change as part of the Arab Awakening. While not captured in the BAU scenario, these events likely have slowed MDG achievement.

The effects of the global financial crisis of 2008-2009, in contrast, are considered in the BAU scenario which in most cases also assumes that an economic recovery begins in 2010. Employment and income per capita gradually recover during 2010-2015, enabling poverty to fall in most countries, except in the Philippines where the path to recovery has been projected to evolve much more slowly under the baseline assumptions. Four countries over-achieve the poverty goal (Kyrgyzstan, South Africa, Tunisia and Uganda) and one meets almost 94 per cent of the target (Uzbekistan). In contrast, two countries (Egypt and Yemen) manage to

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achieve only around 60 per cent of the required reduction in the poverty rate when measured on the basis of national poverty lines. When measured against the international thresholds of \$1.25 or \$2.00 per day, Egypt would meet the target of halving the poverty incidence (not shown in Table 1.2). In some countries, Egypt and Uganda in particular, poverty reduction would fall short of the target not only because of low economic growth in the BAU scenario, but also because of rising income inequality. As discussed further below, inequality rises in these cases mainly because of widening wage gaps between skilled and unskilled workers.

Table 1.2  
Achievement of MDG targets by 2015 under the BAU scenario (per cent)<sup>1</sup>

Per cent						
	MDG 1 <sup>2</sup>	MDG 2 <sup>3</sup>	MDG 4 <sup>4</sup>	MDG 5 <sup>5</sup>	MDG 7a <sup>6</sup>	MDG 7b <sup>7</sup>
<b>Egypt</b>	60.4	91.8	100.9	153.9	101.1	95.7
<b>Kyrgyzstan</b>	181.7	93.8	45.9	46.6	99.9	70.0
<b>Philippines</b>	82.7	61.1	98.2	82.6	105.0	107.0
<b>Senegal</b>	69.7	80.9	99.8	40.0	102.6	67.6
<b>South Africa</b>	110.2	72.0	27.0	78.7	87.4	95.4
<b>Tunisia</b>	117.0	98.1	94.8	56.8	99.7	95.2
<b>Uganda</b>	114.8	51.7	52.0	39.1	86.4	74.8
<b>Uzbekistan</b>	93.6	98.7	84.9	81.9	97.7	92.6
<b>Yemen</b>	59.3	55.8	59.5	n.a.	71.2	43.0

**1** Achievement refers to the percentage of the MDG target that the country would achieve by 2015 under the BAU scenario. The most moderate scenario in terms of GDP growth is considered for countries for which more than one BAU scenario was generated. The "pro-cyclical scenario" as labelled in the country study is used for Tunisia.

**2** The target for MDG 1 is to halve the percentage of the population living on less than a \$1.25 a day (Tunisia and South Africa) or an income/consumption per capita level below a national poverty line (all other seven countries). Achievement by 2015 under the BAU scenario is not available for Tunisia. However, 117 per cent of the MDG-1 target had been achieved in this country by 2005, which is the percentage achievement used in the table.

**3** The target for most countries is to reach, by 2015, on-time primary school completion rates between 95 and 100 per cent. The least ambitious targets are set for South Africa (92 per cent), Senegal (90 per cent) and the Philippines (81 per cent). For Kyrgyzstan, the school completion rate is for basic education (grades 1-9).

**4** Reduce by two thirds the under-five mortality rate.

**5** Reduce by three quarters the maternal mortality ratio. Data are not available (n.a.) for Yemen as targets for the maternal mortality ratio are not considered as part of the country study.

**6** Reduce the proportion of people without sustainable access to safe drinking water according to a national target.

**7** Reduce by half the proportion of people without sustainable access to basic sanitation according to a national target.

**Source:** Country studies of this volume.

*How much would it cost to achieve the MDGs?*

The MDG-financing scenarios delineate a path towards the full achievement of the targets for MDGs 2, 4, 5 and 7a and 7b, as defined in Table 1.2. Through these scenarios MAMS allows to obtain an estimate of the required additional public spending based on a scaling up of interventions which were found to be effective in increasing primary school completion rates, reducing child and maternal mortality and improving access to drinking water supply and basic sanitation. In addition to the direct costs of the interventions and the macroeconomic trade-offs, the model considers three important factors which may influence these cost estimates: the complementarities or synergies in achieving the various development goals (e.g. improved health may accelerate progress towards the education goal); the source of financing for the additional public spending which, as already indicated, influences the required cost of achieving the MDGs; and decreasing marginal returns to additional public spending (which would over time increase the marginal costs to achieve each of the development goals).

To determine how much it will cost to achieve the MDGs, we analyse the required “additional MDG-related public spending” defined as the difference between the estimate for total spending on MDG-related public services under each of the MDG-financing scenarios and the estimate for total spending on MDG-related public services under the BAU scenario.<sup>6</sup> As shown in Table 1.3 (see last four columns), Egypt would have to spend less than 0.3 per cent of GDP per year to ensure that MDGs 2 and 7b are achieved by 2015—though this estimate may be much larger if the effects of Egypt’s revolution were taken fully into account. The other MDGs are achieved under the BAU scenario. For most other countries, additional MDG-related public spending would be between 5 to 10 per cent of GDP per year—or even more, as in Yemen under the domestic resource mobilization scenarios. Interestingly, countries that would make good progress towards the MDGs under the BAU scenario (Kyrgyzstan, the Philippines, Tunisia and Uzbekistan), owing in part to relatively high base-year cost of education, health and basic sanitation services, would also need to significantly step up public spending in order to achieve the targets. These countries may need to find ways to enhance the efficiency of service delivery in order to contain costs.

As mentioned, the financing strategy matters for the estimates of additional MDG-related public spending. Six country analyses considered domestic resource mobilization scenarios through taxation or borrowing. Financing the additional public expenditures through domestic resources (borrowing or taxation) tends to increase the total costs of the strategy in



all but one case (Uzbekistan) as compared with financing through external resources (foreign borrowing or grant aid). Crowding out of private spending makes domestic borrowing the more costly scenario in macroeconomic terms in most cases, while external financing tends to be least costly in all nine country cases. Tax-financing would be less costly as compared with the domestic borrowing scenario in most cases, including Tunisia, Uganda, Uzbekistan and Yemen. This is not the case in the Philippines and Egypt where the “consumption-compression” effect of higher taxation appears to be rather strong. As discussed further below, these macroeconomic cost implications of alternative financing options are not the sole criterion for deciding which might be the more viable option. Other aspects, like debt sustainability and the feasibility of raising tax burdens need to be taken into consideration as well.

Table 1.3  
MDG-related public spending in the base year and simulated scenarios<sup>1</sup>

Per cent of GDP per year						
	Base year <sup>2</sup>	BAU scenario <sup>3</sup>	Additional spending under different financing scenarios <sup>3/4</sup>			
			Foreign aid	Foreign borrowing	Domestic borrowing	Taxation
<b>Egypt</b>	1.48	1.50	0.26	0.26	0.27	0.28
<b>Kyrgyzstan</b>	5.58	4.88	7.83	7.83	n.a.	8.21
<b>Philippines</b>	2.21	2.00	6.30	6.30	7.17	7.41
<b>Senegal</b>	6.66	7.18	8.04	8.04	n.a.	n.a.
<b>South Africa</b>	5.91	3.07	n.a.	n.a.	n.a.	9.08
<b>Tunisia</b>	5.28	5.09	5.56	5.56	6.10	6.09
<b>Uganda</b>	3.89	4.24	6.73	6.73	9.47	9.21
<b>Uzbekistan</b>	5.94	6.28	n.a.	4.76	4.81	4.62
<b>Yemen</b>	5.37	16.04	10.39	10.39	18.76	17.39

<sup>1</sup> MDG-related public spending is defined in the text. For most countries, the base year of the simulation period is on or around 2005 (2004 for Yemen, 2006 for Kyrgyzstan and the Philippines, and 2007 for Egypt and Uganda).

<sup>2</sup> Lack of detailed information on all MDG-related public spending in the corresponding MDG sectors which was required for the construction of the Social Accounting Matrix (SAM) to which MAMS has been calibrated may have caused the base-year MDG-related public spending appear low in some countries (notably Egypt and the Philippines).

<sup>3</sup> Annual average of the period from the base year to 2015, unless otherwise indicated.

<sup>4</sup> Results are not available (n.a.) for financing scenarios considered infeasible in the country studies.

**Source:** Country studies of this volume.

Before getting to those issues, it is important to note that the simulation results reflect the impact of the global financial crisis on the nine countries studied. The crisis caused a slowdown in the growth of GDP, employment, household consumption, tax revenue and government spending, which, taken together, triggered setbacks in MDG progress in the BAU scenario. Consequently, the additional public spending requirements to achieve the MDGs tend to be significantly higher than would have been the case had the crisis not taken place. A related study for six countries (United Nations, 2011, Box I.3) estimates that public spending would need to be scaled up by an additional 0.2-1.5 per cent of GDP per year between 2010 and 2015—over and above additional efforts in a scenario of continued pre-crisis economic trends. The six countries of the referred study included Kyrgyzstan, Uzbekistan and Philippines, for which the additional efforts were estimated at, respectively, 0.5 per cent, 0.2 per cent and 1.0 per cent of GDP per year during 2010-2015.

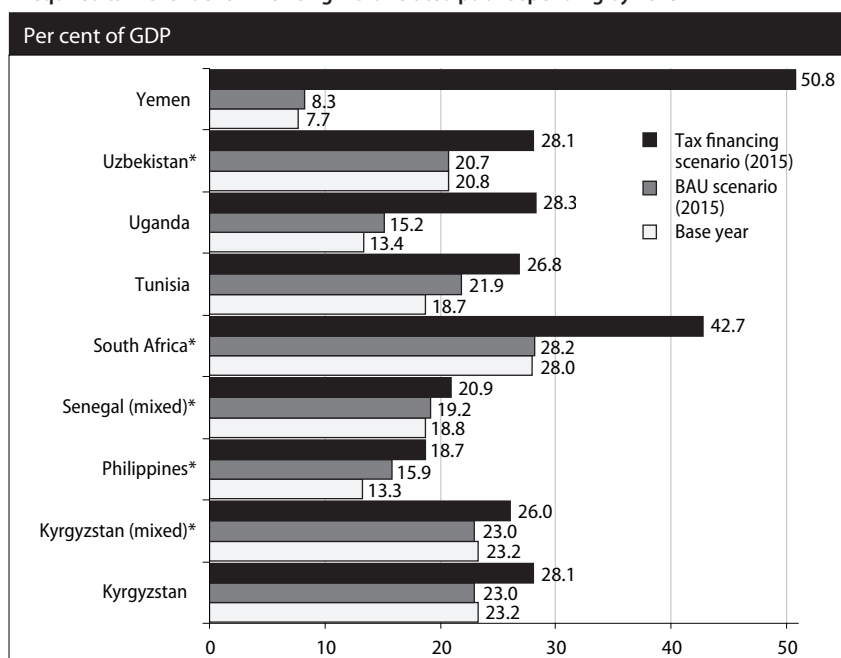
### *What are feasible financing scenarios?*

Except in Egypt (when not considering the impact of the revolution), achieving the MDGs clearly poses a major macroeconomic challenge. For the countries that went through periods of political turmoil and conflict, like Egypt, Tunisia and Yemen, the costs estimates presented in Table 1.3 may in fact underestimate the actual challenge by a significant margin. It was further shown that the source of financing matters to the cost estimates, with external financing typically appearing least expensive in the short to medium run. Yet, this does not necessarily mean external borrowing or accessing more foreign aid would be the better options to finance additional MDG spending requirements. In fact, most country studies (Kyrgyzstan, Philippines, Senegal, South Africa and Uzbekistan) recommend increasing tax revenues to finance the MDG strategy. In two studies, Kyrgyzstan and Senegal, the recommendation is to combine greater tax collection with additional foreign aid. A key argument is that in most countries present tax burdens are low, so tax reform would be preferred to increasing the public debt burden, either because debt sustainability would come into question or because of concerns of crowding out of private investment (with increased domestic borrowing) or loss of export competitiveness induced by a real exchange rate appreciation (with a larger influx of foreign loans).

Three country studies (Tunisia, Uganda and Yemen) conclude that tax financing is not a feasible option as there would be little space to further

broaden the tax base (including because of a large informal economy), because existing tax burdens on taxable parts of the economy are already considered very high, and/or because the tax burden would need to be drastically increased by unrealistic margins (as in the cases of Yemen and South Africa; see Figure 1.2).

Figure 1.2:  
Required tax revenue for financing MDG-related public spending by 2015<sup>1</sup>

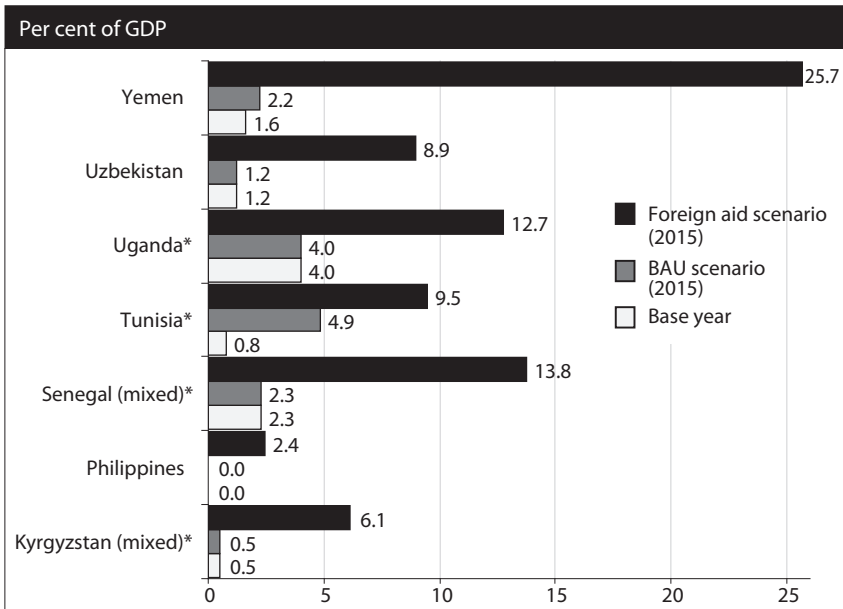


<sup>1</sup> Base year is defined in the first note to Table 1.3. Results are not provided for countries for which tax financing was not considered to be a feasible option in the country study. For Kyrgyzstan and Senegal, the mixed financing scenario combines tax financing and foreign-aid financing. An asterisk (\*) indicates that the study of the corresponding country recommends the tax financing option (alone or combined with foreign aid).

**Sources:** Country studies of this volume.

Four country studies recommend financing exclusively through foreign aid (Tunisia and Uganda) or in combination with increased taxation (Kyrgyzstan and Senegal). However, in such case, these countries would need to mobilize substantial amounts of additional foreign aid in the order of between 6 and 14 per cent of GDP (Figure 1.3), which will be extremely challenging in a global context in which donor countries are limiting their aid budgets.

Figure 1.3:  
Foreign aid required for financing MDG-related public spending by 2015<sup>1</sup>



<sup>1</sup> Base year is defined in the first note to Table 1.3. Results are not provided for countries for which the authors consider foreign-aid financing as an unfeasible option in the country study. For Kyrgyzstan and Senegal the mixed financing scenario combines foreign-aid and tax financing. An asterisk (\*) indicates that the corresponding country study recommends the aid financing option (alone or combined with increased tax revenues).

**Source:** Country studies of this volume.

Only one country study (Egypt) recommends a strategy exclusively based on additional government borrowing. The authors of Egypt’s study recommend domestic borrowing in the first place because the government relied mainly on this source of financing during the late 2000s in order to avoid exchange rate risks seen to be associated with external borrowing, but also because additional borrowing requirements to finance the additional MDG-related public spending would be negligible. However, the feasibility of this policy will likely be put into question by the dire economic and fiscal situation of Egypt during its post-revolution reconstruction, which— at the time of writing—had led the interim military government to seek external funding rather than tapping the domestic capital market. The more so, because Egypt’s public debt burden already well exceeded 100 per cent of GDP before the revolution. In all cases, possibly with the exception of Uzbekistan, public borrowing to finance the MDG strategy would likely lift debt burdens to unsustainable levels (Table 1.4).

Table 1.4  
Total public debt in the base year and 2015 in the baseline and borrowing scenarios<sup>1</sup>

Per cent of GDP				
	<i>Base year</i>	<i>BAU scenario</i>	<i>Foreign borrowing</i>	<i>Domestic borrowing</i>
<b>Egypt<sup>2</sup></b>	118.7	121.1	123.0	125.0
<b>Kyrgyzstan</b>	77.1	26.0	71.8	n.a.
<b>Philippines</b>	61.8	56.6	85.6	135.0
<b>Senegal</b>	48.9	84.9	148.7	n.a.
<b>Tunisia</b>	56.6	33.2	73.8	n.a.
<b>Uganda</b>	19.5	22.9	67.5	188.2
<b>Uzbekistan</b>	27.5	6.8	34.1	49.0
<b>Yemen</b>	39.8	53.6	140.2	82.6

<sup>1</sup> Base year is defined in the first note to Table 1.3. Results are not available (n.a.) for borrowing scenarios that were not analysed in the country studies as they were considered unfeasible options. The authors of South Africa's study do not report results for the borrowing scenarios which they consider infeasible in the context of the country.

<sup>2</sup> The BAU scenario for Egypt does not consider the reduction in the public debt to GDP ratio observed from 2007 to 2009 because MAMS for this country had been estimated and calibrated before this reduction was reflected in the official data.

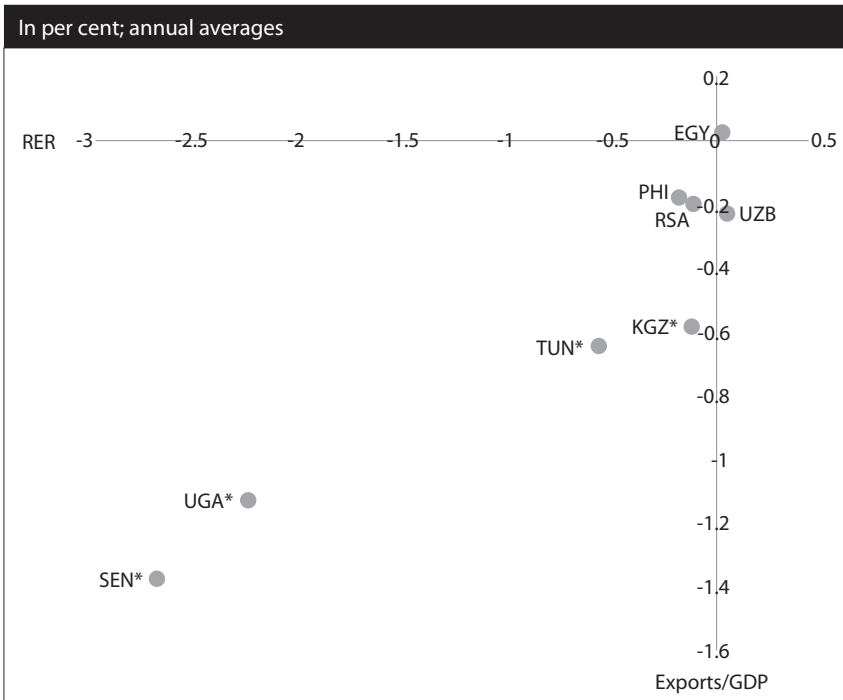
**Source:** Country studies of this volume.

The trade-off between foreign financing and loss of export competitiveness varies in degree across countries (Figure 1.4). Where “Dutch disease” effects are strong, as in the cases of Senegal and Uganda, this may have important implications for long-term growth, especially if the export sector is an important contributor to aggregate growth. The trade-off shown in Figure 1.4 refers to the short-to-medium term impact. Greater investment in human capital, complemented by other conditioning factors, may create additional productivity gains over time, however. The challenge to policymakers thus would be to avoid that, in case of opting for foreign financing, the negative short-run effects can be contained so as not to limit the resources available for long-term investments in human capital.

Yemen's country study concludes that, considering the magnitude of the MDG challenge, full, on-time MDG achievement by 2015 does not appear a realistic objective. The required financing is unlikely to be available and, if it were, it would be extremely challenging for the government to bring about the required increases in real service delivery without strong sacrifices in efficiency.

Considering the macroeconomic trade-offs, probably all countries should consider a mixed financing strategy. In most cases, the balance in this mix

Figure 1.4:  
**Simulated change in RER and export-to-GDP ratio under the recommended MDG-financing scenario compared with the BAU scenario, 2010-2015<sup>1</sup>**



<sup>1</sup> An asterisk (\*) indicates that the country study recommends foreign-aid financing (alone or combined with increased tax revenues). Yemen is excluded for the reasons explained in the text.  
**Source:** Country studies of this volume.

should be tilted towards broadening the tax base, in particular given already high public debt burdens. A further option, explored in the case of Yemen only, would be to seek gains in the reallocation of government spending. In Yemen, where the required MDG financing would unlikely be available, there would notably be more MDG progress than under business-as-usual conditions, if the government reduces spending that is presumably wasteful or covers overlapping functions in order to commensurately expand human development-related spending.

*Poverty reduction, inequality and growth*

Substantial poverty reduction is achieved under business-as-usual conditions in most countries. This holds in particular for Uganda where

poverty reduction appears rather responsive to employment growth. Baseline trends in South Africa suggest a significant shift in the skill composition of labour in favour of less educated workers while the average real wage level increases at a robust pace. As a result, there would be notable declines in both income inequality and poverty (Table 1.5).<sup>7</sup> In the other country cases, however, inequality increases slightly in the baseline, mitigating the degree of poverty reduction. In the Philippines, poverty is projected to increase under the baseline assumptions, as a consequence of a sharp rise in unemployment during global crisis of 2008-2010. Unskilled workers are affected in particular.<sup>8</sup>

Would scaling up public spending to meet the targets for improving primary education, child and maternal health, and water and sanitation help accelerate poverty reduction? This is indeed found to be the case in all country studies for which the poverty impact could be calculated (see final two columns of Table 1.5), except for Uzbekistan. Senegal might see the fastest acceleration in poverty reduction as a result of an expected strong increase in real wages induced by the MDG strategy.<sup>9</sup> Nonetheless, the acceleration would not be enough for Senegal to reach the target for poverty reduction by 2015. Also in the Philippines the acceleration in poverty reduction would be insufficient for meeting the target. Unlike in all other cases, the MDG scenario for Yemen presented in Table 1.5 does not fully scale up MDG-related spending to ensure meeting the targets for education, health, and drinking water and sanitation. Rather, it assumes a budget reallocation in favour of MDG-related spending, as explained in the note to the table. The demand for skilled and semi-skilled workers increases with the expansion of education and health services, thereby helping contain the fall in real wages projected in the baseline scenario. This, in turn, induces greater poverty reduction, enough to meet the target for MDG 1. Uzbekistan is the only case where scaling up MDG-related spending would slow poverty reduction (by almost 2 percentage points). The scenario presented assumes the additional public spending is financed by increasing direct taxes, which reduces disposable income growth and hence poverty reduction.

The results of the microsimulations suggest that progress towards MDG 1 is mostly explained by average income and employment growth and less by changes in the distribution of income/consumption under both the BAU and MDG scenarios (Table 1.5). However, higher growth—or a lower negative growth rate—of both employment and real wages relative to the baseline, explain the reduction in the poverty rate in the MDG scenarios

Table 1.5  
 Labour market, inequality and poverty indicators in the simulation period  
 under alternative scenarios<sup>1</sup>

Per cent of GDP												
	Employment (annual average growth rate)		Unskilled/ skilled employment ratio (annual average growth rate) <sup>2</sup>		Real wage per worker (annual average growth rate)		Unskilled/ skilled wage ratio (annual average growth rate) <sup>2</sup>		Gini coefficient (absolute change from the base year) <sup>3,4</sup>		Poverty rate (absolute change from the base year) <sup>3,5</sup>	
	BAU scenario	MDG scenario <sup>6</sup>	BAU scenario	MDG scenario <sup>6</sup>	BAU scenario	MDG scenario <sup>6</sup>	BAU scenario	MDG scenario <sup>6</sup>	BAU scenario	MDG scenario <sup>6</sup>	BAU scenario	MDG scenario <sup>6</sup>
Egypt	3.4	3.4	3.4	3.3	5.0	4.9	-3.2	-3.0	0.049	0.047	-0.2	-3.1
Kyrgyzstan	2.7	2.6	6.0	5.7	3.0	2.9	-7.2	-7.8	0.007	0.002	-2.0	-2.5
Philippines	2.4	2.0	-1.9	-3.3	0.7	1.4	1.7	1.5	0.004	0.008	0.3	-0.9
Senegal	2.3	2.4	1.3	1.1	1.5	4.9	-4.1	-6.8	n.a.	n.a.	-1.1	-5.2
South Africa	1.0	0.8	-4.3	-5.1	3.2	3.8	3.7	4.0	-0.023	-0.025	-15.4	-16.5
Tunisia	-0.4	-0.3	-6.2	-6.0	4.6	5.1	4.7	3.9	n.a.	n.a.	n.a.	n.a.
Uganda	5.8	5.9	1.6	1.5	0.3	2.6	-0.3	-3.1	0.040	0.070	-6.4	-6.6
Uzbekistan	2.9	2.9	-6.4	-6.8	6.4	6.3	7.8	7.1	n.a.	n.a.	-10.9	-9.2
Yemen	3.4	3.4	-3.6	-3.6	-0.3	-0.1	0.9	0.6	-0.004	-0.004	-0.9	-1.2

1 Some entries are missing (n.a.) for countries whose corresponding study did not estimate results for poverty and inequality (Gini) due to lack of data.

2 Unskilled labour includes workers who have less than a complete secondary education, whereas skilled labour includes workers who have completed secondary education or above.

3 For most countries for which microsimulations were conducted, excluding Uganda and Yemen, the base year of the MAMS simulation period matches exactly the base year of the microsimulations (i.e., the year for which the household survey dataset used to conduct the microsimulations was compiled).

4 Gini coefficient calculated for per capita household consumption for Kyrgyzstan and per capita household income for all other countries.

5 Refers to the percentage of the population living on less than a \$1.25 a day (South Africa) or an income/consumption per capita level below a national poverty line (all other countries except Tunisia). In general, most countries find it more challenging to meet a poverty target when the poverty rate is calculated using national poverty lines.

6 The reported results are for the recommended MDG-financing scenario as identified in the text. In the case of Yemen, no MDG-financing scenario is recommended by the authors of the country study as explained in the text. In this table, however, results for Yemen have been included for a scenario consisting of a 50 per cent cut in the growth rate for government expenditures that are not related to MDG sectors or infrastructure, during 2011-2015, with expansion in MDG-related spending sufficient to make use of the resulting fiscal space. The scenario is similar to the MDG-financing scenarios in that there is an increase in MDG-related spending, though financing is not really being affected, and there is no deliberate targeting of any MDG.

**Sources:** MAMS country model simulation and microsimulation results and analysis from country studies of this volume.

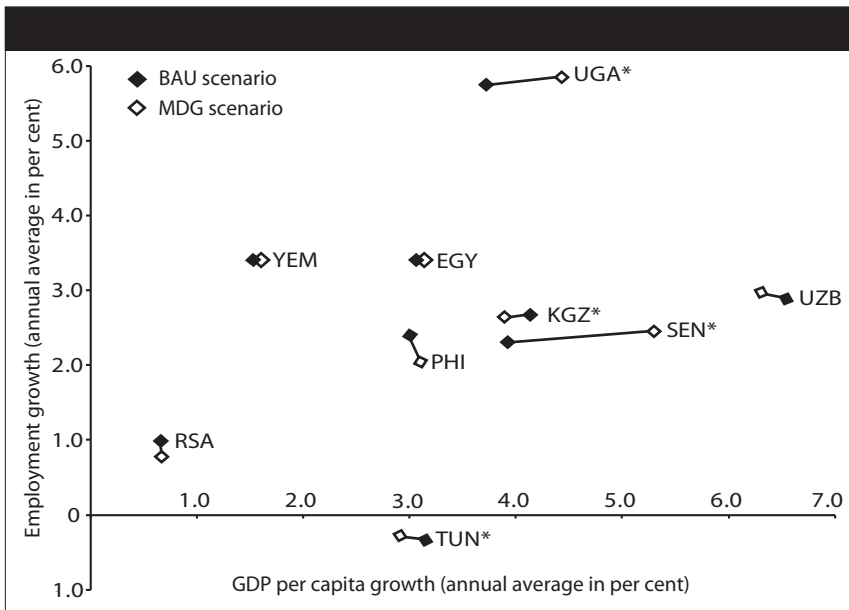


only in three countries (Senegal, Uganda and Yemen). Interestingly, employment stays the same or grows by less than in the baseline in the cases of Egypt, Philippines, South Africa and Kyrgyzstan. This result is apparently associated with the lower labour intensity of MDG-related services sectors compared to the average for tradable sectors in these countries. Also, as said, higher spending to expand government services in education, health, and infrastructure triggers an appreciation of the real exchange rate eroding export competitiveness, that would result in job losses in some export sectors, particularly in Kyrgyzstan, the Philippines and South Africa (see Figure 1.4). Thus, progress towards MDG 1 when MDG-related spending efforts are stepped up in these four countries is mostly explained by an increase in real wages. Unskilled workers benefit relatively more from this increase in real wages in Egypt and South Africa, as making progress towards MDG 2 implies that these workers become relatively scarcer. The impact on overall income inequality (as measured by the Gini coefficient) is rather small, however. In the other two countries, the Philippines and Kyrgyzstan, real wages for unskilled workers also increase in the MDG strategy. In the case of Kyrgyzstan, skilled workers gain more, including because of greater demand for teachers and medical personnel, thereby pushing up the skill premium by more than in the BAU scenario. Rising real wages also help further poverty reduction in the MDG scenario. Similarly, in the Philippines, the real wage growth supports poverty reduction, despite the slight increase in inequality induced by the stronger increase in demand for skilled workers than for unskilled workers.

GDP growth is somewhat stimulated by MDG spending—compared to the BAU scenario—in all but the two Central Asian countries, but this does not tend to move together with employment growth in a number of countries (Figure 1.5). As said, employment decreases under the MDG scenario in various countries, especially because of job losses in labour-intensive export sectors owing to the real exchange rate appreciation. Less ambiguously, in all countries where GDP growth is stimulated by the increase in MDG-related spending, the implied employment-output elasticity decreases significantly under the MDG scenario (by more than 14 per cent in the Philippines, Senegal, South Africa and Uganda) as explained above.

The predominance of employment and average income effects in explaining changes in poverty suggests that income redistribution effects under both the BAU and the MDG scenarios tend to be weak. This is confirmed by the results for the changes in the Gini coefficient of per capita household income/consumption (see Table 1.5). During the simulation

Figure 1.5:  
**Employment-output nexus under the BAU scenario and the recommended MDG-financing scenario<sup>1</sup>**



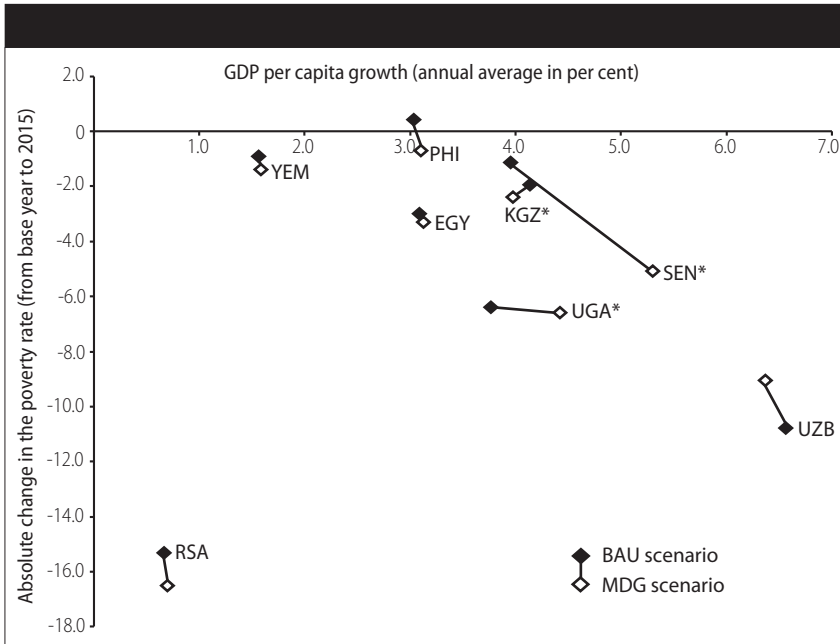
<sup>1</sup> The reported results are for the recommended MDG-financing scenario as identified in the text, and an asterisk (\*) indicates that the country study recommends foreign-aid financing (alone or combined with increased tax revenues). Results for Yemen correspond to the “MDG scenario” defined earlier in the text (see also note 6 to Table 1.5).

**Source:** MAMS country model simulation results and analysis as reported in the country studies.

period to 2015, little income/consumption redistribution is generally achieved under any scenario. This appears to be a surprising general finding, as the MDG-financing scenarios, in particular, would be expected to help raise education levels and labour-market opportunities for all, with most of the gains benefiting the poor who often tend to have a lower education level. The MDG-financing strategy should be expected to raise both the demand for and supply of skilled workers. However, a fundamental timing disparity needs to be taken into account: the demand for skilled workers in MDG-related services will go up first, whereas the increase in the supply of skilled workers would materialize with a lag, given the time it will take before the better-educated school graduates enter the labour market—most likely beyond the time horizon of the present analysis. However, in the case of the countries under study, some progress was already made in improving access to education during the 2000s, and hence skilled labour-supply growth may already be apparent without the MDG-financing

strategy. Shifts in the skilled-unskilled composition of labour demand will depend further on changes in sectoral labour demand induced by general equilibrium effects of the MDG-financing strategy triggered by both higher government spending and real exchange rate appreciation.

Figure 1.6:  
Change in income poverty and GDP per capita growth under the BAU scenario and the recommended MDG-financing scenario<sup>1</sup>



<sup>1</sup> For details on the MDG-financing scenarios see note to Figure 1.5. Poverty has been calculated using the \$1.25 a day poverty line (South Africa) or a national poverty line calculated on the basis of income or consumption per capita, depending on the country (all other countries).  
**Source:** MAMS country model simulation results and analysis as reported in the country studies.

In sum, the employment and real wage effects of an MDG strategy tend to offset each other in terms of their impact on overall income inequality. As a result, the impact on poverty reduction is mainly determined by overall employment and real wage growth. Another important finding is that most countries seem to encounter difficulties in absorbing the growth supply of skilled workers resulting from a successful MDG strategy. Existing economic growth patterns do not appear sufficiently skill-intensive and would suggest countries need to think beyond the MDG strategy and find ways to induce necessary structural change to level up skill demand.

Against this backdrop, in many of these countries, especially those that have recently experienced political conflict (notably, Egypt, Tunisia and Yemen), the MDG-financing strategy will need to be implemented in tandem with production sector and labour market policies that enable raising productivity growth, improving production capacity, and resolving labour market frictions and creating more jobs, especially for skilled labour and groups that, in the case of conflict countries, have felt excluded from their country's economic model. Only in this way, will the MDG-financing strategy achieve its objectives without increasing inequality.

Such policy coherence should be central to inclusive economic and social development strategies aiming to achieve human development goals. Much strengthened policy coherence will also be urgently needed for development strategies beyond 2015, which most likely will be even more ambitious, particularly considering the challenges posed by environmental threats requiring that achievement of human development goals will need to be done in ways that are also environmentally sustainable. This likely will require even larger upfront investments—for instance, in environmental protection, sustainable food agriculture, and cleaner energy supply and use—thus complicating the possible short-term macroeconomic trade-offs to be dealt with for long-term developmental gains. Consideration of such challenges is beyond the scope of this volume and is left for future research.

Other intertemporal trade-offs have clearly come to the fore in the present country studies. The high cost in terms of additional public spending requirements to achieve the MDGs stem in part because the potential economic gains from better education and health outcomes can only be reaped over the medium- to longer-run, since it takes time before better educated workers come out of the schooling system and improved child health translates into higher labour productivity. As economic growth accelerates, the cost (expressed as a percentage of GDP) would thus be expected to decline over time. However, there is no certainty that the economic gains from higher levels of human development will materialize in full. If the economic structure and labour market dynamics are such that better educated workers cannot find employment, this may give rise to new inequalities and a sense of lack of opportunities among important segments of society. As several of the countries studied have witnessed, such conditions may ignite social unrest and conflict. The more general lesson is that human development strategies should be embedded in a broader strategy of inclusive economic growth, ensuring that economic and social development move hand in hand.

## NOTES

- 1 The empirical literature on Dutch disease shows a wide range of RER adjustments in response to strong increases in aid flows or private capital inflows, with the extent of the effects depending largely on the relative demand and supply effects across sectors, and thus on country-specific circumstances (Bevan, 2005; Heller, 2005; Bourguignon and Sundberg, 2006; Gupta and others, 2006).
- 2 Yemen's GDP per capita growth rate was more than three times the rate of net employment growth.
- 3 The model is dynamic-recursive basically because it establishes links between period solutions using past and current information only, and updating some variables and parameters. Agents are not forward-looking such that no system of inter-temporal optimization equations is solved.
- 4 Following the non-parametric approach spelled out in Vos and Sánchez (2010), occupational shifts—recorded in MAMS scenarios—have been proxied by a random selection procedure within a segmented labour market structure. In other words, random numbers have been used to determine—in consistency with the results of the different MAMS scenarios—which persons at working age change their labour force status (employment versus unemployment); those who change sector of employment; which employed persons obtain a different level of education; and how new labour incomes are assigned to individuals in the sample. The key assumption is that, on average, the effect of the random changes in such occupational shifts correctly reflects the impact of the actual changes in the labour market. Because of the introduction of a process of random assignation, the microsimulations are repeated a large number of times—in Monte Carlo fashion, and each time the changes in the labour market are imposed on a given distribution derived from household survey data, in order to produce a new income distribution. This allows constructing 95 per cent confidence intervals for indices of poverty and inequality estimated from the newly generated income distribution.

Vos and Sánchez (2010) also suggest how this approach can be generalized to capture the effects of changes in non-labour incomes, such as government transfers, on poverty and inequality. The authors of the Yemen case study have computed individual labour incomes for each MAMS scenario using the said non-parametric approach, but following a slightly different procedure. They adjusted (per capita) non-labour incomes and added them to labour incomes in order to match the change in per capita household income as recorded by MAMS. This enabled them to generate a new individual income distribution that they used to compute a counterfactual household income distribution and estimate the inequality and poverty indicators. For the Kyrgyz scenario analysis, poverty and inequality indicators have been computed using data on consumption per capita rather than income per capita. However, the authors of the chapter on Kyrgyzstan computed consumption per capita for each MAMS scenario based on income per capita results generated through the non-parametric approach, which they combined with a (fixed) marginal propensity to consume for each household.

The microsimulation approach could not be applied for three countries owing to data limitations (Senegal and Uzbekistan) or lack of access to existing survey data (Tunisia). The authors of the Senegal and Uzbekistan chapters have made inferences about how income poverty would evolve under the MAMS scenarios, using a simple constant-elasticity relationship between the headcount poverty rate and real

household consumption per capita—thus essentially ignoring income distribution effects that would likely affect the final estimates on poverty. In the case of Tunisia, no estimations have been carried out to determine changes in poverty under the MAMS scenarios, although the country had met the MDG target for extreme poverty before its recent revolution.

- 5 Some of the country studies also answer two related questions: What social sectors would require the most additional spending? Are there important cost-saving effects from the synergies among the various MDGs?
- 6 In seven countries, the additional MDG-related public spending is calculated as an annual average for the whole simulation period, from the base year (around 2005) to 2015. For the Philippines and Tunisia, however, the authors of the country studies calculated annual averages separately for the “past” (from the base year to around 2010) and the “future” (from around 2011 to 2015) and added them subsequently. The total obtained provides a more accurate estimate that reflects the additional public spending requirements that the governments should have incurred but did not incur before 2010, in order to be fully on track in meeting the MDG targets, and the additional public spending requirements that the government would have to incur after 2010 to fully meet the targets by 2015.
- 7 In the base year of South Africa’s model, the labour market records relatively higher unemployment for unskilled workers. As a consequence, employment changes clear the market for these workers in the BAU scenario—whereas the labour market adjusts more through wages for the most skilled ones. The assumed growth path of the BAU scenario results in a stronger increase in the demand for unskilled workers than for skilled workers. Since the supply of unskilled workers also slows over time (because of improved access to education), real wages for unskilled workers increase faster than those for skilled workers.
- 8 As a result of the increase in the unemployment rate in the Philippines, the country’s poverty incidence was up by 1 percentage point in 2010 compared with 2006. In the BAU scenario, the poverty rate would fall again with the projected economic recovery during 2010-2015. As indicated earlier, the Philippines would achieve about 83 per cent of the poverty target by 2015 under the BAU assumptions (Table 1.2).
- 9 The magnitude by which the poverty incidence decreases in Senegal (and increases in Uzbekistan) may have been magnified by the method of estimation. As explained earlier, a simple constant-elasticity relationship between the headcount poverty rate and real household consumption per capita was used in the studies of Senegal and Uzbekistan due to data limitations that kept the authors of these studies from applying the microsimulation approach. As a consequence, how precise the reduction (increase) in poverty is in Senegal (Uzbekistan) remains unknown as the distributional effects of the MDG strategy are not being taken into consideration.

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# Chapter 2

## Egypt

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### INTRODUCTION

Prior to the Lotus Revolution in 2011, Egypt was one of the few countries in the Arab region that seemed to be on track to achieve most of the millennium development goals (MDGs). Progress made in the 1990s reflected Egypt's relatively stable socio-economic situation despite significant structural problems beneath the surface. Indeed, human development goals have been central to the aspirations expressed by the Egyptian people during and in the aftermath of the Revolution.

The purpose of this chapter is to assess strategies to achieve the MDGs in Egypt through the application of a macro-micro modelling approach. A set of policy scenarios is generated to explore alternative ways to finance strategies to meet the goals in primary education (MDG 2), child and maternal mortality (MDGs 4 and 5) and drinking water and basic sanitation (MDGs 7a and 7b). The results of the policy scenario analysis help to form an idea about the requirements in terms of additional public spending and financing needs to achieve the MDGs under alternative reference growth conditions. These requirements represent a minimum benchmark against which further efforts towards the development goals need to be assessed, in particular once the Revolution's effects on the economy and the MDGs are fully understood.

At the core of the modelling approach is the economy-wide framework known as MAMS. This model shares the characteristics of most standard dynamic-recursive general equilibrium (CGE) models, but it has the atypical feature of adding a module for the "production" of MDG-related



services. Complementarily, a simulation approach is applied at the micro level to impute labour market changes generated through MAMS to a micro dataset, in order to determine how the distribution of income and poverty incidence (MDG 1) changes in all simulated scenarios. These methodologies are described in greater detail in Chapter 1.

In the next section we provide a brief exposition of the Egyptian economy focusing on recent reforms and macroeconomic policies as well as current and future challenges. In the following section we examine the current status of MDG achievement and whether or not Egypt is or not on track to achieve the MDGs by 2015. We then review the empirical literature on determinants of primary school access and performance, child and maternal mortality and access to drinking water and basic sanitation in Egypt and explain how the findings have served to calibrate the MDG module of MAMS. This is followed by a brief discussion of how we adapted the economy-wide modelling approach to Egypt. We describe how MAMS was used to generate various scenarios in which the non-income MDGs would be achieved using alternative financing strategies. We then present our main findings and assess the feasibility of the different scenarios. The final section puts forward some policy recommendations that have gained further relevance in the aftermath of the Revolution.

## MACROECONOMIC PERFORMANCE

### *Economic growth and reforms*

In 1991, after nearly a decade of sustained government deficits, mounting external debt, double-digit inflation and stagnant economic growth, the government of Egypt launched the Economic Reform and Structural Adjustment Program (ERSAP). Its main objective was to stabilize the economy by reducing structural unemployment, external debt, inflation, and fiscal and external deficits (Economic Research Forum, 2004). Other imbalances and distortions in Egypt's economy were also to be eliminated through a series of market reforms.

The ERSAP was successful in bringing inflation down from more than 20 per cent in the late 1980s to single-digit levels by 1994. It also reduced the fiscal deficit to about 1 per cent of GDP by the fiscal year 1997/98 (Economic Research Forum, 2004) (Table 2.1). By the mid-1990s, stabilization efforts and reforms to the real and financial sectors helped reverse the downward trend of GDP growth, which subsequently peaked at 6.3 per cent in

1998/99 (OECD, 2002). However, as typical of most exchange rate-based stabilization programs, the expenditure-switching effects were short-lived and were accompanied by a sufficiently strong supply response. Three major external shocks acted as catalysts to the subsequent bust: the East Asian crisis (1997-1998), the Luxor massacre (November 1997) and a sharp decline in oil prices (January 1998). As a result of the poor policy response to these shocks and the global economic deceleration following the events of September 11, 2001, economic growth continued to slow to 3 per cent in 2001/02 (Economic Research Forum, 2004). The slowdown continued until 2003 and was accompanied by rising inflation, high unemployment, a widening fiscal deficit and growing domestic debt. Moreover, economic activity was further constrained by generally low productivity levels and a severe shortage of foreign exchange, which culminated in a quasi-currency crisis in 2003. Real GDP growth stayed in a range of 2-3 per cent per year, which is below potential (Table 2.1).

Table 2.1  
Egypt: Main macroeconomic indicators, 1990-2009

	<i>Government deficit (per cent of GDP)</i>	<i>Investment (per cent of GDP)</i>	<i>Trade deficit (per cent of GDP)</i>	<i>Inflation (per cent)</i>	<i>Real GDP growth (per cent)</i>
1990-1994	8.6	20.1	6.9	14.1	3.0
1995-1999	1.7	19.7	7.2	6.9	3.8
2000-2004	8.9	17.9	4.0	4.7	4.8
2005-2009	7.5	19.8	4.8	10.4	6.8

**Source:** International Monetary Fund (IMF), International Financial Statistics (IFS).

A new cabinet was appointed in 2004 to turn around the feeble economic performance through a series of reforms aimed at revitalizing the supply side of the economy. The economy started to recover, with GDP growth reaching 5.1 per cent in 2004/05 and 7.1 per cent in 2006/07. The emergence of the global financial crisis derailed the growth momentum and GDP growth decelerated to 4.7 per cent in 2008/09. Main factors leading to the economic slowdown include the downturns in tourism, Suez Canal earnings, foreign direct investment (FDI), investment, exports, and, to a lesser extent, private consumption.

In spite of the global financial crisis and its effects on the Egyptian economy, GDP growth averaged a respectable 7 per cent per year during 2005-2009 (Table 2.1). But this growth did not trickle down to improve the welfare of the average Egyptian citizen in any notable way. The trend of declining poverty since the early 1990s was reversed in the second half of the 2000s.

### *Fiscal policy*

The ERSAP also envisaged putting public finances back in order by ending deficit financing policies. As mentioned, this helped putting inflation under control and reducing external public indebtedness. The first wave of reforms broadened the tax base through the introduction of a sales tax, shifting towards bond financing and rationalizing expenditure. These measures reduced the deficit to 3.9 per cent of GDP by 1999/2000, down from 17.2 per cent in 1991. The subsequent wave of reforms came with the appointment of the new cabinet in 2004, in response to high fiscal deficits that had reached more than 10 per cent of GDP by 2002/03. The government reduced tax rates, but also implemented administrative reforms to the income tax system to enhance revenue collection. With these reforms, tax receipts came to account for more than half of total government revenue and around 14 per cent of GDP. This helped cut the government deficit from 9.5 per cent of GDP in 2003/04 to 6.6 per cent in 2008/09, but nonetheless averaged more than 7 per cent of GDP in 2005-2009 (Table 2.1). There seems still to be ample room to increase tax income, in particular by expanding the property tax. Currently, property tax revenues hover around a mere 0.03 per cent of GDP, which is negligible compared to countries at similar levels of development.

The level of total public debt peaked at more than 100 per cent of GDP in 2002/03. It decreased to 71 per cent in 2008/09, due to a declining reliance on external debt, which during the same period fell from 42.5 per cent of GDP to 17 per cent in 2008/09, a trend that continued. To manage the debt level and reduce potential exchange rate risk, stringent restrictions were put on external borrowing. Domestic borrowing increased further as a result, but at a lesser pace than GDP growth such that, together with domestic inflation of around 10 per cent per year, the public debt to GDP ratio fell during the 2000s.

In response to the global financial crisis, the government adopted a stimulus package amounting to 14.4 billion Egyptian pounds. The aim

was to spur domestic demand by increasing government expenditure. This widened the budget deficit to 8.5 per cent of GDP in 2010/11.

### *Monetary policy and inflation*

Egypt relied heavily on *seigniorage* before the launching of the ERSAP, as a result of which there were continuous inflationary pressures. The ERSAP succeeded in curbing inflation by using the nominal exchange rate as an anchor and containing the budget deficit. Inflation fell from 15.7 per cent in 1995 to below 5 per cent by the second half of the 1990s (see also Table 2.1).

Despite the positive inflation differential between Egypt and its major trading partners throughout the second half of the 1990s, the nominal exchange was kept fixed. As a result, the real exchange rate appreciated, stimulating import demand. A number of external shocks added to the chronic shortage of foreign exchange, ultimately forcing the government to engage in a succession of devaluations of the Egyptian pound during 2000-2003, until letting it float in January 2003.

A surge of private capital inflows led to renewed pressures for the real exchange rate to appreciate between 2005 and 2008. Even so, adverse effects of the avian influenza, the spillover effect of a 30 per cent increase in oil prices, and increased aggregate demand fuelled by tax cuts in 2006, caused inflation to climb to double-digit rates by 2008 (Table 2.1). In response to the inflation hike, the Central Bank of Egypt (CBE) raised the overnight lending and deposit facility interest rates twice in late 2006. The drop in food prices in 2008 contributed to ease inflationary pressures, too, but inflation remained in double digits, reaching 11.7 and 16.2 per cent in 2008 and 2009, respectively. In efforts to cut inflation, the CBE reduced the overnight lending and deposit facility interest rates by 25 basis points in September 2009. For three years, starting in 2008, the Egyptian economy has witnessed persistently high inflation rates. After peaking at 13.6 per cent in January 2010, inflation remained at around 10-12 per cent until June 2011.

### *External sector*

Egypt opted to open up its economy and promote exports but these changes have not yielded strong export-led growth. In fact, the trade deficit widened, representing on average, just below 5 per cent of GDP for 2005-2009, but up from that registered during the first half of the 2000s (Table 2.1). This deficit has been financed by a surplus of foreign exchange earnings accruing

from tourism, Suez Canal proceeds and workers' remittances as well as by the increasing influx of capital flows, mainly in the form of foreign direct investment (FDI) attracted by new policy incentives and a positive outlook of major macroeconomic indicators.

The woes of the global financial crisis were transmitted to the Egyptian economy via the external sector as seen in a drop in exports, tourism and Suez Canal earnings. Workers' remittances decreased as a large number of expatriate workers lost their jobs. Finally, FDI flows dropped to US\$6.7 billion in 2009.

### *Post-revolution economic outlook*

The Revolution that unfolded on January 25, 2011 represents a paradigm shift. Yet the massive public support and hopes for a better future brought on by the Revolution do not make the short-run macroeconomic challenges the country faces less daunting. First, domestic private absorption and exports are expected to remain stagnant given the climate of uncertainty and a prolonged disruption in various economic activities. The demand deficiency is expected to decelerate economic growth to a mere 2 per cent in 2010/11 in the best-case scenario. Second, the budget deficit is expected to widen to around 10 per cent of GDP in 2010/11 as a result of a drop in tax revenues, including custom receipts, and mounting public pressure on the fiscal authority to increase wages and subsidies and to engage in expansionary fiscal policy to reactivate the economy. Third, inflationary pressures due to rising prices of food and oil imports are putting additional strains on the government budget because of higher demands for subsidies. Inflation expectations are expected to increase, keeping the inflation rate in the double digits. Fourth, the current account deficit will likely widen with fewer earnings from tourism and exports. The capital account surplus is expected to dwindle with the reversal in portfolio investment and short-term flows as well as the expected major drop in FDI flows. Fifth, monetary authorities face daunting dilemmas. There will be a strong pressure on the currency to depreciate as the balance of payment deteriorates. At the beginning of the revolution the CBE used reserves to defend the pound, but this policy is no longer sustainable. On the other hand, leaving the pound to depreciate freely would reinforce inflationary pressures through the pass-through effect and threaten economic stability.

All of these challenges may disrupt the course of Egypt to achieve the MDGs. The widening government deficit will squeeze the fiscal space,

reducing the ability of the government to direct funds to education, health and sanitation. In addition, the slowdown in the level of economic activity will adversely affect household income, thus curtailing private consumption of MDG-related services and slowing poverty reduction. On a more optimistic note, the Revolution carries the seeds of a better Egypt if the result is that the nation's resources are better allocated to improve welfare and shared more equally across society—and if institutional reforms are put in place to guarantee and protect the political, social and economic freedoms of all citizens and to enhance accountability in public action.

## PROGRESS TOWARDS THE MDGS

Egypt is unlikely to face major problems in achieving the MDGs given past progress. However, this progress has not been even: it has been swift and sustained in health and sanitation goals, acceptable in education and poverty reduction, and slow in women's empowerment and environmental protection. Reports and existing statistics also point to worrying gaps in income levels and living standards between Lower and Upper Egypt. Population growth is also seen as one of the main challenges to meeting the MDGs.

### *Poverty*

In 2005, Egypt met the internationally set target of halving the proportion of its population living in extreme poverty. According to data from the Household Income, Expenditure and Consumption Survey 2008-2009 (HIECS), 3.5 per cent of Egyptians live on less than \$1.25 per day (measured at purchasing power parity), compared to 7 per cent in 1995. However, when using other poverty lines, poverty trends oscillated from 1990 to 2008. For example, 44.0 per cent of Egyptians lived on \$2.50 or less a day in 2008/09 compared with 43.7 per cent in 1999/2000 and 57.0 per cent in 1990/91 (Table 2.2). Poverty is more widespread in the rural areas. If one considers the period 1990-2009, poverty declined significantly by all measures and regardless of the poverty line chosen. But in 2008/09, poverty increased relative to levels observed in the mid-2000s, likely as a result of the global economic crisis, which led to higher unemployment and a reduction in labour incomes. As this study was being completed, it was not yet clear how the disruption of economic activity resulting from the Revolution would affect poverty.

Table 2.2

**Egypt: Incidence of poverty and Gini coefficient for per capita income, 1990/91-2008/09 and target for 2015**

	1990/91	1999/00	2004/05	2008/09	Target for 2015
<b>Poverty incidence (per cent of the population)</b>					
National extreme poverty line	24.2	16.7	19.6	21.6	12.1
National moderate poverty line	51.4	42.6	40.5	41.7	25.7
\$1.25 per day (PPP)	7.0	3.4	3.4	3.5	3.5
\$2.50 per day (PPP)	57.0	43.7	42.8	44.0	28.5
<b>Gini coefficient</b>	0.446	0.362	0.320	0.301	

*Source:* Kheir El-Din and El-Laithy (2006) for 1990/91-2004/05 and authors' estimates based on the HIECS for 2008/09.

In any case, the reduction in poverty can in part be explained by an improvement in the distribution of income. Measured by the Gini coefficient for household income per capita, income inequality declined from 0.446 to 0.301 between 1990/91 and 2008/09. A decomposition of the change in the incidence of poverty further confirms that, in addition to growth, improved distribution may also have contributed (see Khorshid and others, 2011).

### *Education*

In the early 1990s, Egypt embarked on a comprehensive educational reform program. The number of basic education schools increased to nearly 11,000 and the total number of students enrolled in pre-university education climbed to 15.5 million in 2003/04 from 12.1 million in 1990/91. Net enrolment rates in primary education rose by 8 per cent between 1995 and 2005, reaching 96 per cent in 2008/09. Furthermore, the number of children (aged 6-12) attending schools increased from 83 per cent in 1995 to 90 per cent in 2008. By these numbers, Egypt would appear to be on track to achieve MDG 2 (universal primary education). Progress has been uneven across regions, however. Educational policies should be more clearly defined and the quality of education needs to be improved in order to ensure adequate educational outcomes.

Reducing the wide gender and regional disparities in education remains challenging. Official data sources have not been able to identify the reasons for these disparities. For example, urban governorates achieved universal primary education whereas in other governorates such as Souhag and South and North Sinai, where there is also a rural population, enrolment rates are below 80 per cent (Ministry of Economic Development, 2010). The Girl Education Initiative and the Food-for-Education program have been launched to, respectively, close the gender gap in education and encourage the most vulnerable and poor children to attend school. However, as a result of the global financial crisis, funds for enhancing access to education and improving the quality of learning have been limited. Announced measures to promote education present good intentions, but in practice seem to be falling short of what is needed to redress the perceived deterioration in the quality of education.

### *Gender equality*

Significant progress in school enrollment has been driven in part by a notable increase in female access to education. Nonetheless, a significant gender gap in access to education remains. By the mid-2000s, 93 per cent of girls in primary school age were enrolled, 3 percentage points less than that of boys. The gap is projected to diminish, however, as female literacy is expected to reach 95.8 per cent by 2015, up from 86 per cent in 2010 (Ministry of Economic Development, 2010).

Improved access to education for females has also facilitated greater participation of women in the labour force. Their share in the total labour force increased from 7.3 to 15.3 per cent between 1976 and 1996. Women have been encouraged to seek employment in the public sector, attracted by higher wages, as labour laws promoting equality between men and women are more strictly applied in the public than in the private sector. Yet, even as it has increased to 22 per cent, the female participation rate still lagged well behind that for males, which stood at 77 per cent in 2005 (Hassan and Sassanpour, 2008). Unemployment is also higher for women, reaching 22.6 per cent in 2001 compared to 5.6 per cent for men. The unemployment rate of females remained high over the past few years, increasing to 22.9 per cent, 4.3 times higher than the jobless rate among men in 2009. The global financial crisis did not seem to have a strong gender bias, but women were particularly vulnerable to job losses in textile companies (Jansen and von Uexkull, 2010).



Gender inequality tracks income levels, and is high among the poor. In addition to traditions and cultural factors, poverty plays an important role, with girls dropping out at higher rates than boys.

### *Health*

Egypt is expected to achieve the target of cutting the under-five child mortality rate (MDG 4) to 12.2 per 1,000 live births by 2015, considering that it succeeded in reducing this rate from 91 in 1990 to 32 in 2008. Given its level of development and income, child mortality in Egypt should be considered relatively low (Boone and Zhan, 2006).

Significant progress also has been achieved towards the target of reducing maternal mortality by three quarters between 1990 and 2015. The maternal mortality rate was reduced by 52 per cent between 1992 and 2000, according to data from the Ministry of Economic Development (2008).<sup>1</sup> This reduction in maternal mortality primarily has been the result of the adoption of an integrated maternity care system and the improvement of service delivery in health care units. There has been a steady increase in the percentage of deliveries attended by health personnel which at the national level went up from 40.7 per cent in 1992 to 74.2 per cent in 2005. Also, the percentage of girls who gave birth at the age of 18 or younger dropped from 23.7 to 15.8 per cent in the same period. As a result of this progress, Egypt was expected to reach MDG 5 by 2015 before the global financial crisis occurred. Because of the crisis, however, national funds allocated for health care were reduced, affecting in particular resources available for training and medical equipment. Total health expenditure fell from 6.4 per cent of GDP in 2008 to 3.5 per cent in 2009 (World Health Organization, 2010).

Maternal mortality rates vary greatly across regions, among other things owing to the lack of availability of health personnel (Anand and Bärnighausen, 2004) and the higher prevalence of adolescence marriage and pregnancy in some parts of the country, especially in rural areas of Upper Egypt. The 2008 Demographic and Health Survey (EDHS) reported lower coverage rates of maternity services among rural women, particularly in rural Upper Egypt. Health personnel attend only 54.8 per cent of deliveries in rural Upper Egypt (Ministry of Economic Development, 2010). Also, 26.8 per cent of women in rural Upper Egypt conceived their first child before reaching the age of 18 compared to the national average of 12.3 per cent.

Meeting MDG 5 would not only require that health expenditures return to pre-crisis levels, but that measures be taken to improve the social status of women, increase female school enrolment and protect young women from early marriage. In addition, the government should invest more to train more qualified health providers and create incentives for physicians to work in remote areas so as to ensure a more balanced geographical distribution of health services.

Though it is not part of the modelling analysis performed in this chapter, it is worth mentioning that Egypt has also made strides in other health goals. Malaria has been well controlled as it declined from four cases to near zero per one thousand between 1990 and 2000. Tuberculosis is regressing as evidenced by studies showing that treatment envisaged by the Directly Observed Treatment Short Course (DOTS) has been cost-effective (see, for example, Vassall and others, 2002). HIV does not pose a serious health threat but it is nevertheless prevalent among the most productive segment of the population, with 84.3 per cent of infected Egyptians falling in the age category of 15-49 years (Ministry of Economic Development, 2010). Half of the HIV-infected cases are in urban areas with even more cases found among women. Egypt is facing an epidemic of Hepatitis C, with 7 to 9 per cent of the population being carriers of this disease. Reducing the prevalence of Hepatitis C and reversing its spread requires coordinated efforts from different governmental entities.

### *Access to drinking water and basic sanitation*

In 2006, 98 per cent of the population had access to safe water, according to census data. This means that Egypt has already surpassed the target for MDG 7a set at 97 per cent, despite some setbacks in the mid-2000s when the volume of public investment stagnated (Kamaly and Eldin, 2009). More efforts are needed to achieve the target of providing 75 per cent of the population with access to improved sanitation (MDG 7b). In 2006, coverage was 66 per cent, up from 50 per cent in 1990. In spite of this progress, some governorates have witnessed a decline in access to improved sanitation, dropping to the coverage levels of 1996. Given the current percentage of buildings in urban areas that have improved sanitation (62.6 per cent), MDG 7b is more likely to be achieved in urban areas. Without changes in policies that increase basic sanitation delivery in the rural areas it will not be possible to meet the target for MDG 7b by 2015.

## DETERMINANTS OF MDG OUTCOMES

A review of the empirical literature was undertaken to identify the factors determining human development outcomes and the types of interventions that could accelerate progress in achieving the goals for primary education (MDG 2), child and maternal mortality (MDGs 4 and 5), and drinking water and sanitation (MDGs 7a and 7b) in Egypt. Many of these factors have been mentioned in the previous section, but here we provide additional empirical evidence. This evidence was critical for the parameter calibration of the MDG module of MAMS for Egypt, as described in more detail in Khorshid and others (2011).

### *Universal primary education (MDG 2)*

Similar to other countries, the most important determinant of education attainment in Egypt is family wealth and income. Roushdy and Namoro (2007) have found that family wealth has a strong positive effect on education attainment. Dancer and Rammohan (2007) confirm this with their finding that the higher the level of per capita household expenditure, the higher the probability of school enrolment of family members in primary school. Data from the 2003 EDHS show that net primary school enrolment was 94.5 per cent for the richest quintile, but 75.9 per cent for the poorest quintile. The dropout rate among the richest quintile was as low as 0.2 per cent, compared with 2.2 per cent for the poorest quintile. In MAMS for Egypt, the level of household consumption per capita features among the key determinants of primary school outcomes (see Chapter 1).

The literature identifies other important factors that affect education indicators, such as parental education; infrastructure, especially the availability of paved roads; and the quality of education. Although empirical studies did not consider all of these factors as part of the same econometric model estimation, Roushdy and Namoro (2007) and Hanushek and others (2008) provide evidence of the importance of, respectively, parents' educational level and the quality of schools in determining enrolment and dropout in primary education. Although these determinants are not explicitly quantified as part of MAMS for Egypt, the empirical findings are used as a basis for the definition of the elasticities related to the determinants of education outcomes in the MDG module of MAMS for Egypt. Family wealth and income—as proxied by per capita consumption capacity—is one of the key factors affecting entry and promotion in primary education as

well as continuation to secondary education. Other possible determinants specified in the MDG module of MAMS, such as MDG 4 (as a proxy of the health status of the population at entry age) and the quality of education (measured by the provision of services by student) may have less marked effects on entry and pass rates in the primary cycle. The quality of education is expected to affect promotion rates because in Egypt the emphasis is on transferring the children from one grade to another with little attention paid to their actual educational performance, which, even according to officials, is deteriorating. In MAMS, though, as said, the quality of education is proxied by service delivery per student and, as further indicated below, additional spending will be required to underpin any strategy aiming to achieve that all children complete primary education without repeating a grade. Student behaviour defining the primary completion rate in MAMS for Egypt has been defined to respond moderately to changes in service delivery per student (with elasticities being 0.2 and 0.87 for entry and pass rates, respectively). The existence of supporting infrastructure such as paved roads has become relatively less important for educational outcomes given the government's efforts to increase the number of schools. Based on this, in MAMS for Egypt, student behaviour barely responds to improvements in public infrastructure that is not directly associated with the education sector. The exception is continuation rates to tertiary education for students who graduate from secondary education for which an elasticity of 0.1 has been used for public infrastructure.

By and large, for the calibration of MAMS for Egypt it has also been assumed that the choice of continuing to the tertiary cycle also responds more quickly to changes in per capita household income, the quality of education, and the wage premium on higher education, which is not seen for the lower education cycles. The opportunity cost of continuing to tertiary education is relatively high, especially for low-income households.

### *Reduction of child mortality (MDG 4)*

Studies on the determinants of child mortality in Egypt tend to come up with ambiguous results, which are probably attributable to the poor quality of data. Casterline and others (1989) and more recently Boone and Zhan (2006) find per capita household income to be the main determinant of a lower probability of early child death. The latter study shows that a one standard deviation increase in household wealth would lead to 30 per cent decline in the probability of child mortality.

Government policies to achieve MDG 4 include a nationwide program of vaccination against diseases with immunization coverage that exceeds 97 per cent with little disparity across regions (Ministry of Economic Development, 2008). Other programs that aim to reduce infant and child mortality include the National Diarrhoeal Control Program and the Healthy Mother–Healthy Child program. All of these efforts are captured in MAMS by the level of delivery of health services per inhabitant.<sup>2</sup>

MAMS also accounts for the synergy effects of increased access to drinking water (MDG 7a) and sanitation (MDG 7b). Aly and Grabowski (1990) have shown that access to clean water has a significant effect on reducing child mortality, whereas Boone and Zhan (2006) have found evidence of such a synergy, but could not estimate a statistically significant quantitative relationship. Both studies concur, however, that appropriate sanitation is an important factor in reducing child mortality. Based on this empirical evidence, MAMS for Egypt assumes that improving access to sanitation has a significant impact on reducing child mortality, more so than improving access to clean water given the already near universal coverage of the latter.

### *Reduction of maternal mortality (MDG 5)*

There is very little quantitative empirical evidence about the determinants of maternal mortality in Egypt. Anand and Bärnighausen (2004) identified factors such as the availability of medical personnel, especially physicians, and female education as key determinants of maternal mortality, whereas Fay and others (2005) add infrastructure to the list. Considering the available evidence, the level health spending per capita (reflecting the availability and quality of health services) is assumed to be the main determinant of maternal mortality in Egypt, followed by general infrastructure (determining the geographical accessibility of services) and per capita income (determining the affordability of health services and also reflecting, indirectly, education levels of mothers).

### *More access to safe water and improved sanitation (MDGs 7a and 7b)*

Access to safe water and improved sanitation depends primarily on how much the government spends on infrastructure as well as the level of household income. Based on recent developments, the elasticity with respect to expenditure on infrastructure should be relatively higher for access to sanitation. In the case of access to safe drinking water, the already

high coverage means that the main issue is not the level of spending on water supply infrastructure. Instead, improvements in household income are considered to be the main factor in ensuring universal access.

## ANALYSIS OF MDG ACHIEVEMENT UNDER GROWTH AND FINANCING SCENARIOS

### *Overview of MAMS implementation*

In order to implement MAMS for Egypt, a social accounting matrix (SAM) was constructed using the following data for 2006/07: national income accounts and input-output tables from the Ministry of Economic Development (MOED), the balance of payments account from the CBE, the population census, the labour market survey and the set of industrial and services censuses developed by the Central Agency for Public Mobilization and Statistics (CAPMAS). Some of the less common features of this SAM—to make it suitable for MAMS—include a full breakdown of MDG-related social services (education by cycle, health, and water and sanitation) and further, where appropriate, by public and private delivery of those services. Furthermore, each institution has a capital account and, in addition to investment by sector of origin (the usual treatment), the model accounts for investment by sector of destination.

Second, time series data, previous modelling studies on Egypt (Khorshid 2003 and 2008) and international indicators of similar countries (see, for instance, country cases presented in Sánchez and others, 2010) were used to estimate the parameters and technical coefficients needed to run MAMS for Egypt. Third, after running the model, further fine-tuning helped validate the results and generate the so-called reference path (or baseline scenario) for 2007-2015 based on the recent economic performance of the Egyptian economy for 2007-10, several analytical studies (Khorshid 2003; World Bank 2006 and 2009) and indicators of the five-year socioeconomic development plans—which do not consider the effect of the Revolution on the Egyptian economy.

Fourth, two baseline scenarios served as reference points (or benchmarks) against which results of new MDG-achieving scenarios were compared. The second baseline scenario was generated to account for the uncertainties in the growth prospects in light of the 2008/09 global financial crises and other domestic socioeconomic problems. Although the effects of the recent

Revolution were not taken into account, this baseline is conservative in terms of the future economic growth prospects. Moreover, the benchmark and scenario comparisons provide findings that will be useful in planning how to offset the impact of the Revolution on the economy—and on meeting the MDGs—once such effects are fully understood.

Finally, labour market results from all MAMS scenarios were used in the application of a microsimulation approach by means of which changes in income distribution and poverty were estimated for such scenarios. The Household Income, Expenditure and Consumption Survey (HIECS) for 2008/09 was used for these purposes.

### *Reference path scenario*

In a first step, the model is used to generate a reference path for 2007–2015 that is regarded as a baseline or business-as-usual (BAU) scenario. This BAU run reproduces the observed functioning of the economy during 2007–2010 and it projects the medium-term economy-wide indicators up to 2015—although it does not account for the effects of the Revolution. A key underlying assumption is that the government continues to rely on various policy measures and strategic trends applied since the 1990s.

The other fundamental assumptions are associated with the closure rules of the model. Government final consumption is assumed to be fixed in real terms and follows an exogenous growth rate to ensure continuation of spending policies and to prevent government spending from responding pro-cyclically to economic growth fluctuations. Tax rates are assumed to be fixed and the level of domestic borrowing is used to clear the budget. All other components of budget financing in MAMS (that is, borrowing from the monetary system, foreign borrowing and foreign grant aid) are treated as fixed shares of GDP. A flexible real exchange rate clears the foreign exchange market, which is a realistic assumption for generating medium-term projections in developing countries (Lofgren, 2008). Household investment spending is an exogenous share of GDP, which is kept fixed. The savings rate adjusts endogenously to balance aggregate savings and investment. Finally, in the factors market, demand and supply of non-labour factors of production (capital and natural resources) equilibrate through changes in the rate of return for a given fixed rate of underutilization. As for labour, adjustments in the level of employment equilibrate the various labour market segments when the unemployment rate is above or equal to a minimum rate. When unemployment drops to the minimum rate, the markets clear through adjustments in the real consumption wage.

The main results of the reference path scenario are summarized in Table 2.3. To account for uncertainties in the growth prospects of the Egyptian economy and the impact of the recent global financial crisis, both an optimistic and a moderate growth path were generated. The former assumes that Egypt will resume its pre-crisis GDP performance before 2015. The second assumes a slow recovery from the global financial crisis. In these two scenarios, real GDP grows on average by 5.7 and 4.9 per cent per year, respectively.

The optimistic growth scenario assumes that real government consumption expenditures grow on average by 4.5 per cent per year, slightly more than in the moderate scenario, where government spending faces more financing constraints due to less tax revenue. According to the CBE database, government domestic borrowing—including treasury bills and loans from the monetary system—was expected to grow by 2 per cent per year up to 2015 before the Revolution unfolded. Public investment grows slightly less than government consumption in order to generate an adequate level of capital stock needed by the government to deliver the desired level of social services. The key question to answer is whether this amount of government spending is adequate to meet the MDGs for primary education, health and water and sanitation.

In the reference scenarios, GDP growth is mostly driven by private final demand for both intermediate and final goods and services. Given its

Table 2.3

**Egypt: Macroeconomic indicators and assumptions of the two baseline scenarios, 2007 and 2010-2015**

	2007 (million Egyptian pounds)	2010-2015 (Percentage annual growth rate)	
		Moderate growth scenario	Optimistic growth scenario
		GDP	715,530
Household consumption	850,153	6.5	7.4
Government consumption	19,777	4.0	4.5
Investment spending:			
Private	130,133	5.7	6.1
Public	25,167	3.2	3.9
Exports of goods and services	230,600	3.5	3.9
Imports of goods and services	254,600	7.9	8.4

**Source:** Authors' estimates based on application of MAMS for Egypt.



importance in aggregate demand, the volume of imports increased annually more than any expenditure component presented in Table 2.3. Export growth is much less, presumably because of a lack of export promotion measures and an ensuing real exchange rate appreciation under the two baseline trends. As a result, exports as a share of GDP decline in the simulation period, resulting in a reduction in gross domestic savings as a percentage of GDP. Assuming the government's continued reliance on domestic debt to finance its budget, the share of domestic debt to GDP increases from 95.4 per cent in the base year to about 106 and 100 per cent in 2015 in the moderate and optimistic scenarios. Consistent with this trend, the ratio of foreign debt to GDP declines from 23 per cent in the base year to 15 per cent in 2015 under the moderate baseline scenario, but the results are not dissimilar in the optimistic growth scenario.

Under both reference scenarios, the targets for reducing child and maternal mortality rates and enhancing coverage of drinking water would be achieved—or even overachieved (see Table 2.4). The target for improving access to safe water (MDG 7a) was achieved in 2006, as indicated above. In contrast, Egypt would fall short of the targets for primary education and for coverage of basic sanitation. For MDG 2, MAMS uses the strict target of reaching almost 100 per cent of on-time primary completion, which can only be achieved if entry is at the right age and students do not drop

Table 2.4  
Egypt: MDG progress and achievement under the baseline scenarios, 2007 and 2015<sup>1</sup>

<i>Indicator</i>	<i>Base year (2007)</i>	<i>Target (2015)</i>	<i>Baseline scenarios</i>	
			<i>Moderate growth</i>	<i>Optimistic growth</i>
MDG 2: primary completion rate (per cent of cohort at primary age)	75.1	99.0	91.8 (2015)	91.8 (2015)
MDG 4: under-five child mortality (per 1,000 live births)	33.0	30.3	30.0 (2013)	30.0 (2013)
MDG 5: maternal mortality (per 100,000 live births)	84.0	40.4	40.0 (2014)	40.2 (2013)
MDG 7a: drinking water (percentage of population)	98.0	98.0	98.0 (2007)	98.0 (2007)
MDG 7b: basic sanitation (percentage of population)	66.0	83.3	79.4 (2015)	80.8 (2015)

<sup>1</sup> In parentheses, year in which MDG is achieved, or last year of simulation period if not achieved.

**Source:** Authors' estimates based on application of MAMS for Egypt.

out or repeat grades. For this reason, even though the targets would not be met, progress towards MDGs 2 and 7b is fairly satisfactory under the baseline scenarios, as can be seen in Table 2.4. Greater policy efforts would be needed to fully meet these targets. (MDG 1, the poverty goal, will be analysed below, based on the results from the microsimulations).

### *Scenarios of alternative MDG strategies*

A new set of MDG-achieving scenarios was generated to gauge the new requirements of public spending in order to meet MDGs 2 and 7b while consolidating the achievements on other fronts. Unlike the baseline scenarios, these new scenarios assume that public spending is fully endogenous and can be scaled up to the extent needed to meet exogenously imposed MDG targets. In these scenarios, spending is scaled up to meet the MDG targets individually or all simultaneously and alternative sources of financing for the additional public spending are assessed. These financing options include: domestic borrowing (db), foreign current transfers to the government or grants (ft) and foreign borrowing (fb). When one of these financing mechanisms is used, it is implicitly assumed that this is the variable that clears the budget. By implication, the closure rule of the budget changes when either foreign borrowing or transfers are used relative to what it is assumed for the baseline scenario. MAMS also allows for adjusting tax rates as an alternative financing mechanism. This option is not considered in the present analysis because despite the relatively low tax burden, increasing tax rates is extremely unpopular because of the general sentiment that the government has failed to deliver quality services. It remains to be seen whether the tax financing option might gain feasibility in the aftermath after the Revolution and if confidence in government increases.

The five MDG-achieving scenarios analyzed below include:

- **mdg-db:** targeting the achievement of MDGs 2 and 7b using domestic borrowing
- **mdg-ft:** targeting the achievement of MDGs 2 and 7b using foreign transfers
- **mdg-fb:** targeting the achievement of MDGs 2 and 7b using foreign borrowing
- **mdg2-db:** targeting the achievement of MDG 2 using domestic borrowing
- **mdg7b-db:** targeting the achievement of MDG 7b using domestic borrowing

Not surprisingly, the required spending efforts would be less if initial GDP growth is higher, that is when using the optimistic growth reference path scenario as the benchmark. Additional public spending to achieve MDGs 2 and 7b simultaneously would range from 0.26-0.27 per cent to 0.37-0.39 per cent of GDP per year, depending on the financing scenario and whether the optimistic or moderate growth scenario serves as the reference (Table 2.5). In spite of the fact that domestic borrowing crowds out private spending that needs to be compensated by more public spending, there is little difference across the financing scenarios in terms of additional annual public spending requirements. This is largely because the gaps to be closed in order to meet the education and sanitation goals under the baseline scenarios are very small. MAMS for Egypt also allows for the effects of synergies: the better the provisioning of basic sanitation, the more progress in reducing child and maternal mortality. Also, children's improved health status has a positive effect on school enrolment. These synergies should make it less costly to achieve the two MDGs simultaneously, however the elasticities that have been used to define the correlations between the MDGs are rather low. As a consequence, the synergy effects are barely visible in Table 2.5—requiring the use of two decimals—as the additional annual public spending required to achieve MDGs 2 and 7b is fairly modest and because of some macroeconomic trade-offs, as explained below.

Table 2.5:

**Egypt: Additional annual public spending required to achieve MDGs 2 and 7b in simulated financing scenarios,<sup>1</sup> 2007-2015**

Deviation from baseline					
	<i>mdg-ft</i>	<i>mdg-db</i>	<i>mdg-fb</i>	<i>mdg2-db</i>	<i>mdg7b-db</i>
<b>Moderate growth scenario</b>					
current	0.23	0.24	0.23	0.13	0.10
capital	0.14	0.15	0.14	0.11	0.03
total	0.37	0.39	0.37	0.25	0.14
<b>Optimistic growth scenario</b>					
current	0.14	0.15	0.14	0.06	0.08
capital	0.12	0.13	0.12	0.10	0.02
total	0.26	0.27	0.26	0.17	0.11

<sup>1</sup> The summation of the last two columns provides the additional annual public spending required to achieve MDGs 2 and 7b separately. The resulting total minus any other of the previous three columns provides the synergy effect which in most cases is not visible using two decimals.

**Source:** Authors' estimates based on application of MAMS for Egypt.

The most costly scenario involves financing the additional public spending required to achieve MDGs 2 and 7b through domestic borrowing. In this case, government debt would increase by 4 percentage points of GDP to 110.2 per cent by 2015, compared to the moderate growth baseline scenario (Table 2.6). In the case of foreign borrowing, the increase in total government debt would be half, that is, 2 percentage points. The main reason for this is the crowding-out effect on private investment of increased public borrowing on domestic capital markets. This slows growth and enhances the costs relative to GDP.

Table 2.6

**Egypt: Domestic and foreign government debt in simulated scenarios, 2015**

Per cent of GDP						
	<i>Baseline scenario</i>	<i>mdg-ft</i>	<i>mdg-db</i>	<i>mdg-fb</i>	<i>mdg2-db</i>	<i>mdg7b-db</i>
Moderate growth scenario						
domestic government debt	106.2	106.1	110.2	106.1	108.8	107.9
foreign government debt	14.9	14.9	14.9	16.9	14.9	14.8
Optimistic growth scenario						
domestic government debt	100.0	99.9	102.4	99.9	101.4	101.3
foreign government debt	14.3	14.4	14.3	15.6	14.3	14.2

**Source:** Authors' estimates based on application of MAMS for Egypt.

The economy-wide impact of the simulated financing strategies is modest. This is not surprising considering that most of the MDGs are either achieved or almost achieved under reference path scenarios. The economy's GDP growth remains by and large unaffected. But there are some changes in production structure (Table 2.7). The share of most government services increases when MDGs 2 and 7b are targeted, in part due to the above-discussed synergy effects. Though relatively small, the additional MDG-related spending induces a small real exchange rate appreciation that affects export competitiveness. This effect is stronger under the foreign financing scenario: the share of agriculture and industry in total GDP shrinks and private services gain importance.

*Analysis of poverty and inequality*

As mentioned above, labour market results generated through MAMS were imposed on 2008/09 HIECS data to perform microsimulations for the above-analyzed scenarios. This procedure was justified to the extent that MAMS includes no MDG-achieving scenarios that target MDG 1 and for other methodological reasons explained in Chapter 1. Poverty is treated as an outcome of economy-wide effects channelled through the labour market. For each scenario, labour market results are translated into a new income distribution at the household level. On this basis, changes in poverty and inequality are estimated using the Foster, Greer and Thorbecke (1984) family of decomposable indices for different poverty lines and the Gini coefficient for household income per capita.

Table 2.7  
Egypt: Sector structure of GDP in the base year and in 2015 in the MDG-achieving scenarios<sup>1</sup>

Per cent						
	<i>Base year</i>	<i>mdg-ft</i>	<i>mdg-db</i>	<i>mdg-fb</i>	<i>mdg2-db</i>	<i>mdg7b-db</i>
Agriculture	12.5	10.5	10.5	10.5	10.6	10.4
Industry	42.5	36.7	36.6	36.7	36.7	36.5
Productive services <sup>2</sup>	27.1	30.2	30.2	30.2	30.2	30.0
Other private services	5.2	6.0	6.0	6.0	6.0	6.0
Governmental services						
education	3.9	5.0	5.0	5.0	5.0	5.4
health	0.9	1.2	1.2	1.2	1.2	1.2
water and sanitation	0.5	0.8	0.8	0.8	0.7	0.8
infrastructure	2.9	3.7	3.7	3.7	3.7	3.7
other government	4.5	5.9	6.0	5.9	5.9	5.9
<b>Total</b>	100.0	100.0	100.0	100.0	100.0	100.0

<sup>1</sup> Modest growth baseline scenario taken as the benchmark.

<sup>2</sup> Transportation, Suez Canal, trade, finance, insurance, tourism, hotels, and restaurants.

**Source:** Authors' estimates based on application of MAMS for Egypt.

One can safely argue that poverty levels are closely associated with the labour market in Egypt. Employment characteristics of the poor point to strong relation between poverty and sector and type of employment. HIECS data show that: a) the poor are mostly unskilled and non-wage workers; b) the unemployed rate is higher for the poor; c) most poor are forced to migrate to the “outside establishment” (that is, workers with no

specific work place); and d) about two thirds (63 per cent) of the rural poor are employed in agriculture.

The present analysis uses both international poverty measures (\$1.25 and \$2.50 per day evaluated at PPP) and moderate and extreme poverty indicators measured with national poverty lines. The latter are generally more in the order of \$2.00 a day, and thus define a poverty challenge of much larger magnitude compared to the more typical \$1.25 per day poverty line. Since the microsimulation approach derives poverty rates by comparing household income with an income poverty line, and the Egyptian official national poverty lines are estimated based on the minimum consumption level required to satisfy basic needs, consumption-based poverty lines were adjusted in order to use them as income-based poverty lines.

The main microsimulation results are presented in Table 2.8. All simulated scenarios show that mean income growth translates into less poverty—especially for the higher poverty line—but not proportionally given inequality in the distribution of income increases. The optimistic growth scenarios yield higher per capita income growth and hence greater poverty reduction than under the scenarios of moderate growth. The difference is more than 1.5 percentage points for the higher poverty lines.

Targets for MDG 1 are met in the baseline scenarios for poverty incidence only when this is calculated using the \$1.25 and \$2.50 per day poverty lines (compare results for 2015 in Table 2.8 with targets set in Table 2.2). In fact, extreme poverty as measured by the \$1.25 per day poverty line had already been achieved in 2005 and what the baselines' results show is further reduction.

Poverty falls in the baseline scenarios as a result of higher employment rates for unskilled workers (it increases by 2.8 per cent for unskilled labour compared with the average of 1.8 per cent for all workers) and agricultural income growth (which reaches 12.9 per cent compared with 6.5 per cent for all sectors). Income inequality rises nonetheless because wages of unskilled workers increase to a lesser degree than that for semi-skilled and skilled workers.

Scaling up public spending to achieve MDGs 2 and 7b, as simulated under the MDG-achieving scenarios, yields modest reductions in poverty incidence compared to the baselines. Only very marginal reductions in income inequality are observed and these are mostly explained by a rise in wages for unskilled labour, which becomes relatively scarce as more boys and girls enrol in and complete primary school. However, the targets for poverty incidence calculated with the national poverty lines are still not met. Poverty reduction is only modest because enhanced skills and related shifts in the composition of the labour force likely only start paying off in

Table 2.8  
Egypt: Poverty incidence and Gini coefficient under different scenarios, 2007 and 2015

Per cent										
	Poverty incidence (percentage of population)								Gini coefficient for per capita income	
	\$1.25 per day		\$2.5 per day		National moderate line		National extreme line			
	2007	2015	2007	2015	2007	2015	2007	2015	2007	2015
<b>Moderate growth</b>										
Base	1.89	1.68	29.65	23.12	40.93	29.68	20.87	17.89	0.331	0.380
mdg2-db	1.89	1.61	29.65	23.01	40.93	29.62	20.87	17.81	0.331	0.378
mdg7b-ftr	1.89	1.69	29.65	23.02	40.93	29.58	20.87	17.84	0.331	0.381
mdg7-db	1.89	1.68	29.65	23.03	40.93	29.59	20.87	17.83	0.331	0.380
mdg-db	1.89	1.61	29.65	22.97	40.93	29.55	20.87	17.76	0.331	0.378
mdg-fb	1.89	1.60	29.65	22.96	40.93	29.52	20.87	17.74	0.331	0.378
mdg-ftr	1.89	1.60	29.65	22.96	40.93	29.52	20.87	17.74	0.331	0.378
<b>Optimistic growth</b>										
Base	1.89	1.43	29.65	21.53	40.93	27.49	20.75	16.33	0.331	0.384
mdg2-db	1.89	1.37	29.65	21.39	40.93	27.38	20.75	16.20	0.331	0.378
mdg7b-ftr	1.89	1.43	29.65	21.51	40.93	27.41	20.75	16.31	0.331	0.384
mdg7-db	1.89	1.43	29.65	21.50	40.93	27.40	20.75	16.30	0.331	0.384
mdg-db	1.89	1.37	29.65	21.38	40.93	27.34	20.75	16.20	0.331	0.377
mdg-fb	1.89	1.33	29.65	21.33	40.93	27.32	20.75	16.06	0.331	0.376
mdg-ftr	1.89	1.33	29.65	21.33	40.93	27.32	20.75	16.06	0.331	0.376

*Source:* Authors' estimates based on application of MAMS for Egypt and microsimulation approach using the HIECS for 2008/09.

terms of higher productivity and growth in the medium to long run, that is, beyond 2015.

Results differ only slightly across the MDG scenarios. Most of the poverty reduction is explained as a result of the strategy that targets MDG 2 and results in higher wages for unskilled workers, as explained above. This, in turn, results in a modest reduction of income inequality, as measured by the Gini coefficient (see Table 2.8). When MDGs 2 and 7b are targeted simultaneously, poverty falls slightly more with respect to the baseline outcomes when the additional public spending is financed with foreign resources. This is because the labour market is not affected by the small crowding-out effect on private spending that is seen when resources are mobilized domestically.

## CONCLUSIONS AND POLICY RECOMMENDATIONS

This study has presented an assessment of financing strategies to achieve the MDGs in Egypt, the results of which have been generated after applying a macro-micro modelling framework. In view of past progress in most of the MDGs, Egypt is unlikely to face major problems toward the achievement of these goals at the national level. Progress towards the various MDGs has been variable, though: it has been fast and sustained in terms of reducing child and maternal mortality and enhancing drinking water coverage, acceptable in terms of improving basic sanitation coverage, primary school completion rates and reducing poverty, and rather slow in terms of empowering women and protecting the environment. The challenges are also greater for most goals when regional disparities are taken into consideration.

The modelling exercise presented here confirms that before the Revolution, Egypt was on track to achieve most of the MDGs, provided that the level of public policy effort seen before the Revolution would be sustained. However, any additional MDG financing available should target the achievement of primary completion (MDG 2) and basic sanitation (MDG 7b) targets—while keeping an eye on the other goals. Since additional public spending required to achieve MDGs 2 and 7b has been found to be a mere 0.26–0.39 per cent of GDP per year, the choice of financing would only pose minor macroeconomic challenges. Should Egypt opt to finance the newly required MDG spending through domestic borrowing, government debt would rise to nearly 110 per cent of GDP by 2015 (slightly up from already high levels). The cost of financing the education and sanitation goals would be less under the optimistic economic growth scenario. There is fiscal space to finance these goals through tax revenue, given it represents only around 15 per cent of GDP, but the cost associated with increasing tax rates are thought to outweigh the expected benefits.<sup>3</sup> Financing through foreign borrowing is usually not recommended due to the exchange rate risk, especially given current conditions, which have the potential of raising the interest spread. Finally, financing through international development assistance is unlikely because Egypt is a middle-income country and as such is not a priority recipient, though international aid has been pledged for the post-conflict nation-building process.

A continuation of growth and public policies seen before the Revolution would ensure that targets of halving poverty by 2015 from the 1990 level would be met when the poverty incidence is measured by international poverty lines. Given that additional public spending required to achieve the MDGs in primary education, mortality rates, and water and sanitation



would be less than 0.5 per cent of GDP per year, they would provide little direct stimulus to economic activity and employment. Hence, further reductions in poverty would be modest. The enhanced skills and labour-market shifts resulting from meeting the education goal would pay off in higher productivity and growth only in the long term, beyond 2015. The poverty reduction goal would not be achieved if incidence is measured using national poverty lines, unless additional policies are put in place to strengthen job creation and income growth for the poor. Such policies should be oriented at employment and income-generating activities that ensure the participation of the poor in the labour market, allocating soft loans to small-scale enterprises, as well as increasing their access to markets, and providing financial subsidies to the poor through cash transfers and subsidized goods and services.

Egypt is currently facing the challenge of a political transition that will likely slow progress towards the MDGs. Political unrest and increasing uncertainty have disrupted economic activity, triggering a series of undesired effects. Incomes have decreased at the same time that the unemployment problems have been magnified, all of which is putting more strain on the government budget. Inasmuch as this compromises poverty reduction efforts and the government's ability to invest in social sectors, this chapter's results may underestimate the actual additional MDG spending needed to meet the goals by 2015. Nonetheless, our estimates of additional public spending and financing needs can be used as a benchmark against which further efforts towards the development goals can be assessed once the effects of the Revolution are fully understood and taken into consideration. The fiscal space to finance social spending through taxation may also become a more feasible option after the Revolution.

## NOTES

- 1 A study conducted by WHO, UNICEF, UNFPA and the World Bank (World Health Organization and others, 2007) shows that this rate had been reduced by 25 percent during the same period.
- 2 MAMS captures a synergy between reductions in child mortality and improved education outcomes—but the latter do not affect the former. The evidence on causality for these two variables remains ambiguous. Marcotte and Casterline (1990) and Aly and Grabowski (1990) have found that parents' education attainment has no significant effect on child mortality. A one standard deviation rise of mothers' and fathers' education would predict 14 and 11 percent declines in the probability of child mortality, respectively, according to a study by Boone and Zhan (2006).
- 3 There is a vast array of costs associated with increasing tax rates such as the administrative cost and the general discontent from increasing taxes, especially as taxes in Egypt are flat and therefore tend to be biased against low-income groups. In addition, raising taxes in the near future would be infeasible from a political point of view, given the depressed state of the economy in light of the recent political turmoil.

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# Chapter 3

## Kyrgyz Republic

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ROMAN MOGILEVSKY AND ANARA OMOROVA

### INTRODUCTION

The Kyrgyz Republic (or Kyrgyzstan) is making progress towards the millennium development goals (MDGs) and is on track to achieve the first goal of halving extreme poverty between 2001 and 2015. For other important human development goals, however, the targets are likely to be missed, due to resource constraints and limited policy implementation capacity. There have also been setbacks owing to problems of governance and political instability that impeded effective policymaking during parts of the 2000s. As a consequence, finding a realistic pathway to achieve all MDGs remains a challenge.

This chapter recognizes that governance needs to improve on many fronts, but focuses on macroeconomic and sector policies as well as on resources that would be needed to timely achieve the MDGs in Kyrgyzstan. Those requirements are assessed under assumptions that the country remains free of conflict in the years ahead. In the second quarter of 2010, social and economic development was affected by political unrest. It caused an acute humanitarian crisis in the southern part of the country and also affected the functioning of social services. The precise economic and social costs of these events are difficult to estimate and could not be considered in the analysis of this chapter.

An important part of the policy analysis presented in this chapter is model-based, using a country-specific version of the computable general equilibrium (CGE) model known as MAMS (see Chapter 1). The model was applied using data that identify the structure and functioning of the Kyrgyz economy. Model scenarios were simulated to determine to what extent the targets for achieving universal primary school completion (MDG 2), reducing child and maternal

mortality (MDGs 4 and 5), and increasing access to safe water and sanitation (MDGs 7a and 7b) would be achieved with a continuation of existing policies and what additional policy and resource efforts would be needed to achieve them. In order to determine the impact on the extreme poverty goal (MDG 1) and inequality, the scenarios analysis with MAMS for Kyrgyzstan was complemented with the application of a microsimulation methodology. As explained in Chapter 1, this methodology takes the labour market outcomes of the MAMS scenarios and simulates how those outcomes affect the full income distribution and how this, in turn, translates into changes in the distribution of expenditure using data from a household survey. Indicators of poverty and expenditure inequality are subsequently estimated.

The remainder of this chapter is structured as follows. In the second section we provide a description of economic policies and performance in Kyrgyzstan in the 1990s and 2000s with a focus on fiscal space available for possible increases in social spending. We next discuss social policies implemented in the country since independence and progress achieved towards the MDGs. The findings of the MAMS-based scenario analysis under alternative assumptions of financing the MDG strategy are discussed in the following section. A key finding is that under a continuation of current policies, only the extreme poverty goal would be achieved, and in order for the government to close gaps in the primary cycle of education, health, and water and sanitation, additional public spending requirements would amount to around 8 per cent of GDP per year. The final section reflects on political difficulties associated with several of the financing options that are considered in the policy scenario analysis, and, as a consequence, makes some recommendations regarding other policies that would have to be undertaken in order to achieve the MDGs.

## MACROECONOMIC POLICIES AND ECONOMIC PERFORMANCE IN 1991-2009

### *Economic reforms and performance after independence*

The economy suffered a sharp downturn in the first half of 1990s, which by 1995, had cut its size nearly in half. At about the same time, a series of complex institutional, economic and social reforms led to the creation of new state institutions. Once they had matured, the reforms enabled the decline in output to be reversed and macroeconomic conditions stabilized,

preventing a further collapse of social services. The contribution of the private sector (mostly small and medium enterprises, or SMEs) to GDP and employment rose to more than 50 per cent as a result of price liberalization, the privatization of state-owned enterprises, the de-collectivization in agriculture coupled with land redistribution, as well as external economic liberalization. In 1996, the economy started to recover, driven in particular by agriculture and gold production.

Nonetheless, the reforms were not implemented consistently and in several respects were not bold enough. The government budget deficit remained unsustainably high and many structural reforms (privatization, restructuring of the infrastructural services, among others) were incomplete, while social spending commitments exceeded fiscal capacity. These flaws gradually undermined social and economic stability, culminating in the financial crisis of 1998-1999. The crisis caused a sharp reduction in GDP growth and an increase in poverty.

After the crisis, more responsible economic management helped cut the rate of inflation to a low single-digit level. The introduction of a new tax regime favouring SMEs in trade and services and a complex healthcare reform helped improve the socio-economic situation. A period of sustained economic growth averaging 5 to 8 per cent per year began in 2000, but was interrupted by the global economic crisis of 2008–2009. Kyrgyzstan's remittances and exports declined, but GDP growth remained positive.

Because of the mixed growth performance during the period of independence, real GDP in 2009 was still slightly below the 1990 level. However, when measuring economic welfare in terms of GDP per capita at purchasing power parity (PPP), a somewhat brighter picture emerges. According to the World Bank's World Development Indicators, the country had managed to surpass the 1990 mean income of PPP\$1,813 by 2007, reaching a level of PPP\$1,980. Nonetheless, Kyrgyzstan remains a low-income country, according to the World Bank's classification.

Remittances from Kyrgyz labour migrants working mainly in Russia and Kazakhstan have acted as an engine of economic growth through its impact on private consumption. According to different estimates, between 250,000 and 500,000 Kyrgyz workers (between 12 and 25 per cent of the total labour force) have migrated in search of employment abroad. According to the estimates of the National Bank of the Kyrgyz Republic (NBKR), remittance income exceeded \$1.4 billion in 2008, the equivalent of 28 per cent of that year's GDP.

The informal sector is a major component of the Kyrgyz economy. Many workers and their families are employed in small-scale enterprises or are



self-employed in agriculture, retail trade, transport, construction, tourism, other services, as well as some industrial sectors (e.g., in sewing industry). Incomes and employment from these activities tend to be underreported and hence not fully accounted for in official GDP and labour market data.

### *Poverty and inequality*

Since 1996, poverty has been measured in Kyrgyzstan following the World Bank's methodology. Poverty indicators are calculated on the basis of per capita household expenditures and comparing it with, respectively, the "general" or moderate, and the extreme or food poverty lines. Expenditure data are derived from the Kyrgyz Integrated Household Survey covering more than 5,000 households, which are interviewed quarterly. Poverty trends are in line with those of GDP growth. Between 2002 and 2009, moderate poverty declined from 54.8 to 31.7 per cent and extreme poverty from 23.3 to 3.1 per cent. In the same period, real GDP per capita grew cumulatively by 29.9 per cent. Consequently, the elasticities of moderate and extreme poverty rates with respect to per capita income growth are equal to -0.77 and -0.68, respectively. These elasticity values are somewhat high and are possibly explained by the trickle-down effects of low inflation—which was maintained in the country until 2007—and the growth of worker remittances which stimulated consumption and benefitted the rural poor in particular. Social policies have also been favourable to the poor. Despite the limited scope and efficiency of the income redistribution policies, some social protection and insurance mechanisms (including pensions) helped prevent extreme poverty from rising in the most difficult period of the country's development at the end of 1990s and in the early 2000s (World Bank, 2003).

Income inequality in Kyrgyzstan is relatively high and shows an ambiguous trend. According to the National Statistical Committee of the Kyrgyz Republic (NSC), the Gini coefficient for household incomes fluctuated in the range of 0.41-0.45 during the period 1996-2008, but declined to 0.37 in 2009. The precise causes of these fluctuations are subject to further investigation, but lie outside the scope of the present study.

### *Inflation*

The history of the independent Kyrgyz economy started with a period of hyperinflation (1992-1994). Starting in 1994, the government avoided resorting to the inflationary sources of budget deficit financing and this

allowed for a gradual decline in inflation—as measured through the consumer price index—to 13 per cent in 1997. However, core problems causing macroeconomic instability—a huge budget and current account deficits—had not been eliminated and, as a result, the economy was strongly affected by the 1998-1999 Russian financial crisis. In 1999, the inflation rate climbed to almost 40 per cent. In the 2000s, the government switched to a much more conservative monetary and fiscal policy, with a view to reduce the government budget deficit and putting inflation control at the centre of monetary policy. The shift in policies helped curb inflation to nearly 5 per cent per year in 2001–2006. In 2007, however, consumer price inflation surged again to more than 20 per cent, pushed up by sharply rising world market prices for food and fuel. At the same time, money supply growth accelerated to 31 per cent per year on average during 2003-2007. Anti-inflationary efforts by the government and the NBKR and the collapse of global commodity prices after mid-2008 pushed the annualized inflation rate down to zero in December 2009.

### *Unemployment*

Both an official estimate of the rate of unemployment and an estimate based on the International Labour Organisation (ILO) definition are used in Kyrgyzstan. The former is usually 2.5–3 times lower than that one would gauge using the ILO definition because incentives to register as unemployed are very weak (unemployment benefits are very low, vacancies provided by government employment services are usually not attractive, and so on).

The official unemployment rate was estimated at 0.1 per cent in 1992 and peaked at 4.3 per cent in 1996. Thereafter, it declined gradually and over the past decade it fluctuated between 2.8 and 3.5 per cent. The ILO-definition-based unemployment rate has been measured since 2003, when it was estimated at 9.9 per cent. It has oscillated between 8 and 9 per cent in the following years. The ILO definition seems to capture the unemployment reality relatively better, even as it shows little correlation with GDP growth. For example, robust GDP growth during the 2000s did not result in a visible decline in unemployment according to the ILO definition. This lack of correlation between economic growth and unemployment could be the result of the flexible and fluid forms of employment in the vast informal sector, which picks up much of the slack in the labour market.

In general, the labour market situation in the country is difficult and the number of well-paid jobs is limited. According to NSC, the average

monthly wage in 2009 was 6,161 soms (about \$150), inducing many to seek employment abroad (mostly in the Russian Federation and Kazakhstan).

### *Balance of payments*

Kyrgyzstan is a small and very open economy. Many essential consumer goods (such as cereals, sugar and shoes) are imported, and a large number of economic agents are involved in exporting activities. The share of exports of goods and services in GDP has been growing constantly, reaching 56 per cent in 2009. The share of imports in GDP is much higher, at 93 per cent in 2008. Thus, the openness of the economy as measured by the ratio of total trade of goods and services to GDP was nearly 140 per cent in 2008–2009.

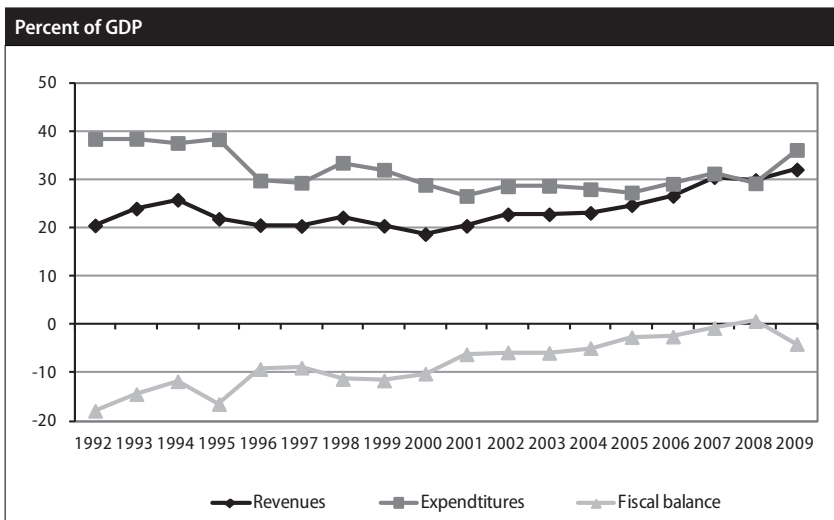
Imports have always been higher than exports. The trade deficit was especially high in 1995–1999 (except in 1997). Then, after a sharp devaluation of the som (by 250 per cent) in 1998–1999, the trade deficit was cut to near zero. This was short-lived, however, as the trade deficit started to widen again with the strong GDP growth and consequent accelerated import demand growth. Inflows of foreign direct investment (FDI) and foreign aid helped to finance the particularly large current account deficits of the 1990s. More recently, remittances have become a main source of financing of the trade deficit. Re-exports of commodities from China to Russia and Central Asia became another important source of foreign exchange. This form of export revenue is not captured by official statistics, however. Judging from the discrepancies between Kyrgyz statistics on imports from China and Chinese statistics on exports to Kyrgyzstan (in some years Kyrgyz customs reported less than one-tenth of the trade volumes reported by Chinese authorities) as well as on the size of the “errors and omissions” item of the balance of payments of Kyrgyzstan (which in 2008 was roughly equal to the current account deficit), it can be inferred that these flows are likely very large.

### *Public finances*

The country inherited a system of public finances heavily dependent on transfers from the central budget of the former Union of Soviet Socialist Republics (USSR) with expenditures much exceeding the level of domestically mobilized revenues. For example, in 1992 the level of government expenditures was almost twice as high as the level of government revenues. Attempts to cover the budget deficit by monetary emission in the early 1990s resulted in hyperinflation. In the mid-1990s, the government

no longer used direct credits of the NBKR for deficit financing but switched instead to concessional foreign borrowing. The deficit remained very high at around 10 per cent of GDP (Figure 3.1). The large fiscal deficit proved unsustainable, causing macroeconomic instability. Relatively minor external shocks associated with the Russian financial crisis of 1998–1999 resulted in a sharp devaluation of the som, an acceleration of inflation, and a decline in GDP growth. Also, the external public debt (accumulated during the period of massive borrowing from foreign donors) levelled off above 100 per cent of GDP.

Figure 3.1  
Kyrgyzstan: General government budget revenues and expenditures, 1992–2009



Source: Ministry of Finance of the Kyrgyz Republic (MoF), National Statistic Committee (NSC).

During and immediately after the Russian financial crisis, the government cut expenditures from 33.5 to 26.6 per cent of GDP between 1998 and 2001. This was done mainly by eliminating the indexation of government spending to inflation, as well as through discretionary spending cuts. The deficit of the general government budget was reduced to around 6 per cent of GDP. Strong growth during 2002–2008 permitted a substantial improvement of the budget situation: the budget showed a small surplus in 2008. In 2009, the situation changed dramatically and the deficit increased again (Figure 3.1).

The improvement in tax collection from 2001 to 2008 can be attributed to the growth of imports, because import taxes (VAT, excises and import tariffs) are the best administered component of the tax system. In 2007, the share of import taxes was close to 50 per cent of total tax collections.

Later on, due to the adoption of a new tax code in 2008, the structure of government revenue changed in favour of direct taxes and official transfers from abroad. Personal and corporate income taxes account for more than 20 per cent of total tax revenue. Personal and corporate income tax rates are flat and low at just 10 per cent, but nonetheless tax collection has improved compared with earlier periods when rates were much higher (including a top margin rate of 33 per cent for personal income tax and of 30 per cent for corporate income tax). Contributions to the Social Fund have the highest nominal rate (27.25 per cent of the payroll) among other taxes and mainly apply to incomes of incorporated enterprises. Self-employed, farmers and businesses in some sectors (trade, sewing industry etc.) only pay a lump sum tax with effective rates (specific by sector) much lower than those applied to incomes generated in the formal economy. A widely held perception in Kyrgyzstan is that the high tax rate, which is levied on a rather limited range of economic activities, turns the payments to the Social Fund into the most distorting tax, as it provides an incentive for businesses to remain in the informal economy. Domestic indirect taxes have the same nominal rates as those levied on imports, but their administration is less efficient and some sectors of the economy (such as, agriculture) are exempt from them, so collection of these taxes is not as large.

Altogether tax revenue represented 22.2 per cent of GDP in 2009, which both the government and private sector agents perceive to be rather high and a possible impediment to growth. Therefore, any substantial increase in nominal tax rates is hardly possible. As already mentioned, in 2008 a new tax code was adopted, which introduced several important changes to the tax system. Its main intention was to reduce the overall tax burden. Some taxes were eliminated, and new ones introduced. At the time of writing it was still too early to gauge the full impact of the tax reform, but one radical change—the reduction of the nominal VAT rate from 20 to 12 per cent—resulted in a sharp drop of tax revenue in 2009. The expected increase in the VAT base after lowering the tax rate was yet to materialize. In view of the very large budget deficit, further tax cuts would not seem to be desirable from a medium-term perspective. There is scope for further improving the tax administration and collection methods. Tax revenue may also obtain a boost from the post-crisis recovery in response to tax incentives provided in the past.

Non-tax revenues are also an important source of government revenues. To a large extent, these are revenues of budget-financed institutions (including medical establishments, universities etc.) from paid services. These revenues are accounted for in the budget, but remain with the entities

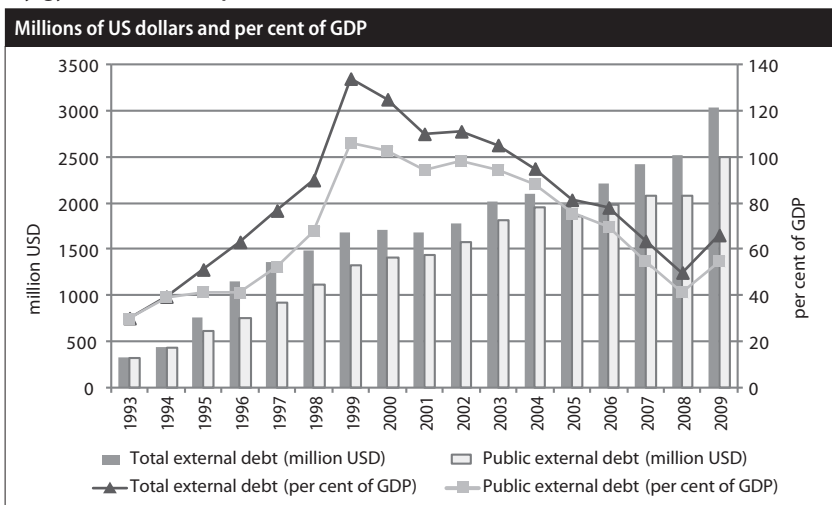
offering the services, such that the government has limited discretionary power over these resources.

Key components of general government expenditures are purchases of goods and services, wages, pensions and different transfers and subsidies. In recent years, the government has substantially increased domestically financed capital expenditures through investments in the construction of hydropower stations and social infrastructure. The government allots more than half of its budget to social sectors (education, healthcare, social protection including pensions, and utilities).

To finance its deficits, the government relies mainly on foreign financing. According to the law adopted in 1997, monetary emission can no longer be used as a means of deficit financing. Domestic borrowing through government securities is marginal and often negative.

Kyrgyzstan started its history as an independent country without foreign debt. Extensive borrowing in the beginning and middle of the 1990s led to some debt accumulation (Figure 3.2), which did not seem to be very high but became unsustainable after the national currency devaluation of 1998–1999. The main external creditors of the Kyrgyz government are the World Bank, the Asian Development Bank and the International Monetary Fund. Kyrgyzstan was granted two rounds of debt relief on highly concessional terms by the Paris Club. In 2006–2007, the country was on a brink of receiving debt relief in the framework of the Heavily Indebted

Figure 3.2  
Kyrgyzstan: Total and public external debt, 1993–2009



Source: NBKR.

Poor Countries (HIPC) Initiative, but after some hesitation the government decided to refrain from joining the initiative. The debt situation improved radically after that, due to a healthier economic situation, the national currency appreciation against the United States dollar and the associated depreciation of mostly dollar-denominated debt as well as an increase in the grant element of aid. It must be noted, however, that the debt situation is still fragile: the debt indicators started to deteriorate again as a result of the 20 per cent devaluation of the som in late 2008 and early 2009 as well as increased borrowing for infrastructure projects, near-zero growth and a worsening of government revenue collection and exports.

Foreign aid provided by multilateral institutions and bilateral donors was extremely important for budget financing in the 1990s and in the early-2000s. Its role diminished somewhat later on though, as tax collection improved. In 2009, however, it dramatically increased again to more than 5 per cent of GDP.

### *Terms-of-trade and other external shocks*

The small and open economy of Kyrgyzstan is highly vulnerable to external and weather shocks. The Russian Federation and Kazakhstan are major export markets for Kyrgyz goods and services, as well as major recipient countries of Kyrgyz migrants and providers of critical imports. Developments in these countries strongly affect economic development in Kyrgyzstan. The economies of the Russian Federation and Kazakhstan have shown strong performance during the 2000s, supported by buoyant oil prices. This has stimulated Kyrgyz exports and remittance income. It has also attracted FDI to the country and reduced the gap between labour supply and demand as increasing numbers of migrants exited the domestic labour market. The customs union between Belarus, Kazakhstan and the Russian Federation, which became operational from July 2010, may affect Kyrgyz exports and especially also re-exports of Chinese goods to the countries of the union, given the much stricter custom control procedures it will introduce.

The recent global increase in food and fuel prices substantially affected both relative prices and general inflation in the country as this relies on imports of gasoline, kerosene, natural gas and other fuel. Kyrgyz exports are rather diversified, providing greater resilience to export price shocks. World prices for gold (the largest export item) do influence export revenues significantly, but not as much the economy at large because much of the revenue is retained by foreign companies exploiting gold production. As

a result, revenues (and volatility therein) are offset by a financial outflow. Furthermore, production of this commodity is weakly linked to other sectors of the economy.

Weather conditions have a strong influence on agriculture, which is still the largest sector of the economy. Recently, droughts also affected electricity production in the country. Successive years of below-average inflow of water into reservoirs feeding hydropower stations significantly reduced energy generation capacity and negatively affected industrial production and living conditions of the population in 2008-2009.

In sum, the government managed to maintain short-term macroeconomic stability during the 2000s, despite a number of exogenous shocks that hit the economy. Nonetheless, the economic situation remains fragile. The fiscal burden is considered to be high with limited scope for further increasing tax revenue because of the vast informal sector (and hence limited tax base) and political and administrative (limited revenue collection capacity) constraints. Consequently, the options for financing government spending aiming at achieving MDG targets seem limited.

## SOCIAL POLICIES AND MDG ACHIEVEMENT

The country inherited a well-developed but expensive system of social services from the Soviet period that was as extensive as that more typically found in countries with much higher income per capita. Therefore, since independence social policies have been mainly directed at sustaining existing levels of social development in a context of much reduced resource availability.

### *Overview of policies and reforms in key social sectors*

After independence, the education system was reformed, including: (i) limiting the scope of government commitments to support education, including by reducing mandatory education from 11 (general secondary) to 9 grades (basic secondary) and by allowing a substantial reduction in the pre-school enrolment rate; (ii) concentrating resources on those components of the system left in the public domain (e.g., maintenance of near universal basic secondary school enrolment); (iii) allowing private provision of education services; and, (iv) tailoring educational curricula better to meet the requirements of the labour market.

Before 1993, general secondary education (grades 1–10/11) was mandatory and available for all children free of charge. With the adoption



of the Constitution in 1993, basic secondary education (grades 1-9)—which comprises primary education (grades 1-4)—became mandatory. Access to general secondary education remained free in public schools, but it was no longer guaranteed to everybody. Government funding of pre-school education was also substantially reduced. Most government resources are allocated to basic secondary education. In 2009, the number of schools had increased by 25 per cent in comparison with 1990 and the student population increased by 12 per cent during the same period. The student-to-teacher ratio is low and barely changed from 13.7 in 1990 to 14.8 in 2009. Despite the government's efforts to protect teacher salaries, financial constraints caused the average pay of teachers to fall from 77 per cent of the average wage in the economy in 1990 to 59 per cent in 2009. Most of the budget for primary, basic and general secondary education is spent on teacher salaries and utility services for schools, leaving little for new textbooks, equipment and other items necessary for the normal education process. This has affected the quality of education.

Private educational establishments have been created at all education levels and are financed by parents' contributions. Their role is still marginal in the overall pre-school, primary, basic and general secondary education systems, covering less than 1 per cent of all enrolled children. The role of private institutions is much more important in tertiary education: 33 per cent of all universities are private and 11 per cent of students are enrolled in private universities.

While these policies allowed preserving and improving enrolment, as further explained below, the quality of education has visibly deteriorated. For example, the results of an independent assessment of fourth grade students' learning achievements show declining educational performance: in 2001, 80 per cent of the students successfully passed a test on math and 60 per cent a test on reading, but by 2007 these numbers had dropped to, respectively, 38 and 36 per cent. Similarly discouraging results were recorded by the 2006 and 2009 PISA studies on schoolchildren's literacy in reading, math and sciences. The quality of education thus seems to be of major concern in Kyrgyzstan.

Unlike its mostly conservative education policies, since 1996 the government has been implementing a far-reaching health reform program, aimed at increasing the effectiveness of the healthcare system and maintaining near-universal access of the population to healthcare services. Implementation of the reform received significant support from the World Health Organization (WHO), the World Bank and the donor community. Key components of this reform are: (i) strengthening primary care and enhancing the efficiency of the network of healthcare establishments;

(ii) changing the financing mechanisms in the sector, including the introduction of mandatory medical insurance and patient's co-payments, the transition from input-based (e.g., per bed) to output-based (e.g., per treated case) system of financing of medical establishments, and so on; (iii) changing medical treatment practices towards improved quality of medical services and introduction of elements of evidence-based healthcare; and (iv) transferring some healthcare system functions (e.g., provision of medicines and dental care) to private establishments.

The health reforms are still ongoing and it is still premature to make definite judgments on their success or failure. Some outcome indicators of the health system reform are improving (e.g., more effective use of available resources), as further indicated below, whereas others are not (e.g., the level of patients' unofficial payments during treatment in hospitals). However, the main result of the reforms is that the healthcare system seems to be sustained at considerably lower levels of government health expenditures without radically deteriorating the health situation in the country: that is, efficiency has improved.

Last but not least, access to safe water has improved and covered 90.4 per cent of the total population in 2009, up from 81.3 per cent in 1996. Progress in access to improved sanitation has been much more modest, as coverage expanded from 24.4 per cent in 1996 to only 25.2 per cent in 2009. In fact, there has been a setback from the coverage of around 30 per cent that had been reached in the early 2000s. Major gaps are mostly seen in rural areas where, compared to urban areas, access to safe water is between 15 and 20 per cent lower and access to improved sanitation is between 50 and 60 per cent lower. In the cities these services are provided by specialized utility companies, whereas in rural areas they are mostly provided by the communities themselves.

Government policies in water and sanitation are focused mainly on sector regulation, rehabilitation of existing and construction of new infrastructure and institutional development. Regulatory activities cover quality standards (e.g., a law on drinking water was adopted in 1999) and the level of user fees that utility companies are allowed to charge to consumers. Institutional development relates to establishing and enabling self-governing Rural Communities of Drinking Water Users, which received all previously created rural water pipelines as well as responsibilities for this infrastructure operation and maintenance and setting of water tariffs.

Recurrent expenditures of utility companies and rural water suppliers are covered by user fees, but revenue is not sufficient to finance new

investments in any significant degree. As a consequence, water and sanitation infrastructure development relies almost entirely on government spending. In 2002, the government introduced the “Taza Suu” (clean water) program, with loans from the World Bank and the Asian Development Bank worth \$70 million. Hundreds of villages and water supply projects have been implemented in the framework of this program. Yet, much more public investments will be needed to provide all of the population with access to safe water and appropriate sanitation. At the same time, it seems imperative that also households take greater responsibility in financing and implementing improvements, especially in rural areas, in order to accelerate the expansion of coverage of sanitation.

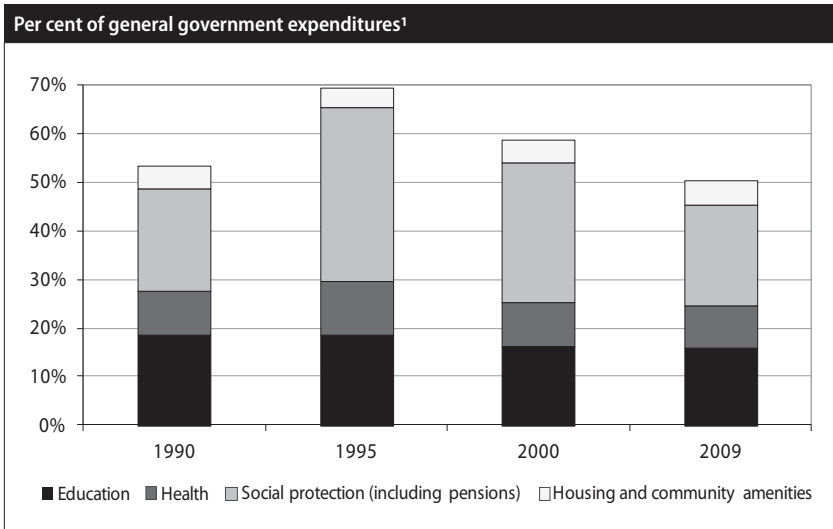
### *Public social spending*

Social spending has always been a very large component of government expenditures in Kyrgyzstan. Since 1990 the share of social spending in general government expenditures has been above or equal to 50 per cent (Figure 3.3). The share of these expenditures was especially high in the mid-1990s, when the economy was going through its most difficult episode. In the 2000s, the government managed to sustain and even increase the shares of education and health in total expenditures, as these were considered priority sectors. At the same time, from the late 1990s, the share of social protection spending has been on the decline, in part because the government allowed for a reduction in social benefits in real terms; pensions did increase in real terms, but fell relative to wages.

However, while the share of social sectors in total government expenditures has always been high, the real value of these expenditures has had different dynamics. As total government resources were shrinking in real terms and as a percentage of GDP in the 1990s, even the increase in the share of social expenditures did not prevent them from falling sharply in absolute terms. Real per capita social expenditures dropped to half or less between 1990 and 2000. The situation changed in the 2000s, when the level of all types of social expenditures corrected for inflation recovered. The recovery was stronger in expenditures on education, housing and community services than those for social protection. Yet there was no full recovery, as in 2009 the per capita spending on education, health and social protection was still only about 65–75 per cent of 1990 levels.

While public social spending has declined, private spending on similar services has increased with government encouragement. Only

Figure 3.3  
Kyrgyzstan: Composition of social expenditures, 1990-2009



<sup>1</sup> Excluding Public Investment Program (PIP).

Source: NSC.

few establishments engaged in social service provision are wholly private. Government establishments nowadays often charge consumers for the use of services to complement funding from the government budget. In 2009, 15 per cent of total financing of government educational establishments came from user fees (this share is higher in secondary professional training and especially in university education). Co-payments of patients in the public healthcare system contributed 10 per cent of total resources of the sector. When also accounting for other out-of-pocket expenses in healthcare (medicines, informal payments, etc.), users covered 57 per cent of total health spending.

The reduction in public spending on education and health contrasts with policies of neighbouring countries which are investing heavily in human capital. The current level of public education and health spending in Kyrgyzstan should be seen as inadequate to ensure minimum service quality by any modern international standard.

### *MDG progress in 1991–2008*

In Kyrgyzstan, the first MDG progress report was published in 2003 and the second in 2009. Taking into account its development situation, the country has substantially adjusted some of the MDG targets and indicators.

A summary of key MDG indicators, most of which are relevant for the purposes of the scenario analysis presented below, is provided in Table 3.1.

As follows from the table, the assessment of the country's progress towards the MDGs is mixed. The country has already achieved the goal of

Table 3.1  
Kyrgyzstan: Actual and expected MDG progress

	Base year		Last observation		2015 target	Progress assessment
	Year	Value	Year	Value		
<b>MDG 1: reduction of extreme poverty</b>						
Extreme poverty level (national poverty line) (per cent)	2000	32.9	2007	6.6	12.9	On track
<b>MDG 2: Achieve universal basic secondary education</b>						
Net enrolment ratio in basic secondary education, girls (per cent)	1990	92.3	2007	97.3	100	On track
Net enrolment ratio in basic secondary education, boys (per cent)	1990	91.7	2007	97.8	100	On track
<b>MDG 3: Promote gender equality and empower women</b>						
Ratio of women's wages to men's wages (per cent)	1996	73.0	2007	67.3	100	Off track
<b>MDG 4: Reduce child mortality</b>						
Under-five mortality rate (per 1,000 live births)	1990	41.3	2007	35.3	10.4	Off track
<b>MDG 5: Improve maternal health</b>						
Maternal mortality ratio (per 100,000 live births)	1990	62.9	2007	51.9	15.7	Off track
<b>MDG 6: Combat HIV/AIDS, malaria and other diseases</b>						
Tuberculosis prevalence (cases per 100,000 people)	1990	52.1	2007 <sup>1</sup>	115.5	52.0	Off track
<b>MDG 7: Ensure environmental sustainability</b>						
Access to an improved water source (per cent of the population)	1996	81.3	2007	93.0	90.0	On track
Access to improved sanitation (per cent of the population)	1996	24.0	2007	24.2	40.0	Off track

<sup>1</sup> 2001 value of this indicator was 167.8

Source: United Nations Development Programme (2009)

extreme poverty reduction (MDG 1) and, based on a linear continuation of past trends, it seems to be on track with regards to providing universal access to basic secondary education<sup>1</sup> (MDG 2) and access to an improved water source (MDG 7a). However, as mentioned above, the poverty situation in Kyrgyzstan is precarious and subject to influences of exogenous shocks. The main problem in education is not so much with access to schooling, but rather with the quality of education, as said. The second MDG Progress Report (United Nations Development Programme, 2009) warns that quality of potable water does not always correspond to standards. The country has made insufficient progress towards reducing child and maternal mortality (MDGs 4 and 5) and tuberculosis prevalence (MDG 6), such that it would be off track with regard to meeting the corresponding targets. There has been no progress—setbacks, rather—towards the goals of gender equality (MDG 3) and access to improved sanitation (MDG 7b). In all, the country faces enormous challenges to achieve the MDGs by 2015. Some targets will likely not be achieved without significant additional policy efforts.

Some MDG progress can be attributed to lower inflation resulting from more prudent macroeconomic policies in the 2000s. Certain changes in the economic and social situation also have been important, such as increased labour migration to abroad generating remittance income, reduced fertility causing a decline in child and maternal mortality, and population becoming increasingly urban which has eased the expansion of the clean water supply. Social policies have been unable to prevent service quality from deteriorating, especially in education and more sophisticated healthcare. Limited supply of quality services is being balanced with existing demand mainly by means of out-of-pocket user payments. As a result, the poor population is in an even more disadvantaged position to access quality services.

#### MODEL-BASED SCENARIO ANALYSIS OF AN MDG STRATEGY FOR KYRGYZSTAN

The analysis presented in this section considers two types of scenarios with MAMS for Kyrgyzstan. The first is a baseline or business-as-usual scenario of unchanged policies and absence of major exogenous shocks during 2011–2015. Second, taking the baseline as the benchmark, a set of MDG-achieving scenarios are assessed in which public spending is scaled up to the level required to meet some or all MDG targets, using alternative mechanism of financing.

*Calibration of MAMS for Kyrgyzstan*

MAMS includes three key data blocks: a social accounting matrix (SAM); miscellaneous macroeconomic, social and education-related time series; and elasticities values.

The Kyrgyz SAM has twelve production sectors (and their corresponding goods or services produced), of which five are directly associated with the MDG (i.e., three cycles of education, health, and water and sanitation). Labour is disaggregated into three categories defined by the level of education achieved by a worker. The Kyrgyz SAM for MAMS includes a capital account per institution and investment by sector of destination. Altogether the SAM contains fifty-four accounts.

The base year of the SAM and MAMS for Kyrgyzstan is 2006. This year has been selected because that was the year for which the most recent input-output table—a central part of the SAM—was available. Other data sources used for the construction of the SAM include the balance of payments (NBKR), fiscal accounts (MoF and IMF), as well as detailed information for the education sector needed to estimate parameters related to student behaviour by cycle (UNESCO data supplemented by NSC data).

The calibration of the model also required using data on population in total and by age cohorts, employment by labour type, unemployment rates by labour type, government investments and consumption by sector, and public and private foreign debt. Sources for these data are also NSC, NBKR and MoF, as well as the UN Department of Statistics for population dynamics.

For the proper estimation of some elasticities, such as those related to structural behaviour in production and trade, sufficiently long time series would be needed for periods of relative economic stability. Unfortunately, given its relatively short history of independent development and the turbulent conditions of transition from one social-economic system to another, Kyrgyzstan lacks such data. Therefore, values of a number of elasticities have been borrowed from models of other countries that are comparable to Kyrgyzstan in terms of size of the economy, its sector structure, and degree of openness—including existing studies on MAMS applications (see, for instance, Sánchez and others, 2010). Multiple runs of the model for different scenarios demonstrated the ability of chosen elasticity values to provide a reasonable description of behaviour of the Kyrgyz economy. More details about the calibration procedure and some of the key assumptions made to input data and key elasticity values are provided in Mogilevsky and Omorova (2011).

*Baseline scenario*

A baseline scenario was first generated to reproduce the aggregate functioning of the Kyrgyz economy for the period 2007–2010. It is calibrated to an assumed GDP growth rate of 7 per cent per year during 2011–2015, which is consistent with the government's and IMF's projections. Export and import prices and remittances in the coming years are expected to grow by 5 per cent per year, which reflect previous trends in these variables and seem to be conservative assumptions. The baseline scenario also assumes that all government expenditures change in fixed proportion to domestic absorption. Foreign transfers received by the government and FDI are assumed to change in a fixed proportion relative to GDP, while foreign borrowing by the government is expected to stay fixed in United States dollar terms at the 2006 level.

So-called closure rules were also used to maintain macroeconomic balances (government budget, savings-investments, and external balance) and equilibrium in the factor markets. Accordingly, taxes adjust endogenously to clear the government budget balance; savings become equal to investment by endogenously adjusting the households' savings rate; and external balance is maintained through a flexible real exchange rate. Labour markets for all three labour types are initially cleared through the changes in the level of employment, as long as the unemployment rate is higher than a minimum rate of 4 per cent. Real wage adjustment clears the labour market when the unemployment rate drops to the minimum. Simulations show that quantity adjustment tends to clear supply and demand for relatively abundant labour types (that is those with basic secondary education and with tertiary education), while price (wage) adjustment tends to clear the market for the scarce labour types (that is, workers with general/professional secondary education).

Simulation results for the baseline scenario show that of all GDP components only exports are expected to grow faster than GDP; all other components would grow during 2007–2015 by an average rate in the range of 4–5 per cent per year (see Table A3.1 in Appendix A3.1). Government expenditures would represent 31.3 per cent of GDP, on average, which is below the 2006 level. Tax revenue increasingly finances government spending, gradually replacing foreign borrowing. This outcome results from the assumed recovery of economic growth in 2011–2015, lifting tax revenue in spite of recent tax rate cuts. In the baseline, the share of MDG-related government expenditures declines from 8.2 per cent of GDP in 2006 to an average of 7.0 per cent of GDP per year during 2007–2015.



The baseline scenario does not imply any changes in the structure of labour demand, so all changes on the labour market are induced by changes in the composition of the work force. The skill composition of the labour force and employment shifts in favour of unskilled workers (those with basic secondary education or less). This is the consequence of the transition from the mandatory general secondary to the basic secondary education made in 1993. Young people, many of whom leave the education system after completion of the first cycle, would be gradually replacing retiring workers with mostly general/professional secondary education. Due to high university enrolment, the number of workers with higher education is expected to grow faster than the demand for their skills. This dynamics of labour supply explains changes in real wages, implied by the baseline scenario: wages for abundant labour type with basic secondary education decrease relative to those with other skill levels, whereas wages for relatively scarcer labour with general/professional secondary education increase.

The baseline scenario leads to some improvement in all MDG indicators under consideration; nevertheless, none of the targets for MDGs 2–7 would be achieved (Figure 3.4).

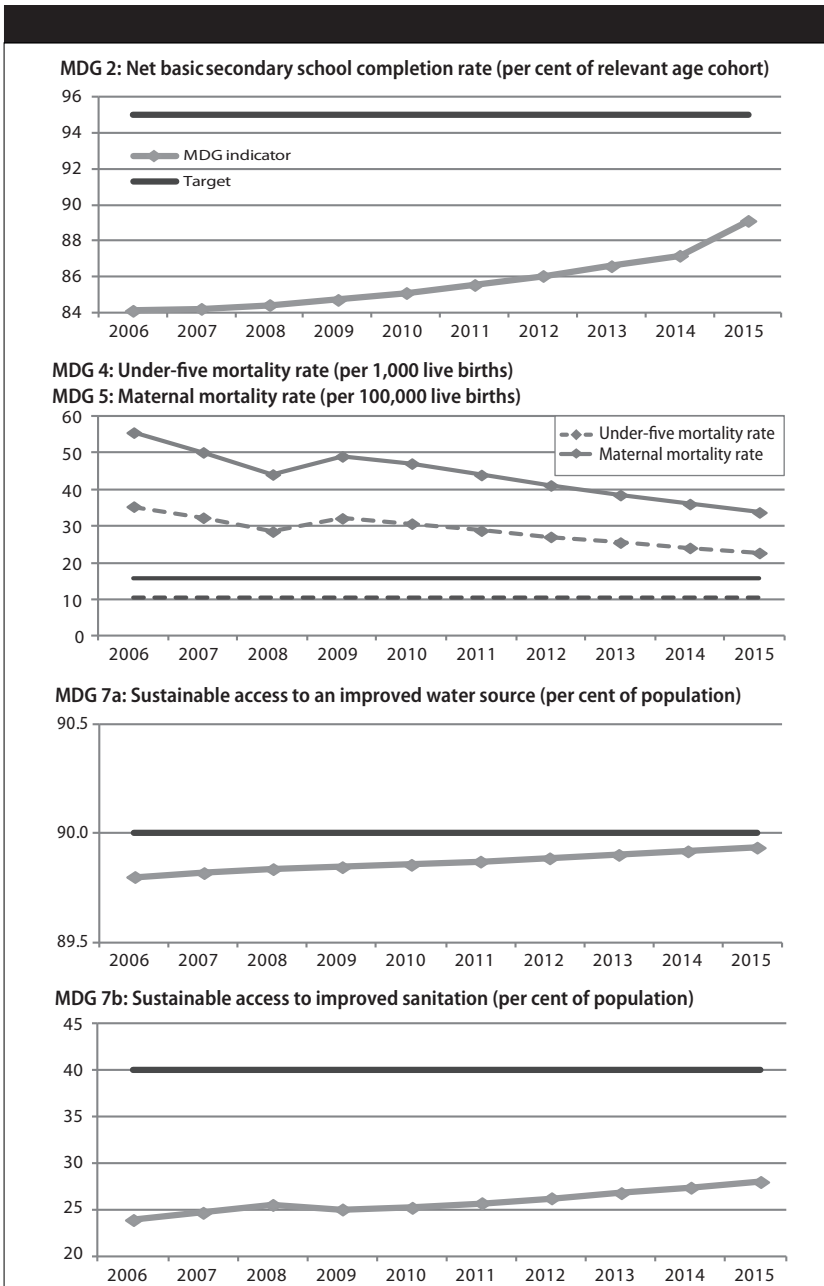
### *MDG-achieving scenarios*

The MDG scenarios differ from the baseline in that government expenditures no longer change in fixed proportion to domestic absorption, but adjust in function of spending needs for achieving the MDG targets for education, health and access to drinking water and sanitation. The scenarios also consider alternative sources of financing for the additional government spending. Domestic public borrowing is not considered to be a feasible financing option because the domestic capital market is too shallow. Therefore, increased tax collection (tax), foreign transfers to the government (ftr) and a mix of these two are considered as options in the subsequent analysis. The option of foreign borrowing (fb) has also been added to the analysis for illustrative purposes only, because this option is not seen as politically feasible given the already high level of external indebtedness and the reluctance of the government to borrow abroad in order to finance social programs.

The financing source matters. Tax financing, for example, means substantial resources are to be redistributed from the private sector to the government budget. This will likely slow growth of private consumption and crowd out private investments, affecting overall economic growth

Figure 3.4

Kyrgyzstan: Dynamics of the MDG indicators under the baseline scenario, 2006-2015



Source: Authors' estimates based on MAMS for Kyrgyzstan.

and poverty reduction. Financing through foreign transfers increases the total amount of resources in the economy and does not reduce resources of the private sector, but a massive inflow of foreign exchange to the economy could cause “Dutch disease” effects through an appreciation of the real exchange rate, eroding export competitiveness and increasing import demand. Foreign borrowing would induce similar effects but with the difference that this kind of financing and its borrowing cost build up a debt stock. A mixed financing option that combines increased taxation and foreign transfers would produce results somewhere in between the two extreme cases—tax and ftr—requiring less reduction in economic growth rates than the tax option alone. In this chapter’s scenario analysis the mixed financing option consists of increasing the collection of domestic indirect taxes (VAT, excises, sales tax, etc.) up to 15 per cent GDP (from 11.7 per cent in 2006) and allowing foreign transfers to the government to be scaled up endogenously as much as needed to finance the required additional MDG spending.

Altogether, ten MDG-achieving scenarios were simulated and scrutinized under the different financing options that would be relevant for Kyrgyzstan, targeting one or two goals at the time, or all of them simultaneously: MDG2-ftr, MDG2-tax, MDG45-ftr, MDG45-tax, MDG7-ftr, MDG7-tax, MDG2457-ftr, MDG2457-fb, MDG2457-tax, and MDG2457-mix. The main results of these scenarios are presented in Table A3.1 in combination with those of the baseline.

As expected, economic growth is slower in all tax-financing scenarios compared to the baseline, whereas growth rates are roughly the same seen for the other foreign-financing scenarios relative to the baseline. The more the extra public spending needed to achieve the MDGs, the more the deviations from the baseline scenario. When MDGs 2 or 7 are targeted individually, such deviations are not very large. In contrast, deviations are quite substantial for the MDGs 4 and 5 achievement scenarios. These two goals are among the most problematic from the point of view of their achievement (see Table 3.1), such that the resource requirements in health spending to achieve them are of significance. Also, as expected, the utilization of the mix-financing scenario allows for less reduction in the economic growth rates in comparison to the tax scenario.

A considerable increase in government spending is found to be needed for achieving the targeted MDGs in comparison to the baseline scenario (Table 3.2 and Table A3.1). The highest government spending level, above 39 per cent of GDP, is seen when all five MDGs are targeted. This is understandable as the government spending is to increase in all three

MDG-related sectors (education, health and water and sanitation). The additional total government expenditure necessary to achieve the MDGs simultaneously—relative to the baseline—is estimated to be in the range 7.8–8.1 per cent of GDP per year, depending on the financing option. It is worth noting, however, that the increase in government consumption and investments is not as much when all five goals are targeted simultaneously as opposed to targeting only one or two at the time, owing to synergy effects allowed in the MAMS model. In the case of Kyrgyzstan, the synergy effects at work relate in particular to the positive impact of greater access to safe water and basic sanitation on reducing mortality rates.

Analysis of government spending by sector indicates that the main increases are needed for recurrent spending in the primary cycle of education (2.0–2.2 per cent of GDP per year), recurrent health spending (1.9–2.0 per cent of GDP per year), and, mainly, investments in primary cycle of education (2.9–3.1 per cent of GDP per year). The latter result could be expected taking into account under-investments in the education sector during the past two decades and the increasing number of children in the country. All these increases look quite sensitive, and their implementation would require making hard policy choices.

Scenarios based solely on the tax financing option require a very substantial (up to 8.3 per cent of GDP) increase in the tax collections, which would be a real challenge for the government revenue collection service. On the other side, using foreign transfers allows to keep tax collections at baseline or lower levels. However, an additional inflow of foreign grant

Table 3.2

**Kyrgyzstan: Additional government expenditures necessary to achieve the MDGs as percentage of GDP, 2007-2015**

Average annual deviation from baseline scenario									
	MDG2		MDG45		MDG7		MDG2457		
	ftr	tax	ftr	tax	ftr	tax	ftr/fb	tax	mix
<b>Recurrent spending</b>									
First education cycle	2.1	2.0	0.1	0.0	0.0	0.0	2.2	2.0	2.1
Health	0.1	0.0	5.6	6.2	0.0	0.0	1.9	2.0	1.9
Water and sanitation	0.0	0.0	0.0	0.0	0.4	0.4	0.4	0.6	0.5
<b>Investment</b>									
First education cycle	2.9	3.1	-0.1	-0.1	0.0	0.0	2.9	3.1	3.0
Health	0.0	0.0	0.5	0.6	0.0	0.0	0.1	0.1	0.1
Water and sanitation	0.0	0.0	0.0	0.0	0.3	0.3	0.3	0.3	0.3
<b>Total</b>	5.1	5.1	6.1	6.7	0.7	0.7	7.8	8.1	7.9

**Source:** Authors' estimates based on MAMS for Kyrgyzstan.

aid in the amount equivalent to 9.1 per cent of GDP per year (under the scenario of simultaneous MDG achievement) is found to be needed for with this financing option. This is a huge amount (more than \$400 million per year), and the ability of the country to compromise assistance from the international community to supply this amount seems to be far from being guaranteed. The mix-financing option is more acceptable as it requires only a relatively moderate increase in tax collections (by 2.5 per cent of GDP in comparison to the baseline) and a smaller (albeit still very high) inflow of grant aid (6.1 per cent of GDP in comparison to 9.1 per cent of GDP under the foreign-transfers option alone). The foreign borrowing option leads to additional government debt servicing expenditures equivalent of 0.3 per cent of GDP per year and foreign debt accumulates up to 71.8 per cent of GDP in 2015.<sup>2</sup>

Labour market shifts of the MDG-achieving scenarios are not as dramatic. Consistent with slower economic growth projections, demand for unskilled workers is less than in the baseline scenario. Real wage growth for this labour type is also lower than in the baseline. In contrast, wages of skilled workers (those, who completed tertiary education cycle) would improve under the MDG-achieving scenarios reflecting higher demand for skilled workers in education and health.

### *Analysis of microsimulation results for MDG 1*

Using the microsimulation methodology (see Chapter 1), with data from the Kyrgyz Integrated Household Survey for 2007 conducted by NSC, estimations were carried out to determine how poverty and inequality indicators would trend under the assumptions of the baseline and MDG-achieving scenarios. The results are presented in Table 3.3—excluding the MDG-achieving scenarios where only one or two targets at the time are achieved. Poverty rates and Gini coefficient values in this table incorporate all effects related to changes in unemployment rates, shifts in employment by labour type (i.e., workers' education) and sector of occupation, and wages for both the average level of the economy and the relative structure by sector of occupation. All of these changes are translated into effects on income per capita, and, subsequently, we estimate how this results in a new consumption distribution in order to compute inequality and poverty indicators.<sup>3</sup>

As mentioned earlier, the extreme poverty reduction goal has already been achieved in Kyrgyzstan; extreme poverty was 6.6 per cent in 2007 and

the target set for 2015 is 12.9 (see Table 3.1). The microsimulation results indicate that MDG 1 would continue to be achieved under any scenario—including the MDG-achieving scenarios where only one or two targets are achieved at a time (not shown in Table 3.3). Thus, the formulation of MDG 1 could be revised in order to set a more ambitious target in poverty reduction; for example, setting the target for the moderate (and not the extreme) poverty rate at the level of, say, 20 per cent by 2015.

Poverty outcomes vary substantially across scenarios. Higher economic growth and education spending yield lower poverty rates. Increased spending on education results in better households' incomes (as follows from the simulations results, the higher education spending the better skills composition in the labour force with positive consequences for average wages and households' incomes), thus reducing poverty. Foreign-financing scenarios imply faster economic growth and thus would have better outcomes in terms of poverty reduction than the tax-financing scenario. The baseline scenario also produces poverty outcomes that are better in comparison with the tax-financing scenario. So, there appears to be a trade-off between, on one hand, higher economic growth rates and faster progress with regards to MDG 1 under the baseline scenario and, on the other hand, efforts towards the achievement of the other MDGs when financed through tax increases because of adverse effects on economic growth over the simulation period. However, a trade off of this nature may disappear over the longer run as higher education levels achieved with the MDG strategy translate into higher productivity growth.

The Gini coefficient of inequality in consumption expenditures varies little across scenarios. Achievement of MDGs 2, 4-5, and 7 generally results

Table 3.3  
Kyrgyzstan: Poverty and inequality estimates for the base year and for 2015  
for selected scenarios

	2006 (actual)	2015			
		Baseline	MDG2457		
			ftr/fb	tax	mix
Extreme poverty rate (per cent of population)	9.1	7.1	6.3	7.9	6.6
Moderate poverty rate (per cent of population)	39.9	25.1	22.4	27.7	23.8
Gini coefficient for consumption per capita	0.402	0.409	0.405	0.404	0.404

Source: Authors' estimates based on MAMS for Kyrgyzstan and microsimulations using the Kyrgyz Integrated Household Survey for 2007.

in slightly lower inequality than in the baseline. This is due to a shift in employment from lower-paid agriculture and some other sectors to higher-paid government services as well as a general improvement in the labour-skill composition. From this perspective the strategy of targeting MDGs 2-5 is somewhat more pro-poor compared to current policies simulated in the baseline scenario.

## CONCLUSIONS AND POLICY IMPLICATIONS

After a difficult period in the 1990s, the economic situation has substantially improved in the 2000s in Kyrgyzstan. Responsible macroeconomic policies in 2000-2008, adaptation of the population to new realities and new opportunities, and positive developments in the economies of neighbouring countries have allowed for several years of good economic growth and significant poverty reduction. Yet, the country remains vulnerable to numerous external and internal shocks, and its public finance and balance of payments are still fragile.

The government's social policies have been directed towards sustaining the most important country's achievements in education, health and access to water and sanitation. While access to essential social services has been mostly preserved, the quality of a broad range of services has suffered. Achievement of many MDGs is at risk without additional policy efforts.

The scenario analysis performed in this chapter, based on the use of MAMS, helped us conclude that under a continuation of current policies only MDG 1, the goal for extreme poverty, would be achieved. Under business-as-usual policies, Kyrgyzstan would fall short of all other MDG targets. Large deviations from the targets would be expected in reducing child and maternal mortality, accessing improved sanitation for a large share of the population, and in increasing the net completion rate for basic secondary education. In order to achieve all of these MDGs, the country would need to increase government spending on MDG-relevant sectors (education, health, water and sanitation) by 7.8-8.1 per cent of GDP per year in comparison to the baseline scenario of business-as-usual policies.

This increase in government spending could be financed either through increased domestic tax collections, official foreign transfers to the government, concessional foreign borrowing, or a mix of these options. All of these financing options seem to be politically difficult. One complication is that the MDG achievement would require the implementation of rather radical sector shifts in the government expenditures (almost all additional

revenues would need to go to the social sector only, increasing its share in the general government expenditures enormously). Then, according to the scenario analysis, the estimated increase in government revenue collections by 8.3 per cent of GDP—in comparison to the baseline—would require a substantial upgrade in government's tax collection capacity. Due to the impact of increased taxation on private consumption, the financing strategy would result in a somewhat slower economic growth (-0.4 per cent per year on average). It is important to note that the required large investments into human capital to achieve the MDGs possibly may affect growth rates in the short- to medium-term only. In the long-term (after 2015) these investments may be expected to contribute to increased labour productivity and hence higher economic growth. Alternative scenarios based on inflows of grant aid do not create these problems, but are based on an ungrounded assumption that donors would channel levels of aid that have never been seen in the past for Kyrgyzstan (that is around 9.6 per cent GDP per year). In a foreign-borrowing scenario, the level of the government foreign debt reaches more than 70 per cent of GDP in 2015. This is below the levels registered in the country's recent history, but taking into account that most probably the government would also borrow for different energy, transport and other infrastructure projects, the summary level of the foreign debt is going to become unsustainable. Finally, a scenario that combines increased taxation and aid inflows seems to be more realistic, but it would still require very substantial increases in both tax collections (by 2.5 per cent GDP per year) and grant aid (by 6.1 per cent GDP per year). Thus, none of the MDG-achieving scenarios under consideration seem feasible. Obviously, an underlying issue is that targets for most MDGs under study are very ambitious in the Kyrgyz context, and time remaining for their achievement by 2015 is very short.

The MDG challenge would be less if projected economic growth rates were to be higher. Then the resources to be redistributed to the MDG-related sectors would amount to a smaller share of GDP, making this redistribution more politically feasible. This is possible if the government succeeds in implementing structural reforms, and there is sufficient attraction of FDI and private domestic investments and mobilization of resources for infrastructure development.

Another possible way out is a substantial increase in government spending efficiency, which would result in higher social returns for money spent. This seems to correspond to government policies as they have been formulated in strategic documents of the country. If properly implemented, efficiency-oriented policies are able to reduce resource requirements substantially.



Thus, MDG achievement in the Kyrgyz Republic seems to require a combination of four types of policies: (i) the promotion of economic growth in the country, (ii) increased domestic financing of MDG-related sectors through redistribution of resources between sectors, (iii) an increase in cost efficiency of social policies, and (iv) increased attraction of foreign aid.

## NOTES

- 1 However, with regard to the net basic secondary school completion rate—another MDG indicator, which is used in the MAMS model by means of which the scenario analysis below is implemented—the country is off track. Based on UNESCO data, this rate reached 84.1 per cent in 2006.
- 2 All other scenarios lead to the foreign debt levels in the range 24.1-26.2 per cent of GDP at the end of 2015.
- 3 All poverty and inequality indicators have been computed using data on consumption per capita as customary in Kyrgyzstan. Consumption per capita for years other than the base year has been estimated for the relevant years in all scenarios using income per capita results from the microsimulations and assuming a fixed marginal propensity to consume for each household.

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## APPENDIX A3.1. SIMULATION RESULTS

Table A3.1  
Kyrgyzstan: Summary of results from MAMS scenarios, 2006-2015

	MAMS scenarios												
	2006		MDG2		MDG45		MDG7		MDG2457				
	Actual	Baseline	ftr	tax	ftr	tax	ftr	tax	ftr	tax	fb	tax	mix
<b>Macroeconomic aggregates</b>	<b>Bill. soms</b>	<b>Average annual growth for 2007-2015, per cent</b>											
GDP at market prices	113.8	5.6	5.5	5.3	5.3	4.9	5.6	5.5	5.5	5.5	5.5	5.2	5.3
Private consumption	108.1	4.8	4.9	4.6	5.0	2.7	4.8	4.7	4.9	4.9	4.9	4.0	4.4
Government consumption	20.5	4.1	4.7	4.5	10.3	10.6	4.8	4.7	6.8	6.8	6.8	6.5	6.7
Private investments into fixed capital	18.7	4.9	4.9	4.7	5.1	3.3	4.9	4.8	5.0	5.0	5.0	4.2	4.6
Government investments into fixed capital	7.5	4.1	3.4	3.2	5.7	5.0	5.0	4.9	4.6	4.6	4.6	4.2	4.4
Exports	47.4	6.8	6.5	6.4	2.9	4.6	6.6	6.7	5.4	5.4	5.4	5.8	5.7
Imports	89.8	4.6	4.6	4.4	5.0	3.4	4.7	4.6	4.7	4.7	4.7	4.0	4.3
<b>Public finance</b>	<b>Per cent of GDP</b>	<b>Annual average for 2007-2015, per cent of GDP</b>											
Receipts/Expenditures - total	33.5	31.3	37.0	36.4	38.1	37.9	32.1	32.0	40.0	40.0	40.4	39.5	39.7
Receipts													
Taxes	23.2	24.1	23.8	29.3	23.9	30.9	24.1	24.7	23.7	23.7	23.7	32.4	26.5
Foreign transfers	0.5	0.5	6.6	0.5	7.6	0.5	1.2	0.5	9.6	9.6	0.5	0.5	6.6
Foreign borrowing	5.6	2.3	2.2	2.3	2.2	2.3	2.3	2.3	2.2	2.2	11.7	2.3	2.2
Other receipts	4.2	4.5	4.4	4.4	4.4	4.2	4.6	4.5	4.5	4.5	4.5	4.4	4.4
<b>Expenditures</b>													
Final consumption in first education cycle	1.5	1.4	3.0	3.1	1.4	1.4	1.4	1.4	3.6	3.6	3.6	3.5	3.5

(continued)

Table A3.1 (continued)  
Kyrgyzstan: Summary of results from MAMS scenarios, 2006-2015

	MAMS scenarios														
	2006		MDG2			MDG45			MDG7			MDG2457			
	Actual	Baseline	ftr	tax	ftr	tax	ftr	tax	ftr	tax	ftr	tax	ftr	tax	mix
Final consumption in health	3.0	2.7	2.7	2.7	8.2	9.0	2.7	2.7	4.8	4.8	4.9	4.8	4.8	4.8	4.8
Final consumption in W&S	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.5	0.4	0.5	0.5	0.4	0.4	0.4	0.4
Investments in first education cycle	0.8	0.5	3.2	3.3	0.4	0.4	0.5	0.5	3.4	3.4	3.6	3.5	3.5	3.5	3.5
Investments in health	0.1	0.0	0.0	0.0	0.6	0.7	0.1	0.0	0.2	0.2	0.2	0.2	0.2	0.2	0.2
Investments in water and sanitation	0.2	0.0	0.0	0.0	0.1	0.0	0.3	0.4	0.3	0.3	0.4	0.3	0.3	0.4	0.3
Other expenditures	27.9	26.4	27.0	26.5	27.1	26.3	26.6	26.5	27.4	26.5	27.0	27.7	27.7	27.7	27.7
Percent of GDP															
Foreign debt of the government	33.5	26.0	25.8	26.2	24.1	25.5	25.8	25.9	25.2	71.8	26.0	25.4	25.4	25.4	25.4
<b>Labour market</b>															
<b>Employment</b>															
Unskilled workers	0.188	8.1	8.0	8.0	7.7	8.0	7.4	8.1	7.9	7.9	7.8	7.8	7.8	7.8	7.8
Semi-skilled workers	1.554	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4
Skilled workers	0.354	4.2	4.3	4.2	4.3	4.2	4.3	4.2	4.3	4.3	4.2	4.2	4.2	4.2	4.2
Total	2.096	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6
<b>Real wage</b>															
Unskilled workers	1,519	-4.2	-4.2	-4.5	-4.9	-6.3	-4.2	-4.3	-4.4	-4.4	-5.1	-4.8	-4.8	-4.8	-4.8
Semi-skilled workers	1,924	4.3	4.4	4.0	5.2	3.4	4.4	4.2	4.6	4.6	3.7	4.0	4.0	4.0	4.0
Skilled workers	2,472	-0.2	1.1	0.9	2.4	0.3	-0.1	-0.2	1.9	1.9	1.1	1.3	1.3	1.3	1.3

Source: Authors' estimates based on MAMS for Kyrgyzstan.

## Chapter 4

# Philippines

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### INTRODUCTION

The Philippines has progressed well towards the achievement of several of the millennium development goals (MDGs). Since 1990, considerable headway has been made towards the eradication of extreme poverty, reductions in child mortality, and improvements in household potable water and sanitation. However, the challenges remain formidable. In the 2000s there was an increase in poverty incidence, delaying the achievement of the goal for extreme poverty (MDG 1) and worsening prospects for a significant reduction in moderate poverty. Likewise, the goals for primary education, as well as for maternal and reproductive health, remain elusive.

For the Philippines, Manasan (2007 and 2010) estimated that achieving the MDGs over the period of 2007 to 2015 may require additional spending in the order of 0.6 to 1.4 per cent of GDP. The increase in spending, though seemingly modest, could take on greater significance depending on the fiscal and other macroeconomic constraints the country faces. The policy options to achieve human development goals while respecting macroeconomic stability constraints can be meaningfully assessed through the application of rigorous modelling of the socio-economic system at large.

This chapter explores the application of one such modelling exercise, using the *Maquette* for MDG Simulation (MAMS) calibrated to a Philippine dataset. Having discussed the country's economic performance and policies as well as the social sector trends and MDG achievement that provide sufficient, required background, results from various scenarios are scrutinized using MAMS in combination with a microsimulation approach that enables

adequate quantification of effects on poverty and inequality.<sup>1</sup> It is shown that the MDGs are achievable and affordable in the case of the Philippines, but in order to sustain macroeconomic stability, the government would need to step up efforts to collect more tax revenue. Other financing options to cover the required additional government spending are found to be less feasible. Stepping up efforts to enhance primary schooling performance, improve child and maternal health, and enhance access to drinking water and sanitation does not immediately translate into accelerated reduction of income poverty, however. For that, the Philippine government would need to pursue further policies promoting more inclusive growth.

#### ECONOMIC PERFORMANCE AND POLICIES

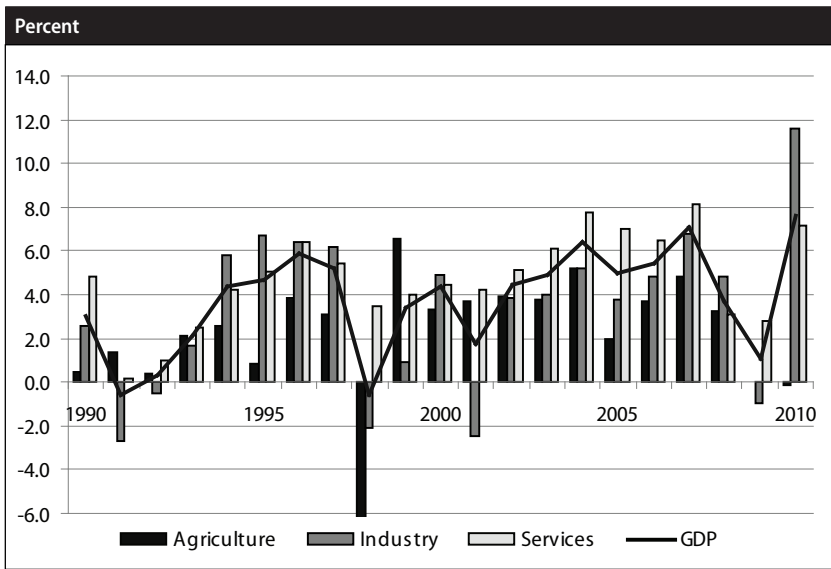
During the Aquino administration (1986–1992), real GDP growth recovered to 5.2 per cent per year between 1985 and 1989. The recovery was supported by market-oriented reforms that were implemented in response to the economic crisis of 1981–1984 when GDP shrank by 2.3 per cent per year. The Ramos administration (1992–1998) also embarked on a program of privatization and liberalization, mainly aiming to boost foreign direct investment and the expansion of the services sector (Abrenica and Llanto, 2003). By the end of the 1990s, the country's industrial sector had a “reasonably clean and undistorted trade regime” (Hill, 2003), unlike agriculture, where distortions in sheltered sub-sectors (notably rice) were amplified in the 1990s (David, 2003).

From 1990 to 2009, the economy grew modestly, averaging just 3.6 per cent (Figure 4.1). Services were the leading growth sector and expanded to account for nearly half of total output by 2006. The agricultural sector has lagged behind. Also, growth of industrial output has been below average taken over the three decades.

GDP fluctuations have been fairly pronounced, owing to a variety of shocks. In the early 1990s the economy was buffeted by natural disasters, high oil prices, and a balance of payments crisis. Incipient recovery in 1992 was nearly brought to a halt by crippling power shortages, which ended in 1994. After a period of fairly robust growth from 1994 to 1997, the economy was battered by the Asian financial crisis and a severe El Niño drought in 1997–1998. Economic growth picked up again after 2000, peaking at 7.1 per cent in 2007, until it was punctured by the global financial crisis of 2008–2009.

The maintenance of the external and fiscal balances has been a major macroeconomic policy challenge. Throughout most of the 1990s, the

Figure 4.1  
Philippines: GDP growth, in constant 1985 prices, 1990–2010

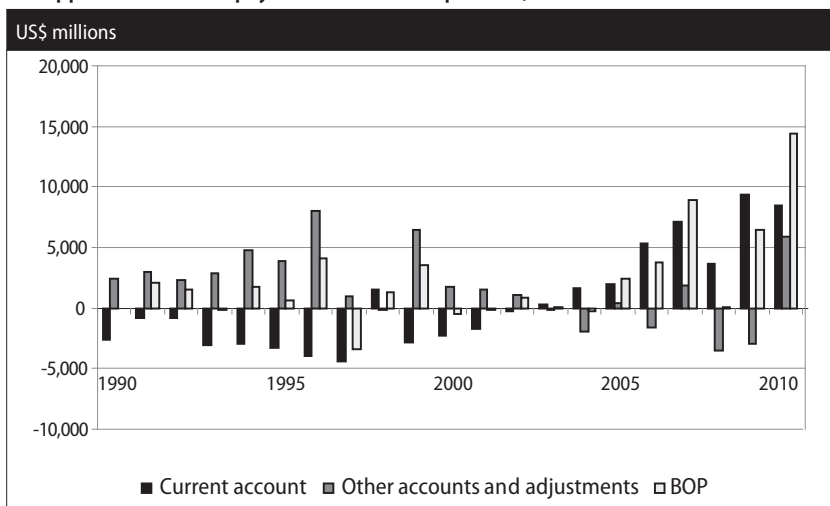


Source: National Statistical Coordination Board (NSCB).  
Available at: ADB Key Indicators 2009 – Philippines.

current account of the balance of payments (BOP) was persistently in deficit. Capital inflows, fed by liquid portfolio investments, complemented by the use of reserves avoided the country running overall BOP deficits, except in 1997 and the first years of the new millennium (Figure 4.2). The BOP position reverted thereafter with the current account increasingly moving into surplus allowing for net capital outflows and reserve accumulation.

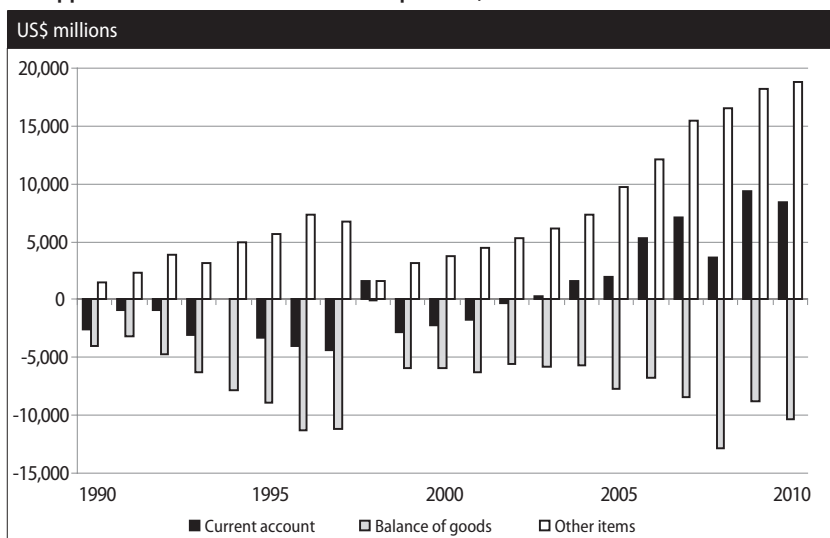
During the 1980s and early 1990s, exchange rate stability was the main objective of the monetary authorities. However, achieving this objective has been difficult given the persistent fiscal imbalances and monetary expansion associated with deficit financing, as visible in several BOP crises, including a severe one in 1983 and a less severe one in 1990. From 1992 onwards, the foreign exchange regime was liberalized. This, however, attracted significant inflows from short-term portfolio investments, causing a sharp currency appreciation. The currency mismatch resulting from the large inflow of foreign capital and a domestic asset price bubble caused by inflation and currency appreciation, made the country vulnerable to contagion from the East Asia crisis and culminated in another exchange rate collapse in 1997. Subsequently, the Philippine independent Central Bank shifted to a policy of inflation targeting in 2001 (Gochoco-Bautista and Canlas, 2003).

Figure 4.2  
**Philippines: Balance of payments and its components, 1990–2010**



Source: Bangko Sentral ng Pilipinas or BSP (Central Bank of the Philippines).

Figure 4.3  
**Philippines: Current account and its components, 1990–2010**



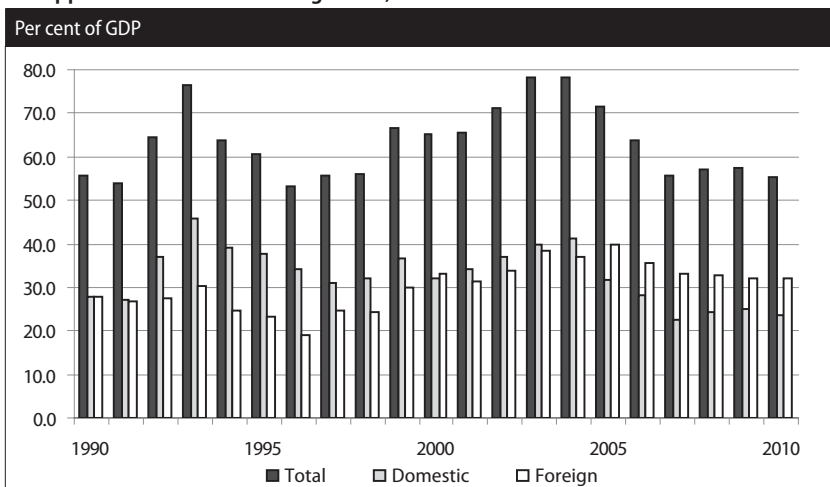
Source: BSP. Available at: ADB Key Indicators 2011 – Philippines.

This and other developments appeared to tame inflation from an average of 8.7 per cent in the 1990s to an average of 5.3 per cent from 2000-2009. It allowed for more exchange rate flexibility, lesser penalization of exports and competitiveness and diminished BOP pressures.

Figure 4.3 presents the trends in the various components of the current account. During the 1990s until the Asian crisis, net income from investment, transfers and other services were not sufficient to offset the increasing trade deficit. In the first half of the 2000s, the current account deficit gradually dissipated and turned into a surplus in 2005, largely due to the surge in workers' remittances from abroad. Remittances accounted for as much as 12 per cent of gross national product (GNP) in 2009, up from just 2.3 per cent in 1993. The extraordinary growth in remittances resulted from both the increasing number of deployed workers as well as their rising skill levels.

As for public finances, the early 1990s witnessed the rapid escalation of public debt, mainly from increased domestic borrowing (Figure 4.4). After 1994, fiscal adjustment and higher economic growth led to budget surpluses, lowering the public debt-to-GDP ratio. Reduction of the debt burden foundered, however, in the years after the Asian financial crisis. Only with spending cuts and tax reforms introduced in 2005 did public indebtedness begin to decline again. Nonetheless, the level of indebtedness remains a cause for concern. One international benchmark suggests that

Figure 4.4  
Philippines: Domestic and foreign debt, 1990-2010



Source: Bureau of Treasury.



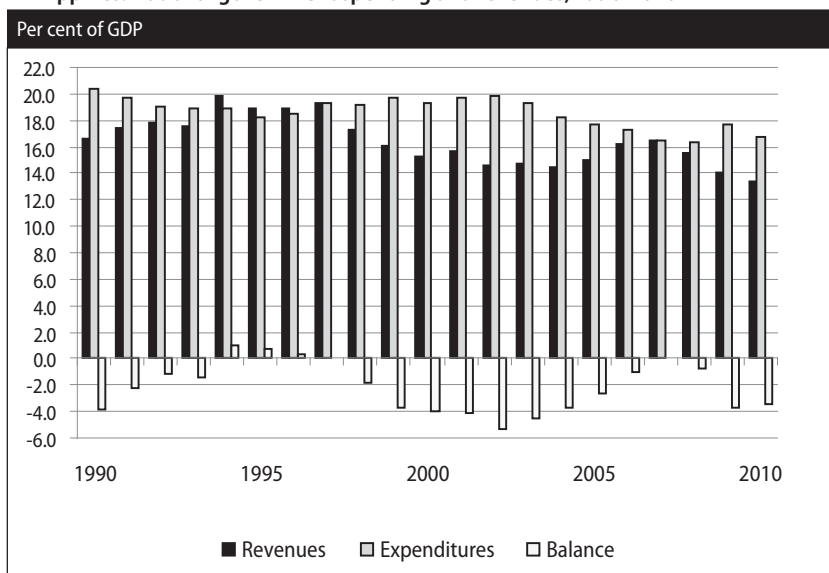
the debt-to-GDP ratio should not exceed 49.7 per cent in order to avoid the risk of a sovereign debt crisis (Manasse and Roubini, 2009). The Philippines has persistently breached this benchmark. In 2010, the ratio fell to its lowest level in 15 years, but at 55 per cent it is still too high for comfort, according to that standard.

At the start of the 1990s, the country's fiscal deficit averaged 3.5 per cent of GDP (Figure 4.5). The deficit was then contained by raising revenues and by reducing the spending-to-GDP ratio. The revenue increase was temporary, however, arising largely from the sale of government assets, and the deficit worsened as revenue collection deteriorated after the Asian financial crisis. The revenue decline persisted despite the subsequent recovery, leading to continuing deficits in the 2000s. When the fiscal deficit began to fall in 2003, it was as a result of slashing spending rather than raising revenues (which actually did increase temporarily from 2005 to 2007). However, the global financial crisis of 2008 and 2009 took a toll on public finances and the fiscal deficit widened again.

Official development assistance (ODA) has been a major source of government finance, growing substantially over the MDG period, amounting to as much as one fifth of GDP in the early 1990s and peaking in 2002 at over \$13 billion. It has dropped since because of two factors

Figure 4.5

**Philippines: National government spending and revenues, 1990-2010**



Source: Bureau of Treasury; NSCB. Available at: ADB Key Indicators 2011 – Philippines.

(Kang, 2010): the rise in foreign remittances, which diminished the need for ODA as an external financing source and the lack of absorptive capacity of the government to fully use all foreign assistance. During 2002-2008, the government was only able to spend 17 per cent of committed ODA and 82 per cent of programmed disbursements, primarily due to governance issues. Against this backdrop, ODA does not seem the most effective means to finance the MDG strategy.

Increasing tax revenue might be a better option. According to Manasan (2007), the country raises less than half its total revenues from direct taxes (23 per cent). Of the various indirect taxes, the largest share is still generated from taxes on imports (45 per cent), followed by the VAT (17 per cent); other domestic taxes and the excise tax account for the rest (15 per cent). In fact, several new tax measures pending in Congress that seek to increase revenues from direct and indirect taxes would provide the government with more space to finance its developmental goals. Of these, Manasan (2010) recommends: (i) restructuring the excise tax on sin products, (ii) rationalizing fiscal incentives and (iii) reforming the road user charge. In addition, the government could also consider simplifying the tax structure, in terms of: (i) reducing the number of rates at which any given tax is imposed (e.g., multi-tiered rate structure for excise taxes, different rates for different types of passive income), and (ii) reducing the number of exemptions (e.g., exemptions under the expanded Senior Citizens Act, the tax on interest income).

In summary, through a series of policy reforms, the Philippines has achieved economic openness and a certain degree of macroeconomic stability. Public finance, however, remains a weak point, raising concerns for the public sector's capacity to invest in human development, as discussed in the following section.

## SOCIAL POLICY AND MDG ACHIEVEMENT

An analysis of national government spending by sector as a proportion of GDP finds that social spending took the brunt of increasing outlays on debt service, which grew to 5.5 per cent of GDP in 2005 from 3.2 per cent in 1997 (Table 4.1). After reaching 5.5 per cent in 1998, social spending declined to just 3.1 per cent by 2005, recovering to 3.6 per cent by 2006. Spending on national defence, law and order, and public administration remained fairly stable.

Economic sector spending, which includes infrastructure, appears to be the most vulnerable spending item. Treasury data show that capital

Table 4.1

**Philippines: National government spending and its composition, 1990-2006**

Per cent of GDP									
	1990	1992	1994	1996	1998	2000	2002	2004	2006
Social services	4.2	3.9	3.7	4.9	5.5	5.0	4.4	3.4	3.6
Economic services	4.8	3.9	4.3	3.9	3.8	3.8	2.6	2.5	2.7
Security and administration	3.7	3.8	4.0	4.1	4.2	3.8	3.6	3.4	3.1
Debt service	6.6	5.9	4.7	3.5	3.7	4.2	4.8	5.4	5.1
Others	1.2	1.5	2.8	2.7	3.0	3.6	3.6	3.0	2.9
Total	20.5	19.0	19.5	19.1	20.2	20.4	19.0	17.7	17.4

Source: Data taken from Manasan (2007).

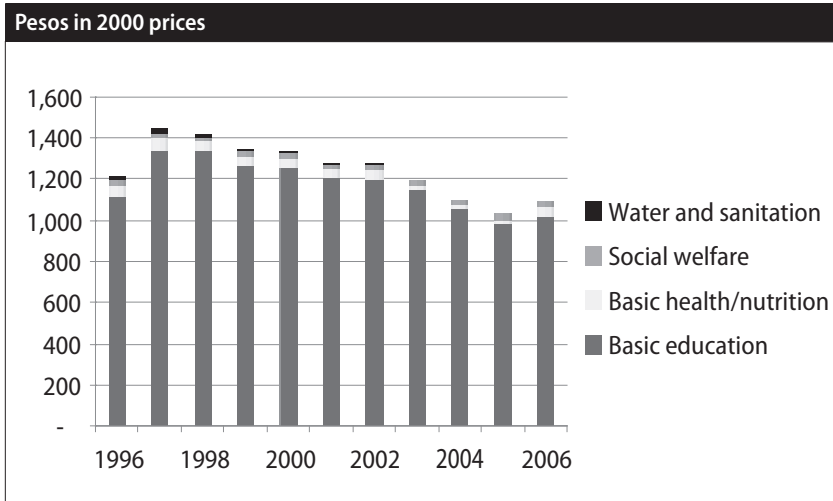
outlays peaked at 17 per cent of government expenditure in 1992. By 2000, however, the share had fallen to below one tenth. The share continued to fall until 2006. In 2007, the national government managed to simultaneously increase the share of capital outlays (to 11 per cent of total spending) while reducing the spending-to-GDP ratio.

Figure 4.6 presents Manasan's (2007) estimates of real government spending per capita on basic services. Spending peaked in 1997 at P1,482, equivalent to just \$36 at the market exchange rate. Following the trend in overall social service spending as shown in Table 4.1, per capita spending on basic services declined steadily thereafter to about P1,000 in 2005, with a slight recovery the subsequent year.

Although the brunt of the decrease in social service spending was borne by basic education, whose share in the total is by far the largest, bigger relative reductions were observed for housing (10 per cent per year), water and sanitation (7 per cent), and health and nutrition (4 per cent). As we shall see later, the declining level of social spending—largely traceable to the overall fiscal bind—may be one reason why progress in MDG achievement has been insufficient to put the country on track to meet the targets by 2015.

Manasan (2007) provides estimates of the cost of achieving the various MDGs (Table 4.2). Her baseline estimate pertains to a *status quo* in terms of service delivery, called a “high cost” assumption. Improvements in service delivery and quality would enhance efficiency, which, if realized, would yield “low cost” estimates. A limitation of Manasan's calculations is that she assumes a simple linear relationship between changes in an MDG indicator

Figure 4.6  
Philippines: National government spending per capita, 1996-2006



Source: Manasan (2007).

and changes in public expenditure, while more likely the relationship is nonlinear in reality, owing to diminishing returns to the interventions (an issue described in more detail in Chapter 1).

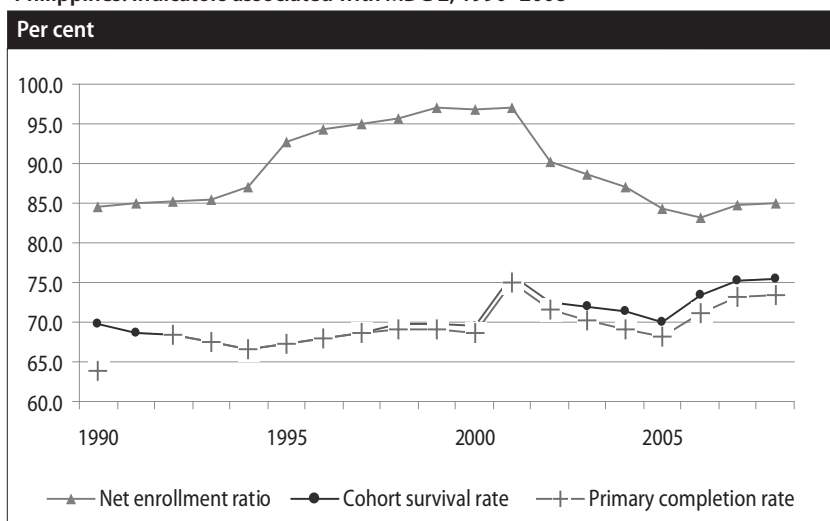
In the following review of MDG gaps, we focus on MDG 2 (education), MDG 4 (child mortality), MDG 5 (maternal mortality), MDG 7a (household potable water), and MDG 7b (household sanitation), as well as MDG 1, which pertains to income poverty. Projections for social MDGs are available from the application of MAMS, while income poverty will be analysed through a separate microsimulation module.

Table 4.2  
Philippines: Cost estimates for attaining education and health MDGs, 2007 and 2015

Millions of pesos				
MDG	Cost level	Item	2007	2015
Education	Low	Classrooms	14,179	17,690
		All other expenses	156,396	333,681
	High	Classrooms	17,724	22,113
		All other expenses	158,515	345,690
Health	Low		8,961	14,650
	High		10,448	17,521

Source: Manasan (2007).

Figure 4.7  
Philippines: Indicators associated with MDG 2, 1990–2008<sup>1</sup>



<sup>1</sup> Primary completion rate data were not available for 1991.

Source: NSCB; Economic Database, PIDS.

*Primary education* – In 1990s, the base year of the MDG framework, the primary completion rate was about 64 per cent. In 2006, it had increased to over 71 per cent, after peaking at 75 per cent in 2003 (Figure 4.7). By 2008, the completion rate was back up to 73 per cent, just below the peak level.

Likewise, the cohort survival rate at the primary level started out at 70 per cent and barely increased, reaching 75.4 per cent by 2008, just below the peak level of 76 per cent that was reached in 2001. The net enrolment rate, which is a good indicator of the “access” to basic education, started out at a high 85 per cent in 1990, increasing further to about 97 per cent by around 2000, before dropping sharply in subsequent years. According to the National Economic Development Authority, poverty, poor health, law and order problems, and child labour all combine to keep children out of school despite the availability of free public education (National Economic Development Authority, 2010). At the same time, underspending remains a problem despite the large resource allocation for education in the government budget.

*Child mortality* – Clear gains have also been made in reducing child mortality (Table 4.3). Both the infant mortality rate and the under-five mortality rate have fallen steeply, respectively, from 57 per 1,000 live births in 1990 to 25 in 2008 and from 80 in 1990 to 34 in 2008. Expanding the coverage of child health programs, particularly immunization programs,

Table 4.3  
Philippines: Indicators associated with MDGs 4 and 5, 1990–2008

	<i>Infant mortality (per 1,000 live births)</i>	<i>Under-five mortality (per 1,000 live births)</i>	<i>Maternal mortality (per 100,000 live births)</i>	<i>Births attended by trained professionals (per cent)</i>
1990	57	80	209	58.8
1991			203	59.7
1992			197	59.4
1993	34	54	191	60.0
1994			186	60.9
1995			180	62.7
1996				64.1
1997				65.0
1998	35	48	172	69.2
1999				69.5
2000				69.0
2001				69.1
2002				67.0
2003	29	40		60.0
2004				63.0
2005				63.7
2006			162	
2007				
2008	25	34		

*Source:* NSCB.

would accelerate progress to achieving the target of 26.7 child deaths per 1,000 live births by 2015.

*Maternal health* – Unfortunately, progress in reducing the maternal mortality rate has been very slow due in large part to a lag in the percentage of births attended by trained professionals. In many remote areas, childbirth is still assisted only by traditional birth attendants.

*Environmental sustainability* – The country has already achieved and surpassed the 2015 target of 83.8 per cent access to sanitary toilet facilities in 2004. The 2015 target of 86.5 per cent access to safe drinking water is likely to be achieved.

*Extreme poverty* – Official statistics on household incomes and expenditures are available only every three years starting in 1991. Table 4.4 presents these figures at the time this study was conducted.<sup>2</sup> Based on the official headcount ratio, nearly half of the population lived in poverty in 1991. By this measure, the poverty rate dropped to below one third in 2006.

Table 4.4  
Philippines: Poverty incidence by poverty line, 1991–2006

Per cent of the population			
Year	Official poverty line	Official food poverty line	PPP-adjusted \$1.25/day
1991	45.3	24.3	30.7
1994	40.6		28.1
1997	33.0	17.0	21.6
2000	33.0	15.8	22.5
2003	30.4	13.5	22.0
2006	32.9	14.6	22.6

**Sources:** Official poverty line and food line: NSCB (2009). [www.nscb.gov.ph/MDGs/index.asp](http://www.nscb.gov.ph/MDGs/index.asp) (accessed September 15, 2009); \$1.25/day line: <http://unstats.un.org/unsd/mdg/default.aspx> (accessed September 15, 2009).

Measured against the subsistence threshold (the food poverty line), poverty has dropped even more: from 24.3 to 14.6 per cent. The final column in Table 4.4 shows that poverty as measured by the international threshold of PPP-adjusted \$1.25 per day has also fallen as much as the official poverty headcount during 1991–2006.

Hence, the country expects to meet MDG 1 on the basis of past trends, and for this very reason the government has adopted somewhat more ambitious income poverty targets for the Philippine Development Plan.<sup>3</sup> Income poverty is generally thought to track overall economic growth rather closely. However, poverty incidence across measures registered an increase from 2003 to 2006 during an episode of fast growth. In fact, averaging over the two decades, the responsiveness of poverty to growth has been weak. Accelerating income poverty reduction, therefore, will require reducing income inequality and instituting policies that would help make economic growth more inclusive.

When extrapolating past trends, the Philippines is expected to meet most of its MDG targets, except for primary education and maternal health, where gaps are pronounced and could only be closed if additional policy efforts are made (Table 4.5). Given the more ambitious national targets for poverty reduction, achieving the income poverty MDG may also be a challenge.

Table 4.5  
**Philippines: MDG gaps—with respect to targets—  
 and likelihood of meeting targets at the national level**

<i>MDG Goals and Targets</i>	<i>Value at 2006 or nearest year</i>	<i>Target by 2015</i>	<i>Likelihood of meeting target</i>
<b>1. Eradicate extreme poverty and hunger</b>			
Subsistence incidence (per cent of population)	14.6	12.2	High
Prevalence of malnutrition, aged 0-5 (per cent of population)	26.2	17.2	High
Households with inadequate kcal intake (per cent of population)	56.9	34.7	High
<b>2. Achieve universal primary education</b>			
Elementary completion rate	73.3	81.0	Low
<b>3. Promote gender equality</b>			Achieved
<b>4. Reduce child mortality</b>			
Under 5-mortality rate (per 1,000 live births)	34.0	26.7	High
Infant mortality rate (per 1,000 live births)	25.0	19.0	High
<b>5. Improve maternal health</b>			
Maternal mortality ratio (per 100,000 live births)	162	52.2	Low
Couples practicing responsible parenthood (per cent)	51.0	80.0	Low
<b>6. Combat HIV/AIDS, and other diseases</b>			
HIV prevalence (per cent of population)	below 1 per cent	below 1 per cent	High
Malaria morbidity rate (per 100,000 population)	55.0	24.0	High
<b>7. Ensure environmental sustainability</b>			
Households with access to safe drinking water (per cent)	80.4 (2004)	86.8	Medium
Households with sanitary toilet (per cent)	86.2 (2004)	83.8	Achieved

Source: NEDA (2010).



Note that these extrapolations do not incorporate possible nonlinearities, such as when the marginal returns of MDG spending decline after an inflection point. The MAMS analysis does incorporate such nonlinear effects, hence it provides a means to validate and broaden the analysis based on linear extrapolation such as in Table 4.5. This will be taken up in the next section.

## POLICY SCENARIO ANALYSIS

### *Calibration with country-specific data*

The general structure and implementation of MAMS is described in Chapter 1. This section focuses on the calibration of the model to Philippine data and elasticities. A full account is provided in Briones and others (2011).

In order to calibrate the model, a Social Accounting Matrix (SAM) was constructed for 2006. Unlike most typical SAMs that have been built for the Philippines, the SAM constructed for this study disaggregates MDG-related services (education by cycle, health, water and sanitation) into private and public provisions. The Philippines' SAM for MAMS also accounts for institutional capital accounts and investment by sector of destination. To construct this, data from the following sources were used: the official input-output table of 2000, updated to 2006 using the RAS method which is most commonly applied to update the matrix of technical coefficients used in input-output analysis; the National Accounts of the Philippines for 2006; the Budget Expenditure and Sources of Financing (BESF) of the Department of Budget and Management; and the Philippine Statistical Yearbook (2008 edition).

Moreover, to calibrate MAMS, values of elasticities and/or parameters had to be obtained from: other country models for the Philippines, such as the PCGEM (Cororaton, 1997); imputation based on existing empirical literature for the Philippines (as shown further below) and other developing countries (as reported in Lofgren, 2010); calibration to reproduce observed values (particularly for the linear expenditure system); growth accounting (for measurement of Total Factor Productivity, TFP); and regression analysis by the authors (for estimating some of the TFP elasticities). As explained in Chapter 1, MAMS possesses an MDG module by means of which MDG indicators are estimated as a function of a series of MDG determinants. However, due to data limitations, microeconomic regression analysis could only be conducted for determinants of primary education outcomes as measured by passing and continuation to secondary rates associated with the construction of the MDG-2 indicator in MAMS.

A probit model was used to estimate the elasticities of passing rates and continuation to secondary school with respect to various determinants, using household-based data from the Multiple Indicator Cluster Survey. Table 4.6 summarizes the elasticity estimates for those determinants that are specific in the education module of MAMS. These elasticities, together with suggestions from the literature such as Orbeta and others (1999), are the basis for calibrating the MDG 2 production function in MAMS' MDG module. More detailed estimation results for education and assumptions made for other elasticities and/or parameters can be found in Briones and others (2011).

Except for the wage premium, parameter estimates in Table 4.6 were all found to be statistically significant in determining the likelihood of passing in each grade of primary school. Nevertheless, elasticities tend to be on the low side, which could be due to measurement errors related to inaccuracies in the proxy variables used to measure effects on educational outcomes. The measurement errors are traceable to insufficient or fragmentary data. More substantively, however, the low elasticities likely also reflect either weak contemporaneous effects of public spending on education outcomes, owing to poor quality of past service delivery and inadequate infrastructure.

### *Baseline scenario*

Once calibrated, MAMS was used to generate a baseline scenario that projects the functioning of the economy under the assumption of business

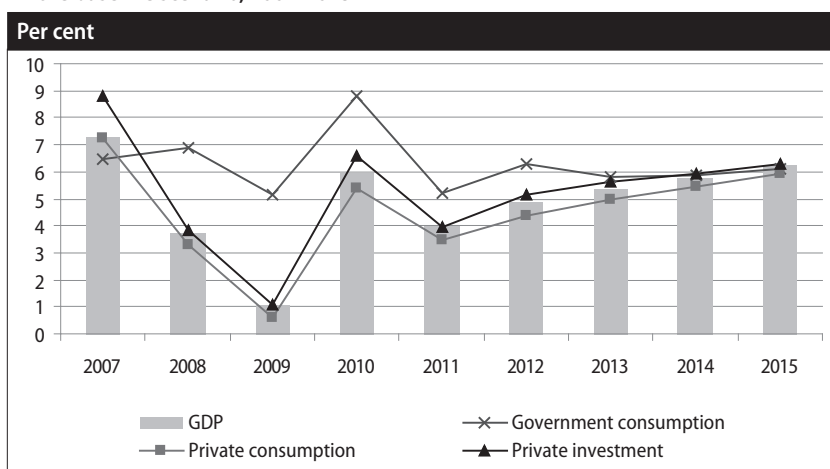
Table 4.6  
Philippines: Elasticity estimates for determinants of primary school completion and of continuation to secondary school

	<i>Passing rate (in each grade)</i>	<i>Continuation to secondary rate</i>
Public spending per student	0.03	0.00
Household purchasing power	0.16	0.03
Infrastructure index	0.21	0.01
Wage premium	-0.00	0.00
Under-5 mortality rate	0.06	0.04

**Sources:** Briones and others (2011).

as usual. This scenario serves two purposes: one is to gauge whether the MDGs would be achieved by 2015 under assumptions of continued trends and policies; the other is to define a benchmark against which results from alternative scenarios are compared. Figure 4.8 shows the baseline results for growth of GDP and its major components over the projection period 2006-15. GDP growth averages 5.0 per cent, taking a deep dip in 2009 because of the global financial crisis, but showing robust recovery after that. The domestic debt-to-GDP ratio declines by nearly 8 percentage points, while the public foreign debt-to-GDP ratio rises slightly between 2006 and 2015 (Figure 4.9). This is consistent with observed trends which show a shift from domestic to foreign borrowing, as well as declining debt-to-GDP ratio (36 to 32 per cent from 2006 to 2009). Overall, the debt-to-GDP ratio drops slightly from 61.8 to 56.7—still exceeding the 49.7 per cent benchmark, but at more sustainable debt levels compared to the present.

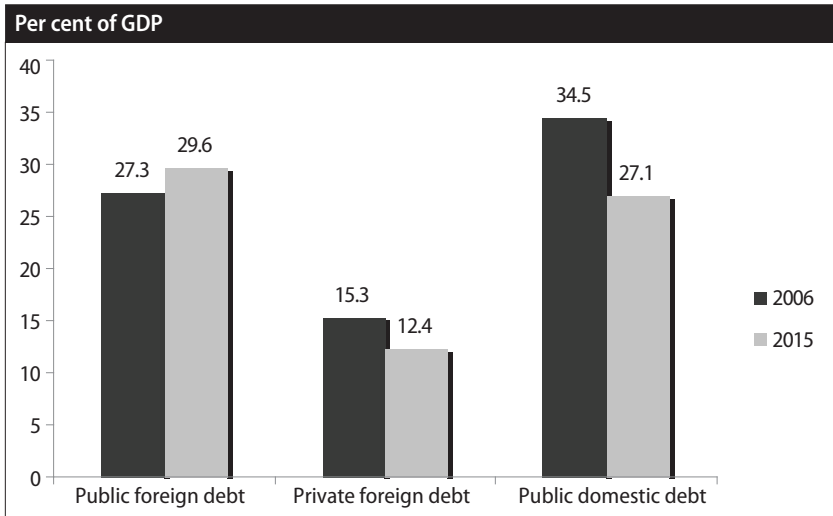
Figure 4.8  
Philippines: Annual growth of macroeconomic variables  
in the baseline scenario, 2007-2015



Source: Authors' estimates based on application of MAMS for the Philippines.

The baseline scenario for measuring progress towards the MDGs is shown in Figure 4.10. By 2015, the target would be met for MDGs 7a and 7b. It would also be met for MDG 4 and shows minor shortfalls for MDG 5. Progress towards MDG 2 would fall well short of the target, however. Accordingly, a set of scenarios were simulated to estimate the cost of achieving the education and health goals by 2015.

Figure 4.9  
**Philippines: Debt stocks in the base year and 2015 (per cent of GDP)**



**Source:** Authors' estimates based on application of MAMS for the Philippines.

Figure 4.10  
**Philippines: MDG indicators<sup>1</sup> in the baseline scenario, 2006-2015**



**1** MDG 2: net primary completion rate (in per cent); MDG 4: under-five mortality rate (per 1,000 live births); MDG 5: maternal mortality rate (100,000 live births); MDG 7a: share of households with access to sanitary toilet (in per cent); MDG 7b: share of households with access to potable water (in per cent).

**Source:** Authors' estimates based on application of MAMS for the Philippines.

*MDG scenarios*

In this section, we focus on two sets of MDG scenarios. The first set (mdg2) targets only the MDG gap for education where the gap to target is biggest. The second set (mdg245) targets achieving all relevant social MDGs that are not fully achieved in the baseline scenario (namely, MDGs 2, 4, and 5). Within each set, four financing options are evaluated, namely: foreign transfers (ftr), domestic taxes (tax), foreign borrowing (fb) and domestic borrowing (db).

Depending on the financing mechanism, the government would have to increase MDG-related spending by 6.3 to 7.4 per cent of GDP per year in order to close the gaps in primary education and child and maternal mortality by 2015 (Table 4.7). This estimation accounts for what the government should have spent since 2007. Most of the additional spending requirement would be for education expenditures (that is, teacher salaries and other inputs). Financing through taxation or domestic borrowing is relatively more costly as they crowd out private spending—on education and health services—that, in turn, needs to be compensated by more

Table 4.7  
Philippines: Additional annual public spending required to close social MDG gaps—relative to the baseline scenario

Per cent of GDP												
	(a) 2010-2015				(b) 2007-2009				(c) = (b) + (a) 2010-2015			
	ftr	tax	fb	Db	ftr	tax	fb	db	Ftr	tax	fb	db
Healthcare	0.51	0.79	0.51	1.09	0.31	0.64	0.31	0.33	0.82	1.42	0.82	1.42
current	0.50	0.78	0.50	1.04	0.30	0.61	0.30	0.33	0.80	1.39	0.80	1.37
investment	0.02	0.01	0.02	0.04	0.00	0.03	0.00	0.01	0.02	0.04	0.02	0.05
Education	2.43	2.67	2.43	2.66	3.05	3.32	3.05	3.09	5.48	5.99	5.48	5.75
current	2.33	2.55	2.33	2.55	2.46	2.68	2.46	2.49	4.79	5.23	4.79	5.04
investment	0.10	0.12	0.10	0.11	0.59	0.64	0.59	0.60	0.69	0.75	0.69	0.72
Total	2.94	3.46	2.94	3.75	3.35	3.96	3.35	3.43	6.30	7.41	6.30	7.17
current	2.83	3.33	2.83	3.59	2.76	3.29	2.76	2.82	5.59	6.62	5.59	6.41
investment	0.12	0.13	0.12	0.16	0.59	0.66	0.59	0.61	0.71	0.79	0.71	0.76

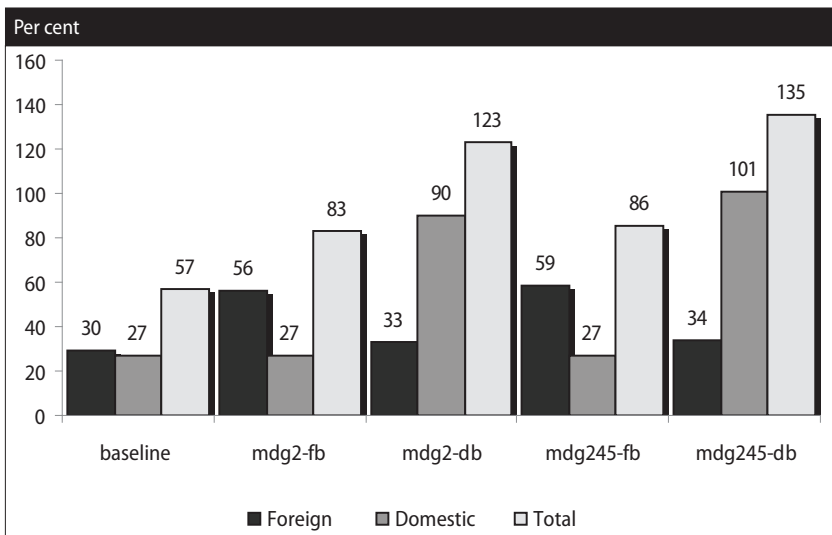
Source: Authors' estimates based on application of MAMS for the Philippines.

government spending. However, it is only under the domestic borrowing scenario that annual GDP growth is slower than that of the baseline (on average by -0.6 and -1.6 percentage points under *mdg2* and *mdg245* scenarios, respectively) owing to crowding out of private investment. GDP growth is only marginally higher in the other MDG scenarios, however, as gains from health and education improvements would be expected to translate into productivity growth in the medium to longer run.

Under debt financing options, the feasibility of the MDG scenarios can be evaluated by the debt-to-GDP ratios by 2015 (Figure 4.11). Consider foreign borrowing: to close the MDG 2 gap, total public debt would increase by an additional 26 per cent of GDP by 2015 compared with the baseline, and by up to 29 per cent of GDP to close all the MDG gaps. The overall debt-to-GDP ratio would climb to between 83 to 86 per cent when achievement of the three goals is targeted, up from 57 per cent projected for 2015 in the baseline, raising questions about debt sustainability.

The increase in public debt indebtedness is even greater in the domestic borrowing scenario, given dynamics between additional domestic borrowing, increased debt servicing burden and growth costs of crowding out of private investment. From 27 per cent of GDP at the baseline scenario, the domestic debt stock would need to rise to 90 per cent of GDP to close

Figure 4.11:  
Philippines: Debt-to-GDP ratios in the baseline and MDG scenarios with domestic and foreign borrowing

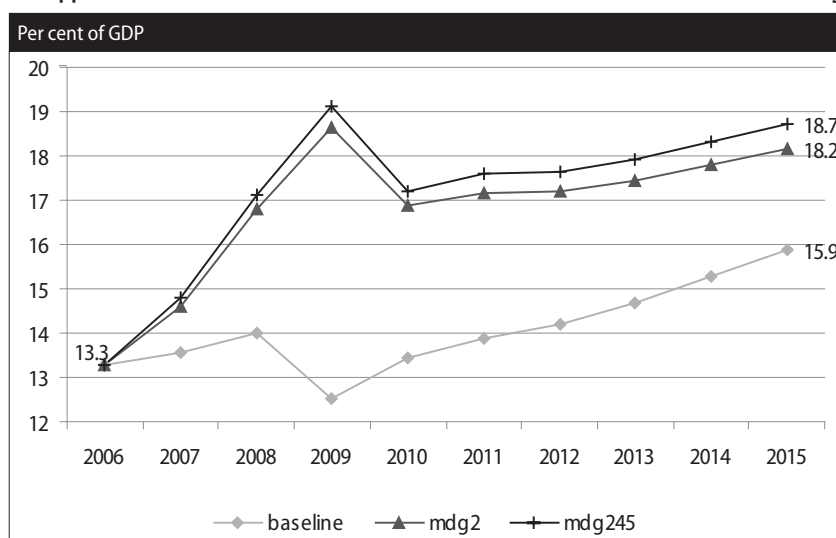


Source: Authors' estimates based on application of MAMS for the Philippines.

the MDG 2 gap, and about the size of GDP to close all the gaps. The resulting levels of total debt stock—between 113 and 135 per cent of GDP—should be considered unsustainable.

Government revenues as a share of GDP are shown in Figure 4.12 for the baseline and tax-financing scenarios. For the baseline, tax income rises from about 13 to about 15 per cent of GDP over the projection period. However the increase in tax effort is faster for the MDG 2 target, rising over 18 per cent of GDP by 2015. Moreover, the projected increase in tax effort up to 2009 is fairly sharp (owing to the need to frontload spending so as to ensure timely enrolment of all boys and girls in order to achieve the target for primary school completion by 2015).

Figure 4.12  
Philippines: Government revenue in the baseline and MDG scenarios with tax financing



Source: Authors' estimates based on application of MAMS for the Philippines.

The fact that actual tax collection over the period 2006-2009 was far lower than the projected requirement suggests the tax-financing option is challenging for the Philippines. Trends are nearly the same when targeting the three MDGs simultaneously, except that, logically, the required tax effort is higher. On average, the projected tax burden is 14.1 per cent of GDP in the baseline, compared to 16.8 per cent when MDG 2 is targeted, and 17.2 per cent when all three MDGs are targeted. In these simulations, additional spending is assumed to be financed by increasing the direct tax

rate. Direct tax revenue averages 6.4 per cent of GDP over the baseline simulation period, while it would need to increase to an average of 9.2 per cent to finance achievement of MDG 2 and to 9.6 per cent in order to finance spending requirements for achieving MDGs 2, 4 and 5.

In summary, under business as usual, there remains a major gap in achievement of MDG 2, a minor one for MDG 5, with MDG 4 close to being achieved and the targets for water and sanitation easily met. Closing all gaps, however, would require substantial increases in government spending, particularly on education. Financing through domestic borrowing would lead to alarming levels of domestic government debt. Similarly, under foreign borrowing, MDG achievement implies dangerous levels of foreign debt.

#### ANALYSIS OF THE MICROSIMULATION RESULTS FOR POVERTY AND INEQUALITY

This section presents the results for progress towards the poverty reduction target after applying the microsimulation approach to Philippine data. The labour market outcomes of the various policy scenarios simulated with MAMS were imposed on micro level data as provided by the Family Income and Expenditure Survey (FIES) of 2006 and the contemporaneous Labor Force Survey (LFS).

##### *Baseline scenario*

The results presented in Table 4.8 suggest that the MDG 1 target of 12.2 per cent for extreme poverty (based on the subsistence poverty line) would not be reached under the baseline scenario. This is despite the fact that not much additional poverty reduction is required, since subsistence poverty had already fallen to 14.4 per cent by 2006. Instead, the microsimulation results show that, between 2006 and 2010, extreme poverty would have increased with the economic downturn caused by the global financial crisis. The trend towards poverty reduction resumes again during the (projected) subsequent recovery.

Similar trends are observed in other poverty measures (Table 4.8). The poverty incidence based on official poverty line and the \$1.25 and \$2.00 per day poverty lines (PPP-adjusted) increases slightly before returning close to the level of the base year. Income inequality, whether measured by the Gini ratio or the Theil index, worsens.



Table 4.8  
**Philippines: Poverty incidence by poverty line and inequality indices<sup>1</sup>**  
**for the baseline scenario**

	<i>Poverty incidence (per cent of population)</i>				<i>Gini</i>	<i>Theil</i>
	<i>Official poverty line</i>	<i>Official food poverty line</i>	<i>\$1.25/day line</i>	<i>\$2/day line</i>		
<b>2006</b>	31.4	14.4	17.9	48.7		
<b>2010</b>	32.7	15.4	19.0	49.9	0.498	0.483
<b>2015</b>	31.3	14.7	18.1	48.6	0.500	0.485

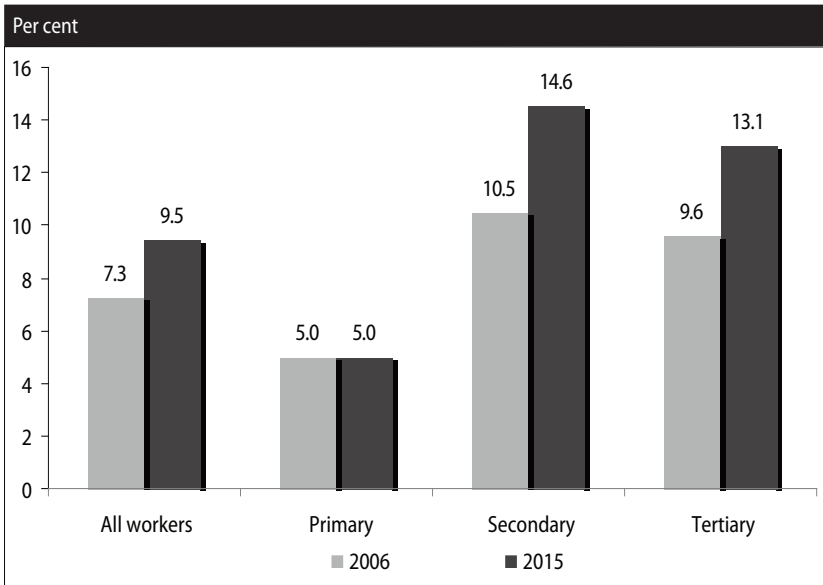
<sup>1</sup> Based on household income per capita data.

**Source:** Authors' estimates based on application of MAMS for the Philippines and the microsimulation methodology drawing data from FIES and LFS.

The rise in inequality and poverty—despite income growth—is due to the simulated changes in the labour market. The projected unemployment rate holds steady at 5.0 per cent for workers that have completed primary school in the baseline, but rises dramatically for secondary and tertiary school graduates (Figure 4.13). As a result, unemployment for all workers increases from 7.3 to 9.5 per cent between 2006 and 2015. Although not shown in Figure 4.13, the increase is strongest during 2008-2010. Wages increase for unskilled workers (by less than 1 per cent), but because of excess supply decline for workers with secondary and tertiary education (respectively, by -0.8 and -1.1 per cent). Overall, the simulated changes in employment and wages cause per capita household income to fall, mainly as a result of the worsening conditions for workers with secondary and tertiary education, especially during the 2008-2010 crisis. This also explains the aggregate outcome for poverty.

The increase in the number of better-educated workers is a product of rapid population growth and a continued emphasis on secondary and tertiary educational attainment. Although it does not account for the extent to which overseas migration may be an outlet for educated workers, the projection puts a spotlight on the economy's failure to create jobs requiring more human capital. It also confirms a tendency toward "over-education" in the Philippine labour market (Asian Development Bank, 2007). As the educational qualifications of workers in the same job and skill set rise over time, actual returns decline. The next section examines how an MDG strategy—of the sort modelled here—would help to solve this structural constraint and contribute to reducing poverty.

Figure 4.13  
**Philippines: Unemployment rate by category of worker  
 under the baseline scenario, 2006 and 2015**



*Source:* Authors' estimates based on application of MAMS for the Philippines.

### *Alternative scenarios for MDG achievement*

We now examine alternate scenarios for closing the MDG gaps in primary education and mortality rates on income poverty. When domestic borrowing is used to finance additional MDG spending (compare Tables 4.8 and 4.9), poverty worsens towards the end of the simulation period compared to the baseline scenario, and the increase in moderate poverty is sharper than for extreme poverty. For the other options, poverty declines compared to the baseline scenario. The tax-financing option produces the biggest declines: moderate poverty falls by 2.2 percentage points and extreme poverty drops noticeably.

Under most financing options, the additional government spending targeted at closing the MDG gaps improves overall employment prospects compared to the baseline. Notably, the biggest reduction in unemployment is for workers with tertiary schooling. Under domestic borrowing, whether the target is MDG 2 only or all the social MDGs, unemployment prospects are somewhat dimmer, with workers with secondary schooling taking the biggest hit. (As explained earlier, GDP growth is less under the domestic

Table 4.9

**Philippines: Poverty incidence measured against the official poverty lines under the MDG scenarios, 2006, 2010 and 2015**

Per cent of the population				
<i>MDG scenario</i>	<i>Poverty line</i>	<i>2006</i>	<i>2010</i>	<i>2015</i>
<b>mdg2-tax</b>	Extreme	14.4	14.1	13.7
	Moderate	31.4	30.5	29.5
<b>mdg2-db</b>	Extreme	14.4	15.1	16.5
	Moderate	31.4	31.7	33.7
<b>mdg2-ftr</b>	Extreme	14.4	14.2	13.7
	Moderate	31.4	30.5	29.6
<b>mdg2-fb</b>	Extreme	14.4	14.2	13.7
	Moderate	31.4	30.5	29.6
<b>mdg245-tax</b>	Extreme	14.4	14.1	13.5
	Moderate	31.4	30.3	29.2
<b>mdg245-db</b>	Extreme	14.4	15.1	16.7
	Moderate	31.4	31.6	33.8
<b>mdg245-ftr</b>	Extreme	14.4	14.1	13.6
	Moderate	31.4	30.5	29.4
<b>mdg245-fb</b>	Extreme	14.4	14.1	13.6
	Moderate	31.4	30.5	29.4

*Source:* Authors' estimates based on application of MAMS for the Philippines and the microsimulation approach drawing data from FIES and LFS.

borrowing because private investment is crowded out and as a result workers are laid off.) Employment and wages do not grow as much as they do under the tax-financing scenario because the inflow of foreign exchange triggers a real exchange rate appreciation that penalizes labour-intensive export sectors.

Although incomes are more evenly distributed than under the baseline scenario, inequality still increases under the various MDG scenarios, regardless of which goal is targeted, financing option, or inequality indicator (compare Tables 4.8 and 4.10). Nevertheless, despite the worsening income distribution, poverty is projected to fall under the MDG scenarios by slightly more than under business as usual. This is likely attributable to the increase in real labour incomes triggered by MDG targeting strategy that addresses the structural issue of “over-education” as discussed above.

Table 4.10  
Philippines: Inequality indices under the MDG scenarios,<sup>1</sup> 2006-2015

Per cent of the population				
MDG scenario	Index	2006	2010	2015
mdg2-tax	Gini	0.496	0.502	0.505
	Theil	0.479	0.487	0.491
mdg2-db	Gini	0.496	0.502	0.504
	Theil	0.479	0.489	0.494
mdg2-ftp	Gini	0.496	0.502	0.504
	Theil	0.479	0.486	0.490
mdg2-fb	Gini	0.496	0.502	0.504
	Theil	0.479	0.486	0.490
mdg245-tax	Gini	0.496	0.502	0.504
	Theil	0.479	0.486	0.490
mdg245-db	Gini	0.496	0.502	0.505
	Theil	0.479	0.487	0.492
mdg245-ftp	Gini	0.496	0.502	0.504
	Theil	0.479	0.486	0.491
mdg245-fb	Gini	0.496	0.502	0.504
	Theil	0.479	0.486	0.491

<sup>1</sup> Based on household income per capita.

**Source:** Authors' estimates based on the application of MAMS for the Philippines and the microsimulation approach drawing data from FIES and LFS.

## CONCLUSIONS AND POLICY RECOMMENDATIONS

The Philippines has committed itself to a development strategy aimed at attaining the MDGs. However, prospects are mixed, based on official and largely qualitative assessments. The MDGs for the environment, child mortality and extreme poverty are likely to be achieved. Under a continuation of current policies, however, the MDGs for moderate poverty, education, and maternal mortality are unlikely to be met by 2015.

Development and policy literature has proposed a number of reforms in policy, investment, institutions, and governance that are needed to translate MDG expenditure into achievement; the National Economic Development Authority deals fairly extensively with such quality and service improvements (National Economic Development Authority, 2010). Even with these reforms, however, a substantial increase in public spending is

required to close the MDG gaps. Hence, a critical element in medium-term development planning is a more quantitative assessment of the financing requirements and the fiscal implications of expanded MDG programs, one that also accounts for second-order and dynamic effects.

This chapter has presented such a quantitative assessment using a policy-modelling tool called MAMS applied to Philippine data and elasticities. Under the baseline or business-as-usual scenario, macroeconomic trends persist over the duration of the projection period, and the fiscal situation, while worrisome, is not dire. Per capita income growth fails to translate into poverty reduction, as the economy fails to create higher paying jobs (for better-educated workers) fast enough. Under this scenario, the targets for increasing access to water and sanitation are attained, while the health MDGs are within grasp. The poverty and education MDGs, however, would remain elusive. Poverty reduction is greater when more government spending is targeted towards achievement the goals for education and health in the MDG scenarios, although the target for extreme poverty is not met. More gains likely will take effect over the longer run when improved education and health conditions may support higher productivity growth. However, it is critical that additional policies are put in place to encourage the creation of jobs requiring higher skills to match labour demand with an increasingly educated work force.

The MDG scenarios suggest that closing the gaps for social indicators would require substantial increases in government spending, particularly for education services, in the range of 6.3 to 7.4 per cent of GDP per year, depending on the financing mechanism. Debt financing either by domestic or foreign borrowing would likely lead to unsustainable levels of public debt. Financing through foreign transfers is more consistent with debt sustainability criteria, but may not be a realistic option given recent trends in ODA flows to the Philippines. Tax financing of the MDG strategy would also be consistent with debt sustainability objectives, but require increasing direct tax revenue by between 3 and 4 per cent of GDP. Given past levels of the total tax burden, such an increase should not be inconceivable, but likely will be challenging given weak tax collection efforts of the past decade. The current government's efforts to improve tax collection are laudable, but in order to achieve the required levels of government revenue additional tax measures may need to be taken.

## NOTES

- 1 The methodological framework is explained in detail in Chapter 1 of this volume.
- 2 By early 2011, the country had adopted a new set of poverty lines leading to revisions in official figures which are not reflected here.
- 3 Based on new official figures, the target would be to reduce moderate poverty by 51.4 per cent from 1991 to 2015 (that is, to 16.1 per cent down from 33.1 per cent).

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# Chapter 5

## Senegal

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ABDOULAYE DIAGNE, FRANÇOIS JOSEPH CABRAL, ANNE-SOPHIE  
ROBILLIARD AND FATOU CISSÉ

### INTRODUCTION

Senegal faces daunting policy challenges if it is to meet the millennium development goals (MDGs). The country's economic and social developments to a large extent resemble those of other West African economies. In the 1970s, GDP growth closely tracked the average for all sub-Saharan African countries. Growth started to decelerate progressively in 1979 due to a sharp deterioration of the countries' terms of trade. The depreciation of the dollar against the French franc, to which the Senegalese CFA franc is pegged under a fixed exchange rate regime, significantly reduced the competitiveness of Senegal's exports. The world market prices for groundnut oil and phosphates, the two main export products, also declined steadily, widening the trade deficit and narrowing foreign reserves. High wages (in both the public and the private sector) and taxation, and other distortions in the business environment also affected the competitiveness of the private sector. The monetary situation rapidly worsened as a result of capital flight and the monetization of deficits. It was only through the relaxation of fiscal discipline that the government was able to better contain the social and political tensions. The vicious circle that stalled the Senegalese economy was halted in January 1994 with the nominal devaluation of the CFA franc. This marked the beginning of a second period in Senegal's economic and social development.

The creation of the West African Economic and Monetary Union (WAEMU) in 1994 had a major impact on the state budget through the introduction of a common external tariff, the harmonization of the value-



added tax (VAT), and the establishment of macroeconomic management standards to accelerate the economic convergence of members of the Union. The recovery of economic growth and the return of capital and foreign aid significantly improved the conditions for macroeconomic management, but had no notable impact on development. It was not until the adoption of the MDG agenda in the early 2000s that Senegal's policy shifted in favour of social sectors that had largely been neglected.

The aim was to achieve macroeconomic stability while implementing policies to eradicate extreme poverty and hunger, promote universal access to basic education and the quality of primary care to reduce child and maternal mortality, encourage gender equality and empowerment of women, and ensure access to safe drinking water and basic sanitation. The new policies were also expected to reduce the deleterious effects of internal and external shocks on the economy and vulnerable groups. All these new policies have been placed in the context of the poverty reduction strategy from the early 2000s. In spite of progress in various social areas covered by the MDGs, economic growth remains slow, irregular and not pro-poor (Cabral, 2010), and the expectation is that with unchanged trends of past achievement the country would not meet most MDG targets by 2015 (République du Senegal, 2006).

The purpose of this chapter is to assess the macroeconomic feasibility of achieving the MDGs in Senegal. Three questions will be addressed: first, what is the trajectory of the Senegalese economy under current policies and are these policies sufficient to achieve the MDGs by 2015? Second, what amount of public spending is needed to achieve the MDGs? Third, what are the best options for financing additional public spending and what are the macroeconomic trade-offs associated with these options? Rigorous answers to these questions are sought through the application of an economy-wide model framework known as MAMS (see Chapter 1), by means of which various scenarios were simulated and their results scrutinized.

The remainder of this chapter is organized as follows. The next section describes the main reforms and macroeconomic policies adopted under the poverty reduction strategy and also as part of efforts to enhance economic performance. The third section describes the main social policies implemented by the government over the past two decades, and the resulting trends in terms of poverty, inequality, and MDG achievement. A fourth section presents the scenario analysis based on MAMS and, subsequently, the final section concludes and makes some policy recommendations.

REFORMS, MACROECONOMIC POLICY, ECONOMIC PERFORMANCE  
AND VULNERABILITIES

*Economic reforms and policies*

Reforms and economic policies implemented during the period 1990-2008 represent a continuation of economic adjustment reforms initiated since 1985 and supplemented by a monetary adjustment in 1994. Policies have focused on economic growth, but also poverty reduction and the MDG agenda.

The so-called “Emergency Plan” (a reduction of public sector salaries and increases in import tariffs and the price of petroleum products) was adopted to reduce macroeconomic imbalances in 1992 and 1993. By and large, however, the plan was not enough to restore the health of public finances. At the same time, the real exchange rate appreciated substantially, hampering the competitiveness of the economy. All these factors, which seemed to be typical of most WAEMU countries, triggered the devaluation of the CFA franc by 50 per cent in 1994.

The devaluation seemed in line with the main objective of the government’s new strategy to improve the competitiveness of the economy, but it raised concerns about adverse social effects. The adjustment programmes and market reforms, supported by the International Monetary Fund (IMF), sought to create better conditions for sustained growth. The economy was liberalized, the size of the public sector was reduced, private sector development was promoted, and inflation was to be controlled. The Poverty Reduction Strategy Program (PRSP), adopted in December 2001, underpinned policy making during much of the 2000s.

The government’s Accelerated Growth Strategy (AGS) seeks to better capitalize on growth opportunities from international trade. A complement to the PRSP framework, it was the result of a participatory approach to design and implement economic policies that emphasize competitiveness. The Millennium Challenge Account (MCA) agenda is also in line with policy objectives of the AGS and the PRSP and relies on two main strategies: creating a favourable business environment and improving infrastructures that would promote private investment.

In response to the surge in world grain prices in 2008, the Great Agricultural Offensive for Food and Abundance (GOANA) was launched to promote agricultural production and ensure coherence in agricultural policy and programmes. GOANA and the national program of food security (PNASA) were designed to complement the PRSP and the AGS.

### *Economic growth*

Despite the structural reforms undertaken during the 1980s, GDP growth was only 2.9 per cent per year in the period between 1985 and 1991, and income growth barely outpaced population growth (2.4 per cent). The decline in grain production and economic activity in an industrial sector hit hard by tariff reductions exacerbated the budget deficit and current account imbalances during the following two years. With the currency adjustment of 1994, however, GDP started to grow incrementally, from 2.9 per cent in 1994, to 4.8 and then 5.5 per cent in 1995 and 2000, respectively.

After 2000, GDP growth was at times robust but also relatively unstable due to climate and energy shocks in 2002, 2006 and 2008 (Table 5.1). Overall, GDP growth has not kept pace with population growth, making efforts to reduce poverty less effective.

### *Driving factors of growth*

Industry and services have been the main engines of growth (Table 5.1). On the demand side, final consumption, influenced to a large extent by relatively high wages, represented almost 93 per cent of GDP in 2008, leaving a low domestic savings rate. Investment demand has substantially contributed to GDP growth since the early 1990s, as a result of strong public investment efforts which averaged about 10 per cent of GDP during 2001-2008 (up from 5.3 per cent during 1990-2000). In view of the low domestic savings rate, investment financing has relied heavily on foreign savings. The share of exports in GDP declined during much of the 2000s, while the import share increased substantially.

### *Fiscal stance and debt*

During the period 2000-2008, the budget deficit exceeded 3 per cent of GDP. Measures to control public spending, particularly salaries and other current expenditures, were initially an important component of enhanced fiscal discipline. Tax revenues rose sharply after 2005 following measures to broaden the tax base and modernize the tax administration. Nonetheless, the level of tax revenue has never reached 20 per cent of GDP and remains somewhat low (Table 5.1).

Helped by the improvement of Senegal's fiscal stance, public debt decreased from 78.6 per cent in 2000 to 34.8 per cent in 2010 (République

Table 5.1  
Senegal: Selected macroeconomic indicators, 2001–2008

	2001	2002	2003	2004	2005	2006	2007	2008
Real GDP growth (per cent)	4.6	0.7	6.7	5.8	5.3	2.3	4.7	2.5
<b>GDP Share (per cent)</b>								
Primary sector	16.3	13.6	15.1	13.7	14.6	13.0	11.8	13.0
Agriculture	9.3	6.8	8.3	7.2	8.1	6.6	5.2	6.7
Secondary sector	21.7	22.3	21.4	21.7	20.5	20.1	20.3	21.1
Tertiary sector	43.8	44.9	44.7	45.8	45.4	46.6	47.4	46.3
Public administration	18.2	19.1	18.8	18.8	19.4	20.4	20.6	19.6
<b>Investment, savings and consumption (per cent of GDP)</b>								
Investment rate	18.4	17.2	22.3	21.6	24.5	24.8	26.4	27.6
Domestic saving rate	9.4	6.8	10.2	9.0	9.1	7.4	6.4	7.4
Public	3.1	6.0	5.8	6.4	6.4	3.7	4.9	4.0
Private	6.3	0.8	4.4	2.6	2.7	3.7	1.5	3.4
Gross national saving rate	13.4	11.2	15.9	15.2	16.7	15.6	17.2	17.6
Final consumption	90.6	93.2	89.8	91.0	90.9	92.6	93.6	92.6
<b>Public finances (per cent of GDP)</b>								
Tax revenue	16.1	16.9	17.1	17.4	18.5	18.8	19.3	18.3
Expenditure	20.8	20.1	21.6	23.3	24.0	27.2	26.5	26.3
Fiscal balance	-1.2	1.8	0.5	-0.2	-0.3	-4.4	-2.3	-2.2
<b>External sector (per cent of GDP)</b>								
Exports	28.7	28.5	26.6	27.1	27.0	25.6	23.2	28.4
Imports	37.8	39.0	38.7	39.8	42.4	43.1	43.2	48.5
Current account balance	-5.0	-6.0	-6.4	-6.4	-7.8	-9.2	-11.6	-14.2

Source: République du Sénégal (2010a).

du Sénégal, 2010c). Since 2005, external financing of budget deficits has become less important. During this period, the government implemented large-scale public investment projects utilizing domestic resource mobilization instead of donor funding. Even so, aid provided in the form of budget support increased sharply between 2006 and 2008 and averaged slightly over 4 per cent of GDP in 2009 (République du Sénégal, 2010c).

### Terms of trade shocks

Internal and external shocks are typically reflected in unstable terms of trade. Agricultural output is frequently hurt by poor rainfall. The external terms of trade fluctuate with the volatile world market prices of the country's key export products (phosphate, peanut oil). Senegal's economy is

further highly vulnerable to contractions in global demand and exchange rate movements between the United States dollar and the euro. A dollar depreciation tends to result in a real exchange appreciation in Senegal (Diagne and Daffé, 2009). The global financial crisis of 2008-2009 resulted in a contraction of Senegal's economic activity that was mainly transmitted through reductions in export demand and migrant remittances.

## SOCIAL POLICY, INEQUALITY, POVERTY AND MDG ACHIEVEMENT

### *Public spending*

Total government expenditure (plus net lending) increased from 497.9 to 1,578.2 billion CFA francs between 1996 and 2007, which corresponds to an average annual growth rate of 10.3 per cent. This strong positive growth is mostly explained by increased capital expenditures. The relative share of capital expenditures in the budget has fluctuated between one third and one quarter of total spending. Current expenditures averaged nearly 60 per cent of total spending during the period 1996-2008 and were mainly composed of wage payments to public employees and, more recently, subsidies to energy producers and households to help these cope with rising prices of primary commodities.

The share of the budget allocated to education spending has fluctuated between a low of 20 per cent during the biennium 2000-2001 and a high of 29 per cent in 2004. Public health spending was increased to close to the target level of 10 per cent of total spending. The government has set this target in pursuit of achieving the health-related MDGs.

### *MDG progress and challenges*

A number of studies have been carried out to analyze the trends of MDG indicators in Senegal and the probability of achieving each of the targets by 2015. Based on MDG reports for 2007 and 2010 (République du Sénégal, 2006, 2007, 2010b), MDG indicators for 2009 and 2010, and a linear projection of past trends, the targets for child mortality and access to drinking water of the population are likely to be achieved (Table 5.2).

The target of halving the share of the population living under the poverty line will unlikely be met. The fact that poverty incidence decreased 17 percentage points between 1994/1995 and 2005 signals important progress. However, a further reduction of similar magnitude would need to be

achieved between 2005 and 2015 in order to meet the target. This seems challenging considering the relatively slow pace of output growth and jobs creation during the 2000s.

Senegal has been implementing an ambitious educational and training program since 2000 (Plan Décennal pour l'Éducation et la Formation, PDEF). This has boosted fiscal resources for the educational sector. The quality of education has been enhanced, not only through the increased supply of education services but also through investments in other areas. These include the electrification of 1,233 rural schools (République du Sénégal, 2010b) and new roads that have reduced the time it takes for pupils to reach schools. As a result, the net completion rate in primary education has increased from 53.4 per cent in 2005 to 59.6 per cent in 2009. Improvements in the three five-year periods to 2005 were even more marked (Table 5.2). Without boosting the fiscal efforts, however, this progress will not be sufficient to achieve a national target of 90 per cent for MDG 2 by 2015.

Table 5.2  
Senegal: Current (1990-2010) and target values (2015) of the MDGs

	1990	2005	2009 or 2010	Target	Probability of achieving target <sup>1</sup>
MDG 1 - Poverty headcount (per cent of population)	68.0	50.8	n.a.	34.0	Low
MDG 2 - Primary completion rate (per cent of age cohort)	24.0	53.4	59.6	90.0	Low
MDG 4 - Under-five mortality rate (per 1,000 live births)	131.4	121.0	85.0	43.8	High
MDG 5 - Maternal mortality rate (per 100,000 live births)	510.0	401.0	370.0	127.0	Low
MDG 7a - Access to drinking water (per cent of population)	56.0	76.6	84.8	90.1	High
MDG 7b - Access to sanitation (per cent of population)	25.8	41.0	43.5	70.1	Low

<sup>1</sup> The probability of achieving target is taken from the 2007 MDG report and it was updated using the 2010 report and an analysis of recent trends.

**Source:** République du Sénégal (2006, 2007 and 2010b).

Progress achieved under several public health programmes has led to significant decreases in the under-five mortality rate in Senegal. The share of children aged 11 months or less who have been vaccinated doubled to 80 per cent between 2000 and 2008. Vaccination programmes have also incrementally covered other age cohorts. The number of children covered by nutritional status surveillance has increased from 112,000 in 2005 to

418,000 in 2008. Together these efforts have led to a significant decrease in the under-five mortality rate from 131.4 per 1,000 live births in 1990 to 121.0 in 2005, according to the Demographic and Health Survey (EDS-4). In recent years, progress has been faster—the under-five mortality rate was estimated at 85.0 per 1,000 live births in 2009 (République du Sénégal, 2010b, 2006). A linear continuation of this trend would mean that MDG 4 could be achieved by 2015.

Regarding maternal mortality, the government has increasingly sought to reinforce the supply and the quality of maternal and reproductive health services. The proportion of deliveries attended by skilled health personnel rose from 49 per cent in 1999 to 66.9 per cent in 2009. The ratio of neonatal consultations has also increased significantly, reaching 94.7 per cent in 2009, up from 88 per cent in 2008 (République du Sénégal, 2010b). The quality of child delivery services has improved and a larger number of women are having access to C sections free of charge. As a result, the maternal mortality rate decreased from 510 deaths per 100,000 live births in 1992 to 370 deaths in 2010 (Table 5.2). However, reaching the target of 127 deaths in 2015 seems unlikely with the current level of policy efforts.

As a result of implementing the “Drinking Water and Sanitation Program Goals” programme (PEPAM), access to drinking water has climbed to 85 per cent of the population, nearly 29 percentage points since 1990 (Table 5.2). The goals may have already been achieved in the urban areas, but the rate of access to drinking water still lags in rural areas (République du Sénégal, 2010b). The government is now targeting rural areas through PEPAM, making it likely that the water access target is achievable by 2015. Regarding access to basic sanitation, however, it will be difficult to reach the target of 70.1 per cent without additional efforts, given that present coverage is at 43.5 per cent. Accelerated progress would require additional fundraising to enable PEPAM to step up implementation.

Achieving all MDGs will entail significant additional spending for improving access and the quality of services in education and health, as discussed above. Investing in agricultural development would seem to have the greatest potential for accelerated poverty reduction in the Senegalese context. Furthermore, specific policies should be put in place to remove or limit the impact of a variety of risks which could hamper MDG achievement. In particular, these policies should try to mitigate: (i) risks related to exogenous shocks that may affect the macroeconomic targets and the absorptive capacity of aid provided in the form of budget support, (ii) natural hazards, such as droughts and heavy rainfalls affecting agricultural production, (iii) the risks of locust aggression, (iv) risks related

to international price volatility, including that of oil prices, (vi) political and institutional risks, which can directly hamper the execution of capital expenditure plans.

## ACHIEVING THE MDGs UNDER VARIOUS SCENARIOS

### *Calibration of MAMS with Senegalese data*

In order to determine additional public spending required to close the MDG gaps in primary education, mortality, and water and sanitation, a scenario analysis was performed using MAMS. A Social Accounting Matrix (SAM) for 2005 was built and adapted as part of the assembling of the Senegalese dataset for MAMS using various sources of information: the input-output table and the supply-demand balance for 2005 from the National Statistical and Demographic Agency (ANSD, in French); 2005 public financial transactions from the Department of Economic Surveys and Forecasting (DPEE); 2005 balance of payments data from the West African Central Bank (BCEAO); detailed education data from the Direction of General Administration of Equipment of the Ministry of Education, the education and training decade program (PDEF) and UNESCO; the 2005 Senegalese Households Survey (ESPS); the Demographic and Health Survey (EDS-4) for 2005; drinking water and sanitation program goals (PEPAM) for water and sanitation sector, which provided important information on cost; and, data on domestic and foreign public debt for 2005 from the Central Bank of Senegal.

Most policy papers that analyze and evaluate MDG progress in Senegal make reference to a number of determinants that are likely to affect MDGs, for example, public delivery of corresponding services on the supply side and income per capita on the demand side (République du Sénégal, 2007, 2010b). It is important to note other determining factors, however, such as available infrastructure, as well as synergies between different MDGs. The health status of children is likely to affect educational outcomes too, while mothers' education and access to safe water and sanitation affect under-five mortality (MDG 4) and maternal mortality (MDG 5).

In the case of Senegal, the more important supply-side determinant appears to be service delivery. On the demand side, household economic well-being is expected to play a role, although it is rarely mentioned explicitly in existing literature. In the case of under-five mortality, the Demographic and Health Surveys conducted in Senegal provide statistics



by socio-demographic characteristics that suggest that demand factors such as economic well-being and mothers' education are likely determinants of child mortality. For instance, according to the last DHS survey (EDS-4, Senegal 2005), the probability of dying before the age of 5 is three times higher for children born in households belonging to the poorest quintile of the population as compared with those of the richest quintile.

In spite of the empirical evidence, elasticity values are not available for Senegal as needed for the MAMS MDG module. In view of this limitation, their values have been borrowed from a systematic review of relevant studies collected by Lofgren (2010ab). As with other studies using a similar methodology, the main purpose here is to highlight the relative importance of various determinants of MDG outcomes and, within a consistent economy-wide framework, discuss the relative merits of various sources of financing and the implications of a targeted pursuit of MDGs on the rest of the economy. Thus, while the exact quantitative findings of this study may be subject to revision if better elasticity estimates become available, the qualitative conclusions should remain applicable.

The different elements reviewed above, the available literature and MDG data, and the functioning of the model in terms of generating plausible trends for the MDG indicators (as further shown below), led us to define the elasticity values as reported in Table 5.3 along with all other information needed for the MDG module. The main determinant is assumed to be service delivery per capita (or per student for education) except in the case of under-five mortality that is mostly affected by household consumption per capita. Improvements in public infrastructure that are not directly associated with the MDGs are assumed to affect progress towards meeting the water and sanitation goals.

### *Baseline scenario*

Once calibrated, MAMS was used to generate a baseline scenario for Senegal. Under this scenario, GDP grows at the observed average annual rate for the period 2005-2010 (3.1 per cent) and at the rate suggested by both official and IMF predictions for the period 2011-2015 (4.0 per cent).<sup>1</sup>

The baseline closure rule for the external sector assumes that the real exchange rate clears the market for foreign exchange, whereas budget financing requirements are assumed to be ultimately covered through adjustments in direct taxes. Other budgetary financing sources, such as domestic and foreign borrowing and foreign aid, are assumed to adjust

Table 5.3  
Senegal: Elasticity of MDG indicators with respect to determinants in MAMS

	<i>Service delivery</i> <sup>1</sup>	<i>Household consumption per capita</i>	<i>Public infrastructure</i>	<i>Other MDGs</i>	<i>Wage incentives</i>
MDG 2 Primary completion rate					
Entry rates	0.900	0.400	0.200	-0.100	0.005
Promotion rates	0.900	0.200	0.100	-0.100	0.005
MDG 4 Under-five mortality	-0.300	-0.600	-0.100	-0.300	
MDG 5 Maternal mortality	-0.900	-0.600	-0.100	-0.600	
MDG 7a Access to water	0.900	0.100	0.500		
MDG 7b Access to sanitation	0.665	0.100	0.500		

<sup>1</sup> Per student in the case of MDG 2 and in per capita terms for all other MDGs.

**Source:** Authors' assumptions based on Lofgren (2010ab).

according to exogenously set rules in the baseline. The provision of government services is assumed to increase by 5 per cent over the simulation period. Private investment is assumed to be a fixed share of domestic absorption and, accordingly, household savings rates adjust endogenously. The unemployment rate is set at 20 per cent for semi- and highly-skilled labour and 5 per cent for unskilled labour. When this unemployment rate is above a pre-set minimum (0.4 per cent for unskilled labour and 2.5 per cent for all other labour categories), the labour market clears through changes in the level of unemployment. Otherwise, when it is equal that minimum, the labour market clears through changes in the real wage level.

In the baseline, the average annual allocation of MDG-related public expenditures as percentage of GDP during 2005-2015 is as follows: 3.7 per cent for primary education (compared with 2.8 per cent in 2005), 1.5 per cent for the health sector (compared with 1.7 per cent in 2005), and 1.9 per cent of GDP for water and sanitation (compared with 2.1 per cent in 2005) (see Table 5.4). Total MDG-related public expenditures would represent 7.2 per cent of GDP in 2005-2015 (compared with 6.7 per cent in 2005). Real spending per student in primary education would increase on average by 9.2 per cent, while, in contrast, per capita spending on health and on water and sanitation services would decrease by 16.1 and 14.5 per cent, respectively.

Furthermore, an elasticity for the poverty reduction (headcount ratio) with respect to growth of GDP per capita of nearly -1 was estimated using the last Senegalese household survey. This estimate was used to compute poverty effects for the baseline—and subsequent scenarios. Poverty changes are exclusively due to growth of mean income since no distribution effects are being taken into consideration.<sup>2</sup>

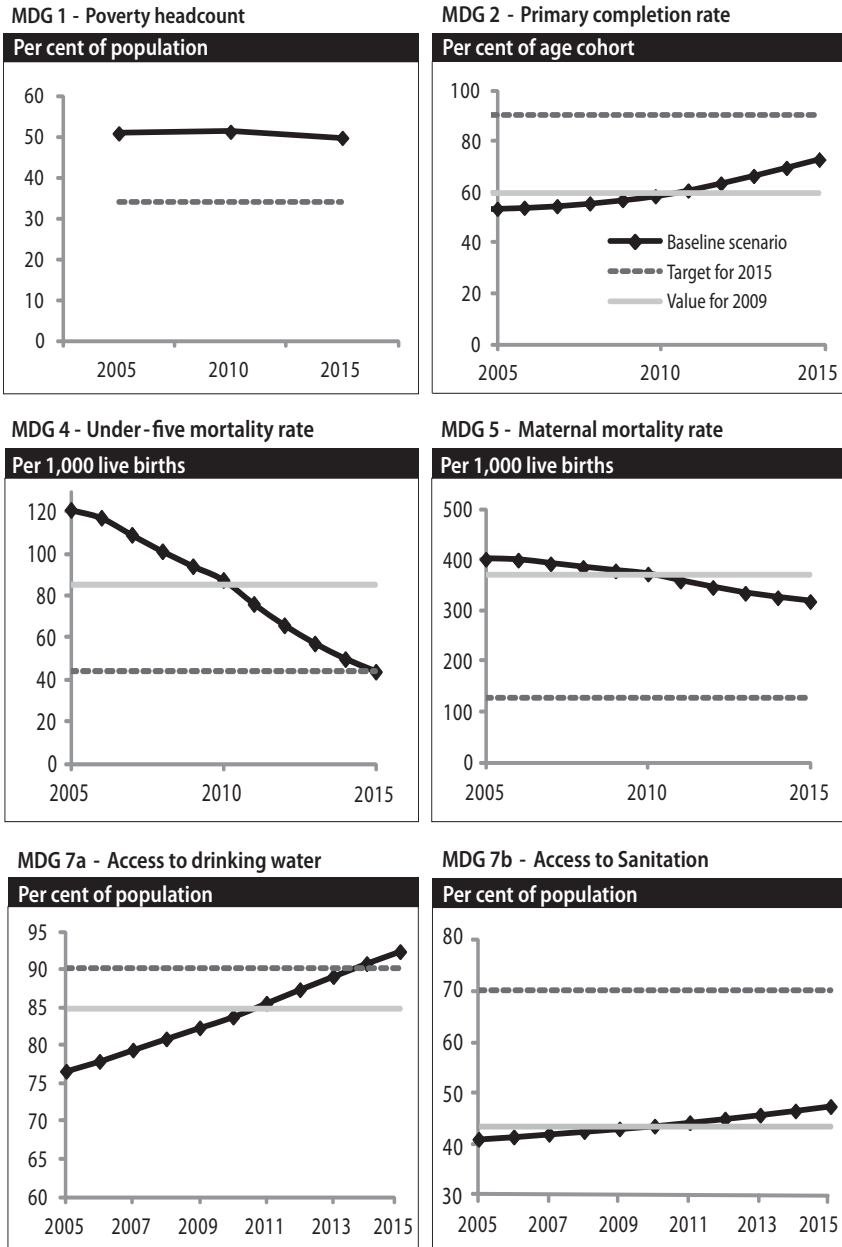
Under these baseline assumptions, only the targets for under-five mortality (MDG 4) and access to drinking water (MDG 7a) would be met by 2015, while, in spite of notable progress, the country would fall short of achieving the other goals (Figure 5.1). In 2005, the base year for MAMS, the country was already relatively close to meeting only MDG 7a. In order to meet all the targets by 2015 in an economic setting such as that underlying the baseline, the government would have to boldly expand the provision of MDG-related services.

### *Alternative financing scenarios for achieving the MDGs*

The baseline scenario was used as the benchmark to assess the impact and spending requirements of MDG achievement under alternative financing scenarios. In order to simulate these alternate scenarios, the closure rule for the government budget was changed. Under these MDG scenarios, public spending is—endogenously—scaled up to the level needed to meet the education, health, water and sanitation targets. The spending needs are then allowed to be financed, alternatively through additional foreign aid, foreign borrowing, or tax increases.<sup>3</sup>

Depending on the financing mechanism (Table 5.4), the government would have to allocate an additional 8.0 to 8.9 per cent of GDP—compared with the business-as-usual scenario reflected in the baseline—to ensure that all non-income poverty MDG targets are achieved by 2015. Achieving the MDG for primary education would be most costly in budgetary terms. Most additional spending would be on public sector wages and other current expenditures, except in the case of sanitation where capital expenditures weigh more. When the additional costs are fully covered through foreign financing, the additional public spending required to meet the targets is relatively less. Under a mixed financing strategy which combines an increase in direct taxes with additional foreign transfers, public spending requirements are higher. Increasing domestic tax collection, perhaps desirable from a foreign policy perspective because it would signal Senegal's strong commitment to the MDGs, would have an adverse effect on disposable

Figure 5.1  
**Senegal: Evolution of MDG indicators in the baseline scenario, 2005-2015**



Source: République du Sénégal (2010b) and authors' estimates based on the application of MAMS for Senegal.

household incomes. Since household income is an important demand-side determinant of all non-income poverty MDGs, the reduction of private incomes would have to be compensated by enhanced policy efforts by the government, thus increasing the additional total cost. Resorting to foreign borrowing, on the other hand, would carry the costs of an increasing public debt burden. As is also the case in mobilizing more foreign aid, it would penalize export growth owing to real exchange rate appreciation.

Table 5.4  
Senegal: MDG-related public spending, base year and period annual average in 2005–2015 for simulated scenarios

Per cent of GDP					
	Base year (2005)	Baseline scenario	MDG-achieving scenarios		
			foreign transfers	foreign borrowing	foreign transfers & direct taxes
<b>Primary education</b>	2.82	3.71	8.17	8.17	8.65
Current	1.56	2.04	4.60	4.60	4.86
Investment	1.26	1.67	3.56	3.56	3.79
<b>Health services</b>	1.72	1.54	2.92	2.92	3.15
Current	1.04	1.01	1.67	1.67	1.78
Investment	0.68	0.52	1.25	1.25	1.37
<b>Water and sanitation</b>	2.12	1.94	4.14	4.14	4.25
Current	1.06	1.03	1.97	1.97	2.03
Investment	1.06	0.91	2.16	2.16	2.23
<b>Total</b>	<b>6.66</b>	<b>7.18</b>	<b>15.22</b>	<b>15.22</b>	<b>16.06</b>

**Source:** Authors' estimates based on the application of MAMS for Senegal.

The additional annual spending required to meet the non-income poverty MDGs as a percentage of GDP corresponds to annual flows of 459.7 to 498.8 billion of CFA francs for foreign financing or foreign transfers combined with increased direct-tax revenue, respectively (Table 5.5). These numbers have to be contrasted with the base-year global budget of MDG-related sectors that amounts to 298.2 billion of CFA francs in 2005. This means for instance that the primary education sector would have to absorb twice the value of its 2005 budget per annum, on average, over the period 2005–2015. While sharp increases in the education budget have been registered since 2000, this could still be a challenge and it raises a crucial question with respect to the absorptive capacity of the social sectors in Senegal.

The average annual additional public expenditures required to meet the MDGs—with respect to the baseline, as estimated by MAMS, are also 10 to

15 times larger than cost estimates by sector presented in the 2007 MDG report (see Table 5.5)<sup>4</sup>. In the case of education, other methodologies have been used to assess the cost of achieving the universal primary education goal. Mingat and others (2003), for example, estimate that it will cost from 20 to 40 billion CFA francs per year depending on the scenario. Although higher than the UNDP estimate for MDG 2 (16.3 billion CFA francs per year), their estimate is 10 times lower than our MAMS estimates and should be subjected to further scrutiny.<sup>5</sup> Unlike a merely sectoral study, MAMS calculations capture the macroeconomic repercussions of MDG financing which may increase or even decrease the additional MDG spending. Importantly, MAMS does not rely on forward projections of linear trends, but considers a more plausible non-linearity in the form of decreasing marginal returns to public interventions. The closer the country is to meeting the 2015 target, the more difficult and costly it becomes to make further progress.

Table 5.5

**Senegal: Base-year and average annual additional public spending required to meet the MDGs—with respect to the baseline—and UNDP cost estimations, 2005–2015**

Billions of CFA francs					
	Base year (2005)	MDG-achieving scenarios (2005-2015)			UNDP estimates (2005-2015)
		foreign transfers	foreign borrowing	foreign transfers & direct taxes	
Primary education	126.2	255.0	255.0	277.7	16.3
Health Services	77.0	79.0	79.0	90.8	21.4
Water and sanitation	95.0	125.7	125.7	130.3	23.4
Total	298.2	459.7	459.7	498.8	61.1

*Source:* Authors' estimates based on the application of MAMS for Senegal and République du Sénégal (2006).

Turning to the key macroeconomic issues, GDP growth is slightly higher than it is in the baseline under the MDG-achieving scenarios (Table 5.6). Public spending on MDG-related services increases the domestic components of demand, but financing this through inflows of foreign exchange penalizes exports through real exchange rate appreciation. This, in turn, encourages imports with respect to the baseline. The negative impact on exports is relatively less when foreign transfers are combined with increased direct taxation, but GDP growth is still relatively lower than

in the other two financing scenarios due to the crowding-out effect of direct taxation on private spending.

The choice of direct-tax financing combined with foreign aid appears to have an explicit cost: fewer gains in terms of growth (and poverty, as further indicated below). When the choice is made for financing through foreign borrowing, however, the country is shown to experience a high debt burden (Table 5.6). Raising the stock of external debt would not seem to be a good strategy for a country that takes part in the Heavily Indebted Poor Countries (HIPC) Initiative. Furthermore, foreign indebtedness can have adverse effects on growth in the long term. Financing the extra MDG spending through foreign aid would produce the same effects on the economy as foreign borrowing, but without accumulating debt. The question is whether Senegal is able to mobilize the amount of foreign aid required—on average 5 to 6 times more than in the base year (Table 5.6). Still, in view of the criteria combining WAEMU convergence ratios and highest growth rates, foreign transfers seem to be the more suitable financing mechanism for MDG achievement in Senegal.

The labour market shows modest improvements under the MDG-achieving scenarios, perhaps as a result of MDG 2 being achieved and perhaps because GDP growth is only slightly higher than in the baseline. This illustrates the links between the dynamics of the labour market and MDG-achieving strategies: efforts to increase the net completion rate in education and keep students at school would shrink the relative supply of unqualified workers—thus raising these workers' wages relative to the baseline. Also, as the government scales up health and education service delivery, the demand for skilled workers may rise. In the short term, higher labour costs may have an adverse impact on the private sector's production, but in the longer term, a more educated labour force will likely boost growth. Within the bounds of the simulation period, however, the growth effects of the MDG-achieving strategies are very modest. Also, wages for the more skilled workers decrease less than they do in the baseline scenario because high unemployment in the Senegalese context leaves little room for wages adjustments (Table 5.6).

GDP growth per capita in the baseline allows the poverty incidence to fall from 50.8 to 48.8 per cent between 2005 and 2015 (Table 5.6). Under the MDG-achieving scenarios, poverty reduction is 7.5 percentage points higher than in the baseline by 2015—or 4.4 percentage points higher if increased taxation is used. These results are likely overestimated as the distributional effects of the MDG strategy are not being taken fully into

Table 5.6  
**Senegal: Selected results for macroeconomic variables, wages and poverty in the base year and simulated scenarios, 2005–2015**

	<i>Base year (2005)</i>	<i>Baseline scenario</i>	<i>MDG-achieving scenarios</i>		
			<i>foreign transfers</i>	<i>foreign borrowing</i>	<i>foreign transfers &amp; direct taxes</i>
	<i>bln CFA francs</i>	<i>Average annual growth rate, 2005-2015 (per cent)</i>			
Real GDP at market prices	4,478	3.4	3.9	3.9	3.7
Private consumption	3,242	2.8	4.4	4.4	3.7
Government consumption	817	3.1	6.0	6.0	6.1
Private investment	676	3.0	5.6	5.6	4.8
Public investment	483	2.8	7.5	7.5	7.7
Exports	849	5.0	-1.2	-1.2	-0.7
Imports	1,590	2.5	5.9	5.9	5.2
Real GDP per capita (thousand CFA francs)	397	1.0	1.4	1.4	1.2
Real Exchange Rate	1.00	0.7	-2.5	-2.5	-2.1
	<i>Per cent</i>	<i>2015 level</i>			
External debt-to-GDP	46.9	83.0	65.4	146.8	68.0
External debt service-to-exports (per cent)	5.3	7.2	15.6	33.5	14.4
	<i>USD per capita</i>	<i>Average annual level, 2005-2015</i>			
Foreign resources	59.2	59.1	159.5	166.7	142.5
Grants	17.5	17.5	105.8	17.5	91.0
Loans	41.7	41.7	53.8	149.2	51.5
	<i>Thousands of CFA francs</i>	<i>Average annual growth rate, 2005-2015 (per cent)</i>			
Unskilled-labour wage	360	2.8	2.9	2.9	2.9
Semi-skilled labour wage	1,063	-0.8	-0.7	-0.7	-0.7
Highly-skilled labour wage	2,207	-1.1	-1.0	-1.0	-1.0
	<i>Per cent of population</i>	<i>2015</i>			
Poverty headcount	50.8	48.8	41.3	41.3	44.4

**Source:** Authors' estimates based on the application of MAMS for Senegal.



account, as explained earlier. Since wage changes essentially affect the three types of workers in the same direction and by similar magnitude, most distributional effects would likely be driven by changes in employment.

## CONCLUSIONS AND POLICY LESSONS

The scenario analysis carried out in this chapter for Senegal shows that a continuation of current policies and programs would enable the country to meet the millennium development goal for access to drinking water by 2015, and perhaps also the under-five mortality goal. In order to meet the goals for primary education, maternal mortality, and access to basic sanitation, additional fiscal efforts are needed.

What's more, MDG services would have to be extended to parts of a growing population that have not yet been covered by social services. To achieve this, the government would have to mobilize up to an additional 8 per cent of GDP per year—under the assumption that economic growth remains strong at around 7 per cent per year—to be spent on primary education, health and basic sanitation. The challenge for Senegal would not stop here. Given its limited space to mobilize domestic resources, the government would have to rely on international aid to finance this extra MDG spending. Foreign borrowing is not a feasible option as it would lead to a high debt burden. Should the government be left with no other option than raising taxes, the least regressive tax rates in the Senegalese institutional context would need to be targeted to minimize any negative impact on economic growth.

Each option for financing additional MDG spending has a macroeconomic trade-off. For example, inflows of foreign resources would penalize the Senegalese export sectors through real exchange rate appreciation. However, the effect on GDP growth would be less adverse than if the government resorted to domestic-resource mobilization (for example, direct taxes) as this would crowd out private spending with more marked effects on production. In spite of these trade-offs, achieving the MDGs in Senegal by scaling up public spending would have a modest, positive impact on GDP growth in the short term. Benefits from educating the labour force, and through this, improving labour productivity, will likely be reaped in the longer term.

The amount of additional public spending required to achieve the MDGs could be less if the quality of education and the efficiency of service delivery in general is improved. Some resources could also be spent on infrastructure that facilitates the delivery of MDG-related services and has a positive

impact on growth. Similar benefits would be seen if resources were directed to key sectors like agriculture (particularly cereals and vegetables) that could have a positive impact on exports and production, as well as the well-being of many Senegalese families.

The projections and simulations results presented in this chapter indicate that significant additional spending and policy efforts are needed in order to achieve all the MDGs under study by 2015 in Senegal. This raises two important challenges—how best to finance the additional spending and the capacity of the social sectors to absorb additional budget. The analysis of the latter should be subject to further research. Furthermore, a number of contingencies need to be addressed by putting in place policies to remove or limit the impact of a variety of risks that could hamper MDG achievement. In particular, these policies should try to mitigate: (i) risks related to exogenous shocks that may affect the macroeconomic targets and the absorptive capacity of aid provided in the form of budget support, (ii) natural hazards, such as droughts and heavy rainfalls affecting agricultural production, (iii) the risks of locust aggression, (iv) risks related to international price volatility, including that of oil prices, (vi) political and institutional risks, which can directly hamper the execution of capital expenditure plans. Dealing with these issues may have additional costs, but at the same time would also likely induce additional growth gains as the economy would be less volatile and actors would face less uncertainty. Assessing such policies, however, should be subject to further study.

## NOTES

- 1 IMF predicts average annual growth of 4.5 per cent for the next years but the baseline scenario assumes a rate of 4 per cent considering that energy shortcuts will likely affect the economy adversely.
- 2 Most country chapters in this volume use a microsimulation approach to estimate poverty and inequality results while accounting for full income distribution effects (see Chapter 1). This approach could not be implemented for Senegal since existing household surveys do not provide the labour market detail that is needed to apply it.
- 3 Due to the small size of domestic borrowing which was close to 3 per cent of GDP in 2005, meaning that the domestic bond market is underdeveloped in Senegal, modelling the pursuit of MDGs strategies through that financing mechanism was considered unrealistic and this is the reason why it was not simulated as permitted by the MAMS framework.
- 4 The 2007 MDG report reports cumulative costs over the period 2005-2015. These costs were divided by 11 (years) in order to translate them into annual efforts and include them in Table 5.5 for comparison purposes.
- 5 Detailed cost calculations are not presented in the MDG reports and background sectoral studies on which these were based were not available for consultation.

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# Chapter 6

## South Africa

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MARNA KEARNEY AND AYODELE ODUSOLA

### INTRODUCTION

After successful free elections in April 1994, South Africa was readmitted to the international community, following years of international isolation imposed on the country due to its racially motivated apartheid policies. Since then, trade liberalization has been accompanied by responsible monetary and fiscal management, and South Africa has continuously recorded moderate economic growth. Inflation has been within target, and the budget deficit has been falling in recent years. The government has also channelled an important amount of resources to social programs and services. Yet despite bold policy changes, the economy has failed to grow in sufficient amounts to make inroads into high unemployment and poverty (Hoogeveen and Özler, 2005).

In 2000, the South African government adopted the United Nations Millennium Declaration, pledging to meet the millennium development goals (MDGs) by 2015. The country has made some progress in achieving the MDGs since then, but some gaps remain, especially with regard to the health goals. This chapter addresses three key questions: First, what is the likelihood that South Africa will achieve the MDGs given current policies and levels of social investment? Second, if business as usual is not good enough, what changes in strategies and policies should be pursued in order to achieve the goals? Finally, what will it cost to implement the different strategies, policies and investment alternatives to ensure MDG achievement by 2015, and how should they be financed?

This chapter begins with a discussion of recent economic reforms and the macroeconomic performance achieved by South Africa as well as current

economic constraints and vulnerabilities the country faces. The next section addresses the country's social policies with specific reference to the MDGs. The third section analyses alternative scenarios created using the MAMS model and a microsimulation approach. It describes a baseline scenario that shows MDG outcomes if South Africa maintains its current growth path, then examines additional spending that may be required to ensure that South Africa meets its MDG targets by 2015, including the alternative financing options and how these may impact the economy. The concluding section provides some policy recommendations.

## MACROECONOMIC PERFORMANCE

### *Recent reforms*

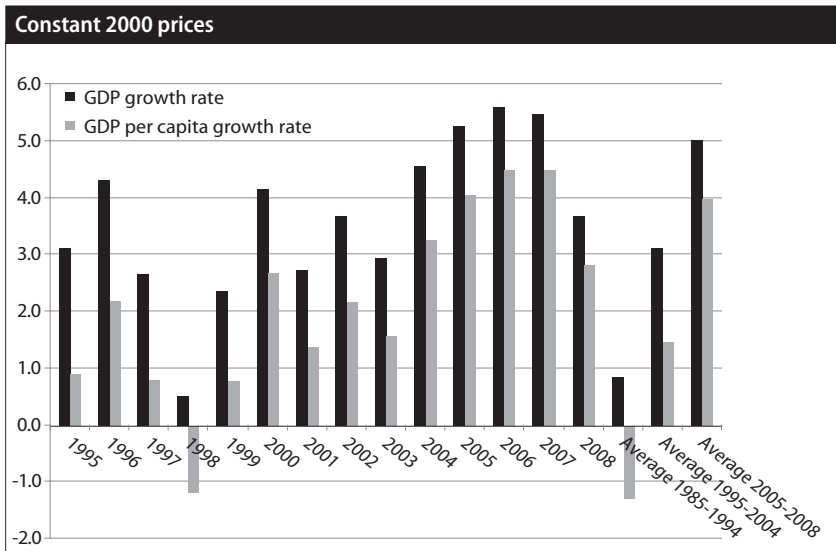
In October 2010, President Zuma proposed a New Growth Path (NGP) strategy for South Africa that places employment as a priority. The strategy identifies the following key areas for job creation: infrastructure expansion in transport, energy, water, communications and housing; increased value-added generation in agriculture and mining; the greening of the economy; stimulus of selected manufacturing sectors identified in the government's industrial policy action plan; and tourism and certain high-end services. This economic policy builds on earlier initiatives such as the Accelerated and Shared Growth Initiative (AsgiSA), the Growth, Employment and Redistribution (GEAR) programme, and the Reconstruction and Development Programme (RDP).

The target is to create five million jobs by 2020, so as to reduce the rate of unemployment from 25 to 15 per cent. In order to achieve this, though, the economy at large would also need to grow faster. As part of its macroeconomic approach, the government plans to pursue more active monetary policy interventions, make the exchange rate more competitive, reduce the cost of capital, maintain a more restrained fiscal stance, and reprioritize public spending to ensure fiscal sustainability. The strategy includes other measures to support jobs and competitiveness, including education and vocational training programmes for skills development, new regulation to enhance competition in industry and promote small businesses development, labour market reforms, rural development programmes, African regional integration policies and other trade policy reforms (The Presidency of South Africa, 2010).

### Economic trends

After apartheid, economic growth has been relatively robust. During 1995-2003, GDP increased by 3.3 per cent per year on average. Income per capita increased by 1.7 per cent per year. This growth performance was a notable improvement compared with the 0.8 per cent of GDP growth and -1.3 per cent GDP per capita growth per annum during 1985-1994 (Figure 6.1). Economic growth picked up further during 2004-2007, averaging over 5 per cent per year. Growth slowed somewhat thereafter as a result of the global financial crisis.

Figure 6.1  
South Africa: GDP growth, 1995-2008



Source: South African Reserve Bank (SARB) database ([www.reservebank.co.za](http://www.reservebank.co.za)).

Du Plessis and Smit (2006) attribute most of the positive economic growth to improvements in total factor productivity driven for the most part by greater openness to international markets. Fedderke and others (2007) argue that greater competition among industrial sectors also helped enhance productivity.

The slowdown in 2008 was associated with the global economic downturn, which adversely affected South African trade and inflows of foreign direct investment and portfolio capital. More recent estimates of real GDP growth suggest the economy contracted by 1.7 per cent in 2009, showing a mild

recovery thereafter with the economy growing at 2.8 per cent in 2010 and an estimated 3.3 per cent in 2011 (Statistics South Africa, 2011a).

Post-apartheid strategies oriented to promote growth and income distribution did not succeed in reducing the high levels of unemployment, particularly for less-skilled younger blacks. Neither did the policies help to significantly reduce widespread poverty and high inequality. Employment growth, although positive, has been outpaced by labour force participation growth in various periods, leading to high unemployment rates. Banerjee and others (2006) have gauged that the rate of unemployment—according to the official definition<sup>1</sup>—increased from 15.6 to 30.3 per cent between 1995 and 2001. According to the official estimate published by Statistics South Africa, the unemployment rate has declined to 23.6 per cent in 2008, but remaining well above the level of the mid-1990s. The global financial crisis pushed unemployment further up again. From 2009 to mid-2011, the jobless rate stayed stubbornly above 25 per cent (Statistics South Africa, 2011b).

The reasons for the poor employment performance, as identified by Rodrik (2006), include insufficient growth, high real wages due to strong trade union influence in wage setting, poor performance of the tradables sector (which is considered one of the drivers of growth), the shrinkage of the manufacturing sector and the related decline in the demand for unskilled workers, and failure of the informal market to absorb the unemployed.

Public debt sustainability has been a key objective of government policies since 1994. Measures taken from 1996 have helped reduce public debt and interest costs over time and created the necessary fiscal space for the government to mitigate the impact of the global economic downturn at the end of the 2010s. External borrowing has remained relatively stable since 2003, but domestic borrowing increased sharply in 2003 and 2008 and is forecast to remain high on a slight decreasing trend over the medium term (National Treasury, Budget Reviews: 1994 to 2009). The total debt as a percentage of GDP decreased from 48 per cent in 1994 to 22.8 per cent in 2008 owing to the government's efforts to bring it down to sustainable levels. However, with the economic slowdown and countercyclical policies, government debt as a share of GDP has been on the rise again after 2008 and is expected to increase further in the near future—with the net national government debt peaking at 44 per cent of GDP in 2015/16 (National Treasury, 2011).

The current level of social spending is already quite high in South Africa and further increases could undermine fiscal sustainability. The government is perceived to have little scope to broaden the tax base further as long as employment growth remains subpar and given the fiscal reforms that have already been undertaken. External budget support is also limited as South

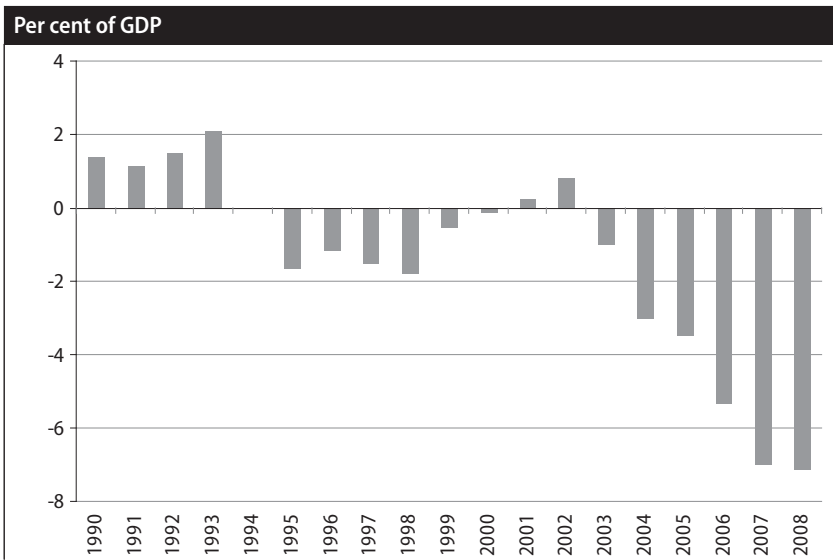
Africa is not a major recipient of Official Development Assistance (ODA). It received R5 billion in ODA in 2005 which constitutes about 1.5 per cent of government expenditures, and less than 1 per cent of GDP.

### *Current economic constraints and vulnerabilities*

Macroeconomists in South Africa generally agree that the widening current account deficit is becoming a major liability. Prior to 2003, the country had moderate current account surpluses and deficits, with no systematic tendency in one direction or another. However, since 2003 deficits have been growing steadily, reaching 7.1 per cent of GDP in 2008 (Figure 6.2). The deterioration of the trade balance, which moved from an almost balanced position in 2004 to a deficit of more than 2 per cent of GDP in less than two years, has been a large contributory factor to the current account deficit.

As indicated, the government's borrowing requirements are another source of vulnerability. Borrowing requirements are expected to rise to 7.5 per cent of GDP in 2009/10 and, as said, government debt as a share of GDP is expected to increase in the near future owing to the effects of the economic slowdown and countercyclical policies implemented to offset

Figure 6.2  
South Africa: Current account of the balance of payments, 1994–2008



Source: South African Reserve Bank (SARB).



them. A large share of borrowing is to finance the investment programme of the utilities, including Eskom and Telkom, which was set at R90 billion per year over the period 2009/10.

Backlogs in logistics, energy infrastructure, and skill development, as well as the low levels of domestic savings and productive investment form additional challenges. The high degree of concentration of economic activity, practices of price collusion, and an overvalued currency are other concerns, all of which are to be addressed by the NGP (The Presidency of South Africa, 2010).

### MDG ACHIEVEMENT IN SOUTH AFRICA

The latest MDGs report produced by the Republic of South Africa (2010) indicates that South Africa is likely to meet its poverty reduction targets, depending on which poverty line is used (Table 6.1). The ambitious target to reduce the Gini coefficient of income inequality from 0.65 to 0.30 is very unlikely to be met. In fact, inequality increased during the 2000s.

South Africa is also likely to achieve universal primary education (MDG 2) and is also close to achieving the targets for gender equality in education and empowerment of women (MDG 3). However, there are still important gaps to achieve the health-related MDGs (MDG 4, 5 and 6). The rise in child and maternal mortality rates is mainly attributable to the substantial increase in HIV/AIDS prevalence after 1998. Prevalence rates have stabilised in recent years with a major shift in the government's approach in combating the pandemic. Despite the upward trend in the under-five mortality rate, the infant mortality rate has remained more or less stable as there has been a marked increase in the proportion of children under 1 year of age who have received all their primary vaccines for tuberculosis, diphtheria, whooping cough, tetanus, polio, measles, hepatitis B and haemophilus influenza. Although good progress is being made in combating malaria, the country is not on track to meet its targets in combating HIV/AIDS or tuberculosis. In contrast, South Africa is more likely to meet the targets for improving access to drinking water and basic sanitation (MDG 7).

### SCENARIO ANALYSIS OF MDG ACHIEVEMENT

This section analyses various scenarios using the dynamic, computable general equilibrium (CGE) model called MAMS (Maquette for MDG Simulations), as described in Chapter 1 of this volume. Those are defined

Table 6.1  
**South Africa: Selected MDGs and most important related indicators**

	<i>Past</i>	<i>Most recent</i>	<i>Target (2015)</i>
<b>MDG 1: Eradicate extreme poverty</b>			
Proportion of population below \$1 per day (PPP) (per cent)	11.3 (2000)	5.0 (2006)	5.7
Proportion of population below \$1.25 per day (PPP) (per cent)	17.0 (2000)	9.7 (2006)	8.5
Proportion of population below \$2.50 per day (PPP) (per cent)	42.2 (2000)	34.8 (2006)	21.1
Gini coefficient (per capita expenditure, excluding taxes)	0.65 (2000)	0.67 (2006)	0.3
<b>MDG 2: Achieve universal primary education</b>			
Adjusted net enrolment ratios for primary education (per cent)	96.4 for males 97.0 for females (2002)	99.4 for males 98.8 for females (2009)	100.0
Primary completion rate for 18 year olds (per cent)	89.2 (2002)	93.8 (2009)	100.0
<b>MDG 3: Promote gender equality and empower women</b>			
Ratio of girls to boys in primary education	0.97 (1996)	0.96 in 2009	1:1
Ratio of girls to boys in secondary education	1.13 (1996)	1.05 in 2009	1:1
Ratio of women to men in tertiary education	0.86 (1996)	1.26 in 2009	1:1
Proportion of seats held by women in national parliament	25 (1994)	44 in 2009	50.0
<b>MDG 4: Reduce child mortality</b>			
Under-five mortality rate (per 1,000 live births)	59 (1998)	104 (2007)	20.0
Infant mortality rate (per 1,000 live births)	54 (2001)	53 (2007)	18.0
<b>MDG 5: Improve maternal health</b>			
Maternal mortality ratio (per 100,000 live births)	369 (2001)	625 (2007)	38.0
<b>MDG 6: Combat HIV/AIDS, malaria and other diseases</b>			
HIV prevalence among pregnant women aged 15-24 (per cent)	22.8 (2002)	29.3 (2008)	22.8
HIV prevalence in men and women aged 15-49 (per cent)	15.6 (2002)	16.9 (2008)	15.6
<b>MDG 7: Ensure environmental sustainability</b>			
Access to improved drinking water per cent of population	61.1 (1996)	92.4 (2009)	81.0
Access to an improved sanitation facility (per cent of population)	58.5 (2001)	72.2 (2009)	79.2

**Source:** Republic of South Africa, 2010.

to shed light on the likelihood of achieving some of the MDGs under assumptions of unchanged policies and alternative growth paths, as well as on the budgetary efforts that would be required to close some of the existing gaps towards the targets. As also described in Chapter 1, the analysis with MAMS is combined with a microsimulation approach to determine the impact on poverty and inequality. Details of the implementation of these methodologies using South African data are spelled out in Appendix A6.1.

### *Baseline scenarios*

A baseline scenario was defined replicating a trajectory of South Africa's economy under unchanged economic trends and policies for the period 2005-2015. For the calibration of this baseline the model is initially solved allowing a part of total factor productivity to adjust endogenously in order to reproduce the assumed path of GDP growth. The baseline is a plausible benchmark against which alternative policy scenarios can be assessed.

Various closure rules are imposed to define macroeconomic adjustment and equilibrium in all markets. Taxes, domestic borrowing, foreign borrowing and foreign aid are the sources the government can use to finance its budget deficit. For the baseline scenario, we assume that tax revenue and domestic and foreign borrowing follow exogenously set growth rates in line with the actual trends and projections as estimated by the National Treasury. Any residual budget financing requirement is assumed to be covered by official foreign transfers to the government. In the baseline, these residual financing requirements are relatively small, consistent with the actual size of disbursements of foreign aid to South Africa in recent years. Government consumption grows at predetermined rates, except for health expenditures whose level is determined as a fixed share of GDP. The real exchange rate is assumed to be flexible and clears the market for foreign exchange. Accordingly, the current account of the balance of payments is endogenous, while capital flows are assumed to increase at an exogenously given rate. Household savings rates are assumed to adjust to generate the required resources to satisfy the demand for private investment. The latter is assumed to be a fixed share of domestic absorption. In factor markets, the rate of underutilization of productive capital is assumed to be fixed and the rate of return adjusts to balance demand and supply of capital. In MAMS for South Africa, equilibrium in the labour market is assumed to be achieved as follows. Real wages clear the market in case unemployment drops to a

given minimum level. As long as the unemployment rate is higher than the minimum, the labour market clears through quantity adjustment (that is, more or fewer workers are employed at the given wage level).

The baseline scenario was calibrated to replicate the National Treasury's GDP growth forecast for 2010-2012 and a continuous trend of GDP growth for 2013-2015. An alternative, more optimistic baseline scenario was also generated according to which the GDP growth rate would average 6 per cent per year during 2010-2015. This second baseline is more akin to AsgiSA's projection of around 5 per cent growth for the period 2004-2014 (The Presidency of South Africa, 2008) and assumes the "growth initiative" would effectively induce higher levels of productivity in the economy. Observed data were used for the period 2005-2009 to generate both baseline scenarios. Government spending follows the same (exogenous) rules of the initial baseline for the more optimistic scenario. The latter was designed to assess whether the growth acceleration, as expected under the AsgiSA and NGP, would suffice to meet South Africa's MDG targets. The baseline results for key macroeconomic aggregates are presented in Table 6.2. In the first baseline scenario, household consumption expenditure remains a strong driver of GDP growth, while export growth is sluggish as a result of the strong appreciation of the real exchange rate that results from steady growth of government consumption and other non-tradables goods demand. Investment spending expands strongly. Public investment spending is by and large financed through domestic borrowing (at the exogenously set

Table 6.2  
South Africa: Initial value and average annual growth rate of key  
macroeconomic aggregates in the baseline scenarios, 2005-2015

	<i>Average annual growth rate (per cent)</i>		
	<i>Base year value (R billion)</i>	<i>Moderate baseline scenario</i>	<i>Optimistic baseline scenario</i>
GDP	1291.9	3.39	4.50
Household consumption	942.5	4.98	6.03
Government consumption	306.6	2.83	2.84
Investment			
Private	188.3	4.92	6.02
Public	64.2	0.92	1.36
Exports of goods and services	407.8	0.39	2.73
Imports of goods and services	433.0	4.21	5.45

**Source:** Authors' estimates based on MAMS.

rate). GDP growth is 1.1 percentage points higher in the optimistic baseline scenario, and growth rates of aggregate demand components are also commensurately higher.

Under these baseline scenarios, South Africa would make further progress towards achieving the MDGs, but only the target for reducing extreme poverty (MDG 1) would be met by 2015. This also holds under the more optimistic growth scenario (Table 6.3).<sup>2</sup> The higher demand for unskilled workers would help reduce poverty. The unemployment rate for unskilled workers would drop from 33 per cent in 2005 to 24.1 per cent by 2015 in the first baseline and to 22.8 per cent in the more optimistic scenario. Real wages would also increase strongly contributing to poverty reduction.

Table 6.3

**South Africa: MDG achievement in the baseline scenarios, 2005 and 2015**

<i>MDG and associated indicator</i>	<i>Moderate baseline growth scenario</i>		<i>Optimistic baseline growth scenario</i>		<i>Target (2015)</i>
	<i>2005</i>	<i>2015</i>	<i>2005</i>	<i>2015</i>	
MDG 1: Percentage of the population living on less than \$1.25 per day (PPP)	38.4	23.1	38.4	20.2	25.4
MDG 2: Primary completion rate (per cent of cohort)	36.1	66.4	36.1	68.2	92.3
MDG 3: Child mortality rate (per 1,000 live births)	57.6	97.6	57.6	90.7	26.4
MDG 5: Maternal mortality rate (per 100,000 live births)	124.0	143.0	124.0	139.3	112.5
MDG 7a: Access to drinking water (per cent of population)	84.7	86.5	84.7	87.3	99.0
MDG 7b: Access to basic sanitation (per cent of population)	94.0	94.5	94.0	94.7	99.0

**Source:** Authors' estimates based on MAMS and microsimulations.

As said, both baseline scenarios assume that government consumption either grows at a given rate or follows a fixed share of GDP (as in the case of health expenditures). Government investment follows government consumption growth to increase the capital stock as much as needed to ensure social infrastructure expands commensurately with overall service delivery. Even so, substantial gaps vis-à-vis the MDG targets for primary education, child and maternal mortality, and water and sanitation remain under these scenarios.

One of the targets is to achieve a nearly 93 per cent net completion rate (on time) in primary education. Although school enrolment rates are fairly

high in South Africa, high repetition and dropout mean that a majority of children do not complete primary school in the number of years of the education cycle. The baseline simulations with MAMS suggest the primary completion rate (on time) of the relevant age cohort would increase gradually with unchanged education policies over the simulation period, reaching 66 per cent by 2015, well short of the target. Reducing child and maternal mortality rates poses an even bigger challenge for South Africa. The baseline scenarios reproduce the observed increase in both mortality rates during the 2010s. The trend is projected to reverse towards the end of the simulation period, but progress is far from sufficient to meet MDGs 4 and 5. This is an indication that health spending is highly ineffective, considering that the moderate to relatively robust GDP growth in the two baseline scenarios (see Table 6.2) and that health spending is maintained fixed as a percentage of GDP. Lastly, baseline projections show a larger share of the population would have access to drinking water and basic sanitation by 2015 mostly owing to strong spending. Yet this would be insufficient to reach the target of 99 per cent coverage for both services.

In sum, under the assumptions of the two baseline scenarios, South Africa would witness some progress in achieving the MDGs, but most targets would remain unmet by 2015. Government spending is already high to deliver existing levels of education and health services, but it would either need to be scaled up further, become much more efficient, or both, in order to meet all the MDG targets by 2015. The analysis below sheds light on the additional MDG spending that would be required to close the gaps and the mechanisms the government could resort to in order to finance it.

### *Achieving the human development goals under alternative financing scenarios*

A set of MDG scenarios were simulated to gauge the additional public spending that would be required to achieve the MDGs in primary education, mortality, and water and sanitation. In these scenarios, public spending is scaled up to the required level to achieve the MDG targets by 2015. The economy-wide effects and precise costs may differ depending on whether the newly required public spending is financed through increased taxation, domestic borrowing or foreign borrowing. These MDG scenarios do not specify any special measures targeted at reducing income poverty. The poverty is modelled to be endogenous to the impact of the different policy scenarios on employment and labour incomes. Hence, achieving the

targets for education, health, drinking water and basic sanitation, does not necessarily imply the target for MDG 1 will also be achieved at the same time.

Table 6.4 shows the increase in public (current and capital) spending that would be required to achieve the MDGs with respect to the first baseline scenario. The results are shown for the case in which the additional spending is financed through (direct) taxation. The domestic and foreign borrowing scenarios are not shown because in both cases public debt levels would become unsustainable, as discussed further below. The option of financing the MDG strategy with foreign grants is not considered because it is unlikely that South Africa could become a major recipient of official development assistance being a middle-income country.

Social spending would need to have increased by 9.1 per cent of GDP on average during 2005-2015—considering also what the government should have spent, but did not, in the period 2005-2009 (Table 6.4). Given the enormous deficits, the cost for the South African government to meet the targets for reducing child and maternal mortality are highest, at nearly 5 per cent of GDP per year during 2005-2015. In the scenario where all MDGs are targeted, meeting the targets for improving access to water and sanitation would cost an additional 3.5 per cent of GDP per year. Achieving the target for primary school completion would require additional spending of 0.7 per cent of GDP per year during 2005-2015.

The results presented in Table 6.4 also indicate that the spending requirements would increase when getting closer to the 2015 deadline. This is because the marginal returns of the interventions would decrease as more progress is made towards meeting the human development goals. The government would need to scale up MDG spending by at least 12.5 per cent of GDP per year, compared to the first baseline, in order to achieve the MDGs in primary education, mortality, and water and sanitation.

The estimated costs in terms of additional MDG spending decline only marginally under the more optimistic baseline scenarios (see Table 6.5). This is because even with faster GDP growth, macroeconomic costs remain substantial due to the size of the deficits in MDG achievement, especially in child and maternal health.<sup>3</sup> Also, improvements in factor productivity from the newly added MDG service delivery are expected to kick in only over the medium run and hence do not make an impact during the simulation period.

The results for required MDG spending discussed thus far belong to the scenarios that assume additional spending is financed through increased taxation. However, the cost of achieving the MDGs is sensitive to the source of financing. Take as an example the scenarios where only achievement of MDG 2 (primary completion) is targeted and the first baseline scenario

Table 6.4  
**South Africa: Additional public spending required to achieve the MDGs under the MDG-achieving scenarios with tax financing, 2005-2015**

<b>Deviation from first baseline scenario, per cent of GDP</b>				
	<i>Only MDG 2</i>	<i>Only MDGs 4 &amp; 5</i>	<i>Only MDGs 7a &amp; 7b</i>	<i>All MDGs</i>
<i>Annual average for the period 2005-2009</i>				
<b>Primary education</b>	1.0	0.0	0.0	0.7
Current spending	0.7	0.0	0.0	0.5
Investment	0.3	0.0	0.0	0.2
<b>Health</b>	0.0	2.9	0.0	3.0
Current spending	0.0	2.5	0.0	2.5
Investment	0.0	0.4	0.0	0.5
<b>Water and sanitation</b>	0.0	0.0	1.3	1.3
Current spending	0.0	0.0	0.3	0.3
Investment	0.0	0.0	0.9	0.9
<b>Total</b>	1.0	2.9	1.3	4.9
<i>Annual average for the period 2010-2015</i>				
<b>Primary education</b>	1.1	0.0	0.0	0.7
Current spending	1.2	0.0	0.0	0.8
Investment	0.1	0.0	0.0	-0.1
<b>Health</b>	0.0	6.4	0.0	6.4
Current spending	0.0	5.5	0.0	5.4
Investment	0.0	0.9	0.0	0.9
<b>Water and sanitation</b>	0.0	0.0	5.4	5.4
Current spending	0.0	0.0	2.5	2.5
Investment	0.0	0.0	3.0	2.9
<b>Total</b>	1.1	6.4	5.4	12.5
<i>Annual average for the period 2005-2015</i>				
<b>Primary education</b>	1.1	0.0	0.0	0.7
Current spending	0.9	0.0	0.0	0.6
Investment	0.1	0.0	0.0	0.1
<b>Health</b>	0.0	4.8	0.0	4.8
Current spending	0.0	4.1	0.0	4.1
Investment	0.0	0.7	0.0	0.7
<b>Water and sanitation</b>	0.0	0.0	3.5	3.5
Current spending	0.0	0.0	1.5	1.5
Investment	0.0	0.0	2.0	2.0
<b>Total</b>	1.1	4.8	3.5	9.1

**Source:** Authors' estimates based on MAMS.



Table 6.5  
**South Africa: Additional public spending required to achieve the MDGs under the MDG-achieving scenarios with tax financing, 2005-2015**

<b>Deviation from optimistic baseline scenario, per cent of GDP</b>				
	<i>Only MDG 2</i>	<i>Only MDGs 4 &amp; 5</i>	<i>Only MDGs 7a &amp; 7b</i>	<i>All MDGs</i>
<i>Annual average for the period 2005-2009</i>				
<b>Primary education</b>	1.0	0.0	0.0	0.7
Current spending	0.7	0.0	0.0	0.5
Investment	0.3	0.0	0.0	0.2
<b>Health</b>	0.0	2.9	0.0	3.0
Current spending	0.0	2.5	0.0	2.5
Investment	0.0	0.4	0.0	0.5
<b>Water and sanitation</b>	0.0	0.0	1.3	1.3
Current spending	0.0	0.0	0.3	0.3
Investment	0.0	0.0	0.9	0.9
<b>Total</b>	1.0	2.9	1.3	4.9
<i>Annual average for the period 2010-2015</i>				
<b>Primary education</b>	1.0	0.0	0.0	0.6
Current spending	1.1	0.0	0.0	0.7
Investment	0.1	0.0	0.0	-0.1
<b>Health</b>	0.0	5.9	0.0	5.9
Current spending	0.0	5.1	0.0	5.1
Investment	0.0	0.8	0.0	0.8
<b>Water and sanitation</b>	0.0	0.0	4.9	4.9
Current spending	0.0	0.0	2.3	2.3
Investment	0.0	0.0	2.6	2.6
<b>Total</b>	1.0	5.9	4.9	11.4
<i>Annual average for the period 2005-2015</i>				
<b>Primary education</b>	1.0	0.0	0.0	-1.2
Current spending	0.9	0.0	0.0	-1.4
Investment	0.2	0.0	0.0	0.1
<b>Health</b>	0.0	4.5	0.0	4.5
Current spending	0.0	3.9	0.0	3.9
Investment	0.0	0.6	0.0	0.6
<b>Water and sanitation</b>	0.0	0.0	3.2	3.3
Current spending	0.0	0.0	1.4	1.4
Investment	0.0	0.0	1.8	1.8
<b>Total</b>	1.0	4.5	3.2	6.6

**Source:** Authors' estimates based on MAMS.

is used for comparison. As can be seen from Table 6.6, GDP growth is lower when domestic financing is mobilized as compared to accessing foreign borrowing. In 2015, GDP growth would be, respectively, 0.03 or 2.0 percentage points lower when the strategy is financed by taxation or domestic borrowing as compared with the foreign borrowing scenario. Here, domestic resource mobilization by the government crowds out private spending; private investment, in particular, declines by 18.6 per cent in the domestic borrowing scenario. Lower private investment also affects social service delivery and, consequently, the government is required to further scale up public spending to compensate for lesser private spending in order to achieve the desired outcomes in education, health, and water and sanitation.

The feasibility of the alternative financing options should not only be evaluated against the additional public spending requirements for achieving the development goals. One should also consider by how much the tax burden should increase and whether public indebtedness would not rise to unsustainable levels. Looking again at the results of the scenarios in which only the achievement of MDG 2 is targeted, for instance, income taxes as a percentage of GDP would need to increase to 15.8 per cent of GDP by 2015, up by 1.2 percentage points from 2005 (see Table 6.6). Under the other financing scenarios, total government debt would increase notably from around 37 per cent of GDP in the base year to between 50 and 82 per cent of GDP by 2015, depending on whether the government resorts to, respectively, foreign or domestic borrowing. These results are for the scenarios where only MDG 2 is being targeted. When all MDGs are targeted simultaneously, income taxes would have to be raised by 15 points of GDP between 2005 and 2015—taking the first baseline scenario as the benchmark. The results under the optimistic baseline scenarios—not presented here—only show small deviations from those that are being analysed here, for the same reason indicated earlier; that is, the additional MDG spending requirements are also high in the optimistic growth scenario given the large deficits in MDG achievement, especially in health.

Such a considerable increase in tax revenues is not likely to be feasible for South Africa, considering that the tax burden was already more than 27 per cent of GDP in the base year (2005). Rather than increasing taxes, policies to broaden the tax base should be put in place. Current policies that focus on promoting economic growth and increasing employment could also be expected to broaden the tax base. South Africa should avoid a high public debt burden as, by increasing the risk profile of the country, borrowing

Table 6.6  
**South Africa: Selected macroeconomic results for the first baseline and associated scenarios where MDG 2 is achieved under alternative financing options, 2005-2015**

<i>Variable and scenario</i>	<i>2005</i>	<i>2010</i>	<i>2015</i>
<b>GDP (annual growth rate)</b>			
First baseline scenario		2.3	4.0
MDG 2 achievement with direct-tax revenue		2.2	3.9
MDG 2 achievement with external borrowing		2.3	3.9
MDG 2 achievement with domestic borrowing		1.5	1.9
<b>Private consumption (annual growth rate)</b>			
First baseline scenario		3.1	4.2
MDG 2 achievement with direct-tax revenue		3.7	4.2
MDG 2 achievement with external borrowing		3.0	4.1
MDG 2 achievement with domestic borrowing		2.8	3.6
<b>Private investment (annual growth rate)</b>			
First baseline scenario		3.8	5.0
MDG 2 achievement with direct-tax revenue		4.5	5.0
MDG 2 achievement with external borrowing		3.8	4.9
MDG 2 achievement with domestic borrowing		2.6	-18.6
<b>Exports (annual growth rate)</b>			
First baseline scenario		-2.3	3.2
MDG 2 achievement with direct-tax revenue		-2.3	3.2
MDG 2 achievement with external borrowing		0.0	3.6
MDG 2 achievement with domestic borrowing		-3.1	0.1
<b>Domestic public debt (per cent of GDP)</b>			
First baseline scenario	8.1	7.8	7.7
MDG 2 achievement with direct-tax revenue	8.1	7.8	7.7
MDG 2 achievement with external borrowing	8.1	7.8	7.7
MDG 2 achievement with domestic borrowing	8.1	17.6	44.9
<b>External public debt (per cent of GDP)</b>			
First baseline scenario	29.1	30.8	34.4
MDG 2 achievement with direct-tax revenue	29.1	30.8	34.6
MDG 2 achievement with external borrowing	29.1	35.6	42.2
MDG 2 achievement with domestic borrowing	29.1	31.3	37.4
<b>Income taxes (per cent of GDP)</b>			
First baseline scenario	14.6	14.2	14.9
MDG 2 achievement with direct-tax revenue	14.6	15.6	15.8
MDG 2 achievement with external borrowing	14.6	14.2	14.9
MDG 2 achievement with domestic borrowing	14.6	14.2	14.9

**Source:** Authors' estimates based on MAMS.

costs would rise and further reduce fiscal space and increase borrowing requirements. According to the simulation results, the substantial financing requirements would quickly push public debt to likely unsustainable levels when recurring to borrowing, especially in the case of domestic borrowing.<sup>4</sup> Again, the challenge for South Africa to broaden the space for domestic resource mobilization will be to achieve higher and sustained growth and reduce unemployment.

### *Poverty reduction under simulated scenarios*

The application of the microsimulation approach enabled the computation of poverty and inequality indicators for baseline and MDG-achievement scenarios. Under the assumptions of the first baseline scenario, extreme poverty incidence, as measured by the percentage of the population earning less than \$1.25 a day, would fall to around 23.1 per cent in 2015, from 38.4 per cent in 2005 (Table 6.7), thus meeting the target of 25.4 per cent (Table 6.3). The reduction of poverty is accompanied by a reduction in

Table 6.7  
South Africa: Poverty and inequality indicators in the base year and 2015 for the baseline and tax-financing MDG scenarios

	Base year (2005)	End of simulation period (2015)				
		Baseline	Achieving MDG 2 only	Achieving MDGs 4 & 5 only	Achieving MDGs 7a & 7b only	Achieving all MDGs
<b>First baseline growth assumption</b>						
Incidence of poverty (per cent of the population)						
\$1.25 per day poverty line at PPP	38.4	23.1	22.8	22.3	23.6	21.9
\$2 per day poverty line at PPP	43.2	28.1	27.4	26.2	28.6	26.2
Gini coefficient for labour income	0.633	0.621	0.620	0.618	0.626	0.619
<b>Optimistic baseline growth assumption</b>						
Incidence of poverty (per cent of the population)						
\$1.25 per day poverty line at PPP	38.4	20.2	20.0	19.3	20.7	19.3
\$2 per day poverty line at PPP	43.2	23.9	23.4	22.8	24.5	22.8
Gini coefficient for labour income	0.633	0.610	0.606	0.605	0.614	0.608

**Source:** Authors' estimates based on MAMS.

income inequality as the Gini coefficient for labour income declines slightly (Table 6.7).

Lower unemployment is a main factor determining the reduction in poverty and inequality in the MDG scenarios.<sup>5</sup> The unemployment rate of unskilled labour (workers who have not completed secondary education) declines from 33 to 24.1 per cent between 2005 and 2015, resulting in a decline in extreme poverty incidence to 24.5 per cent in 2015. The increase in real wages that most workers experience explains the remaining reduction in poverty and inequality.

In the MDG-achievement scenarios with tax financing, extreme poverty falls the most when all the MDGs are targeted simultaneously because, as explained earlier, the additional MDG spending that the government mobilizes would be relatively less owing to MDG synergies, as a result of which the macroeconomic trade-offs and the GDP growth effects in particular, would also be relatively less important. Extreme poverty in 2015 falls from 23.1 per cent in the first baseline scenario to 21.9 per cent in the scenario where all MDGs are achieved using tax financing. Extreme poverty in 2015 is slightly higher when only one or two goals are targeted (Table 6.7). The distribution of income, which is mostly driven by a reduction of the unemployment rate, and changes in the structure of remuneration to a lesser extent, does also improve in the MDG-achieving scenarios. Poverty and inequality are less when the MDGs are achieved under the higher GDP growth assumption of the second baseline scenario. The poverty incidence, as measured by the \$1.25 per day poverty line, would be between 2.6 and 3.0 percentage points lower under the assumptions of the optimistic growth baseline scenario as compared with the moderate growth baseline. Poverty would be significantly lower when measured by the \$2 per day poverty line. This suggests that there is a high concentration of people with incomes around the moderate poverty line in South Africa and that even a modest acceleration of economic growth could help achieve significant poverty reduction. This underscores the importance of current government plans to lift constraints to growth and job creation.

## CONCLUSIONS AND POLICY IMPLICATIONS

South Africa's economic growth performance has been fairly satisfactory over the last decade and more. However, economic growth has not been accompanied by much needed reductions in unemployment, which continues to be high due to a growing labour force, high real wages, and

a decline in the demand for unskilled workers. Still widespread poverty also remains an issue and inequality has actually worsened further recently. Current policies that can create job opportunities include measures to reduce backlogs in infrastructure, most notably harbour backlogs, and to enhance competition and reduce the degree of concentration of economic activity. Macroeconomic policies should also aim to reduce the trade deficit, increase domestic savings and ensure a competitive exchange rate. However, borrowing requirements for the government to finance large infrastructure spending projects and increased spending on social welfare programmes present challenges for economic growth in the short run.

Given the relatively favourable economic situation, South Africa has made some progress in terms of achieving the MDGs. There are, however, important gaps that need to be paid particular attention since under current policies and expected growth only the extreme poverty goal (MDG 1) would be achieved by 2015. The scenario analysis of this chapter helped to determine that spending on education, health, and water and sanitation would have to increase by nearly 9 per cent of GDP compared to a baseline where GDP grows as forecast by the National Treasury for 2010-2012. Reducing mortality rates would be most costly, with additional public health spending requirements amounting to little less than 5 per cent of GDP. These cost estimates would be slightly less under more optimistic growth assumptions and would be somewhat higher if the strategy would be to achieve one or two goals at a time, instead of all goals simultaneously, given the synergies among some MDGs.

The government will have to create substantive additional fiscal space. The simulation results suggest this will be an enormous challenge. Using income tax revenue this would need to be about 15 percentage points of GDP higher by 2015 compared to 2005 (for both the trend GDP and optimistic GDP baselines), but the total tax burden is already considered relatively high. In 2008, the IMF estimated total government debt at a conservative 26.7 per cent of GDP. The debt burden would increase rapidly to likely unsustainable levels when financing the MDG strategy through foreign or domestic borrowing, and more steeply in the case of the latter.

Thus, the government will have to rely heavily on increased tax revenue to finance the MDG strategy. It will have to make sure that the policies related to the New Growth Path, which aims to promote economic growth and employment opportunities, also comprise measures to broaden the tax base. Areas where more jobs can be created include infrastructural works, agro-industries, processing of mining products, investment in green energy

and climate change adaptation, tourism, and some high-end services. If the economy grows and unemployment among unskilled workers falls systematically, South Africa would also ensure the achievement of the extreme poverty goal and likely a reduction in inequality.

In spite of the new spending requirements that have been gauged through the scenario analysis, one should take into consideration that government spending on education and health is already high and has not been seen to accelerate MDG achievement in any efficient way. Therefore, it is of paramount importance that South Africa addresses the quality of service delivery and improves its MDG monitoring to ensure that it remains on the right track.

Importantly, the success of any MDG-related strategy will depend on combining these measures with the aforementioned policies to pursue economic growth and job creation, thereby giving the government the opportunity to broaden the tax base.

## NOTES

- 1 In the official definition, the unemployed are those individuals within the economically active population who: did not work during the seven days prior to the interview; want to work and are available to start working within two weeks of the interview; or are actively looking for work or some form of self-employment in the four weeks prior to the interview. In the expanded definition of unemployment, the third criterion (some sort of work-seeking activity) is dropped such that unemployment also includes so-called “discouraged job seekers”.
- 2 Some MDG indicators generated by MAMS and the microsimulation approach may differ from MDG indicators as published in United Nations (UN) reports and those in Table 6.1. For example, the UN reports extreme poverty to be 9.7 percent in 2006, much less than 38.4 percent as generated by the integration of MAMS results and the microsimulation approach. The main difference lays in the use of different sources of information for the estimation of extreme poverty: the UN report uses the Income and Expenditure Survey for 2005 and 2006, while the microsimulation approach was applied here with data from the 2008 GHS. The construction of the income variable that was used to compute extreme poverty is also different. In any case, the UN report also indicates that South Africa is likely to reach the target for extreme poverty. Another difference is that MAMS uses the net on-time primary completion rate (that is, the product of the entry rate and the promotion rates for the relevant series of years in the primary cycle) for the relevant age cohort as the indicator for MDG 2. UNDP in 2010 reported the primary completion rate for 18 year olds only, and not on time.
- 3 This result is also partly model-driven, as the elasticity of the different MDG indicators with respect to household consumption per capita, one of the MDG determinants the value of which increases when GDP growth is higher at given population growth rates, has been assumed to be very low for the calibration of

- MAMS for South Africa (that is, 0.1 for education behaviour parameters or even lower for the other MDG-related indicators).
- 4 In fact, public debt levels turned out to be so high in scenarios where all non-poverty MDGs were targeted using either foreign borrowing or domestic borrowing to finance the newly required public spending, that MAMS could not reach a feasible macroeconomic solution at the end of the simulation period.
  - 5 See Kearney and Odusola (2010) for a decomposition of the microsimulation results presented here.
  - 6 Quantec (Pty) Ltd is a privately owned company in South Africa selling data, software and consultancy services to various agents and institutions in South Africa, including the government and academia.
  - 7 This choice of the base year of the SAM (and the model) is important particularly in the case of primary education as, in order to achieve the related target (MDG 2), the model follows the age cohort that should enter into the education system and pass all grades without repeating one in order to graduate in 2015. A simulation period of 10 years also permits to perform a good calibration and likely all efforts need not be made exclusively at the end of the period.

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## APPENDIX A6.1

## CALIBRATION AND DATA ISSUES

MAMS requires two data sets in order to be fully calibrated: a “general dataset” that permits to solve a reduced, core version of the model, and a “MDG dataset” by means of which the MDG module of the model becomes operational. Here we described very briefly the main pieces of information that were used to complete both datasets.

The most important data are comprised in a Social Accounting Matrix (SAM) in the general dataset. This is a consistent accounting framework that links supply and use tables and institutional sector accounts. To calibrate MAMS, however, the SAM must be extended to make proper account of activities and commodities that would be directly or indirectly associated with the MDGs (such as education, health, sanitation, and infrastructure). It further requires distinction between government and private provision of the services; labour groups by education level; capital accounts of the institutions represented in the model (households, government and rest of the world; institutions’ borrowing and associated interest payments); and investment by sector of destination associated with each capital stock.

Various SAMs have been constructed to represent the South African economy, as reported in Conninghart Economists (2001), Statistics South Africa (2002) and Quantec (2003 to 2010). The latest SAM released by Quantec<sup>6</sup> is based on 2008 national accounts figures. However, for the purposes of the present analysis we decided to use the Quantec 2005 SAM to allow a sufficient number of years before the MDGs are supposed to be met.<sup>7</sup> The 2005 Quantec SAM was also chosen as a basis for developing the SAM for MAMS as it already contained a well-disaggregated government sector. It was also chosen because the other SAMs do not disaggregate the sources of income of the represented households, and knowing, for example, whether households get the majority of their income from labour or capital is essential for policy analysis. The various adjustments and extensions performed to get the 2005 Quantec SAM in the required format for MAMS, and the data sources used, are described in Kearney and Odusola (2010).

Other data used to complete the general dataset include a GDP growth forecast, growth in government consumption, receipts, and debt, a population growth forecast, a labour force growth forecast, factor quantities, as well as trade, production and consumption elasticities. Sources used to compile these data include budget projections from the National Treasury, data from the South African Reserve Bank (SARB), Statistics South Africa, and UNESCO. Some elasticity values were estimated; however, guesstimates defined on the basis of international empirical evidence and sensitivity

analysis had to be used where lack of data prohibited estimations. The data used to calibrate MAMS and how these were obtained are described in Kearney and Odusola (2010).

MAMS includes an MDG module, which, through government production functions, generates MDG indicators that are a function of a series of socio-economic determinants. These include government spending, the MDG policy variable in the MAMS framework, and also some MDG indicators themselves: for example, reductions in child mortality (MDG 4) have a positive impact on education attainment (MDG 2), as explained in Chapter 1 of this volume.

A complete MDG dataset should contain estimations of these elasticities. The 2008 General Household Survey (GHS) was used to carry out estimations for determinants of education attainment and the determinants of water and sanitation, the results of which are summarized in Table A6.1 panel (a), just as they are set out in the MDG dataset of MAMS. This table shows the extent to which different MDG indicators or education behaviours that MAMS uses to compute the primary completion rate or MDG 2 indicator (as set out row-wise) would change as a result of different socio-economic determinants (as set out column-wise) including the delivery of public services per capita or student and also synergies between pairs of MDG indicators. A negative elasticity indicates that determinant and indicator move in opposite directions: for example, if child mortality (MDG 4) increases, primary completion rates (MDG 2) would decline as a result. Details on how the authors arrive at these elasticity values are provided in Kearney and Odusola (2010).

The elasticities for child and maternal mortality could not be estimated empirically as the authors did not have access to a survey with relevant information. The 2008 GHS did not cover any form of mortality whether for children or mothers. The Department of Health Survey for 2003 does cover these aspects but it is not available for public use. In these cases, guesstimates were used as starting points, the selection of which was based on values from models applied to other developing countries. These guesstimates were subsequently fine-tuned to calibrate the logistic functions of MAMS in a way that they would generate values for MDGs 4 and 5 that turned out to be consistent with past trends. Accordingly, the determinants tend to affect maternal mortality more than child mortality and this reflects that interventions would be relatively less effective in reducing child mortality in South Africa (see Table A6.1).

The MDG dataset also includes information on a hypothetical scenario under which it is thought the target would be met in 2015 for each indicator

separately—or in 2010 for primary completion, year as of which the age cohort that enrolls for the first time in first grade of primary would pass until graduating in 2015 without repeating, for a cycle of six grades. This hypothetical scenario is imputed through ratios for the value of each determinant in the target year (2015 for all MDGs except education for which the target year is 2010 as explained earlier, and poverty as further explained below) and in the base year of the model (2005). These ratios are estimated from observed data and provide MAMS with a starting point to calibrate its logistic functions for the corresponding MDG (see Table A6.1, panel (b)). For example, the table shows that health spending per capita would need to be 1.26 times higher in 2015 compared to 2005 for MDGs 4 and 5 to be achieved. Household per capita consumption would by and large have to double to achieve most MDGs. The main gaps would be thought to be for MDGs 7a (drinking water) and 7b (sanitation), which would presumably be achieved only if spending in water and sanitation per capital quintuplicate. As said, these are all isolated scenarios. MAMS would likely provide different ratios for MDG achievement once all general equilibrium effects have been taken into consideration.

### *Microsimulation approach*

For the purposes of this study, results of the labour market generated in all MAMS scenarios were imposed on a micro dataset in top-down fashion, in order to, through microsimulations, estimate income distribution and poverty indicators without having to make any assumptions on the form of the distribution. The approach is explained in more detail in Chapter 1 and its use is justified to the extent that the distributional detail one would have in any typical CGE model is fairly limited.

The GHS for 2008 was used to generate the microsimulations for South Africa. The variables used from the GHS include age, gender, level of skill according to the level of education, employment status, labour income, and sector of employment. There are 24,293 respondents to the survey. For the base year, in particular, the application of the microsimulation approach yielded a percentage of the population that lives below the 1.25-dollar-a-day poverty line to be in the region of 38.4 per cent compared to other estimates of 44.5 per cent. The Gini coefficient for labour income was estimated to be around 0.63, which is also somewhat lower than other estimates (United Nations, 2007). The differences may be attributed to the use of different data sources and methodologies employed to estimate labour income and per capita household income.

Table A6.1  
South Africa: Elasticities and parameters used to calibrate the MDG module in MAMS

MDG indicator or education behaviour	Health spending per capita	Water & sanitation spending per capita	Education spending per student (education quality)	Stock of public infrastructure	Household consumption per capita	MDG 4	MDG 7a	MDG 7b	Wage premium
<b>(a) Elasticities of MDG indicators with</b>									
MDG 4: child mortality	-0.49			-0.05	-0.05		-0.10	-0.10	
MDG 5: maternal mortality	-0.86			-0.09	-0.09		-0.09	-0.09	
MDG 7a: drinking water		1.00		0.06	0.01				
MDG 7b: basic sanitation		1.00		0.06	0.00				
Entry rate - primary education			1.00	0.10	0.10	-0.10			0.10
Pass rate - primary education			1.00	0.10	0.10	-0.10			0.10
Pass rate - secondary education			1.00	0.10	0.10	-0.10			0.10
Pass rate - tertiary education			1.00	0.10	0.10	-0.10			0.10
Continuation to secondary education			1.00	0.10	0.10	-0.10			0.10
Continuation to tertiary education			1.00	0.10	0.10	-0.10			0.10
<b>(b) MDG achievement scenario (2015/2005 ratios)</b>									
MDG 4: child mortality	1.26			1.89	2.13		2.56	4.50	
MDG 5: maternal mortality	1.26			1.89	2.13		2.56	4.50	
MDG 7a: drinking water		5.65		1.89	2.13				
MDG 7b: basic sanitation		5.65		1.89	2.13				
Entry rate - primary education			1.52	1.63	1.79	0.55			1.00
Pass rate - primary education			1.52	1.63	1.79	0.55			1.00
Pass rate - secondary education			1.04	1.89	2.13	0.60			1.00
Pass rate - tertiary education			1.10	1.89	2.13	0.60			1.00
Continuation to secondary education			1.04	1.89	2.13	0.60			1.00
Continuation to tertiary education			1.10	1.89	2.13	0.60			1.00

Source: Authors' estimates.

# Chapter 7

## Tunisia

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### INTRODUCTION

Tunisia has had one of the fastest growing economies in North Africa and the Middle East (MENA) since the 1990s. By 2010, gross national income per capita had increased to \$4,070, three times more than thirty years ago. Economic growth was driven by labour-intensive and export-oriented manufacturing activities, creating jobs for low and semi-skilled workers, including many females. Economic diversification, along with high inflows of workers' remittances, underpinned domestic demand growth.

Robust economic growth also strengthened government revenue, which in turn helped finance increased social spending. In Tunisia, almost all children attend school compared to only 80 per cent for the MENA region as a whole. Also, female labour participation is high compared to the rest of the region. More children also survive their first few years of life and also life expectancy is above average in comparison with both lower-middle-income and MENA countries. In 2005, only 3.8 per cent of the population lived in extreme poverty as measured against the lower national poverty line. Income inequality has also dropped steadily since the 1990s. As a result of these achievements, the middle class has expanded to nearly 81 per cent of the population.

It is not surprising therefore that Tunisia has made considerable progress towards the millennium development goals (MDGs). Up until 2010, the country was on track towards reducing extreme poverty, achieving universal primary education, reducing child mortality and providing the population with access to drinking water and basic sanitation. The 2008-2009 global crisis did not cause major setbacks as the government responded in a

timely manner with countercyclical spending policies to offset reductions in private expenditures on MDG-related services. The country is not on track to achieve the target of reducing maternal mortality by two thirds, however, but its achievement seemed elusive before the global financial crisis erupted. Meeting this MDG target by 2015 will require significant improvements in access to maternal care, especially in rural areas.

Despite the countercyclical fiscal response, GDP growth decelerated in 2008 and 2009. The economy regained some steam in 2010, but popular discontent with persistent high rates of (youth) unemployment, inequality in economic opportunities, related in part to important skill mismatches in the labour market, rising food inflation, perceptions of excessive government control and corruption, and lack of political freedom cause a social revolt and the toppling of the regime in early 2011.

The Tunisian revolution affected economic activity. GDP contracted and the fiscal deficit widened—owing to fewer fiscal receipts and higher social transfers—in 2011. Constitutional reforms paved the way for democratic elections, leading the international donor community to pledge loans and grants for political and economic reconstruction. Once social tensions have subsided, the economy may get back on more solid footing again.

As growth in Tunisia has been pro-poor in recent decades, the questions worth raising are whether the country is likely to remain on track towards meeting the MDG targets despite the economic consequences of the revolution, and, should that not be the case, what additional public spending efforts would be needed to achieve the goals. Additional questions are what would be the fiscally and economically most sound financing mechanism to cover the additional spending costs, and what would be the economy-wide repercussions of further scaling up the spending on MDG related services.

To answer these questions we use a model-based analysis applying the computable general equilibrium (CGE) model known as MAMS to Tunisian data. The salient characteristics of this model, especially the inclusion of a module of determinants to MDG achievement, are briefly explained in Chapter 1 of this volume and discussed in more detail in Lofgren and Díaz-Bonilla (2010a and 2010b).

The next section describes the main economic trends, along with economic reforms and macroeconomic policies implemented during the period from 1990 to 2008. It also provides a short discussion of the economic impact of the global financial crisis and the revolution on the Tunisian economy during 2009-2011. The subsequent section describes the key features of social policies and the progress made towards meeting the

MDG targets, as well as the prospects of achieving them by 2015. The main features of MAMS for Tunisia as well as the key policy simulation results are presented in the fourth section. A main finding is that, despite significant progress in past decades, the additional public spending requirements to meet the targets are substantial. Furthermore, the affordability of the extra fiscal costs will depend on the ability of the country to mobilize foreign resources that should gradually be replaced by domestic resources through fiscal reforms that permit to enhance the efficiency of tax collection and by this means broaden the tax base. The final section presents the main conclusions and policy recommendations, in particular regarding the best financing strategy to be followed by the Tunisian government if it is to keep fiscal and public debt sustainability and pursue the achievement of the MDGs without sacrificing economic growth.

#### REFORMS AND MACROECONOMIC POLICY, PERFORMANCE, AND VULNERABILITIES

##### *Main economic reforms and policies*

The structural adjustment program, whose implementation began in mid-1986, marked a turning point in economic policymaking since Tunisia's independence. The programme aimed at preserving macroeconomic stability and a balanced budget, opening the Tunisian economy to global markets, and reducing poverty and income inequality through greater coherence between social and economic policies. The reforms were expected to spur economic growth that would trickle down to the population through job creation and overall income growth. This policy orientation was sustained until the global financial crisis started to unfold.

The accession to the WTO in 1995 and the implementation of a number of bilateral and regional free trade agreements helped deepen Tunisia's integration into the world economy. The association agreement with the European Union (EU) in 2008 represents the major trade agreement signed by Tunisia. During the same period, the government committed to a host of programs and economic policy actions to enhance competitiveness, including reforms consolidating tax and financial legislations; deregulation of investment, trade and price regimes; rebalancing the roles of public and private sectors; modernisation of the administration of the financial and banking systems; infrastructure improvements; investment in human capital and upgrading of firms and production sectors.



Export sectors in duty-free processing zones have received generous fiscal incentives since the 1970s. Until the mid-1990s, capital-intensive domestic economic activities have been shielded against international competition through high import tariffs and a complex system of non-tariff barriers. Export incentives consistent with WTO and FTAs rules were maintained, however, in order to promote the development of labour-intensive light manufacturing sectors which spurred GDP growth and job creation during the 1990s and 2000s.

Prudent fiscal and monetary management helped control inflation, thereby contributing to fighting poverty and securing a stable macroeconomic environment. The average inflation rate was close to 5 per cent in the 1990s, declining to below 3 per cent in the period 2000-2007. In 2008, due to higher food and energy prices, inflation surged to 5 per cent, but tapered off again to 3.7 per cent in 2009 (International Monetary Fund, 2010).

Maintaining healthy public finances has not been easy because of an array of mandatory expenditures. The volatility of world market prices of key import commodities, notably oil and food, has also had a direct bearing on the government budget because of subsidies on those commodities, as well as on operating surpluses of state-owned companies. The phasing out of tariff protection on imports from the EU and other trading partners led to considerable reductions of revenues from duties. However, reforms to the value-added tax (VAT) system and better income and corporate profit tax collection mechanisms compensated for those revenue losses (Table 7.1).

Public finances also improved through better resource allocations, enhancement of private-public partnerships in infrastructure and other services previously provided solely by the state, and a reduction of fuel subsidies through the continued control of energy use and the progressive adjustment of prices to market conditions. This allowed reducing the budget deficit (excluding privatization and grants) to less than 3 per cent of GDP on average during 2000-2009, down from an annual average of almost 5 per cent in the 1980s—when social spending and generous increases in government salaries resulted in macroeconomic disequilibria. The government increasingly relied on domestic borrowing to finance its deficit, in spite of low national savings (Table 7.1). Recently, workers remittances have fallen as a consequence of the global financial crisis, the unfolding of the revolution in early-2011 and, more recently, the civil war in Libya, the main destination of Tunisian migrant workers. This substantially weakened the domestic resource base, as remittances had become to represent nearly half of national savings. Slower growth and stimulus measures taken to

Table 7.1  
Tunisia: Selected fiscal indicators, 1995-2009

Per cent of GDP, unless otherwise indicated				
	1995	2000 <sup>1</sup>	2005	2009
Tax revenue	19.9	19.8	20.6	19.9
<b>Structure of total tax revenue (per cent)</b>				
Direct taxes (on income and profit)	23.9	30.0	36.5	39.8
Import taxes	22.8	12.1	6.4	4.5
VAT	26.5	33.2	29.1	29.1
Taxes on consumption	17.6	17.6	15.33	13.7
Other taxes	9.1	7.1	12.6	13.0
<b>Deficit, borrowing and debt</b>				
Overall deficit, excluding grants and privatizations	-4.5	-2.8	-3.2	-3.0
Overall deficit, including grants and privatizations	-4.1	-0.6	-2.6	-2.7
Government borrowing	4.1	0.6	-2.6	2.7
Foreign	2.9	0.0	0.8	0.0
Domestic	1.2	0.6	1.8	2.7
Government debt <sup>2</sup>	58.4	58.1	58.3	42.8
Foreign <sup>2</sup>	38.4	35.3	21.0	17.7
Domestic <sup>2</sup>	20.0	22.8	37.2	25.0

<sup>1</sup> Data for deficit, borrowing and debt are for 1998.

<sup>2</sup> Debt stocks of the central government.

**Source:** National Institute of Statistics of Tunisia (INS in French).

counteract the impact of the global financing crisis pushed the government deficit back up to 3 per cent of GDP in 2009, from 1.2 per cent in 2008. During 2011, the deficit widened further owing to the effects of the revolution on the economy.

Before the crisis, fiscal discipline allowed for a sustained reduction of the government debt, which was brought down to under 43 per cent of GDP by 2009. Yet, it may have also prevented the country from enjoying higher and sustained economic growth, for instance, if more would have been invested in infrastructural improvements. Furthermore, fiscal reforms did little to deal with excessive government regulation in many activities, which is limiting competition in domestic markets.

Tight monetary policy has also led to a persistent overvaluation of the currency, making it more difficult for producers to compete with other developing country exporters, such as China. Even so, prior to the crisis and the revolution, export growth, tourism receipts, remittances from abroad, and foreign direct investment (FDI) have helped to improve the external

balance, and kept foreign government debt in check (Table 7.1). By 2010, the current account deficit had been brought down to less than 3 per cent of GDP, well below average for the period 1995-2007.

### *Growth and poverty reduction*

Tunisia witnessed robust economic performance between 1990 and 2007, with total and per capita GDP growing at average annual rates of 4.8 and 7.2 per cent, respectively. Total GDP growth averaged 3.9 per cent per year during 1990-1995. With the maturing of the economic reforms, GDP growth accelerated to 5.6 per cent per year during the second half of the 1990s. However, GDP growth slowed visibly to 4.9 per cent per year during 2000-2007 and further to 4.5 per cent in 2008 and 3.1 per cent in 2009, owing to the global financial crisis. The economy recovered slightly in 2010, when output grew by 3.8 per cent. Up to this point, the growth outlook looked brighter than that of some other parts of the world.

It may seem paradoxical therefore that despite palpable economic growth and major social achievements and despite the government's ability to provide social protection during the global financial crisis, so much discontent and unrest erupted among the populace. However, not all shared in the gains from growth, as persistently high youth unemployment and growing discontent with overreaching government control and perceived corruption were among the factors that ignited political turmoil in late 2010 that resulted in the ousting of President Zine El Abidine Ben Ali in early 2011. The unrest led to instability, putting the economy in serious peril. GDP growth declined by 3 per cent in the first half of 2011. There was a mild recovery in the second half but GDP growth for the year posted nonetheless an estimated -0.6 per cent.

The satisfactory growth performance until 2007 had been driven by a development strategy that combined prudent macroeconomic management and direct government involvement in productive decisions through a complex system of incentives and ad hoc interventions. However, the effectiveness of this strategy to achieve higher growth has been challenged by high unemployment, vulnerability to external shocks, lack of competition in the service sectors, and unfavourable weather conditions (particularly the drought of 1990-1995). The global financial crisis uncovered several of these weaknesses and the situation has become more challenging with the revolution. Of particular concern is the high level of youth unemployment, which hovered at 25 per cent in late 2010.

The sectoral composition of GDP reveals four major trends during the 1990-2007 period. First, the services sector has become the mainstay of the economy, accounting for about 57 per cent of GDP. Recent growth is mainly attributable to the emergence of new sectors with high potential, including financial services, health, education, data processing, telecommunications and business services. Tourism has become a key driver of the economy. For example, in 2009, the sector contributed 5 per cent to GDP, 11.6 per cent to total current account receipts from abroad, and 12 per cent to total employment. Second, manufacturing output growth has outpaced that of the industrial sector at large. Even so, manufacturing's share in total GDP averaged only 17.6 per cent over the period, much less than in fast-growing emerging economies. Manufacturing's share in total employment is substantial, generating 32.3 per cent of all jobs in the economy, especially for low-skilled, mostly female workers in textiles and clothing. Third, export-oriented sectors, notably textile and electromechanical equipment industries, have been weakly integrated with the rest of the economy, thus limiting their contribution to growth and employment. Fourth, agriculture's contribution to GDP has been rather volatile. It averaged 13.4 per cent of GDP for the 1990-2007 period as whole, but settled to below 10 per cent in 2005-2009.

Private consumption remains the main driver of growth and occupies a central place in Tunisia's development strategy. Increasing at an annual average rate of 4.7 per cent during 1990-2007, private consumption accounted for 62 per cent of GDP in that period, much more than the contribution of exports, as further explained below. In fact, private consumption typically has contributed to offset reductions in foreign demand during international crises, such as, for example, the first Gulf war of 1991. Public consumption has also remained high at 15.6 per cent of GDP on average during 1990-2007, in spite of successive privatization plans initiated since the adoption of the structural adjustment programme. Continued expansion of government spending has supported the progress made towards the MDGs.

Exports are the second driver of growth owing to the strategy of development of export-oriented manufacturing industries. Exports contributed almost 44 per cent of GDP growth over the period 1990-2007, growing at 5 per cent per year, slightly above the pace of GDP growth. Fiscal incentives attracted foreign firms that helped develop a competitive manufacturing sector. Tunisian firms managed to increase their share in the European market and elsewhere. The diversification of markets and products has been crucial to export dynamics.

Gross fixed capital formation is the third driver of growth, with an average contribution to GDP estimated at 23.3 per cent from 1990 to 2007, a period during which it grew on average by 4 per cent per year. Public investment represented nearly 18 per cent of gross fixed capital formation in 2008, which is relatively high considering the several reforms undertaken to increase the role of the private sector in the economy. This has enabled the maintenance of capital stocks in adequate amounts to provide key social services for human development, though there is still ample scope for infrastructural development.

The impact of the global financial crisis was mainly transmitted through trade. In 2009, export and import values (in US dollars) declined compared to 2008, but the trade deficit fell from 8.9 to 8.5 per cent of GDP between 2008 and 2009 (International Monetary Fund, 2010). To contain the impact of the global crisis, the government deployed a fiscal stimulus package representing 1.4 per cent of GDP, and the Central Bank of Tunisia (CBT) devised a more accommodating monetary policy. The CBT reduced interest rates, implemented policies to increase credit and liquidity in the banking system, and doubled its capital to finance small and medium-sized enterprises so as to boost domestic investment. As part of its countercyclical response, the government allowed the budget deficit to rise in 2009, which helped push aggregate demand back up and GDP increased by 3.1 per cent, while most trading partners (especially in Europe) saw a much more protracted recovery.

The growth outlook for 2010 was conditioned by uncertainties on the expected global recovery that would particularly affect exports, tourism receipts and workers' remittances. The 2010 budget law maintained a supportive fiscal policy to ensure the economic recovery would not be undermined by an early withdrawal of stimulus measures introduced in 2009. As said, the economy managed to recover by 3.7 per cent in 2010, but the recovery was short-lived due to the unfolding of the revolution.

One last but critical aspect of Tunisia's growth model is that it has been pro-poor. Policies have been supportive and development programs have been put in place to provide infrastructure for agricultural development. More investment in education, health and birth control programs has helped increase the quantity and quality of human capital. The education strategy pursued in the first two decades after independence (the 1960s and 1970s) was very selective with respect to passing grades and graduation from primary school, resulting in a relatively competent civil service and workforce that has helped to boost growth and reduce poverty. The industrial development strategy based on light manufacturing and export

growth and the expansion of tourism have paid off in terms of employment creation, particularly for low-skilled workers.

Both poverty incidence and income inequality—as measured on the basis of data from the household expenditure surveys—have decreased more or less continuously since the 1980s. Different studies provide evidence that poverty and economic growth have been highly correlated.<sup>2</sup> Although in times of growth deceleration, it has been social policies that have helped keep poverty on the decline. Even though economic growth was faster in the early-1990s, the incidence of rural poverty increased by 2.7 points for the first time since 1980—while urban poverty declined slightly—as agricultural output contracted owing to three consecutive years of drought. After that period, poverty resumed its decline in both rural and urban areas. Poverty is reasonably expected to have increased in 2011 as the revolution took its toll on output and employment growth.

### *Economic vulnerabilities*

Economic diversification and good macroeconomic management have helped Tunisia weather international price shocks. Exports from Tunisia are more diversified than those from most other MENA countries and comprise agricultural goods, energy, some mining products, services, and various manufactured products. However, world prices for key imported products, especially food and energy, have a strong influence on domestic consumer prices.

Policy responses to world price shocks have been timely. Since 1986, when a sharp fall in oil prices nearly precipitated a balance of payment crisis, the authorities have followed consistent stabilization policies and adopted gradual adjustment measures, including expenditure restraint, revenue measures, and control of monetary aggregates. The exchange rate has been managed flexibly, but the overall objective has been to maintain its stability. Vulnerability to capital flow volatility has been contained through the use of capital controls.

By various indicators, Tunisia is a moderately indebted country (see Table 7.1). However, domestic resource mobilization is critically constrained. As a consequence, any serious deterioration of the external balance would likely lead to higher external indebtedness and a deterioration of the external debt profile due to unfavourable term structures of interest rates. The factors that could undermine the external stance include a concurrent surge in imports from the EU, weak international demand for Tunisian

exports, adverse price shocks, lack of competition in domestic markets and less FDI and fewer workers' remittances.

## SOCIAL POLICY AND PROGRESS TOWARDS THE MDGs

### *Public spending*

Since independence, the Tunisian government has given importance to the social sector, with a view to improving the social conditions of the population. Total public spending on education and health, two key MDG-related sectors, has been subject to some fluctuations as a share of total spending (Table 7.2). Public spending on all levels of education has historically been high. It represented about 25 per cent of total government spending over the period 2006-2008.<sup>3</sup> More than 91 per cent consists of current expenditures, however, leaving important deficits in education infrastructure. In 2009, capital spending on education increased sharply as a result of the fiscal stimulus package. The share of public spending allocated to the health sector declined sharply from over 10 per cent during the 1970s and 1980s to a mere 5.7 per cent in 2008. This was the direct result of a deliberate policy that encouraged the development of a private health system for which Tunisians have shown growing preference as they have witnessed improved healthcare results. Nonetheless, as further shown below, the country still needs public interventions to achieve health-related development goals, especially in reducing maternal mortality.

Public spending policies have also given priority to both increasing investments in irrigation, drainage and reuse of treated wastewater and

Table 7.2

**Tunisia: Government spending on transfers and social services, 1990-2008**

Per cent of total government spending					
	1990	2000	2006	2007	2008
Education	20.7	16.0	25.1	25.2	24.0
Health	6.6	5.2	6.1	6.3	5.7
Agriculture and water management	6.1	4.8	4.4	4.1	5.1
Electrification	4.1	4.6	n.a.	n.a.	n.a.
Food subsidies	8.8	5.6	2.8	2.7	7.6
Transfers and other subsidies (energy)	11.5	15.9	11.3	10.5	12.3

n.a.: data not available

Source: Authors' calculations based on data from INS.

mobilizing and distributing drinking water. Nonetheless, in 2008 the share of spending for these purposes was still below that of 1990. However, spending for the mobilization and distribution of safe drinking water is managed by a public enterprise and a large share of the cost of investments is recovered through user charges.

The government has sustained the food subsidies, granted since the 1970s, in order to keep domestic food prices down. However, as a result of reforms implemented in the 1990s and 2000s, food subsidies are no longer universal but only apply to basic food items. Even so, food subsidies increased to 7.6 per cent of total government spending in 2008, up from 2.8 per cent in 2006, as a result of the rise in international food prices. The government has also managed to sustain transfers and other subsidies, including for social security, as a significant share of total government spending. These amounted to 12.3 per cent of total government spending in 2008, but are expected to increase over the longer term owing to the demographic transition that is underway.

### *Poverty reduction policies*

Since independence, social policy has been aimed at raising the purchasing power of the population, reducing unemployment and poverty, enhancing skills through better education and health systems, and improving access to social services and gender equality. In the period 1990-2008, mean incomes rose as a result of collective bargaining of wages that led to reforms to remuneration scales, revisions to the minimum wage and amendments to the labour code. The purchasing power of the minimum wage has been protected through successive nominal wage adjustments and the control of inflation. Indeed, the real purchasing power of wages increased by about 2 per cent per year during 1990-2006.

The government has also intervened intensively to limit the negative repercussions of economic deregulation on vulnerable social sectors with the help of a package of social protection instruments. Welfare transfers doubled between 1996 and 2005 to adopt such social protection policies, costing an estimated average of 0.4 per cent of GDP per year (Bibi and Chatti, 2007). Also, as said, the government has continued to subsidize food consumption, even though reducing these subsidies was one of the objectives of the structural adjustment program. The government has also implemented public works projects to provide jobs to unemployed poor workers.



The improvements in wages and other incomes and transfers no doubt have improved living conditions. Not only has the poverty rate declined, as shown further below, but the share of poor housing shrunk from 2.7 to 0.8 per cent between 1994 and 2004, and there has been a notable increase in homeownership. The coverage of drinking water, basic sanitation, and electrification also expanded greatly, particularly in rural areas.

The education system, while still showing deficits, has become more accessible to the poor, providing them greater opportunities to improve their living conditions. The government is also providing almost universal healthcare to the population, applying differentiated fees for the use of services. Family planning and birth control programs, which Tunisia embarked on as early as the beginning of the 1960s, very unusual for a Muslim country, have played a critical role in moderating population growth over the last three decades; it decelerated from around 3 per cent at the beginning of the 1960s to around 1 per cent in recent years. This may also have contributed to poverty reduction.

### *Progress towards MDG targets*

Consequently, Tunisia has made considerable progress towards the MDG targets (see Table 7.3 for selected MDG indicators). Nonetheless, not all the targets would be met by 2015 if pre-revolution public spending policies would continue unchanged, as further shown below. Progress in reducing maternal mortality has been insufficient. It is the area where Tunisia faces one of its biggest challenges. Areas where progress has been remarkable include poverty reduction, increasing primary completion rates for boys and girls and reducing child mortality. Using the international \$1.25 a day poverty line (in purchasing power parity), the extreme poverty target has already been met. The fast MDG progress achieved before the global financial crisis and the revolution prompted the government to set more ambitious goals and targets, including by adding one for improving the quality of education. But where progress has been lagging, the government has acknowledged the gaps that persist at the sub-regional level. Some regions have experienced remarkable strides in development, but others are still lagging behind (United Nations Development Programme, 2004).

Despite sustaining high levels of public spending on education and reforms to the schooling system, the goal of education for all has not yet been achieved. Although the share of students who do not complete primary education is small, it has not declined as much as expected. However, the education reform adopted in July 1991 yielded good results, guaranteeing

Table 7.3  
Tunisia: MDG achievement and targets for 2015

<i>MDG and related indicator</i>	<i>1990 (or circa)</i>	<i>2005 (or circa)</i>	<i>2015 target</i>
<b>MDG 1: Poverty headcount ratio (per cent of population)</b>			
National poverty line	6.7	3.8	3.4
US\$1.25-a-day poverty line (PPP)	5.9	2.5(2000)	3.0
<b>MDG 2: Enrolment rate (per cent)</b>			
Children aged 6 years	96.3	99.2 (2008-09)	100.0
Children aged between 6 and 11 years	88.1	97.7 (2008-09)	100.0
<b>MDG 4: under-five mortality rate (per 1,000 live births)</b>	37.3	22.1 (2002)	16.6
		18.4 (2007)	
<b>MDG 5: maternal mortality rate (per 100,000 live births)</b>	74.8	54.8 (2000)	18.7
<b>MDG 7a: Access to clean water (per cent of population)</b>	75.0	97.8 (2004)	100.01/
<b>MDG 7b: Access to basic sanitation (per cent of urban population)</b>	59.9 (1994)	70.4 (2002)	100.01/
		78.3 (2004)	

<sup>1</sup> A national, full coverage target is used in the table and the policy scenario analysis presented below. The international target of reducing by half the proportion of the population without coverage (from base year) would be 98.9 per cent for clean water and 89.2 per cent for basic sanitation in both urban and rural areas.

**Source:** INS (various publications), World Bank (2007) and United Nations Development Programme (2004).

nine years of basic education for all children aged 6 to 16, reducing the dropout rate and improving access to schooling for children aged 6 to 12. The enrolment rate for both boys and girls aged 6 passed from around 96.3 per cent in 1990-1991 to 99 per cent in 1999-2000 and 99.2 per cent in 2008-2009 (Table 7.3). For children aged 6 to 11, the net enrolment rate went up from 88.1 per cent in 1990-1991 to 97.1 per cent in 1999-2000 and 97.7 per cent in 2008-2009. This implies that repetition and dropout rates have also come down and that gender disparities in access in primary education have been significantly reduced.<sup>4</sup> Nonetheless, the quality of education is perceived to have declined with the increase in enrolment.

By 2007, Tunisia's under-five mortality rate was 18.4 deaths per 1,000 live births, just shy of its 2015 target of 16.6 (Table 7.3). The rate had fallen substantially as a result of the health system's modernization and increased coverage as well as other improvements in living conditions, including the steady decline in income poverty. The country will likely meet the under-five mortality target through additional efforts to address child healthcare

deficiencies in rural areas. In contrast, the country has made much less progress in reducing maternal mortality. According to the United Nations Development Programme (2004), maternal mortality will only reach 33.6 per 100,000 live births by 2015 if past trends continue and are linearly extrapolated into the future; this is well short of the target of 18.7. The main reason behind the lack of progress is the poor quality of emergency healthcare and deficient road and transport infrastructure in the rural areas. Reducing maternal mortality will require additional resources aimed at improving the regional coverage of health centres.

With almost 98 per cent of the population having access to safe drinking water, Tunisia has made a remarkable progress towards achieving nearly full coverage (Table 7.3). The target will likely be met if ongoing investments to improve the water distribution network in disadvantaged regions are completed rapidly and illegal urbanization gets under control. Official statistics also confirm that considerable progress is being made in terms of access to basic sanitation services. However, meeting the target will be more challenging considering the gap was at more than 21 per cent of the urban population in the mid-2000s and was likely much larger for the rural population, though this could not be confirmed due to lack of data. There are stark regional variations in access to sanitation compared to access to safe drinking water: coverage varies from 10 per cent in some cities of the south to 96.3 per cent in the governorate of Tunis. Meeting the sanitation target will also depend on ongoing investments that are expected to expand the sanitation network. However, households tend to request a connection only when the number of private residences is large enough to reduce the cost of installation and operation. Thus, meeting the sanitation target will also depend on urbanization policies and the creation of awareness among households that connecting to a sanitation network is important for health purposes.

Due to past progress, the identified shortfalls towards the MDG targets are generally small, except for maternal mortality. Countercyclical spending policies enabled the country to remain on track in making progress towards the MDG targets amid the global financial crisis. Nonetheless, GDP growth is expected to suffer a setback in 2011 as the revolution affects social spending.

## POLICY SCENARIO ANALYSIS

A number of scenarios were generated through the MAMS framework to assess the impact of the economic deceleration caused by the revolution on MDG progress, under continuation or disruption of pre-revolution

countercyclical public spending. The analysis also provides answers to two additional questions: what additional public spending requirements should be met to close the remaining MDG gaps? How could these spending requirements be financed without inflicting damage to the economy at large?

### *Modelling framework and calibration*

The MAMS framework is a dynamic-recursive computable general equilibrium (CGE) model, which is explained briefly in Chapter 1 and in greater detail in Lofgren and Díaz-Bonilla (2010a and 2010b). As for most CGE models, the accounting consistency and framework of MAMS and its main structural parameters are provided by a 83 x 83 social accounting matrix (SAM), which was built and adapted for MAMS in millions of 2005 dinar using the Official National Accounts from CBT and the Employment Survey from the National Institute of Statistics.

While it shares standard features of most economy-wide models, MAMS is more atypical in that it includes a special MDG module, which specifies the main determinants of MDG achievement. Different indicators monitor MDG achievement and are derived as a function of the determinants of the various areas of human development. The model allows for targeting specific values in achieving universal primary education (MDG 2), reducing under-five and maternal mortality (MDGs 4 and 5) and increasing access to safe water and basic sanitation (MDGs 7a and 7b, respectively).<sup>5</sup> The net primary completion rate is the indicator used for universal primary education and it is constructed by the model using student behavioural patterns in terms of promotion rates and other indicators.<sup>6</sup> Through logistic functions for the “production” of (public and private) social services, each determinant becomes relatively less effective the more progress towards the MDG targets is made. There are various determinants but the relevant policy variable relates to public spending on the delivery of the related social services.

To calibrate the MDG module, a set of initial elasticities for each MDG indicator or student behaviour parameter with respect to the determinants is specified. The model recalculates the initial elasticities in consistency with the shape of the logistic functions. In view of data limitations, elasticities estimated for other Arab countries were used as starting points and these were subsequently adjusted through sensitivity analysis until, given all other information being used in the calibration of the model, a continuation of past MDG trends was generated. This is explained in more detail in Chemingui and Sánchez (2011). The final elasticity values used in

the calibration are presented in Table 7.4. The determinants are presented in the columns. Spending (per capita or per student for education) and, in the case of education, student behaviour indicators are presented in the rows. The under-five mortality rate (MDG 4) is a proxy for the health status of the potential student population, household consumption per capita is a proxy for the capacity to pay for social services, and the level of other public infrastructure—in sectors other than education, health, and water and sanitation—is a proxy for the effective distance to school or health centres and hospitals. In this application for Tunisia, another synergy is that access to drinking water and sanitation (MDGs 4 and 5) can improve the health of children and mothers-to-be, although the impact is small.

Finally, for each MDG indicator or student behaviour parameter a set of so-called MDG-scenario parameters also provide starting points to project an outcome for an expected year (2010 for student behaviour parameters

Table 7.4  
Tunisia: Elasticities of the MDG indicators and student behaviour parameters with respect to determinants

<i>MDG or student behaviour indicator</i>	<i>Spending per capita or per student</i>	<i>Other public infrastructure</i>	<i>Household consumption per-capita</i>	<i>MDG 4</i>	<i>MDG 7a</i>	<i>MDG 7b</i>	<i>Wage incentives</i>
<b>Non-education MDGs</b>							
MDG 4: child mortality	-0.485	-0.010	-0.100		-0.020	-0.020	
MDG 5: maternal mortality	-0.864	-0.010	-0.100		-0.005	-0.005	
MDG 7a: drinking water	0.100	0.000	0.010				
MDG 7b: basic sanitation	0.644	0.000	0.100				
<b>Primary education</b>							
Net intake rate	1.100	0.000	0.250	-0.110			0.110
Promotion rate	0.867	0.150	0.250	-0.087			0.087
<b>Secondary education</b>							
Promotion rate	0.200	0.150	0.300	-0.017			0.017
Graduation and continuation	0.100	0.150	0.300	-0.020			0.030
<b>Tertiary education</b>							
Promotion rate	0.137	0.150	0.250	-0.014			0.014
Graduation and continuation	1.230	0.100	0.750	-0.015			0.030

Source: Chemingui and Sánchez (2011).

associated with MDG 2, given the primary cycle lasts 6 years,<sup>7</sup> or 2015 for all other goals), given the set of values for determinants under which—it is believed—the projected outcome could be achieved. To estimate the MDG-scenario parameters, we use unit cost estimates and financing gap studies from the World Bank (2003), for water and sanitation; the World Bank's Road Costs Knowledge System (ROCKS) database, for public infrastructure; and the World Health Organization (WHO), for mortality rates. The student behaviour related determinants were estimated using data from the UNESCO database. We found that public spending per student would barely have to change to achieve MDG 2 and this is consistent with observed progress. Health spending per capita would have to be about 43 per cent larger between 2005 and 2015 to achieve MDGs 4 and 5, whereas spending in water and sanitation per capita in 2015 would have to be about 23 per cent above the value observed in 2005—likely due to existing gaps, especially in the rural areas. Lastly, we found that other public infrastructure—not directly linked to education, health, and water and sanitation—would have to increase by about 19 per cent from 2005 to 2015 in order to achieve the MDGs under study. All these—partial equilibrium or sectoral—requirements are taken and re-estimated by MAMS in a general equilibrium setting in which they take different values.<sup>8</sup>

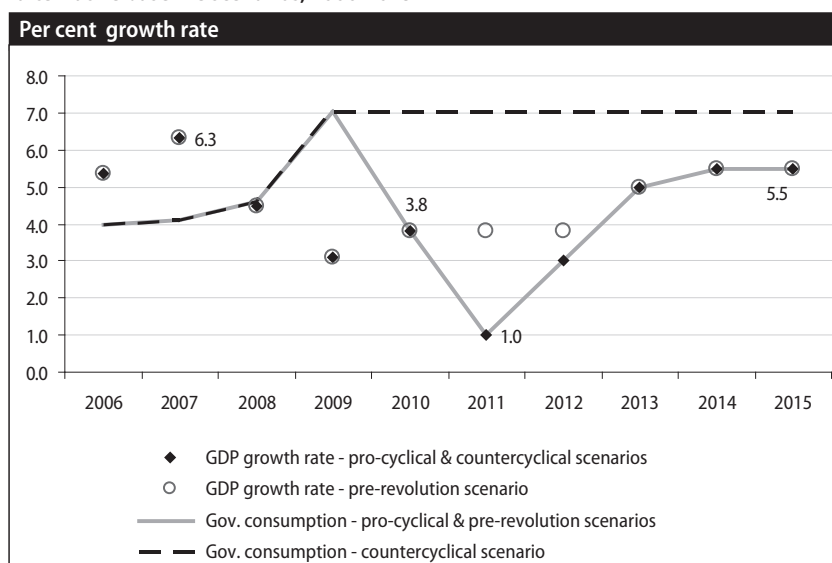
### *Baseline scenarios*

Three alternative baseline scenarios were generated, starting from 2005, the base year, and ending in 2015, the MDG target year. These scenarios are regarded as “countercyclical”, “pro-cyclical” and “pre-revolution”. The first two scenarios take observed growth rates for real GDP and government consumption in 2006-2010. Subsequently, they project that GDP growth decelerates markedly in 2011, presumably as a result of the revolution, followed by a steady recovery until GDP growth reaches 5.5 per cent in 2015 (Figure 7.1). In these two scenarios, economic growth also decelerates in 2008 and 2009 because of the global crisis but public spending continues to increase at rates of 4.6 and 7.0 per cent respectively. These two scenarios are different because government consumption grows at the GDP growth rate in the period from 2010 to 2015 in the pro-cyclical scenario, whereas the 7.0 per cent growth rate seen in 2009 for government consumption is kept unchanged until 2015 in the countercyclical scenario. In MAMS, public investment shifts to ensure that government capital stocks grow at the same pace as the services that are produced.

The “pre-revolution” baseline scenario is designed under the same government consumption assumptions as the countercyclical scenario but it maintains the pre-revolution 3.8 per cent GDP growth rate of 2010 throughout 2011-2012. From 2013 to 2015, GDP grows as in the other two baseline scenarios. This scenario helps to determine the likely impact of the revolution on the MDGs, when compared to the countercyclical scenario, under the assumption that this is fundamentally transmitted through a GDP growth deceleration. The less GDP grows—as in the countercyclical scenario—the lower the number of jobs created and the less the consumption per capita households can afford, which has a direct effect on the MDGs (see Table 7.4).<sup>9</sup>

For all three baseline scenarios it is assumed that consumption and other components of recurrent spending grow at a given rate per year, which is one of the closure rules of the model. As said, government investment spending depends on the demand for capital in the public services sector which, in turn, depends on the level of government consumption. Other closure rules used to generate the baseline scenarios are as follows. Government investment spending is financed through current savings and fixed levels of borrowing (domestic and external) and tax rates. Any

Figure 7.1  
Tunisia: Real GDP and government consumption in  
alternative baseline scenarios, 2006-2015



Source: Central Bank of Tunisia and authors' assumptions based on a plausible scenario for 2011-2015.

remaining imbalances are covered by foreign transfers from abroad (that is, foreign aid), which basically assume their true value in 2006-2010 as observed trends for the levels of borrowing and tax revenues were used to calibrate the model. The real exchange rate adjusts endogenously to clear any imbalances in the demand and supply of foreign exchange through its impact on exports and import demand. Private savings rates adjust to ensure that private investment is equal to total savings, given an assumed fixed ratio of private investment to GDP.

The model distinguishes three types of workers: those who have not completed secondary education (unskilled), those with at least completed secondary education (semi-skilled), and those who have completed some degree in tertiary education (skilled). In all scenarios, if the unemployment rate for each type of worker exceeds a minimum unemployment rate, the real (consumption) wage is equivalent to a “reservation wage” and the market for that type of worker reaches equilibrium through adjustments in the unemployment rate. If the unemployment rate is equal to the minimum rate, the labour market for that type of worker reaches equilibrium through adjustments in the real wage. For other factors (capital and natural resources), equilibrium is given by flexible wages (or rents).

The three baseline scenarios by and large reflect the actual aggregate functioning of the Tunisian economy during the period 2006-2010 and project this through 2015—based on available data.<sup>10</sup> One of the most interesting results is that while there would be notable progress towards meeting the MDGs under these scenarios, most targets would not be achieved, with the greatest shortfalls in maternal mortality and basic sanitation (Figure 7.2). The MDG gaps would be slightly wider under the pro-cyclical baseline scenario, as one would expect. The comparison of results between the countercyclical scenario and the pre-revolution scenario shows the impact of the revolution on the MDGs would only be modest if pre-revolution public spending is not disrupted. The small impact is explained by GDP growth, which is only, on average, 0.3 percentage points higher in the pre-revolution scenario.

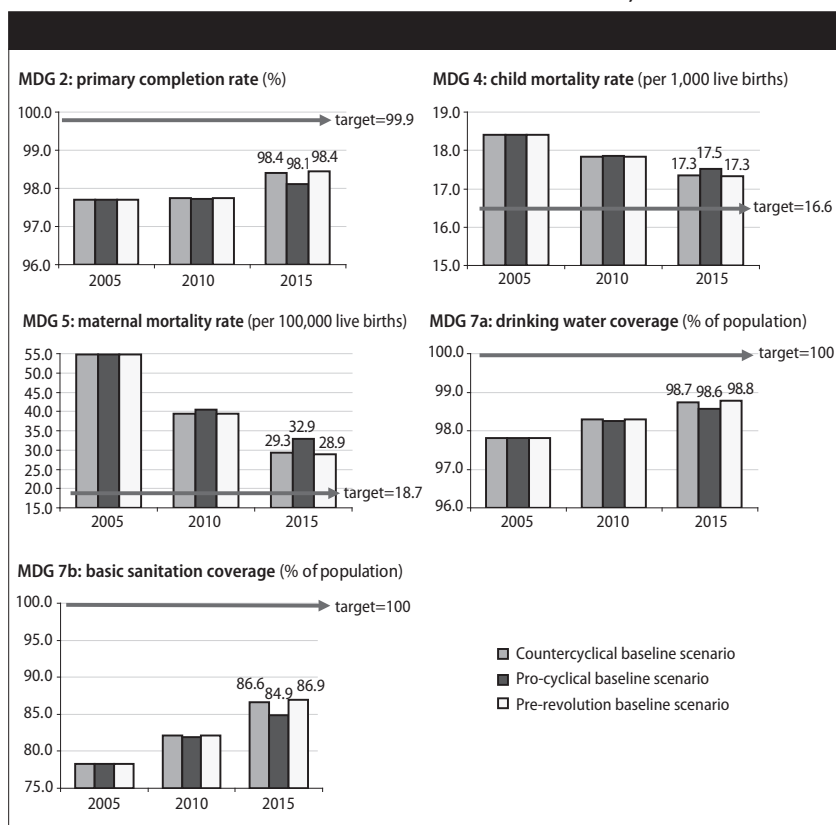
### *MDG-financing scenarios*

A set of alternative policy scenarios was simulated in which public spending is scaled up to the level needed to achieve the MDG targets for primary education, child and maternal mortality, and water and sanitation and with different assumptions about how the additional spending is financed.<sup>11</sup> In



Figure 7.2

## Tunisia: MDG indicators under the alternative baseline scenarios, 2005-2015



**Source:** Authors' estimates based on application of MAMS for Tunisia.

these scenarios, government spending in MDG-related sectors becomes endogenous and no longer increases at a given growth rate as in the baseline scenarios.<sup>12</sup> It is subsequently assumed that the uncovered government budget deficit is financed endogenously through, alternatively, foreign transfers from abroad (ftr), domestic borrowing (db), direct tax increases (tax) or foreign borrowing (fb). The baseline assumed uncovered budget deficits were financed through foreign aid. Another difference with the baseline closure rules is that the model becomes savings-driven in the MDG-financing scenarios; that is, private investment adjusts endogenously, even as a share of GDP, to maintain balance between total savings and total investment. This closure allows us to see if the MDG strategy triggers crowding out effects on private investment.

The additional public spending requirements to meet the MDG targets, as measured here, include what the government should have spent in 2006-2010 to be fully on track in meeting the targets, and the additional spending the government will have to incur in 2011-2015 to meet the targets.<sup>13</sup> As with the MDG gaps seen in the baseline scenarios (Figure 7.2), meeting the goals for reducing child and maternal mortality would be the most costly, as the additional public spending requirement would be more than 3 per cent of GDP per year, followed by additional costs for achieving the primary education goal (Table 7.5). Taking the countercyclical baseline scenario as the benchmark, public spending would need to increase between 5.7 to 6.2 per cent of GDP per year to meet the MDG targets, depending on the financing source. New spending requirements would include about 2 per cent of GDP for investment to account for deficits in infrastructure in the social sectors.

Additional spending requirements are about 1.5 per cent of GDP higher using the pro-cyclical baseline scenario as the benchmark. This suggests continued efforts to maintain countercyclical spending policies may pay off in comparison with what the government would have to spend later on, at an incremental marginal cost, if it disrupts spending in response to GDP deceleration. Furthermore, continuously undertaking countercyclical spending policies would mean that additional public spending requirements

Table 7.5

**Tunisia: Additional annual public spending requirements to meet the MDG targets in alternative financing scenarios<sup>1</sup>**

Deviation from baseline scenario, per cent of GDP												
	<i>Countercyclical</i>				<i>Pro-cyclical</i>				<i>Pre-revolution</i>			
	<i>ftr</i>	<i>tax</i>	<i>fb</i>	<i>db</i>	<i>ftr</i>	<i>tax</i>	<i>fb</i>	<i>db</i>	<i>ftr</i>	<i>tax</i>	<i>fb</i>	<i>db</i>
<b>Primary education</b>	1.7	1.8	1.7	1.8	2.3	2.4	2.3	2.5	1.6	1.7	1.6	1.8
current	1.4	1.4	1.4	1.5	1.7	1.8	1.7	1.8	1.3	1.3	1.3	1.4
capital	0.3	0.4	0.3	0.4	0.6	0.7	0.6	0.7	0.3	0.4	0.3	0.4
<b>Health</b>	3.2	3.4	3.2	3.5	3.6	3.9	3.6	3.9	3.0	3.2	3.0	3.3
current	2.0	2.1	2.0	2.2	2.2	2.4	2.2	2.5	1.9	2.0	1.9	2.1
capital	1.2	1.2	1.2	1.2	1.3	1.4	1.3	1.4	1.1	1.2	1.1	1.2
<b>Water and sanitation</b>	0.8	0.9	0.8	0.9	1.2	1.3	1.2	1.3	0.7	0.8	0.7	0.8
current	0.2	0.2	0.2	0.2	0.3	0.3	0.3	0.3	0.2	0.2	0.2	0.2
capital	0.6	0.7	0.6	0.7	0.7	0.8	0.7	0.8	0.6	0.6	0.6	0.6
<b>Total</b>	5.7	6.1	5.7	6.2	7.1	7.6	7.1	7.8	5.3	5.7	5.3	5.9
current	3.6	3.7	3.6	3.9	4.2	4.5	4.2	4.6	3.4	3.5	3.4	3.7
capital	2.1	2.3	2.1	2.3	2.6	2.9	2.6	2.9	2.0	2.2	2.0	2.2

<sup>1</sup> Additional public spending is defined in the text.

**References:** fb=foreign borrowing; db=domestic borrowing; tax=direct taxes; ftr=foreign grants

**Source:** Authors' estimates based on application of MAMS for Tunisia.

would only increase marginally owing to the revolution—by around 0.4 per cent of GDP per year. Additional public spending requirements would be larger under the domestic-resource mobilization scenarios—potentially by up to 0.7 per cent of GDP per year under the assumptions of the pro-cyclical scenario.

The injection of public spending triggers a real exchange rate appreciation in all MDG-financing scenarios (Table 7.6). For low- and even middle-income countries like Tunisia, large-scale investments in MDG sectors could meet severe skilled-labour constraints in the short to medium run, in spite of the high levels of education of the population and high rates of youth unemployment. Public expenditures targeted at meeting the MDGs in the form of expanding basic social services in health and education would put intense pressure on a pool of teachers, doctors and other trained workers that is likely to be limited. Constraints on skilled labour could then lead to upward pressure on the skill premium for such workers, which in turn would increase the overall labour costs for the public sector and the cost of achieving the MDGs.<sup>14</sup> As a result, “non-tradables” such as MDG-related services become relatively more expensive than “tradables” as public spending is scaled up and this translates into a real exchange rate appreciation. This penalizes export sectors regardless of the financing mechanism of public spending, which in the case of Tunisia affects GDP growth, though

Table 7.6  
Tunisia: Real macroeconomic indicators in alternative financing scenarios, 2006-2015

Deviation from baseline scenario, percentage annual growth												
	Counter-cyclical				Pro-cyclical				Pre-revolution			
	ftr	tax	fb	db	ftr	tax	fb	db	ftr	tax	fb	db
Consumption – private	0.1	-0.5	0.1	-0.6	0.0	-0.8	0.0	-0.9	0.1	-0.5	0.1	-0.6
Consumption – government	1.3	1.4	1.3	1.4	2.0	2.2	2.0	2.2	1.3	1.4	1.3	1.4
Fixed investment – private	-0.1	-0.4	-0.1	-0.3	-0.1	-0.5	-0.1	-0.4	-0.1	-0.4	-0.1	-0.3
Fixed investment – government	2.5	3.0	2.7	2.9	1.9	1.9	1.9	2.0	2.8	3.0	2.8	3.0
Exports	-1.2	-1.0	-1.2	-0.8	-1.7	-1.4	-1.7	-1.0	-1.1	-1.0	-1.1	-0.8
Imports	0.1	-0.4	0.1	-0.5	0.0	-0.8	0.0	-0.7	0.1	-0.4	0.1	-0.5
GDP at market prices	-0.2	-0.3	-0.2	-0.3	-0.2	-0.4	-0.2	-0.3	-0.2	-0.3	-0.2	-0.3
Total factor employment (index)	0.1	0.0	0.1	0.0	0.2	0.1	0.2	0.1	0.1	0.0	0.1	0.0
Total factor productivity (index)	-0.2	-0.3	-0.2	-0.3	-0.3	-0.4	-0.3	-0.4	-0.2	-0.3	-0.2	-0.3
Real exchange rate (index)	-0.5	-0.3	-0.5	-0.2	-0.6	-0.2	-0.6	-0.2	-0.5	-0.2	-0.5	-0.2

References: fb=foreign borrowing; db=domestic borrowing; tax=direct taxes; ftr=foreign grants

Source: Authors' estimates based on application of MAMS for Tunisia.

this trade-off is more pronounced when foreign resources are used as the financing mechanism, owing to the inflow of foreign exchange associated with them. Hence, in the MDG-financing scenarios, exports grow less than in the baseline and only when foreign resources are used to finance the new public spending would imports increase slightly more than in the baseline (that is, merely 0.1 percentage points per year). As a result, trade volumes in the MDG-financing scenarios increase at a slower pace compared to the baseline scenarios. In MAMS, trade openness is represented by the ratio of trade volumes to GDP and is one of the determinants of factor productivity. Thus, the deceleration of GDP growth in the MDG-financing scenarios is also explained by a reduction in factor productivity relative to the baseline. Higher factor employment in the MDG sectors is insufficient to revert the reduction in GDP. The productivity gains from greater MDG achievement do not materialize during the simulation period.

GDP growth is slightly less when the new public spending is financed through domestic borrowing or increased taxation as these financing options also penalize private spending (Table 7.6). On one hand, the government takes a (larger) share of private savings to finance the budget when borrowing domestically, thus crowding out private investment and, as a result, private consumption and imports. On the other hand, increased taxation reduces the amount of disposable income households can spend to consume, which subsequently reflects also in reduced private spending and imports. Due to the macroeconomic trade-offs it triggers and the fact that productivity gains will take some time to materialize, the MDG strategy cannot be expected to stimulate the Tunisian economy in the short term, where post-revolution reconstruction, including restoration and renovation of infrastructure and institutions, and growth and employment recovery (especially for critical groups) should become priorities. Not only would GDP growth be less when domestic resource mobilization is used to meet the MDG targets, compared to the other scenarios, but the reduction in private spending in education and health services in the domestic-financing scenarios has to be fully compensated by more public spending to meet the targets. Domestic borrowing mainly, but also increased taxation to a lesser extent, would magnify additional public spending requirements to meet the MDGs in a range of 0.3 to 0.5 per cent of GDP per year (see Table 7.5).

Domestic borrowing or increased taxation would not only be less desirable financing mechanisms for Tunisia, they would be less feasible in view of the relatively higher public spending requirements. Domestic resources are not easily mobilized through domestic savings, which is fairly low in Tunisia, and is likely to remain so in coming years. It is also likely that the revolution

has weakened the domestic financing base. During the biennium 2011-2012, unemployment is expected to reach dramatic levels, particularly for youth, and remittances' inflows are unlikely to increase substantially. One of the reasons the domestic debt is small—as a percentage of GDP—is that the domestic bond market is not deep enough to allocate domestic savings in amounts that are commensurate to development financing.

Tax revenue was nearly 20 per cent of GDP in 2009 (Table 7.1), a relatively high rate by developing country standards, and one that the Tunisian government will probably not be able to raise in the short run. From 1995 to 2009, tax collection essentially remained unchanged as percentage of GDP. Further tax increases are likely to be politically infeasible and economically undesirable at a time when the country is in the midst of forming and consolidating a new political regime and reviving the economy. Improving tax collection should be a priority, but achieving this will require some time.

According to the simulation results, tax revenue would need to increase by more than 6 percentage points of GDP by 2015 in order for the government to be able to finance MDG-spending requirements under the tax-financing scenario that uses the countercyclical baseline as the benchmark (Table 7.7). This accounts for both the extent to which tax revenue should have increased but did not increase in 2006-2010 in order to have fully financed MDG-spending requirements, and the tax revenue that the government would additionally have to raise to continue financing MDG spending until 2015. Tax revenue would have to be about 4 percentage points of GDP higher if, before undertaking the MDG-financing strategy, public spending declines in 2011 in tandem with GDP—as under the pro-cyclical baseline scenario.

These are macroeconomic constraints that Tunisia will likely face if the government opts to finance newly required MDG spending through domestic borrowing or increased taxation. As explained above, these are

Table 7.7  
Tunisia: Additional annual foreign aid and tax revenue requirements to finance the cost of the MDGs,<sup>1</sup> 2011-2015

Deviation from baseline scenario, per cent of GDP		
<i>Benchmark</i>	<i>Tax revenue (tax financing scenario)</i>	<i>Foreign aid (ftr financing scenario)</i>
Countercyclical baseline	6.4	6.4
Pro-cyclical baseline	10.6	8.7
Pre-revolution baseline	6.1	6.2

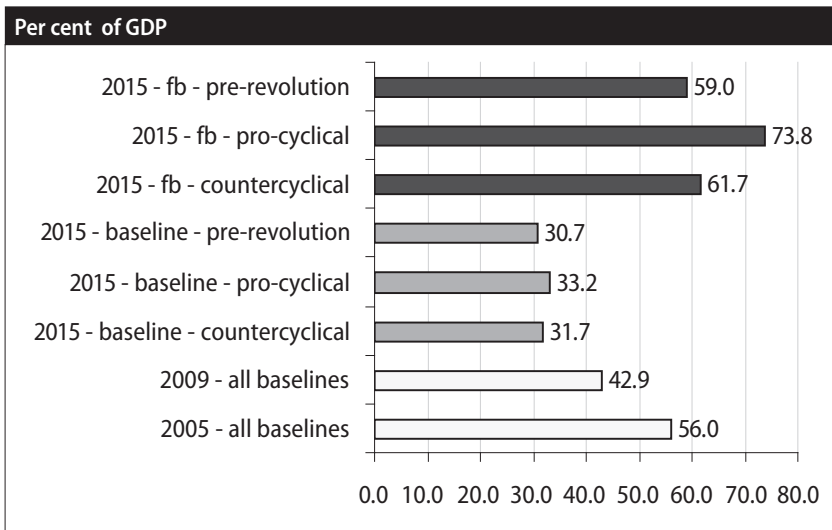
<sup>1</sup> Additional foreign aid and tax revenue requirements are defined in the text.

**Source:** Authors' estimates based on application of MAMS for Tunisia.

financing options that would also hurt private spending in MDG-related sectors, making it more costly for the government to ensure MDG targets will be met on time, compared to the situation where financing is through resources from abroad. Against this backdrop, Tunisia may have to rely on foreign resources to reconstruct its political system, spur economic growth and finance development goals. The international donor community has pledged help in reaction to ongoing political changes and constitutional amendments that are expected to pave the way for a full-blown election.

According to the simulation results, Tunisia would need at least an additional 6 per cent of GDP per year in foreign aid to be able to finance additional MDG-spending requirements (Table 7.7). This accounts for both foreign aid that Tunisia should have received but did not receive in support of the MDGs in 2006-2010, and additional foreign aid required to continue financing MDG spending until 2015. The estimate of foreign-aid requirements is notably higher under the foreign-aid scenario that uses the pro-cyclical baseline scenario as the benchmark. Using the simulation results, we estimate that foreign-aid requirements to achieve the MDGs under study would be in the range of \$2.7 to \$3.9 billion per year—depending on the projected trends of MDG spending and GDP growth under the baseline scenarios.<sup>15</sup> In late May 2011, the G8 group promised

Figure 7.3  
Tunisia: Government debt in the baseline and foreign-borrowing (fb) scenarios, 2005, 2009, 2015



Source: Authors' estimates based on application of MAMS for Tunisia.

\$20 billion in loans and grants for post-revolution reconstruction in Tunisia and Egypt, another Arab country that has recently witnessed a revolution. Should this help materialize and be directed in part to MDG sectors, it would be quite feasible for Tunisia to meet the MDG targets by 2015.

Non-concessional loans and other borrowing from abroad would be at the cost of debt accumulation, but it is perhaps the only other feasible option for Tunisia to mobilize resources for MDG financing—perhaps along with receipts from the sale of confiscated assets belonging to members of the ousted dictatorship. Following the trend of 2005-2009, the government debt decreases in the baseline scenarios and is little more than 30 per cent in 2015 (Figure 7.3). The government debt rises to almost 62 per cent of GDP under the foreign-borrowing scenario that takes the countercyclical baseline as its benchmark. That is, the debt by 2015 would be only 6 percentage points of GDP higher than in 2005, which makes this option, or at least borrowing from abroad in lower amounts, a plausible financing mechanism. Under the pro-cyclical spending reference path assumptions, whereby, as seen, MDG-spending requirements are relatively more, the government debt would reach almost 74 per cent of GDP in 2015, turning foreign indebtedness into a less realistic option considering debt sustainability objectives of the country. The simulation results also show that, to meet the MDG targets, government foreign indebtedness increases by only 3 percentage points of GDP from 2005 to 2015, when the effects of the revolution are not accounted for.

## CONCLUSIONS AND POLICY RECOMMENDATIONS

The policy scenario analysis performed in this chapter sheds light on the prospects and challenges Tunisia faces to meet the MDG targets. It shows MDG progress would be sustained up until 2015 if public spending in social sectors continues to grow at pre-revolution rates, even if growth deceleration during the revolution is taken into account. Even so, targets for primary education, child and maternal mortality, and water and sanitation would not be met by 2015. The main gaps would be seen for maternal mortality, and, to a lesser extent, basic sanitation. MDG progress would be less if pre-revolution public spending is disrupted as a result of the revolution. The impact of the revolution on the MDGs, simulated primarily through reduced household income and consumption per capita, would be only modest if pre-revolution growth rates for MDG spending are maintained. The global financial crisis did not affect MDG progress precisely because social spending grew at high rates in spite of observed GDP deceleration.

In order for the MDG targets under study to be met by 2015, public spending would have to rise by 5.7 to 7.8 per cent of GDP per year, depending on how public spending evolves after the revolution and how additional spending is financed. The health goals would be the most expensive to finance (3.2-3.9 per cent of GDP per year), in view of the gaps in maternal mortality. Little more than half of the new spending requirements would be for new investment, as a great deal of infrastructure needs to be renewed. If this growth in public spending is not disrupted, the impact of the revolution on the MDGs and additional spending requirements will be minimized.

The injection of additional public spending would not be harmless to the economy, though. It could result in a small real exchange rate appreciation—if skilled-labour supply constraints lead to upward pressure on the skill premium for teachers, doctors and other trained workers, which in turn increases labour costs for the public sector. As a consequence, exports and economic growth would somewhat be penalized. This effect was found to be larger for scenarios in which additional public MDG spending is financed through resources from abroad on account of the foreign-exchange inflow. GDP growth was found to be even slightly less when the new public spending is financed through domestic borrowing or increased taxation as these mechanisms of financing crowd out private spending. In these cases, we found the government incurs an extra cost of 0.4-0.7 per cent of GDP per year in order to compensate for less private spending in MDG-related sectors. Due to these macroeconomic trade-offs and as productivity gains from greater MDG achievement would take some time to materialize, the MDG strategy should not be expected to stimulate the economy right after the revolution.

Domestic borrowing and increased taxation are less desirable and perhaps infeasible options to finance MDG spending requirements in Tunisia. The revolution has hurt the economy and it would be unthinkable that under such circumstances sufficient national savings could be mobilized to finance MDG spending. Worker's remittances from abroad have been an important source of household savings but these have also been on the decline. The mechanisms of domestic resource mobilization analysed here could slow down the economic recovery that Tunisians badly need. Furthermore, Tunisia's domestic bond market is not sufficiently developed to allocate domestic savings in amounts that are commensurate to development financing. The existing tax burden, at around 20 per cent of GDP, would also be difficult to increase from both political and economic reasons.

Tunisia will likely have to rely on foreign resources to reconstruct its political system, renew key infrastructure, spur economic growth and



finance development goals. Non-concessional loans and other borrowing from abroad would come at the cost of debt accumulation. According to the scenario analysis performed here, relying on foreign borrowing alone to finance additional MDG spending requirements would push the government debt up to at least 62 per cent of GDP by 2015, 6 percentage points of GDP more than in 2005.

Acquiring that amount of new debt can be avoided if the international donor community honours recent pledges of aid. The willingness of donors to help Tunisia is based on the expectation that current political changes will translate into constitutional amendments that ultimately pave the way for a full-blown election. According to our scenario analysis, Tunisia would need at least an additional 6 per cent of GDP per year in foreign aid in order to be able to finance public spending required to meet the goals in primary education, health, and water and sanitation by 2015. The necessary foreign aid would be in the range of \$2.7 billion to \$3.9 billion per year, depending on the pace at which MDG spending grows after the revolution. This is plausible given the amount of aid that the Group of Eight (G8) has promised to grant to countries like Tunisia and Egypt.

If foreign aid cannot be mobilized in the amounts required to finance the MDG strategy, a combination of foreign aid and foreign borrowing—at levels that would not compromise debt sustainability—seems to be the other plausible option. The use of aid should be coordinated behind a national development strategy (NDS) with the main conditionality being well-planned disbursements linked to the achievement of NDS targets, including the MDGs. The NDS should allow for fiscal expansion during post-revolution reconstruction. Domestic resource mobilization should gradually replace foreign resource mobilization, mainly through fiscal reforms that enhance the efficiency of tax collection and broaden the tax base. The fiscal constraints could also be eased if the sale of assets confiscated from members of the ousted dictatorship were to generate resources to finance the achievement of development goals.

In addition to a smart development financing strategy, the government will need to implement active production sector and labour market policies in order to raise productivity growth, improve production capacity, resolve labour market frictions and create more jobs, especially for groups that felt excluded from the economic model before the revolution. This path will enable the economy to recover enough to reduce the alarming level of youth unemployment. Finally, economic growth could have a large impact on poverty reduction by ensuring that fiscal reforms are progressive—that they reduce the inequities that were a source of conflict before the revolution.

## NOTES

- 1 The authors are thankful to Moncef Youzbachi, Nidhal Ben Cheikh, Jameleddine Boumedie, Olfa Triki and Diyora Kabulova for their valuable inputs that made it possible to calibrate the economy-wide model used in this chapter.
- 2 See, for example, Ayadi and others (2005), Lahouel (2007) and Chemingui and Bchir (2008).
- 3 Government expenditures on education over the period 1990-2007 vary between 6 and 7.5 per cent of GDP, and this share stabilized at around 7 per cent in the biennium 2008-2009—according to World Bank data.
- 4 MDG 3 seeks to promote gender equality and empower women. Tunisia is one of the most advanced countries in the MENA region as far as women's rights are concerned. Females currently account for more than 50 per cent of all enrolled students, a rate that is reflected at all levels.
- 5 MAMS lacks sufficient detail of income distribution in order to analyze poverty changes in a rigorous manner and, by doing so, evaluate if the goal of reducing extreme poverty (MDG 1) is met under different assumptions. Many of the country applications in this publication combine MAMS and a microsimulation approach to determine how changes in the labour market, as generated by MAMS, would affect poverty and inequality when these changes are imposed into a micro dataset under different scenarios (see Chapter 1). Due to a lack of access to a detailed household survey, the microsimulation approach could not be implemented for Tunisia. In any case, MDG 1 had been met in Tunisia before the revolution. Nonetheless, it remains to be seen if the revolution will result in an increase of poverty that puts the country off track in meeting the extreme poverty target.
- 6 The net primary completion rate is the share of the students who would complete primary school on time, defined as the product of the relevant first-year primary school entry rate (or net intake rate) and the pass (promotion) rates over time for the cohort that graduates from primary school in the current year.
- 7 In this application of MAMS for Tunisia, the primary cycle comprises six grades, whereas the secondary and tertiary include, respectively, seven and three grades. The new definition, in which the first cycle is basic education and comprises nine grades, is not being used. The target of getting almost all boys and girls in the age cohort to enrol and pass all the basic education grades without repeating any would be overambitious given the short timespan to 2015. The target modelled here is for almost all boys and girls to enrol in the primary cycle of six grades at the expected age in 2010 and to graduate by 2015. On this basis, the computed net primary completion rate for the base year is close to 98 per cent for boys and girls aged 6 to 11. This equates with reported enrolment rates and thus assumes repetition and drop-out rates are nil. It may be a strong assumption, but it is difficult to calibrate the model otherwise in view of a lack of official data on net primary completion rates.
- 8 Other aspects of the calibration of MAMS for Tunisia are explained in Chemingui and Sánchez (2011), including econometric estimations of other, more standard elasticities used in CGE models.
- 9 Real GDP growth is imposed through a calibration procedure whereby factor productivity is adjusted, but GDP remains fully endogenous in the model. Thus, for the pre-revolution baseline scenario, in particular, the effects of the revolution take place through productivity losses, without exogenously updating any other parameter. Productivity losses affect the level of production, and so on.

- 10 Chemingui and Sánchez (2011) present detailed results that show the plausibility of the baseline scenarios generated for Tunisia.
- 11 As said, due to a lack of access to a detailed household survey, the microsimulation approach could not be implemented for Tunisia in order to monitor how MDG 1 evolves under the different scenarios (see note 5).
- 12 The model remains fully determined (that is, the number of endogenous variables is exactly equal to the number of equations) because, in the MDG-financing scenarios, the MDG indicators (including those for student behaviour) follow an exogenous, non-linear trend that leads to fully meeting targets by 2015, given diminishing marginal returns to variations in the MDG determinants.
- 13 The additional public spending requirement to achieve the MDGs is defined as the public spending on MDG-related sectors in the MDG-financing scenarios minus the public spending on MDG-related sectors in the corresponding baseline scenario. Annual averages for the additional public spending requirement for 2006-2010 and 2011-2015 are calculated and subsequently added.
- 14 In fact, wages for the highly skilled workers grow about 1 percentage point more in the MDG-financing scenarios, compared to the baseline scenarios. As applied here, the unemployment rate of all types of workers reaches a minimum unemployment rate of 11 per cent in the generated baselines. Since these are taken as the benchmarks, in the MDG-financing scenarios the labour market for all types of workers clears fundamentally through wages, not employment.
- 15 Estimates are based on additional foreign aid requirements presented in Table 7.7 and GDP at current prices (\$44.3 billion) as recorded in the July 2011 update of IMF's World Economic Outlook.

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# Chapter 8

## Uganda

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### INTRODUCTION

The Ugandan economy underwent major structural change over the past two decades. Growth of income per capita began to accelerate in the late 1980s and has since outpaced that of most countries in Africa. Uganda's post-war macroeconomic reform programme exceeded all expectations in supporting economic growth and poverty reduction, as compared with other post-conflict recoveries. These reforms have reduced barriers to trade and liberalised prices and markets previously subject to state control. Improved management of monetary and fiscal policy helped achieve macroeconomic stability and paved the way for debt relief under the Heavily Indebted Poor Country (HIPC) initiative.

Poverty incidence is less than half the 1990 level, which means that Uganda has achieved the first millennium development goal (MDG). The country has made less progress towards other MDG targets, especially those for health, education, and environmental sustainability. The new National Development Plan (2010/2011-2014/2015) aims at further accelerating growth and reducing poverty, but contains little additional efforts to improve education and health indicators.

Against this background, this chapter tries to answer two key questions: first, how much progress is Uganda expected to make in achieving the MDGs under continued economic trends and policies? Second, what additional efforts, in terms of public spending and broader economic policy reforms, would be needed to accelerate progress towards the achievement of the human development goals?

The policy analysis is based on simulations with a dynamic-recursive computable general equilibrium (CGE) model known as Maquette for MDG Simulations (MAMS) that was adapted and estimated with data for Uganda (see Chapter 1 and Lofgren and Diaz-Bonilla, 2010). The CGE model analysis is combined with a microsimulation approach to determine impacts on poverty (MDG 1) and inequality (see Chapter 1 and Vos and Sánchez, 2010).

The next section details the macroeconomic policy reforms that helped accelerate the growth and transformation of Uganda's economy following the end of the civil war despite the lingering low-intensity conflict. It finds that the country is still facing major challenges in ensuring more sustained and inclusive growth. The third section assesses observed progress towards the MDG targets and highlights some of the obstacles to more accelerated progress. The fourth section details the way in which the modelling framework was adapted and fitted to data for Uganda and presents the results of the policy scenario analysis. The concluding section discusses policy implications. One of the main findings is that achieving the MDGs will be costly for Uganda, and given the limited scope for enhancing domestic resource mobilization in the short run, the country's reliance on foreign aid will need to increase temporarily to finance the additional MDG spending. Reforms to enhance tax collection and efficiency in public service delivery should gradually phase out such reliance on foreign resources, and resource mobilization can be diversified further once revenues from newfound oil resources begin to flow.

## REFORMS AND ECONOMIC PERFORMANCE

When the National Resistance Movement (NRM) took over power under the leadership of President Yoweri Museveni in 1986, the Ugandan economy was in tatters after decades of civil war, social dislocation and asset destruction. Economic instability was high, and visible in huge macroeconomic imbalances, high inflation and shortages of foreign exchange. The reform policies that were in place induced structural change and helped spur economic growth. Since the early 1990s, Uganda's economy has been among the fastest growing in sub-Saharan Africa. Robust growth has been sustained, well beyond what would be expected of typical post-conflict recovery and reconstruction. Economic prosperity has continued despite the prevalence of a number of conditions which in

other contexts would be impediments to growth. These conditions include continued insecurity, especially in the northern parts of the country as well as in neighbouring countries, limitations of being a landlocked country, important infrastructural deficits, and the failure to exploit its (mineral) resource base. The latter condition has changed recently with the discovery of vast oil reserves.

Observers agree that Uganda's economic success has its foundations in the government's ability to restore a certain degree of internal stability and security and the effective implementation of a series of economic reforms considered to be the most comprehensive in Africa (Collier and Renikka, 2001; World Bank, 2007). The reform process started in 1990s after several years of internal wrangling over the direction of macroeconomic policy, especially whether a state-led or market approach should prevail (Whitworth and Williamson, 2010). The latter approach was chosen and between 1990 and 1993 the exchange rate regime was liberalized and the parallel foreign-exchange market was legalized, as a result of which there was a large devaluation of the Ugandan shilling. This laid the foundation for the liberalization of the coffee sector, the country's main source of income and export revenue. The export tax was abolished and replaced by an import tax, which subsequently was lowered gradually. The measure led to a steep increase in coffee production and exports, which in turn helped lift rural incomes and reduce poverty (Appleton, 1999).

These early reforms were followed by measures to ensure macroeconomic stability, notably the restoration of fiscal discipline and tighter control of inflationary pressures. Fiscal reform also included the establishment of a Medium Term Expenditure Framework (MTEF). The reform process was completed with the Poverty Eradication Action Plan (PEAP) of 1997 and a series of complementary measures to stimulate growth and private sector development. The latter included the Plan for the Modernization of Agriculture, the Medium-Term Competitive Strategy for the Private Sector, the Strategic Export Programme and the Strategic Export Intervention Programme.

In 2002, Uganda became the first country to qualify for debt relief under the HIPC Initiative. Macroeconomic performance has been impressive throughout the reform period (see Table 8.1). Real GDP growth recovered to 5.6 per cent during 1989/90-1993/94 and accelerated to 8.2 per cent during 2005/6-2009/10. Private investment more than doubled to 18 per cent of GDP. The public debt burden was slashed from 76 per cent to 19 per cent of GDP over the same period. Inflation fell from 31 to 9 per cent.



Table 8.1

## Uganda: Selected macroeconomic and social indicators, 1989/90-2009/10

	1989/90 to 1993/94	1994/95 to 1999/00	2000/01 to 2004/5	2005/6 to 2009/10
<b>Real Sector</b>				
Real GDP growth (per cent)	5.6	6.0	6.7	8.2
Private investment (per cent of GDP)	8.0	-	14.1	17.7
Public investment (per cent of GDP)	6.6	-	4.7	4.7
Private consumption (per cent of GDP)	89.4	-	77.8	77.4
Public consumption (per cent of GDP)	9.2	-	13.9	11.4
<b>Fiscal Sector</b>				
Government domestic revenue (per cent of GDP)	7.8	11.3	12.2	12.8
Government expenditure (per cent of GDP)	17.9	18.0	22.6	18.2
Fiscal deficit excluding grants (per cent of GDP)	-10.1	-6.7	-10.4	-5.4
Domestic interest payments (per cent of GDP)	1.6	0.9	1.5	1.2
Domestic borrowing (per cent of GDP)	-0.1	-1.1	0.0	-0.2
<b>External Sector</b>				
Exports of goods (per cent of GDP)	6.7	9.5	8.4	15.0
Imports of goods (per cent of GDP)	21.3	19.6	16.8	22.9
Trade deficit (per cent of GDP)	-14.5	-10.1	-8.4	-8.0
Public debt stock (per cent of GDP)	75.8	62.4	58.6	19.1
Donor aid (per cent of GDP)	11.2	10.7	10.7	6.8
Foreign Direct Investment (FDI) (per cent of GDP)	0.1	2.5	3.1	4.9
<b>Monetary Sector</b>				
Inflation(Headline)	30.9	5.8	4.3	9.0
Reserves in months of imports	1.5	5.6	6.3	5.3

Source: Uganda Bureau of Statistics and Bank of Uganda.

Nevertheless, as discussed at greater length in a companion study (Matovu and others, 2011), the economy continues to face a number of serious challenges. These include: (i) overcoming the obstacles to further progress in shifting from subsistence agriculture to higher value-added and commercial agricultural production; (ii) dealing with the severe deficits in physical infrastructure and ensuring that new investments support growth and industrial development as well as facilitate access to markets and services for the poor; (iii) the need to improve government service delivery, enhance accountability and fight corruption; (iv) overcoming constraints to access to new technologies and to domestic and foreign resource mobilization;

and (v) the need to build better economic and political institutions at the national and local levels so as to strengthen social cohesion and resilience to external shocks stemming from world market volatility, intensification of conflict inside or outside Uganda's borders, and adverse weather conditions.

In April 2010, Uganda published its first five-year National Development Plan (NDP) for the period 2010/11-2014/15. The Plan is cast as the first in a series of six five-year instalments that seek to transform Uganda from a peasant society to a modern and prosperous country within a 30-year time horizon. It replaces the PEAP as the country's preeminent planning instrument and seeks to stimulate economic and social development more broadly than before. Public investment priorities are with physical infrastructure, human resources development and access to basic services, expanding the productive capacity of the economy and promoting science, and technology and innovation. For these purposes the level of public investment will be increased by 50 per cent from the average of the PEAP period. The government expects that the plan will help sustain economic growth of more than 7 per cent per year and generate about 550,000 new jobs per year over the planning period. Expected progress towards the MDGs falls short of the international targets, according to the plan's projections. Notably, the targets for universal primary school completion and reductions in child and maternal mortality rates may not be met under the first NDP due to insufficient financial resources as well as implementation capacities.

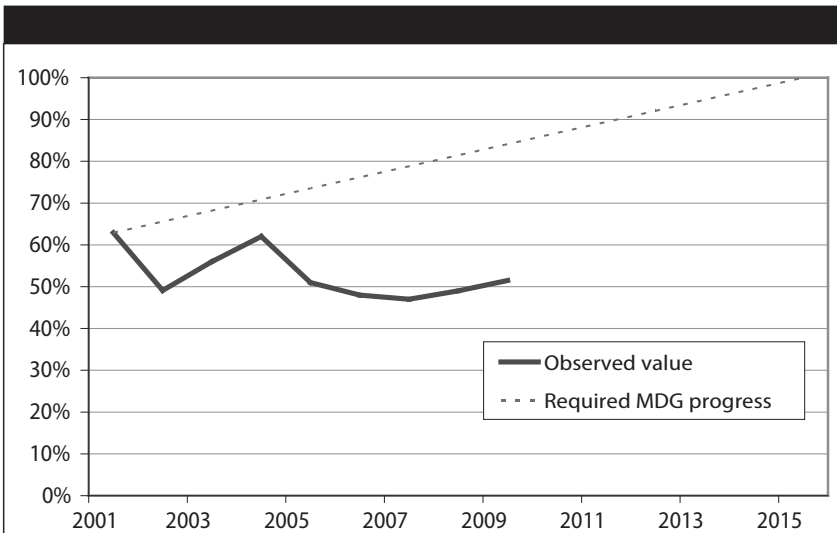
#### SOCIAL POLICIES AND PROGRESS TOWARDS THE MDGs<sup>1</sup>

Prior to the NDP, pro-poor policies were framed by the PEAP that was in effect during 1997-2008. The PEAP consisted of a multi-sectoral program aimed at reducing poverty. Specific components of the PEAP were the Universal Primary Education program (UPE) and a policy to enhance access to health services. UPE was started in 1997 and aimed at providing free basic education to all children of school-going age. Related measures included the elimination of tuition fees. Access to health care was enhanced by constructing health centres in all the sub-counties and parishes of the country and, subsequently, by the removal of user fees for health-care services. Similarly, measures were taken to enhance the coverage of drinking water supply, extend the road network and improve agricultural infrastructure, especially in previously underserved areas. These measures caused the share of poverty-related expenditures within the MTEF to increase from 16 per cent in 1997/1998 to about 32 per cent in 2008/2009.

Over the past two decades, Uganda has made important progress towards many of the MDG targets. Nonetheless, this progress is sufficient only to ensure meeting 7 of 19 targets by 2015, according to the 2010 MDG Country Report (Ministry of Finance, Planning and Economic Development, 2010). This section briefly surveys the progress towards each of the goals. Achievement of the goals is further assessed below through a modelling exercise, drawing on the MDG report as well as additional data sources.

*Eradicate extreme poverty and hunger (MDG 1):* Uganda has made impressive progress in reducing poverty. According to the Uganda Bureau of Statistics, the poverty incidence (that is, the share of the population with a per capita income below the poverty line) has declined from 56 per cent in 1992/1993 to 24.5 per cent in 2009/2010. The decline has been continuous, except for a slight increase in the 2002/2003 survey. Consequently, Uganda has already met the international target of halving extreme poverty. The NDP target of reducing poverty to 25 per cent by 2014/2015 has also already been surpassed. Poverty has fallen most substantially in rural areas. Nonetheless, poverty rates remain much higher in rural than in urban areas. For instance, in the rural areas of the northern region of Uganda, the incidence of poverty is 49 per cent compared with less than 3 per cent in the urban areas of the western region. Job creation remains the major challenge to secure greater poverty reduction in the most affected regions.

Figure 8.1  
Uganda: Net primary completion rate, 2001-2009



Source: Ministry of Education of Uganda.

At the national level, the share of employed in the population has remained more or less stable around 78-80 per cent during the 2000s (Ministry of Finance Planning and Economic Development, 2010). The prevalence of malnutrition also has declined, but food security remains a problem, especially in the eastern parts of the country. The share of children under five years of age with a weight too low for their age declined from 26 to 16 per cent between 1995 and 2005/2006.

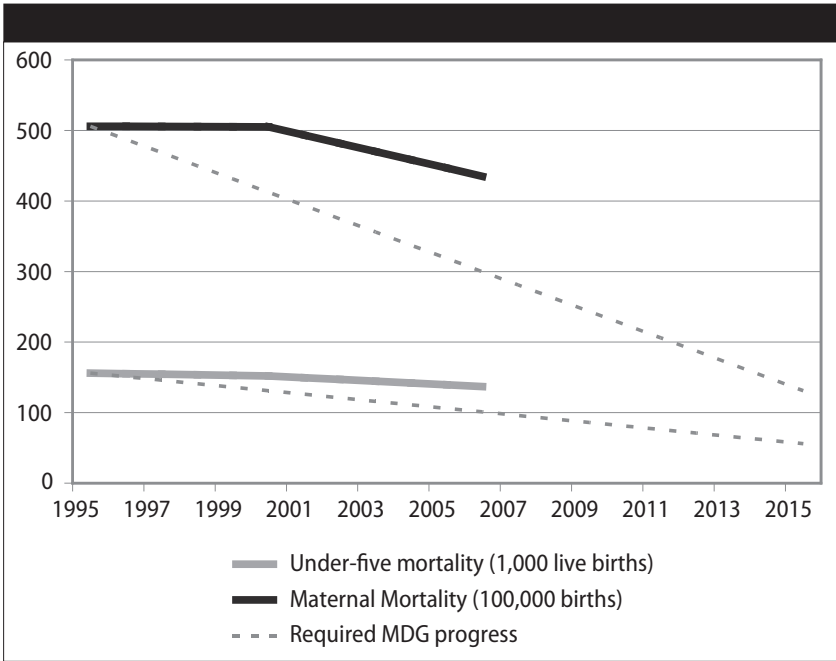
***Achieve universal primary education (MDG 2):*** Since the introduction of UPE in 1997, the total number of students enrolled in primary education increased from 2.7 million in 1996 to 8.2 million in 2009. The net enrolment ratio has hovered above 90 per cent in recent years, nearing the 100 per cent MDG 2 target.<sup>2</sup> However, the proportion of pupils starting primary school who reach the final grade (i.e., the net primary completion rate) remains low and in fact has deteriorated in recent years, as a result of rising drop out (National Planning Authority, 2010 and Figure 8.1).

***Reduce child mortality and improve maternal health (MDGs 4 and 5):*** Indicators of child health and mortality show that there has been progress towards MDG 4 since the mid-1990s but that it has been too slow to make it likely for Uganda to reach the target of a reduction by two thirds from the 1990 level (Figure 8.2). The child mortality rate fell from 156 per 1,000 live births in 1995 to 152 in 2001 and further to 137 in 2006. The infant mortality rate, which measures deaths among children less than 1 year of age, rose from 81 to 88 per 1,000 live births between 1995 and 2001, especially due to faltering immunisation rates, but fell again thereafter to 76 in 2006 with the immunisation revitalisation strategic plan. Coverage of vaccinations has improved, but remains insufficient. For instance, the measles immunisation rate was 81 per cent in 2009, below the national target of 90 per cent.

The maternal mortality rate remained more or less stable from 1995 to 2001, and was estimated at 506 per 100,000 births in 1995 and 505 in 2001. Thereafter the rate dropped to 435 in 2006. Despite the more recent progress it is still far from sufficient to meet MDG 5 target of reducing the maternal mortality ratio by three quarters between 1990 and 2015 (Figure 8.2). Between 1995 and 2005, the share of births attended by professional health personnel increased from 35 to 44 per cent. This has likely contributed to reducing the maternal mortality ratio, but access to skilled birth attendants remains low.<sup>3</sup> Stark inequalities in health status also remain, with the least-served rural areas lagging the most.

***Ensure environmental sustainability (MDG 7):*** The share of individuals with access to safe water (MDG 7a) has increased from 57 per cent in 1999/2000 to 68 per cent in 2005/06, which means that Uganda may

Figure 8.2  
**Uganda: Child and maternal mortality, 1995-2006**



Source: Ministry of Health.

be on track to meet its target of 89 per cent in 2014/15, which is a more ambitious target than that established by the international MDG agenda. Access to safe water remains much lower for the rural than for the urban population, despite the fact that coverage of improved water supply trebled in rural areas from 21 per cent in 1991 to 63 per cent in 2007. The change in access to improved sanitation (MDG 7b) is more difficult to gauge owing to data limitations. Available information suggests that 74 per cent of urban residents and 62 per cent of rural residents had access to an improved sanitation facility in 2007/08, short of the respective targets of 100 per cent and 77 per cent coverage.

### MDG SCENARIO ANALYSIS

In summary, Uganda has seen mixed progress towards the human development goals. The previous section also included tentative assessments of the likelihood of achieving the MDG targets by looking at the past trends.

However, those may not be a good predictor of progress moving forward. This section will provide a counterfactual assessment of the feasibility of achieving the MDGs in Uganda, using the dynamic-recursive computable general equilibrium model, MAMS. The model assesses the interactions between the overall performance of the economy, public policy efforts and the progress towards the human development goals. In the analysis here, the model is used to assess, first, the degree of progress towards the MDGs under a scenario of unchanged growth trends and policy intentions as laid down in the NDP. Against this baseline scenario we assess the macroeconomic feasibility of fully achieving the MDGs by simulating the implications of scaling up public spending for that purpose under alternative financing scenarios.

### *Calibration of MAMS for Uganda*

MAMS for Uganda was calibrated using a Social Accounting Matrix (SAM) with base year data for 2007. It builds on the original 2002 SAM, which was updated and modified by the International Food Policy Research Institute (IFPRI).<sup>4</sup> For purposes of the Uganda model, the 2007 SAM was expanded to add more detail for the demand and supply of social services, including specifications of education services by level, the health sector, and drinking water and sanitation systems. Further detail was added to identify public and private provisioning of physical infrastructure. The technical coefficients used in the SAM are derived from the 2002/2003 supply-use table (Uganda Bureau of Statistics, 2007), which contains detailed information for a large number of sectors. These coefficients had also been used by IFPRI to construct the previous 2002/2003 SAM. The distribution of labour incomes and employment by sector and type of worker were estimated on the basis of the 2005/2006 Uganda National Household Survey (UNHS5). These structural variables were subsequently fitted to consistency with observed economic aggregates for 2007.

The determinants of outcomes for MDG indicators related to education, health and water and sanitation were estimated using microeconomic models. This way elasticities derived are expected to reflect the impact of policy interventions and changes in demand factors on primary school enrolment and completion, child mortality and access to drinking water and sanitation. The determinants of maternal mortality (MDG 5) in Uganda could not be identified through microeconomic analysis due to data limitations. For the purposes of the present study, it was assumed that

the determinants of maternal mortality (and corresponding elasticities) are the same as those for child mortality.

There are synergies among the MDGs, as was explained in Chapter 1. For instance, improved health status of children tends to improve their performance in school. Child health, in turn, tends to improve with access to safe drinking water and improved sanitation systems, as much as by reductions in health threats posed by diseases such as malaria, tuberculosis and HIV/AIDS. In the empirical analysis for Uganda, we account indirectly for the impact of increased mortality and morbidity caused by the prevalence of HIV/AIDS, malaria and other ailments on education performance by using child mortality as a proxy for the health status of young children. The microeconomic regression model explaining changes in the rate of child mortality includes access to water and sanitation and coverage of immunization programs among the determinants. The full specification of the functions determining progress towards the various MDGs can be presented in general terms as follows:

$$MDG_y = 1/0 = C + I + S + oMDG + X$$

where, the MDG target is measured as a binary variable that is 1 if the individual or household has attained the status required for the MDG to be met and 0 if not. Key demand-side determinants are proxied by changes in household consumption ( $C$ ) and accessibility and functionality of social services as influenced by improvements in physical infrastructure, such as roads and electricity supply ( $I$ ). The availability and quality of social services are captured by the level of spending per capita or per student for such services ( $S$ ).  $oMDG$  identifies the progress towards other MDGs considered to influence  $MDG_y$ .  $X$  is a vector of other determinants and control variables. The determinants of education performance, child mortality and access to drinking water and sanitation were all estimated through a probit model specification and combining data from household surveys, demographic and health surveys and administrative records of the education and health sectors. Full details of the microeconomic estimation procedure and results can be found in Matovu and others (2011). The relevant elasticities for MDG determinants obtained this way and used to calibrate MAMS are presented in Table 8.2. In the few cases where the elasticity estimates were not significant and/or showed an unexpected sign, they were replaced with values estimated by other studies for countries similar to Uganda, so as to ensure that the calibrated MAMS for Uganda would reproduce observed trends for the relevant MDG indicators. For example, using data from the

Table 8.2  
Uganda: Elasticities of MDG indicators with respect to its determinants in MAMS<sup>1</sup>

	C	I	S			oMDG			X
			Health	Water & sanitation	Education	MDG 4	MDG 7a	MDG 7b	Wage premium
MDG4			<i>-1.000</i>				-0.086	-0.010	
MDG5	-0.110	-0.011	<i>-1.000</i>				-0.086	-0.010	
MDG7a	0.001	0.014		0.744					
MDG7b	0.089	0.005		0.099					
Entry primary		0.009			1.000	-0.002			0.110
Completion primary		0.003			1.000	-0.003			0.087
Entry secondary		0.107			0.748	-0.003			0.165
Completion secondary		0.044			0.632	-0.003			0.165
Entry tertiary		0.327			0.169	-0.003			0.486
Completion tertiary		0.167			0.246	-0.003			0.486

<sup>1</sup> Elasticities in italics were not estimated econometrically for Uganda. They are based on other sources of information so that MDG trends generated in MAMS accord with observed trends. Several additional variables pertaining to vector X were included in the various estimations but only wage premium is reported here.

**Source:** Matovu and others (2011).

Ugandan household survey, the regression results showed that the wage premium on education is negatively related to primary school enrolment and completion. The unexpected sign might have resulted from data limitations and insufficient control variables included in the specification and were replaced with values found by other studies.

### *Baseline scenario*

The baseline scenario was defined such that MAMS for Uganda replicates trends in key aggregates of the model, including MDG indicators, for 2007-2009. The baseline assumes subsequently that the policies of the NDP are effectively implemented and operational during 2010-2015. By assuming a baseline corresponding to expected NDP outcomes we can assess the likely impact of the strategic thrust and policies of the NDP on the MDGs. The baseline scenario is subsequently used as a benchmark against which we compare the macroeconomic and social impacts of alternative scenarios of increased policy efforts seeking to accelerate progress towards the MDGs and step up productivity growth.



Specifically, the baseline assumptions include that the rates of growth of government spending on education, health and water and sanitation, as well as that of public investments in roads and agricultural development, match the GDP shares as proposed by the new NDP. In the past, increasing domestic government revenue has been challenging, and over the past five years tax income has remained rather stable at between 12 and 13 per cent of GDP. Consequently, the baseline allows government revenues to increase only slightly (by two percentage points) between 2010 and 2015. This assumption deviates somewhat from the NDP projections, according to which revenues increase by 0.3 percentage points of GDP annually. In the baseline, the closure rule for the government budget assumes that changes in the deficit are financed through changes in the level of foreign borrowing.

Other closure rules are that private savings adjust endogenously to investment demand and the real exchange rate is flexible so as to clear the external balance of supply and demand for foreign exchange. The latter assumption is a reasonable approximation of the actual functioning of Uganda's exchange rate regime. Rates of return of production factors are assumed to be flexible—and the unemployment rate fixed, except when the rate of unemployment of any type of labour increases above the assumed minimum rate of 5 per cent. In the case of the latter, quantity (employment level) rather than price (wages) clears the relevant segment of the labour market.

The main macroeconomic results of the baseline scenario are summarized in Table 8.3. The average rate of GDP growth is 7.2 per cent during 2010-2015, as expected by the NDP. This pace of projected economic growth does not take account of the gains from oil production, which is expected to start exerting an impact on the Ugandan economy at large from 2015 onwards. Growth of the components of GDP is in the range of 5-9 per cent per year, with growth of exports and public consumption at the upper bound of about 9 per cent. Growth in public investment within the NDP is to be driven by infrastructure development, especially in roads and energy. In the baseline, the real exchange rate depreciates by 0.8 per cent per year, thus maintaining export competitiveness. At a sector level (not shown in Table 8.3), services are projected to be a main driver of overall GDP growth, expanding by 8.5 per cent per year on average. Agriculture and industry would grow, respectively, by 4.3 and 7.6 per cent per annum.

The limited increase in government revenue raises the question as to how the accelerated progress towards meeting the MDGs is going to be financed. Domestic borrowing under the baseline is maintained at an average of 1 per cent of GDP while foreign borrowing is estimated at 1 per cent during the

Table 8.3  
Uganda: Macroeconomic indicators in the baseline scenario, 2008-2015

	2008	2009	2010	2011	2012	2013	2014	2015
<b>Macroeconomic aggregates (percentage change)</b>								
Consumption – private	9.5	6.1	6.4	4.9	4.9	5.1	5.2	5.2
Consumption – government	12.8	4.9	8.4	8.9	8.4	8.0	8.2	8.4
Fixed investment – private	10.0	6.3	6.9	6.4	6.0	6.2	6.3	6.3
Fixed investment – government	9.1	-3.1	1.0	15.6	-1.6	6.0	8.7	9.3
Exports	-5.7	14.3	9.4	10.5	13.9	12.0	10.8	10.5
Imports	3.4	4.0	5.6	5.8	3.7	5.0	5.6	5.7
GDP at factor cost	9.5	7.2	7.2	7.2	7.2	7.2	7.2	7.2
Total factor employment (index)	2.9	2.8	3.0	2.9	3.2	3.2	3.4	3.7
Total factor productivity (index)	6.6	4.4	4.2	4.3	4.0	4.0	3.8	3.5
Real exchange rate (index)	-5.5	3.0	1.3	1.3	2.4	1.6	1.2	1.0
<b>Fiscal revenues and other receipts (per cent of GDP)</b>								
Direct Taxes	3.7	3.6	3.6	3.6	3.8	3.9	4.1	4.2
Import tariffs	6.4	6.5	6.4	6.4	6.4	6.4	6.4	6.4
Other indirect taxes	3.2	3.1	2.5	3.1	3.5	3.9	4.2	4.6
Private transfers	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Foreign transfers	4.8	4.3	4.1	4.0	4.0	4.0	4.0	4.0
Domestic borrowing	-0.2	-0.3	0.1	0.4	0.7	1.0	1.4	1.7
Foreign borrowing	3.0	2.5	2.7	2.6	1.3	0.5	0.0	-0.6
<b>Government expenditures (per cent of GDP)</b>								
Consumption	11.3	11.0	11.1	11.2	11.3	11.3	11.4	11.4
Fixed investment	8.4	7.6	7.2	7.8	7.3	7.3	7.4	7.6
Domestic interest payments	0.9	0.8	0.8	0.8	0.8	0.8	0.9	1.1
Foreign interest payments	0.2	0.2	0.3	0.3	0.3	0.3	0.3	0.2
Total	20.8	19.7	19.4	20.1	19.6	19.7	20.0	20.3
<b>Balance of payments (per cent of GDP)</b>								
Imports	28.5	28.5	28.6	28.5	28.2	28.1	28.0	27.9
Factor income payments to rest of the world	3.1	3.5	4.0	4.3	4.7	5.1	5.4	5.8
Net interest income payments to rest of the world	0.2	0.2	0.3	0.3	0.3	0.3	0.3	0.2
Exports	12.7	14.0	14.5	15.1	16.5	17.5	18.3	19.1
Private transfers from rest of the world	6.8	6.8	6.8	6.8	6.8	6.8	6.8	6.8
Official transfers from rest of the world	4.8	4.3	4.1	4.0	4.0	4.0	4.0	4.0
Factor income from rest of the world	0.7	0.8	0.8	0.8	0.8	0.8	0.8	0.8
Government borrowing from abroad	3.0	2.5	2.7	2.6	1.3	0.5	0.0	-0.6
Private borrowing from abroad	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Foreign Direct Investment	3.8	3.8	3.8	3.8	3.8	3.8	3.8	3.8
Total outflows/inflows	31.8	32.2	32.8	33.1	33.2	33.4	33.7	34.0

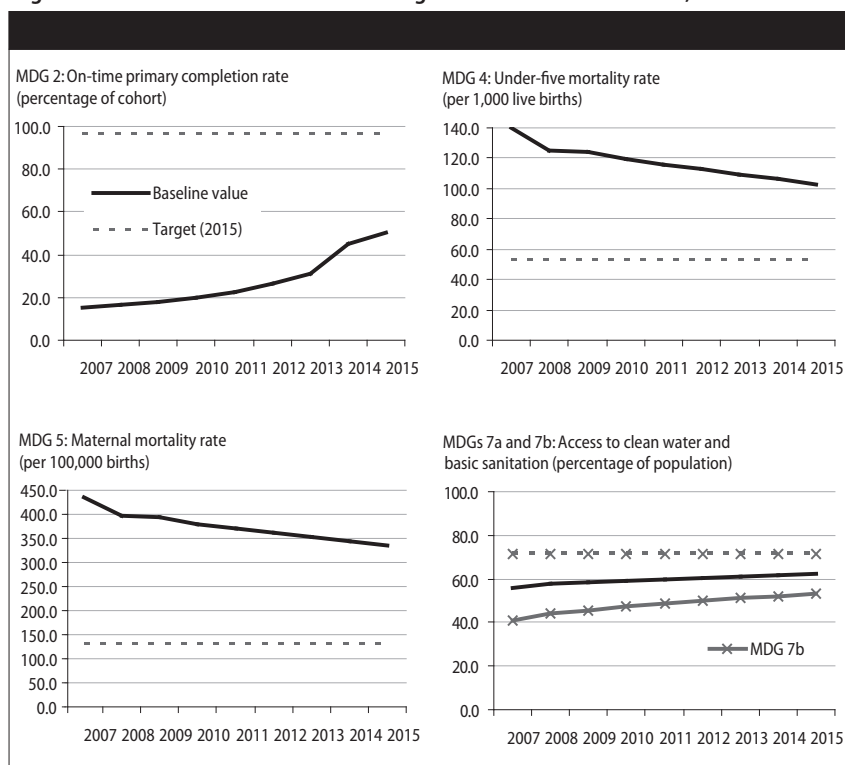
**Source:** Authors' estimates based on the application of MAMS for Uganda.

period 2010–2015, which implies a fiscal deficit of 2 per cent on average. The increase in the deficit is within the limits of the convergence criterion requirement established by the East African Community Monetary Union and which is expected to be ratified in 2012. The additional foreign borrowing that would be needed to finance government deficits in the baseline scenario cause the public debt-to-GDP ratio to increase from 37.0 to 42.5 per cent. This degree of indebtedness is considered sustainable, given the robust pace of GDP growth.

However, the generally positive macroeconomic baseline trends are not good enough to support achievement of most MDG targets. Only the target for poverty reduction would be met, but—as indicated above—that target was already met by the mid-2000s. The shortfall in achievement of the other MDGs is considerable as Figure 8.3 shows.<sup>5</sup>

Figure 8.3

## Uganda: Trends in MDG indicators and targets in the baseline scenario, 2007–2015



Source: Authors' estimates based on the application of MAMS for Uganda.

*Alternative scenarios for achieving the MDGs*

MAMS is particularly useful for assessing the impact of additional resources and policy reforms on accelerating progress towards the MDGs. This subsection explores the impact of scaled-up public expenditure for MDG achievement under alternative financing options, including financing through foreign aid, foreign borrowing, taxation or domestic borrowing. Also a scenario of mixed financing of the MDG strategy is performed in order to assess the feasibility of reducing reliance on foreign aid and borrowing. The scenario analysis is undertaken for both achievement of one MDG at the time and for all MDGs simultaneously. A key difference in model assumptions from those of the baseline is that in the MDG scenarios, government spending no longer adjusts according to a fixed rule, but becomes endogenous to adjust to the levels required to meet the MDG targets. In addition to the MDG scenarios, additional simulations of the impacts of other policy reforms were performed—specifically, policies inducing improvements in the efficiency in the delivery of public services and increased investments in physical infrastructure.

The additional spending requirements to close the achievement gaps for all MDGs considered in MAMS for Uganda (universal primary school completion, reducing child and maternal mortality and enhancing access to drinking water and basic sanitation) are substantial but vary depending on the source of financing. Financing through increased taxation or domestic borrowing would be more costly in terms of spending requirements. Under these financing options, public spending for the MDGs would need to increase by 10 per cent of GDP on average during 2011-2015 (Table 8.4). If we add what the government should have spent during 2008-2010 in order to achieve the target, but did not, the total cost would add to about 18 per cent of GDP, according to the simulation results. This would seem an almost insurmountable challenge for public finances. In the case of foreign aid or external borrowing, the additional costs are estimated at 7 per cent of GDP per year during 2011-2015 and nearly 12 per cent of GDP when adding the additional spending requirements for 2008-2010. At the end of the period (2015), however, the required education spending would be lower than the level estimated under baseline assumptions, because of the need to frontload much of the additional expenditures in order to sufficiently accelerate progress and to meet the MDG target on time.

The synergies among the MDGs would imply some cost savings if all goals are targeted simultaneously as compared with a (hypothetical) situation in which synergies were not considered. The synergy effects

were gauged by comparing the sum of public spending requirements for scenarios simulating attainment of just one or two goals with those of the corresponding scenario where all MDGs are targeted simultaneously. Figure 8.4 presents the results for the scenarios with aid-financed additional MDG spending. It shows that the synergy effects (the difference between the dotted and the continuous line) are estimated at about 2.5 per cent of GDP. The figure shows further that the cost of achieving the MDGs increase over time as a result of the decreasing marginal returns to the policy interventions for MDG achievement.

External financing of the MDG strategy causes a strong appreciation of the real exchange rate. In Uganda, the macroeconomic policy challenges have been subject to the debate in the past, in particular in the case of high aid inflows to finance health expenditures. As at the time, it could be argued that over time the adverse effects on export competitiveness of real exchange rate appreciation will be offset by labour productivity growth resulting from higher education levels and better health status of the work force. It has been argued further that it is possible that not all aid inflows add to the excess supply of foreign exchange. For example, aid may be

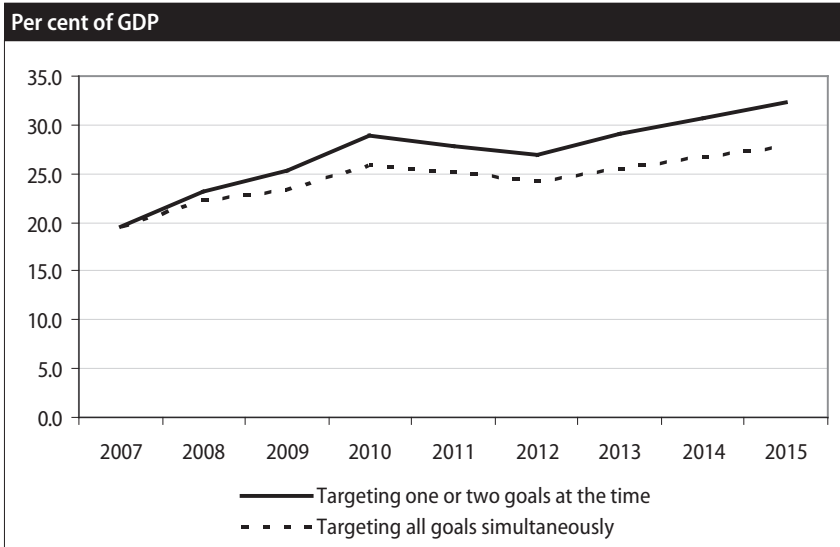
Table 8.4

**Uganda: Additional annual public spending required to achieve the MDGs under different financing scenarios compared to the baseline scenario**

Per cent of GDP			
<i>MDG financing scenario</i>	<i>2008-2010</i>	<i>2011-2015</i>	<i>2015</i>
Tax financing	8.10	9.91	13.05
Primary education	3.42	0.64	-0.50
Health	3.60	6.30	9.41
Water and sanitation	1.08	2.97	4.14
Foreign transfers (grant aid)	5.24	7.63	9.41
Primary education	2.66	0.29	-0.92
Health	2.08	5.12	7.22
Water and sanitation	0.50	2.22	3.11
Foreign borrowing	5.24	7.63	9.41
Primary education	2.66	0.29	-0.92
Health	2.08	5.12	7.22
Water and sanitation	0.50	2.22	3.11
Domestic borrowing	8.28	10.16	8.73
Primary education	3.46	0.73	0.39
Health	3.70	6.36	4.08
Water and sanitation	1.12	3.06	4.26

*Source:* Uganda Bureau of Statistics and Bank of Uganda.

Figure 8.4  
 Uganda: Total public expenditure<sup>1</sup> in the MDG scenarios with foreign aid financing



<sup>1</sup> Includes spending on both MDG and non-MDG related public services and transfers.

**Source:** Authors' estimates based on the application of MAMS for Uganda.

in kind or involve the direct purchase of drugs or medical equipment in the donor country, thus lessening the potential pressure for the exchange rate to appreciate. Nonetheless, the model simulations for Uganda yield a loss of export competitiveness in the short to medium run, as one of the macroeconomic trade-offs of the MDG strategy. Accumulation of external debt is another macroeconomic trade off, as the external debt-to-GDP ratio would increase to over 60 per cent by 2015, up from 15 per cent in 2007. This could endanger fiscal sustainability over time if robust economic growth is not sustained. Likewise, stepping up domestic borrowing to finance the strategy would lead to an even higher build-up of the public debt burden. Financing the MDG strategy by increasing tax rates would lead to an increase of the national tax burden from about 13 per cent of GDP in 2007 to 28 per cent in 2015 (against 15 per cent in the baseline), well above the projections of the NDP (see below).

Domestic resource mobilization to finance the MDGs will be challenging in Uganda. It is not just the sheer magnitude of the adjustment that matters, but the high degree of informality of urban and rural sectors makes any significant expansion of the tax base hard to achieve. Similarly, the shallow domestic financial market limits the scope for government borrowing.

Even if such financing would be feasible, the model results suggest that it would increase unemployment by crowding out private consumption and investment. The total unemployment rate would increase to 20 per cent in 2015, seven percentage points higher than in the baseline. Foreign financing, in contrast, would avoid such adverse effect and the unemployment rates would drop to 7.6 per cent in 2015.

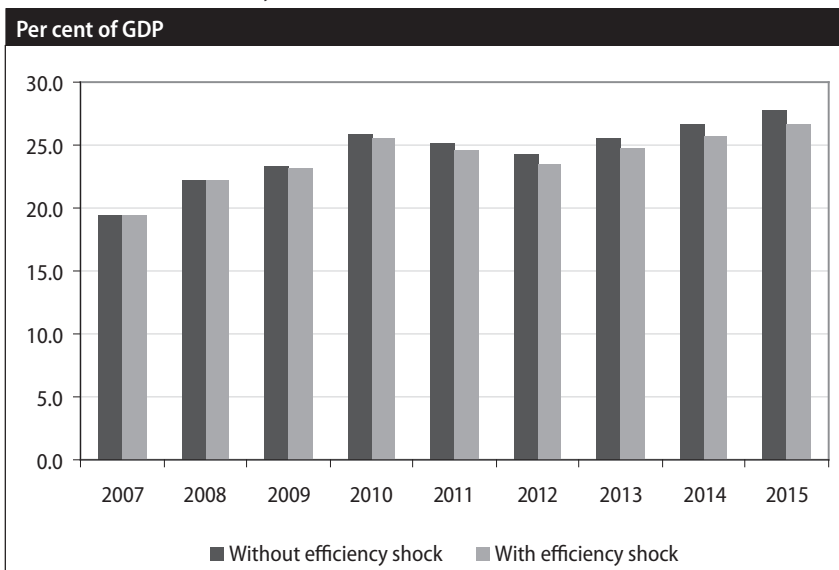
In all, increasing foreign aid would seem the better way to finance the MDG strategy. The increase in aid dependence could be seen as only temporary, however, given the anticipated oil resources. Alternatively, the government could consider borrowing externally using future oil revenues as collateral. Authorities appear reluctant to pursue such an option, however, and the National Development Plan does not consider future oil revenues as a potential source of MDG financing today. However, given the remaining gaps towards MDG achievement and the very large public financing requirements, this option may need more serious consideration. It would be consistent with fiscal sustainability criteria that would recommend investing the proceeds from exhaustible natural resources, such as oil, in physical (e.g. infrastructure) and human capital (e.g. health and education) that would enhance productivity and raise future incomes.

### *Efficient utilization of resources*

While increasing resources to meet the MDGs is critical, there is also much scope for reforms that would facilitate a more efficient use of resources. For instance, a study by Economic Policy Research Centre (2010) identified a series of interventions to address inefficiencies in the health sector. It highlighted, among other things, that the challenges of effectively delivering drugs in Uganda are related to problems with the institutional partnerships for the delivery of drugs, deficiencies in the procurement and disbursements by National Medical Stores, the ineffective use of funds for drugs under credit lines, third parties and primary health care, and the poor quality of district-level drug acquisition and delivery mechanisms. Similar expenditure tracking studies confirm there are significant resource leakages, especially in the education sector. For instance, Reinikka and Smith (2004) found that, on average, only 13 per cent of the capitation grant disbursed per student by the central government reached the intended primary schools. There are also other inefficiencies in the education sector, including teacher absenteeism, the importance of which could not be quantified in this study.

To examine the potential impact of measures to increase public sector efficiency, we simulated a scenario targeting simultaneous achievement of all non-income MDGs and assuming an improvement in the efficiency in the delivery of education, health, water and sanitation services. The efficiency gain was introduced by assuming an increase in the total factor productivity of 2 per cent per year in each of the corresponding social sectors. The additional assumption is that the efficiency improvements can be achieved through administrative measures at no direct additional fiscal cost. Unsurprisingly, this would help reduce the fiscal costs of the MDG strategy. The results, shown in Figure 8.5, indicate that the efficiency gains

Figure 8.5  
Uganda: Total public expenditure<sup>1</sup> in aid-financed MDG-scenarios  
with and without efficiency shock<sup>2</sup>



1 Including both MDG and non-MDG related spending and transfers.

2 The simulated efficiency improvement corresponds to an increase of total factor productivity of 2 per cent per year in primary education, health, and water and sanitation sectors.

**Source:** Authors' estimates based on the application of MAMS for Uganda.

would amount to about 1 per cent of GDP. This simulation is presented for purely illustrative purposes. The actual efficiency gains from public service reforms are likely to differ across sectors and will ultimately depend on political commitment of the country's leadership to take on vested interests and break with corrupt and inefficient practices.



*Combining improved domestic resource mobilization and aid financing*

For the baseline and the MDG achieving scenarios where taxation is not the financing mechanism of newly required MDG spending, it was assumed that tax revenues would increase from 13 to 15 per cent of GDP between 2007 and 2015, in line with NDP projections. An alternative scenario was assessed in which the MDG strategy would be in part financed by requesting additional official development assistance and in part through an increase in the tax effort (to 19 per cent of GDP in 2015). Improved tax collection should be achievable in the medium run by strengthening the tax administration and reducing or eliminating ad hoc exemptions for selected businesses. This mixed financing scenario would mitigate the real exchange rate appreciation and limit the adverse impact on exports as compared with the case of fully financing the strategy with foreign grants. Average annual export growth would still be 3 percentage points below that of the baseline scenario, but less severe than the 5.5 percentage points drop in the scenario of a fully aid-financed MDG strategy.

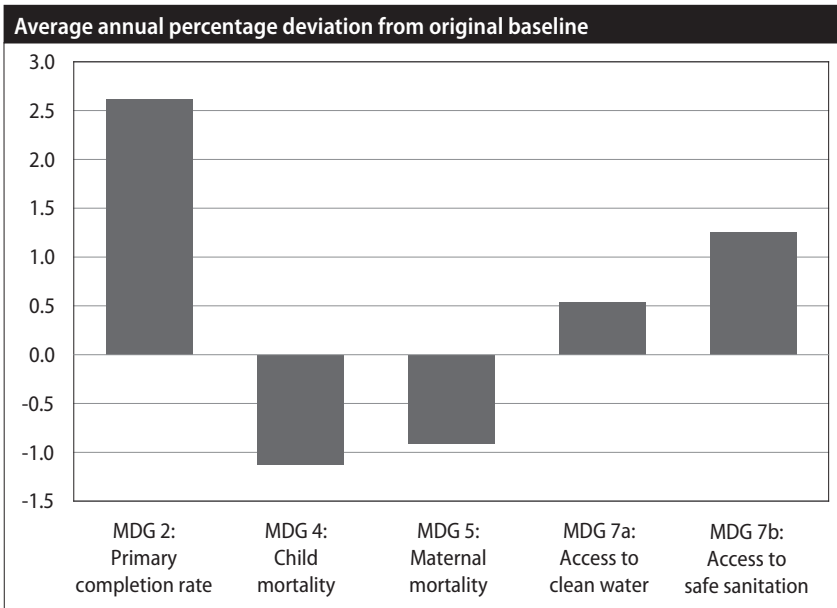
While not presented here, similar outcomes may be expected in a scenario which combines tax increases and external borrowing against future oil revenues to finance accelerated MDG attainment. As this would imply upfront investments in human capital it could be a means to avoid the “resource curse” effects that has plagued many natural resource abundant countries.

*Infrastructure and MDG attainment*

The above analysis involves resources largely targeted towards MDG attainment through the provision of MDG-related public services and improvements in household means. In a final set of simulations, we assess the impact on MDG achievement of increasing public investment in general infrastructure, such as roads and electricity supply. Improvements in infrastructure could have a direct effect on MDG achievement by making social services more accessible (better transportation) and more functional (e.g. allowing for the use of electronic instruments). Infrastructure investment would further add a demand impulse to the economy and enhance productivity of economic activity. Scenario results presented below assume a 25 per cent increase in spending on general public infrastructure. All other baseline assumptions were kept the same.

Figure 8.6 compares the difference in progress towards the MDG between the original baseline and the baseline with increased infrastructure investment. The primary completion rate would be 2.6 per cent higher,

Figure 8.6

Uganda: Impact of other public infrastructure spending on MDG indicators<sup>1</sup>

<sup>1</sup> MDG indicators accord with those presented in Figure 8.3.

**Source:** Authors' estimates based on the application of MAMS for Uganda.

while progress towards the other MDGs would also improve, albeit to a lesser extent. This provides a basis for viewing investments in MDGs and investments in infrastructure not as competing but complementary public policy objectives. In this case, less MDG spending would be compensated by higher spending on general public infrastructure.

#### EFFECTS ON POVERTY AND INEQUALITY

As already indicated, Uganda had already met the MDG-1 poverty target by the mid-2000s. Nonetheless, it is still useful to examine how additional policy efforts to achieve the non-income MDGs affect poverty reduction and income distribution.

In order to do so, the non-parametric microsimulation approach as described in Vos and Sanchez (2010) was applied to, in top down fashion, take simulation results generated in MAMS and apply them to the full welfare distribution from the 2005/2006 Uganda National Household Survey. As described at greater length in Chapter 1, the method allows

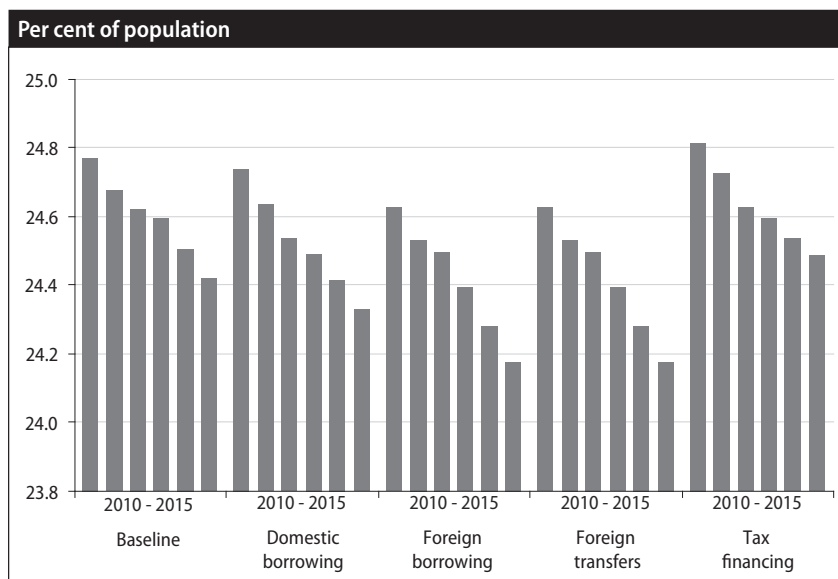
to overcome the limitation that MAMS only shows labour market and household income outcomes for a limited number of labour categories and household groups. Through the microsimulation approach, labour market outcomes and changes in the demographic structure of the labour supply resulting from the MAMS simulations were imposed on the full income distribution as observed through household surveys.

The official monthly poverty line (of UGX 21,135) established by the Uganda Bureau of Statistics (Appleton, 1999) was used to calculate the poverty incidence. All changes in the labour market structure after the base year are assessed relative to the base-year structure of the baseline survey.

The first set of results from the microsimulations shows the impact of the different MDG scenarios on the poverty incidence, or poverty headcount, between 2010 and 2015 (Figure 8.7). In all scenarios, poverty continues to decline. Under the baseline assumptions, which model the assumptions underlying the NDP, the incidence of poverty would fall from 25 to 24 per cent between 2010 and 2015. However, poverty reduction decelerates in the baseline, because economic growth is not sufficiently pro-poor and because of difficulties to reach the “chronic poor”. Targeted policy interventions may

Figure 8.7

**Uganda: Poverty incidence in the baseline and MDG scenarios under alternative financing options, 2010-2015**



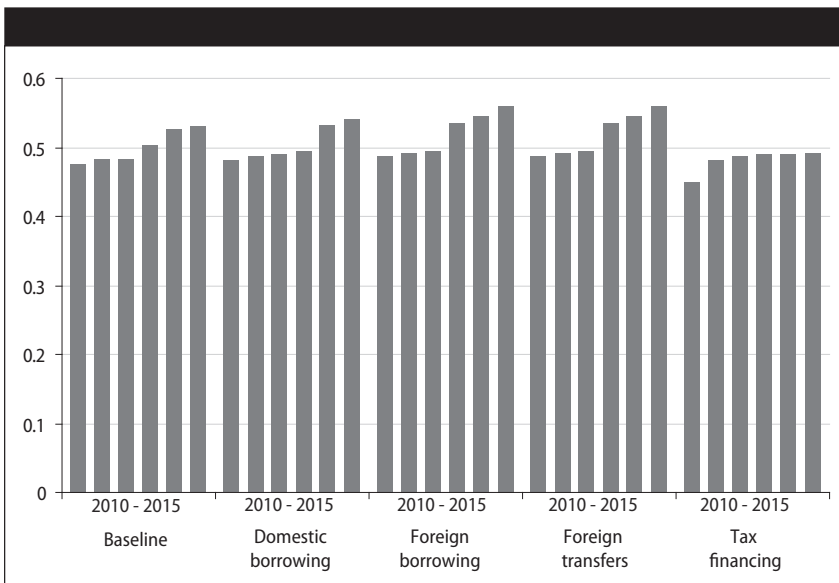
**Source:** Authors' estimates based on the application of MAMS for Uganda and microsimulations using the 2005/2006 Uganda National Household Survey.

be needed, including through cash transfers programs (e.g., for the elderly and households with children, which are already being piloted in selected areas of Uganda). Public works programmes and employment subsidies could be considered to reduce unemployment and underemployment among targeted population groups.

The poverty impact of the MDG scenarios varies depending on the financing scenario. The scenarios with foreign financing help reduce poverty further, while a tax-financed strategy would weaken poverty reduction in comparison with the baseline. The reasons for this were already mentioned, namely that the assumed direct tax increases would reduce disposable household incomes, aggregate demand and hence employment generation. These kind of trade-offs would be even stronger in the domestic borrowing scenario.

Figure 8.8 shows the results of the microsimulations for income inequality as measured by the Gini coefficient. The degree of inequality rises over the simulation period in all MDG financing scenarios. This could suggest that the NDP will do little to reverse the upward trend in inequality, even though

Figure 8.8  
Uganda: Gini coefficient in the baseline and MDG scenarios under alternative financing options, 2010-2015<sup>1</sup>



<sup>1</sup> The Gini coefficient was estimated for household income per capita.

**Source:** Authors' estimates based on the application of MAMS for Uganda and microsimulations using the 2005/2006 Uganda National Household Survey.

the NDP itself assumes otherwise. The simulated increase in inequality is mainly driven by a strong increase in wages of skilled workers, which more than offsets the inequality-reducing effects of the decline in unemployment of unskilled workers induced by the MDG scenario. Figure 8.8 also shows that the tax-financing scenario mitigates the inequality-enhancing effects, by tempering the wage increases for skilled labour. Rising inequality is often seen as an inevitable outcome of the development process, at least up to a certain level of development, especially as business opportunities expand and returns to education rise. Nevertheless, rising inequality should be of concern to policymakers in Uganda as it slows poverty reduction and may affect long-term economic growth and social cohesion.

## CONCLUSIONS AND POLICY IMPLICATIONS

This chapter's scenario analysis points to the need for a new round of structural reforms that will enable Uganda to accelerate progress towards the MDGs. The package of reforms needs to include a combination of increased public expenditure in sectors that expand the productive capacity of the economy, including agriculture and infrastructure, as well as to the social sectors where services that contribute directly to the MDGs are delivered. Additional public spending required to meet existing MDG gaps in primary education, child and maternal mortality, and water and sanitation, would amount to 12 per cent of GDP or more. The limited scope for enhancing domestic resource mobilization in the short run would suggest Uganda would need to increase its reliance on foreign aid in order to achieve the MDGs. Our analysis suggests that this need only be a temporary necessary evil when combined with reforms to enhance tax collection and enhance efficiency in public service delivery.

Moreover, once revenues from Uganda's newfound oil resources begin to flow, resource mobilization can be diversified further. Frontloading some of the future revenues (e.g. by borrowing abroad using oil as collateral) can be sound economic policy if the resources are invested in both physical and human capital that would enhance productivity and thereby offsetting possible "Dutch Disease" effects in the medium run as well as serving the purpose of accelerating progress towards the MDGs. More effective delivery of public services requires greater attention to implementing accountability mechanisms and fighting corruption. This should also be a key priority if Uganda is to avoid the "resource curse" of the ill-management of the proceeds from the impending oil boom.

With the recent cessation of hostilities in the north, after the end of decades of low-intensity civil war, there are now real opportunities for a renewed push to accelerate both economic growth and improvements in the social conditions through MDG achievement. This should also reduce the risk of recurrence of conflict.

## NOTES

- 1 This section draws mainly from the 2010 MDG progress report by the Ministry of Finance, Planning and Economic Development (2010).
- 2 The high net enrolment rate also implies that the target of gender parity in primary education is close to being achieved.
- 3 Uganda also faces great challenges to comply with MDG 6 on combating HIV/AIDS, malaria and other diseases which is not subject of analysis in this chapter. Since the late 1990s the data show a troubling upward trend in the number of new HIV/AIDS infections and young women are particularly vulnerable (Ministry of Finance, Planning and Economic Development, 2010). Progress towards two other major diseases, malaria and tuberculosis, has been mixed.
- 4 The IFPRI 2002 SAM is an update of a 1999 Uganda SAM prepared for IFPRI by Paul Dorosh and Moataz El-Said. The latter was published in 2005 (see: <http://www.ifpri.org/dataset/uganda-1>).
- 5 Please note that the achievement towards MDG 2 is monitored here for primary school completion (rather than enrolment).

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# Chapter 9

## Uzbekistan

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### INTRODUCTION

The government of the Republic of Uzbekistan's commitment to the millennium development goals (MDGs) is a priority of the national development strategy. Goals include halving poverty and the number of underweight children under five between 2000 and 2015. The goal to achieve universal primary education has already been achieved when measured in terms of net enrolment. However, improving the quality of education remains an important challenge. A number of laws and national programmes have been adopted to promote gender equality and women's empowerment. The country has made tangible progress toward reducing child and maternal mortality, though current trends suggest that the targets would be met only through additional policy efforts and resources targeted to healthcare. Measures taken to protect the environment and to ensure the rational use of natural resources are expected to secure tangible results, reversing environmental damage. Access to safe drinking water and sewage system connections has notably improved for urban and rural households and the 2015 targets are likely to be met.

This chapter discusses key social and economic reforms that have taken place in Uzbekistan during 2000-2009, with a primary focus on their implications for progress toward meeting the MDGs. It also presents a summary of key findings based on results from simulated scenarios of alternative strategies to finance the increase in public spending required for the timely achievement of the MDGs in Uzbekistan. These scenarios reveal macroeconomic trade-offs that the country would have to deal with depending on the choice of the financing option.



The remainder of this chapter is divided into four sections. The next section begins with a brief overview of main economic reforms, economic performance and vulnerabilities of the country. The following section reviews the government's social policy and examines inequality and poverty trends and the progress made towards the MDGs during 2000-2009. The section also discusses whether the country is on track to achieve the MDGs under existing policies and what additional efforts might be needed. The next section presents the scenario analysis. It addresses the information and procedures used to implement the modelling framework used to simulate the scenarios. It also explains the assumptions and analyzes the main results of the various simulated scenarios. The main upshot is that the targets for child and maternal mortality rates, and, to a lesser extent, those for water and sanitation delivery, would only be fully met if the government steps up spending by nearly 5 per cent of GDP per year. In order to generate the resources, the chapter recommends broadening the tax base. Because this additional MDG spending would trigger macroeconomic trade-offs that may limit production capacity in the short run, higher GDP and employment growth will be essential to achieve the poverty goal. This and other key findings and policy recommendations are presented in the final section.

## MACROECONOMIC PERFORMANCE AND POLICIES

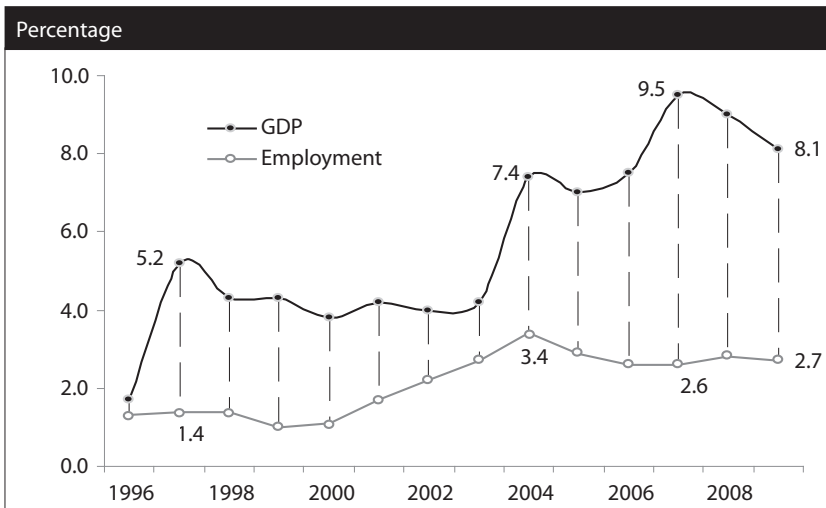
When Uzbekistan emerged as an independent state in 1991, the government adopted an approach of gradual reform and transformation of the economy. The main goal at the time was to prevent a sharp fall in output, a reduction in people's incomes, and unemployment growth, which a more radical approach might have triggered. The focus of the economic transformation was placed on the privatization of small and medium companies, and of housing and other sectors (public utilities, retail trade and other services), and on comprehensive support to expanding private ownership. Unlike most other members of the Commonwealth of Independent States (CIS), Uzbekistan did not enter into a deep economic recession. This was a result of its gradual reform approach and targeted support and reforms to the industrial and agricultural sectors.

In the second half of the 1990s, the government pursued import-substitution policies with some success, motivated by the fact that the country's key exports consist of commodities that are characterized by low short to medium-run supply and demand responsiveness to exchange rate and international price adjustments. During that period, Uzbekistan's

economy was hit by two major external shocks: falling world prices for its main export commodities (cotton, in particular) and the 1998 Russian financial crisis. Despite these blows to foreign exchange earnings, the economy managed to achieve moderate, but stable growth averaging 5.7 per cent per year from 1996 (Figure 9.1). The country had a low initial level of industrial activity, but ample spare production capacity that helped it keep up the pace of growth. At the same time, cotton production continued to expand, and the country reached energy self-sufficiency by 1995. Inflation was cut considerably from 58.8 per cent in 1997 to a still high of 29.1 per cent in 1999. The budget deficit averaged 2.6 per cent of GDP in the second half of the 1990s, but given the pace of overall economic growth, did not lead to an unsustainable run up of public debt.

A clear need to shift economic policies emerged at the beginning of the new century. A continued appreciation of the real exchange rate had eroded the competitiveness of domestic producers and export potential. In response, the government introduced special programmes to support small and medium-scaled enterprises, while a beginning was made with the privatization of state-owned enterprises. Along with a significant devaluation of the official exchange rate, measures were also taken to move towards a unified exchange rate in mid-2003. In October 2003, the government also committed to regulations stipulated in Sections 2(a),

Figure 9.1:  
Uzbekistan: Growth rates of real GDP and employment, 1996-2009



Source: The State Committee on Statistics, Ministry of Economy of the Republic of Uzbekistan.

3 and 4 of Article VIII of the Agreements of the International Monetary Fund (IMF) facilitating current account convertibility of the domestic currency.

Output growth accelerated to over 7 per cent per year during 2000-2009 (Figure 9.1). Growth was boosted by the greater openness to foreign markets, large-scale investments that supported export production capacity, and favourable external demand. In the second half of the 2000s, GDP increased by 50 per cent and exports by 150 per cent. Export growth rested primarily on the diversification into non-primary goods and services with high value added, such as cars and transportation services. The strong export drive turned the current account of the balance of payments into surplus. All main production sectors achieved fairly sustained output growth, but manufacturing and services contributed most to the expansion of aggregate GDP. By 2009, manufacturing's share of GDP reached 23.6 per cent and that of services 44.1 per cent.

During the 2000s, fiscal policy aimed at a balanced budget, while reducing the tax burden on businesses. A gradual reduction of the corporate, individual income and the single social tax rates led to a decline in tax revenue by more than 5.5 percentage points of GDP between 2000 and 2009 in spite of respectable GDP growth rates. At the end of the period, the tax burden had dropped to 22.5 per cent of GDP. The reduction could have been more pronounced if revenues from natural resource and property taxes had not increased from 2.4 to 3.7 per cent of GDP in the same period. The tax reforms did little to protect the purchasing power of low-income groups or promote labour-intensive economic activities, however. High rates for excise taxes on basic consumption goods (vegetable oil, sugar, etc.) have been maintained to ensure parity of prices with neighbouring countries, thereby limiting the purchasing power of household incomes, especially for the poor. Furthermore, the individual income taxation system is sub-optimal, limiting tax collection.

Attainment of the MDGs has been facilitated by the international community through ample provisioning of preferential loans, credits and grants to Uzbekistan. The total foreign aid provided to Uzbekistan by international financial institutions, foreign governments and non-governmental organizations amounted to \$10.9 billion during 1993-2008 (United Nations Development Programme, 2009b). This represented on average a little less than 5 per cent of GDP per year. During 2004-2008, one third of foreign aid supplied during that period (about \$0.7 billion) directly supported policies and programmes aiming at the achievement of the MDGs, especially for the development of social infrastructure (education, health,

water supply, housing and public utilities). Projects aimed at reforming the healthcare system in rural areas, improving women's and children's health, as well as strengthening the emergency medical services in urban and rural areas. Initiatives in the areas related to water supply service provision in urban and rural areas mainly targeted improvements in facilities and infrastructure. Foreign aid has been decreasing steadily since 1993, an indication that Uzbekistan may no longer be considered a key beneficiary country by international donors. Aid is therefore not expected to be an important financing source for MDG investments in the near future.

The recent global financial crisis affected the Uzbek economy mainly through the impact on the world demand for the country's key export commodities, such as precious and non-ferrous metals, cotton, petroleum products, gas and mineral fertilizers. The government responded with the Anti-Crisis Programme, which was highly rated by international organizations such as the World Bank and the IMF and aimed at stimulating domestic demand through investments in core economic sectors, supporting domestic manufacturers with fiscal incentives, and creating new jobs through state-based projects. As a result, the Uzbek economy managed to sustain economic growth rates amidst the global crisis. In 2009, when many developing countries recorded negative growth, output growth in Uzbekistan—even if slowing somewhat from previous years—reached a robust per cent, while the number of workers employed in the economy increased by 2.7 per cent (Figure 9.1).

## SOCIAL POLICIES AND PROGRESS TOWARDS THE MDGs

### *Social policy trends*

The gradual economic reforms were not the only distinctive feature of Uzbekistan's approach in transitioning towards a market economy. The government also protected social expenditure levels and policies aiming at improving the wellbeing of the population.

The national educational reform envisaged a new concept for the country, creating a system enabling continuing education (that is to say, broadening the spectrum of post-secondary learning activities and programmes) and extending mandatory free education to 12 years of schooling. The latter includes nine years of mandatory, universal, and free-of-charge basic education plus three years of free, universal, and mandatory secondary special and vocational education. The reforms have been supported by

increasing the share of public current expenditure on education to over 7 per cent of GDP in 2008-2009 (Table 9.1). In effect, 100 per cent literacy and enrolment in primary education and high levels of enrolment in secondary and higher education were reached during the 2000s.

To improve the health system, the Healthcare Reform Programme was adopted for the period 1998-2004, while the Child Sports Development Programme was approved in 2004. The reforms aimed to create a more favourable environment to raise healthy generations of Uzbeks, support improvements in health sector infrastructure, and allocate more government funds to primary care. It also sought to enhance outpatient and polyclinic-based treatment and prevention in lieu of the inefficient use of costly hospital beds, and to create a nationwide system of emergency medical care. Despite the reforms, public health expenditure dropped from 3.6 per cent to 2.4 per cent of GDP between 1995 and 2002, due to insufficient revenues, forcing the government to prioritize spending on maternal and child health. In the course of the 2000s, health spending recovered somewhat to 2.7 per cent of GDP in 2008-2009 (Table 9.1).

Table 9.1  
Uzbekistan: Government current expenditures on social sectors, 2000-2009

Per cent of GDP			
	2000-2003	2004-2007	2008-2009
Education	6.6	6.3	7.1
Healthcare	2.4	2.4	2.7
Social protection	2.0	1.5	2.1

*Source:* Ministry of Finance and Ministry of Economy of the Republic of Uzbekistan.

During 1996-2009, several programmes supported the expansion of water supply and sanitation systems. These included the installation of meters for utility services, major renovations to apartment blocks that had been built before 1991, the modernization of many houses, ensuring the supply of water to apartment blocks, and an overall improvement of access to water supply and sanitation facilities. In terms of public welfare programmes, the government introduced a financial aid system for deprived families in 1994. In addition, social support is now provided to all socially vulnerable groups, including retirees, disabled persons and children.

Despite the increase in welfare expenditures, the cost of social protection programmes has remained around 2.0 per cent of GDP during the 2000s (Table 9.1). Costs have been kept down as a result of more effective targeting. In August 2007, the government adopted the first national development

strategy, the MDG-based Welfare Improvement Strategy (WIS) for 2008-2010. The strategy aimed to spur sustained economic growth and enhance the population's wellbeing. As detailed further below, outcomes of recently implemented policies suggest that a number of challenges remain in order to achieve the MDGs: improving the quality of education and health services, job creation that is sufficient to keep households out of poverty, and better targeting of social programmes that provide income protection to vulnerable groups (through pensions, allowances and other transfers).

Table 9.2

**Uzbekistan: Progress towards the MDGs, 2000-08 and the 2015 target**

Per cent of GDP				
MDG and related indicator	2000	2005	2008	2015 (target)
MDG 1: People living below the national poverty line (per cent of population)	27.5 <sup>1</sup>	25.8	19.5 <sup>2</sup>	14.0
MDG 2: Primary school completion rate (per cent of relevant age group)	98.9	98.4	99.0	100.0
MDG 4: Under-five mortality rate (per 1,000 live births)	28.5	20.6	17.3	13.4 <sup>3</sup>
MDG 5: Maternal mortality rate (per 100,000 live births)	33.1	29.2	22.4	17.4 <sup>4</sup>
MDG 7a: Access to improved drinking water (per cent of population)	80.2	82.6	82.6	100.0
MDG 7b: Access to improved sanitation facilities (per cent of population)	46.6	48.2	51.5 <sup>5</sup>	65.0

<sup>1</sup> Estimate computed by the World Bank for 2001 based on data from the first Household Budget Survey.

<sup>2</sup> Value for 2009.

<sup>3</sup> The under-five child mortality rate would be reduced from 20.1 per 1,000 live births in 2006, by one-third in 2010, and by another one-third by 2015.

<sup>4</sup> The maternal mortality rate would be reduced from 24.8 per 100,000 live births in 2006, by 15 per cent in 2010 and a further 15 per cent by 2015.

<sup>5</sup> Value for 2007.

**Source:** UzbekInfo 1.0 and United Nations Development Programme (2009a).

## MDG PROGRESS AND POLICIES

The WIS (Government of Uzbekistan, 2007) defines country-specific MDG targets for 2015 (see Table 9.2). Overall, much progress has been made towards all targets though important gaps remain in some areas.

The government has made substantial efforts to achieve MDG 1—eradication of poverty and malnutrition—in the framework of national strategies and development programmes, and in partnership with

international development institutions. In unison with sustained economic growth, the poverty incidence started to fall steadily from 44.5 per cent in 1994 (based on an ad hoc sample survey), to 19.5 per cent in 2009 (estimated from the Household Budget Survey). For each 1 per cent growth in per capita GDP, poverty decreased by 0.38 per cent. Nevertheless, the gains from economic growth have not been distributed equally. The Gini coefficient of income inequality was quite high in 2000-2006 (0.45-0.50). Urban average incomes are significantly higher than those in rural areas. Consequently, rural poverty is higher than urban poverty, with the incidence in rural areas about 4 percentage points higher than the national average. This is due to the prevalence of low-paid jobs, large household size, and poorer social infrastructure compared with urban areas.

A key challenge to poverty reduction is the creation of more remunerative jobs for a growing labour force. About 50 per cent of the rural workforce is employed in the agricultural sector, which is characterized by low productivity and labour incomes. Civil service wages paid to 20 per cent of the workers are also below average. Recently, however, increased public spending on social sectors has allowed for higher wages for civil service workers. In recent years, overall jobs growth has pushed down the rate of open unemployment to below 5 per cent of the economically active population. High rates of underemployment remain a concern, however.

The government has supplemented the WIS with the 2009-2011 National Nutrition Improvement Strategy, which has already yielded visible results. The quality of public nutrition in general and child nutrition in particular have improved. Iron/folic acid supplementation and the first stage of the flour fortification helped to reduce the incidence of under-five child anaemia from 66.6 per cent in 2000 to 33.5 per cent in 2009, while the prevalence of diseases caused by iodine deficiency dropped from 47.7 to 28.6 per cent. Greater birth spacing and better awareness of childcare among parents have also helped reduce malnutrition.

In spite of observed progress, a linear continuation of past trends would take the incidence of poverty to 16 per cent by 2015, which is short of the target of 14 per cent. Therefore, meeting the target for reducing income poverty will require broader based growth, requiring the enhanced creation of remunerative jobs. The World Bank (2005) and the Asian Development Bank (2006) have arrived at the same conclusion that despite the steady decline in poverty rates, it is unlikely that MDG 1 will be achieved at the current pace of poverty reduction.

Nearly all boys and girls at school age complete the primary education cycle on time in Uzbekistan (Table 9.2). Accordingly, the targets of achieving universal primary education (MDG 2) and eliminating gender disparities in (primary) education (part of MDG 3) have already nearly been met. The literacy rate among the population aged between 16 and 24 years is nearly 100 percent. Given these achievements, improving the quality of primary and secondary education, while maintaining universal access to it, has become a central educational goal. The government is implementing the State School Education Programme to improve school infrastructure, supply schools with equipment and information technologies and create a solid ground for further qualitative changes in the primary and basic education. However, the quality of education will not increase sufficiently without addressing problems such as the lack of teachers with certain types of specialization or for certain educational levels, insufficient logistical support to schools, and inadequate levels of textbook availability.

Targets set by Uzbekistan for MDGs 4 and 5 fully correspond to the targets set by the international community to reduce the under-five and maternal mortality rates by two-thirds and three-quarters by 2015, respectively. Child mortality in the country is considered to be one of the lowest among the Central Asian countries. The under-five mortality rate was 28.5 per 1,000 live births in 2000 and it was brought down to 17.3 in 2008. The maternal mortality rate also decreased notably from 33.1 to 22.4 per 100,000 live births over the same period. These achievements have been the result of programmes and reforms to the health system, promotion of healthier habits, and the improvement of maternal health. As explained earlier, health expenditures remained unchanged during the first half of the 2000s and began to increase in 2006 in order to reach 2.7 per cent of GDP in 2008-2009. Nevertheless, child mortality indicators are still high compared with developed countries. Moreover, observed maternal mortality rates show unstable trends, which may reflect both problems in measurement and considerable differences in maternal mortality indicators across regions in the country. Based on current trends, Uzbekistan is likely to meet the under-five and maternal mortality targets if better policies and additional resources are put in place. Healthcare financing in Uzbekistan should improve further in the foreseeable future. Currently, the Programme for Improvement of the Health Infrastructure and Facilities for 2010-2014, and the Law on Mandatory Health Insurance are under consideration. Implementation of the mandatory health insurance will help to improve the mechanisms of health system financing, which should help improve public health in general, and maternal and child health in particular.



During the Soviet period most cities and towns were already connected to centralized water supply and sewage systems. In rural areas, other forms of semi-centralized systems to provide access to potable water were in widespread use, including wells, springs, rainwater collection, and so on. As a result, from Uzbekistan independence, a large share of the population already enjoyed access to improved water supplies and sanitation technologies.<sup>1</sup> Special government programmes for the construction of water pipelines were implemented during 2001-2009, allowing for the construction of about 54,000 km of new water pipelines, of which 47,900 km were in rural areas. They have resulted in increased access to potable water (MDG 7a) from 80.2 per cent in 2000 to 82.6 per cent in 2008. The percentage of the population with access to sanitation services (MDG 7b) has also gradually increased from 46.6 per cent in 2000 to 51.5 per cent in 2007. More progress, mainly in rural areas where the shortage is much larger, would put the country on track to achieve the two targets related to MDG 7.

## MAMS SCENARIO ANALYSIS

Various scenarios were simulated with the economy-wide model known as MAMS (see Chapter 1), in order to determine whether the above-presented MDG targets (Table 9.2) are likely to be met by 2015 under current policies and, if not, what additional policies would need to be put in place to meet all the goals. The model was calibrated to Uzbek data to ensure the scenario analysis reflects as good as possible the country's reality.

### *Calibration of MAMS*

The core database of MAMS consists of a social accounting matrix (SAM), which was constructed for Uzbekistan for the year 2005. The same year is the base year of MAMS for Uzbekistan and the starting year of the simulation period. National accounts data and the 2005 input-output matrix (prepared by the State Committee on Statistics of Uzbekistan) were key data sources. Following the accounting structure and other requirements of MAMS, the MDG-related government activities were disaggregated as follows: education (by cycle), health, provision of water and sanitation, other public infrastructure services, and other government services. Investment and capital stocks are explicitly disaggregated for each of these government sectors. In the case of the education and health sectors, the SAM also accounts for private provisioning of these services. In addition to the eleven

MDG-related sectors, the SAM includes eleven production sectors and three types of labour classified by the level of education attained by the worker.

Due to the absence of sufficient data to econometrically estimate the model's standard elasticities (such as those for substitution and transformation in production, savings and consumption demand with respect to income levels, etc.) as well as those of determinants of MDG achievement, most of the required model elasticities had to be based on existing MAMS applications and computable general equilibrium models for other countries. The choice of elasticities was validated through expert opinion on the functioning of the Uzbek economy and social sectors. Borrowing "extraneous" values could have a negative impact on the accuracy and precision of the model simulation results, but this approach was used with certain confidence for two reasons. First, all parameters used are within the model's possible and plausible ranges and they generate a baseline scenario that reasonably replicates the aggregate functioning of the economy—as well as a smooth continuation of past trends for key macroeconomic variables. Second, a sensitivity analysis indicated that the elasticities did not for the most part have a significant impact on the simulation results and performance of the model. With such caveats, the calibrated model was expected to provide useful results to inform recommendations on how the country should strategize to achieve the MDGs as well as the costs involved.

The MDG elasticities are of particular importance as they define the extent to which each MDG-related indicator would respond to changes in their corresponding determinants (see Chapter 1). The values used are presented in Table 9.3. Taking into consideration that mortality among children and mothers has common causes and correlates, the same elasticities were used for both child and maternal mortality rates. In the case of access to improved water and sanitation facilities, the elasticities were derived from information from the 2005 SAM and COWI (2004). Regarding the range and sign of the elasticities, reasonable and informed assumptions were made based on existing studies, economic logic and the opinion of experts in the field. For example, since public provision of primary education is mandatory and the constitutional responsibility of the state, the wage premium, household consumption and public infrastructure are likely to have only a small impact or none at all on household decisions to enrol children in primary schools. This is reflected in values near the lower limit of the feasibility range assigned for the elasticity in question (Table 9.3). The above-mentioned determinants are likely of greater importance in the demand for higher education.

Table 9.3

**Uzbekistan: Elasticities of MDG-related outcome indicators with respect to their determinants in MAMS**

MDG-related indicator	Health service delivery per-capita	Water & sanitation delivery per-capita	Education service delivery per-capita	Public infrastructure	Household consumption per capita	MDGs			Wage premium
						4	7a	7b	
MDG 1					-0.32				
MDG 4	-0.75			-0.05	-0.10	-0.05	-0.05		
MDG 5	-0.75			-0.05	-0.10	-0.05	-0.05		
MDG 7a		0.50		0.10	0.09				
MDG 7b		0.20		0.10	0.12				
<b>Primary education</b>									
entry rate			0.08	0.01	0.02	-0.03			0.10
promotion rate			0.08	0.01	0.02	-0.01			0.10
<b>Secondary education</b>									
promotion rate			0.10	0.01	0.02	-0.01			0.20
graduation (primary) and continuation rate			0.10	0.01	0.02	-0.01			0.20
<b>Tertiary education</b>									
promotion rate			0.10	0.01	1.00	-0.01			0.40
graduation (secondary) and continuation rate			0.10	0.01	1.00	0.00			0.40

**Source:** Authors' assumptions and estimates based on United Nations Department of Economic and Social Affairs (2010).

The logistic functions that define trends in MDG-related indicators were calibrated to reproduce observed trends for each corresponding indicator. The procedures and the compilation of other information used to calibrate MAMS are described in more detail in Olimov and Fayzullaev (2011).

### *Baseline scenario: key assumptions and results*

Once calibrated, MAMS enabled the generation of a baseline scenario for the period 2005-2015 that follows the current optimistic medium-term projections and assumptions. This scenario assumes no additional public interventions are put in place to target MDG achievement. In the baseline scenario, real GDP grows on average by 8.1 per cent and the population by 1.5 per cent per year. Real public spending is assumed to increase at the same

annual growth rate as GDP. In general, the baseline scenario reasonably replicates the aggregate functioning of the economy and generates a smooth continuation of past trends for key macroeconomic variables (Table 9.4).

The baseline scenario further assumes that the market for foreign exchange clears through adjustments in the real exchange rate. The latter appreciates over the simulation period to eliminate excess demand for foreign exchange, as a result of which the GDP share of exports declines notably whereas that of imports increases. Foreign savings decreases relative to GDP in view of the real exchange rate adjustment. GDP growth is mostly explained by growth in consumption and private investment.

An exogenous rule is imposed on all sources of financing for the government budget (taxation and domestic and foreign borrowing) except for foreign transfers which are assumed to be endogenous. Consequently, foreign aid is assumed to adjust to ensure full financing of any budget imbalance. Government consumption is also assumed to evolve according to an exogenously set rule that public spending replicates a ‘business-as-usual’ pattern. According to this pattern, current public spending grows by 9.3 per cent per year on average in the 2006–2009 period of the baseline scenario, which is close to the observed rate of 9.4 per cent. Public investment is allowed to grow such that the capital stock for social infrastructure increases commensurately with the provision of government services—though it shows a small reduction as a share of GDP towards the end of the simulation period due to the effect of capital accumulation. In the baseline scenario, tax revenue remains constant at 20.8 per cent of GDP throughout the simulation period. The government’s budget balance for current spending and revenue is in surplus, but decreases from 4.6 per cent in 2006 to 3.5 per cent of GDP by the end of the simulation period owing to the fact that current spending increases faster than GDP growth. Domestic borrowing requirements are negative (-2.0 per cent of GDP), reflecting net repayment of domestic public debt and net lending to the non-government sector. Foreign borrowing declines in tandem with foreign savings. The government debt shows a clear reduction in the baseline.

Total employment increases at an average annual rate of 2.9 per cent over the simulation period in the baseline. Employment growth is lower for unskilled labour the bulk of which attends the first cycle of school. Progress in education translates into a relatively larger participation of and demand for more qualified workers, especially semi-skilled (who have completed the second cycle of education). The average real wage increases by 5.3 per cent per year during the simulation period, and given the aforementioned changes in employment, the increase is relatively lower for semi-skilled workers.

Table 9.4

Uzbekistan: Key results of the MAMS scenarios<sup>1</sup>, 2005, 2015 and period annual average for 2010-2015

	Base year (2005)		Baseline scenario		Scenario where MDGs 4, 5, 7a and 7b are achieved with:				
	2010-2015	2015	direct taxes		foreign borrowing		domestic borrowing		
			2010-2015	2015	2010-2015	2015	2010-2015	2015	
Real exchange rate (2005 = 100)	100.0	100.1	99.4	100.2	99.5	99.3	99.1	100.3	99.5
Real GDP growth rate (per cent)	8.2	8.0	8.1	7.4	7.8	7.2	7.8	5.1	6.7
Private consumption	49.8	58.8	58.9	53.7	56.0	58.1	58.6	60.2	59.5
Government consumption	16.6	19.1	18.5	24.7	21.8	26.3	22.7	25.3	22.1
Private investment	18.5	20.5	20.4	18.6	19.1	20.3	20.3	11.2	14.8
Government investment	4.2	3.4	3.4	5.0	4.7	4.8	4.6	5.3	4.8
Exports of goods and services	39.2	30.5	31.2	28.1	29.8	22.9	26.6	27.2	29.4
Imports of goods and services	31.3	32.2	32.4	30.1	31.1	32.4	32.7	29.2	30.7
Foreign savings	8.0	1.5	0.9	1.5	0.8	9.5	5.2	1.5	0.8
Government savings	4.6	3.5	3.6	5.1	4.8	5.1	4.9	7.8	6.2
Tax revenue	20.8	20.7	20.9	28.1	25.6	20.3	20.7	20.5	20.7
Domestic government borrowing <sup>2</sup>	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	7.4	2.9
External government borrowing	0.7	-0.1	-0.8	-0.1	-0.8	7.8	3.6	-0.1	-0.8
Domestic government debt	2.5	0.4	0.8	0.4	0.8	0.3	0.8	41.9	23.1
External government debt	25.0	6.4	9.3	6.2	9.1	33.8	24.3	7.1	9.7
Employment <sup>3</sup>									
Unskilled workers	583,932	0.7	-0.2	0.2	-0.5	0.4	-0.4	0.2	-0.4
Semi-skilled workers	211,898	5.8	6.5	6.5	7.2	4.6	7.0	6.2	7.0
Skilled workers	223,800	4.5	4.4	4.5	4.4	4.6	4.5	4.5	4.4
Real wage per worker <sup>4</sup>									
Unskilled workers	347,246	10.3	11.0	9.0	10.4	11.8	12.1	7.2	9.4
Semi-skilled workers	624,620	3.5	1.8	3.7	2.2	9.4	4.2	2.6	1.6
Skilled workers	608,098	6.0	5.4	6.0	5.7	9.2	7.6	4.3	4.7

<sup>1</sup> In per cent of GDP unless specified otherwise.<sup>2</sup> A negative entry indicates lending.<sup>3</sup> Number employed in thousands for the base year and growth rates in the scenarios.<sup>4</sup> In Uzbek Soums (local currency unit) in the base year and growth rate in the scenarios.**Source:** Authors' estimates based on MAMS for Uzbekistan.

As said earlier, social programmes in the education (the National Human Resources Training and the School Education Development Programmes) and health (the Healthcare Reform Programme) sectors have resulted in substantial progress towards the MDGs. However, the baseline results suggest that without additional efforts, progress would be insufficient to fully close existing MDG gaps by 2015. Under the assumptions of this scenario, even with continued increases in public spending and expected improvements in per capita consumption, the targets would not be met by 2015, although shortfalls are not large (Table 9.5).

### *Achieving the MDGs under alternative financing scenarios*

In MDG-achievement scenarios, public interventions are scaled up such that, alternatively, one or two of the MDGs are achieved or all of them are achieved simultaneously. The scenarios further assess the implications of different forms of financing of the additional spending efforts, that is, through direct taxation, foreign borrowing or domestic borrowing. As said, foreign aid is not expected to be an important source of financing for

Table 9.5

**Uzbekistan: MDG indicators in the baseline scenario and targets, 2005-2015**

<i>MDG and related indicator</i>	<i>2005</i>	<i>2010</i>	<i>2015</i>	<i>2015 target</i>
MDG 1: People living below the national poverty line (per cent of population)	25.6	20.4	14.9	14.0
MDG 2: Primary school completion rate (per cent of relevant age cohort) <sup>1</sup>	98.9	98.5	98.5	100.0
MDG 4: Under-five mortality rate (per 1,000 live births)	20.6	17.1	15.8	13.4
MDG 5: Maternal mortality rate (per 100,000 live births)	29.2	23.4	21.2	17.4
MDG 7a: Access to improved drinking water (per cent of population)	82.6	92.4	97.5	100.0
MDG 7b: Access to improved sanitation facilities (per cent of population)	48.2	54.6	60.2	65.0

<sup>1</sup> The figures for MDG 2 are calculated directly from the MAMS model. For this reason, they are not fully comparable with the observed figures presented in Table 9.2, except for the base year, 2005.

**Source:** Authors' estimates based on MAMS for Uzbekistan.

MDG investments in the near future, which is why it was not considered as part of the set of MDG-achieving scenarios. These scenarios do not consider additional measures to achieve the target for poverty reduction for methodological reasons, either, as explained in the below. The goal of achieving universal access to primary education (MDG 2) is also excluded from the targeting as this has by and large been met, as explained earlier. Hence, the simulations consider full achievement of the targets for health (MDG 4 & 5) and water and sanitation (MDG 7a & 7b) only.

In order to keep primary completion rates at least as high as projected in the baseline, these scenarios assume that education spending per student (which in MAMS is assumed to be both a proxy for the quantity and quality of service delivery) is maintained at the same level as in the baseline scenario. Increases in public current and investment spending on health and drinking water and sanitation are strictly associated with achieving one or two of the related MDGs separately or all of them simultaneously.

The results shown in Table 9.6 indicate that the additional public spending required to simultaneously meet the targets for reducing child and maternal mortality and improve access to drinking water and sanitation would range between 4.6 and 4.8 per cent of GDP per year on average during 2010-2015, depending on the financing mechanism. Most of the additional spending would be needed to achieve the health MDGs. A comparison of the scenarios in which the MDGs are attained separately or simultaneously, shows that the latter produces synergistic effects. Progress towards MDGs 7a and 7b, for example, would accelerate the reduction in mortality rates. During 2010-2015, the cost of achieving the MDGs would be 0.06, 0.04 and 0.02 percentage points of GDP per year less under the three different financing scenarios—respectively, external borrowing, higher income taxes or domestic borrowing because of these synergistic effects (Table 9.6). The additional cost required to maintain primary completion rates as in the baseline is marginal and this basically reflects very small reductions in GDP in the MDG-achieving scenarios relative to the baseline (see Table 9.4).

Table 9.7 presents a further specification of the required additional public spending. These calculations should be treated as representing order of magnitude rather than precise estimates. The immediate conclusion to be drawn from this table is that, in the case of the MDG achieving simulations, there is a need to increase MDG-related spending—relative to the baseline scenario—from 6.3 to 11.2 per cent of GDP from 2010 to 2015, almost doubling it in terms of Uzbek soums (UZS). However, this could overestimate the actual cost owing to existing interrelationships

Table 9.6

**Uzbekistan: Public spending on MDG-related services in the baseline and MDG-achieving scenarios under alternative financing strategies, 2005 and 2010-2015**

Per cent of GDP					
	Base year 2005	Baseline scenario (2010-2015) <sup>1</sup>	Required additional public spending under alternative financing scenarios (difference with respect to the baseline scenario), 2010-2015 <sup>1</sup>		
			direct taxes	foreign borrowing	domestic borrowing
<i>Scenario where MDGs 4 &amp; 5 are achieved</i>					
Environment <sup>2</sup>	0.06	0.05	0.00	0.00	0.00
current	0.04	0.04	0.00	0.00	0.00
investment	0.02	0.01	0.00	0.00	0.00
Healthcare	2.84	3.00	4.12	4.15	4.26
current	2.40	2.63	2.81	2.93	2.88
investment	0.44	0.37	1.30	1.22	1.37
Education <sup>3</sup>	3.05	3.24	0.17	0.27	0.19
current	2.18	2.42	0.11	0.22	0.12
investment	0.87	0.82	0.06	0.05	0.06
Total (1)	5.94	6.28	4.29	4.42	4.44
<i>Scenario where MDGs 7a &amp; 7b are achieved</i>					
Environment <sup>2</sup>	0.06	0.05	0.37	0.37	0.37
current	0.04	0.04	0.36	0.36	0.36
investment	0.02	0.01	0.01	0.01	0.01
Healthcare	2.84	3.00	0.00	0.01	0.00
current	2.40	2.63	0.00	0.01	0.00
investment	0.44	0.37	0.00	0.00	0.00
Education <sup>3</sup>	3.05	3.24	0.01	0.02	0.01
current	2.18	2.42	0.00	0.01	0.01
investment	0.87	0.82	0.00	0.00	0.00
Total (2)	5.94	6.28	0.38	0.40	0.38
<i>Scenario where all MDGs are achieved</i>					
Environment <sup>2</sup>	0.06	0.05	0.38	0.37	0.41
current	0.04	0.04	0.37	0.36	0.39
investment	0.02	0.01	0.01	0.01	0.01
Healthcare	2.84	3.00	4.07	4.11	4.21
current	2.40	2.63	2.78	2.90	2.85
investment	0.44	0.37	1.29	1.21	1.36
Education <sup>3</sup>	3.05	3.24	0.18	0.28	0.19
current	2.18	2.42	0.11	0.23	0.13
investment	0.87	0.82	0.07	0.05	0.06
Total (3)	5.94	6.28	4.62	4.76	4.81
Synergy effect <sup>4</sup>			<b>0.04</b>	<b>0.06</b>	<b>0.02</b>

<sup>1</sup> Period annual average. Some minor discrepancies between the total value and the sum of items are due to rounding.

<sup>2</sup> Spending on potable water and improved sanitation facilities.

<sup>3</sup> Includes the primary, secondary and tertiary education.

<sup>4</sup> Total (1) + Total (2) – Total (3).

**Source:** Authors' estimates based on MAMS for Uzbekistan.



between the various kinds of diseases.<sup>2</sup> For instance, like many infectious diseases, tuberculosis spreads more quickly and is much more dangerous in the presence of HIV/AIDS, which in turn may have an impact on child and maternal mortality. In contrast, oral rehydration therapy, vaccinations, and the promotion of breast feeding contribute to reduction in infant mortality. On the other hand, these model-based estimates may overlook limited absorptive capacity of social sectors. Solving capacity constraints are not just a matter of money, but require overcoming administrative and other hurdles and adequate time to build additional infrastructure. For that reason, careful sequencing of public investment across sectors as well as improvement of governance and institutional structures can significantly reduce the cost of achieving the MDGs.<sup>3</sup>

Table 9.7  
Uzbekistan: Average annual cost of achieving the MDGs, 2010-2015

	<i>Baseline scenario</i>		<i>MDG scenarios</i>	
	<i>Billion UZS</i>	<i>Per cent of GDP</i>	<i>Billion UZS</i>	<i>Per cent of GDP</i>
Education (primary)	919	3.24	954–1,014	3.5–3.6
Health (child and maternal mortality)	851	3.00	1,917–1,957	6.9– 7.1
Environment (water and sanitation)	14	0.05	116–121	0.41–0.45

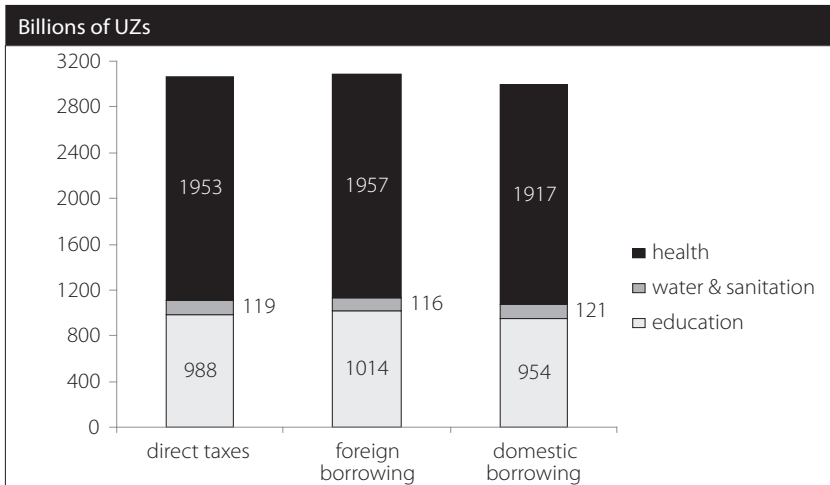
*Source:* Authors' estimates based on MAMS for Uzbekistan.

From this point of view, for all the health-related goals, it is estimated that the additional total cost of achieving the respective millennium targets by 2015 ranges from 1,917 to 1,957 billion UZS depending on whether the increased spending would be financed through tax increases, external borrowing, or domestic borrowing (Figure 9.2).

In the simulated scenarios, achieving the MDGs would not only require increasing public spending, but accounting for macroeconomic trade-offs. Real GDP growth is less under the MDG achievement scenarios, particularly when the additional public spending is financed through domestic borrowing (Table 9.4).

In the domestic-borrowing scenario, the government absorbs more resources by mobilizing private savings that would otherwise be used for private investment, which is notably much less compared to the other scenarios. In terms of the additional public spending required to meet the targets, this financing option is also more costly because the reduction in private spending in MDG-related sectors is compensated by more public spending to fully meet the targets (see Table 9.6). The internal public debt

Figure 9.2:  
Uzbekistan: Public spending required to achieve the MDGs under alternative financing scenarios, 2010-2015



Source: Authors' estimates based on MAMS for Uzbekistan.

would increase to 41.9 per cent of GDP in 2015 from an initial level of 2.5 per cent of GDP in the base year (Table 9.4). Domestic borrowing would lead to a doubling of the fiscal deficit with respect to the baseline scenario, while tax revenues almost do not change and external government debt falls from 25.0 to 7.1 per cent of GDP, as expected owing to the nature of the scenario.

In the case of the tax-financing scenario, to finance the additional public spending tax revenues need to increase from 20.7 to 28.1 per cent of GDP (Table 9.4). As a result, the transfer of resources from the private to the public sector crowds out private spending and import demand. The government needs to offset the reduction of private spending in education, health, and water and sanitation in order to achieve the MDGs and, even so, GDP growth is on average slightly less than in the baseline scenario. In general, the required increase in the tax revenues seems to be an unfeasible scenario because of two reasons: (i) political constraints—the government's fiscal policy in the past ten years has been focused on ensuring a balanced government budget, for which, as explained, it has concurrently reduced the tax burden on businesses; and (ii) due to the high share of agriculture and informal economic activity typical of economies in transition, direct taxes (corporate and personal) are unlikely to be a major source of domestic revenues in the short- to medium-term (World Bank and International Monetary Fund, 2004).

Policies that help generate additional revenues by broadening the tax base need to be formulated. At the same time, measures need to be taken to increase the efficiency of existing MDG-related spending (or general budget management and tax administration) in conjunction with efforts to attract external resources.

The external-borrowing scenario leads to an increase in the external debt-to-GDP ratio to 33.8 per cent in 2015, up from 25.0 per cent in the baseline, putting the feasibility of this scenario for Uzbekistan into question as it would represent a turning point for the stable debt dynamics shown since 2000. In addition, consistent with the existing MAMS literature, reliance on foreign resources tends to induce a real exchange rate appreciation which slows export growth (Table 9.4). These trends are clear Dutch disease symptoms, which reflect damage to the economy in the form of a structural shrinkage of the tradable sector, risking the capacity of the economy to sustain growth over time. Compared with the domestic-borrowing scenario, the availability of external resources allowed an increase in government absorption (31 per cent of GDP in 2015 against 22.5 percent in the baseline) without crowding out private sector demand. The trade deficit would widen substantially as a result of the real exchange rate appreciation, reaching 9.5 per cent of GDP by the end of the simulation period.

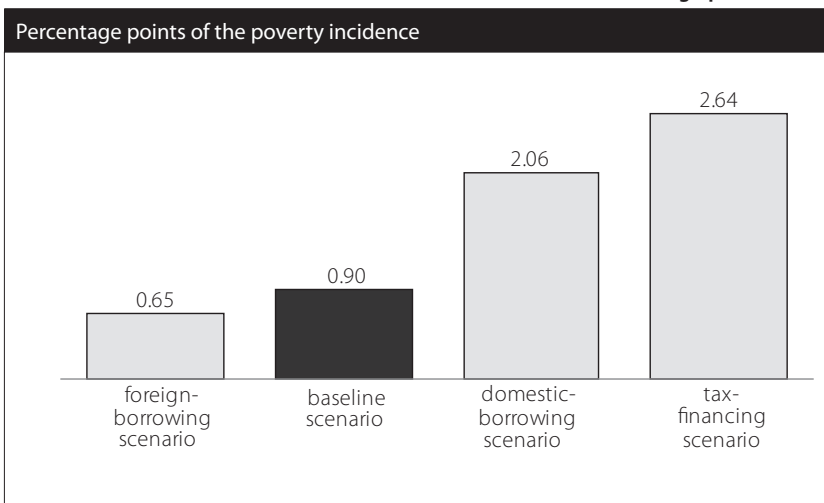
### *Incidence of poverty under all scenarios*

Computable general equilibrium (CGE) models, including MAMS, typically fail to specify the income distribution with sufficient detail to properly estimate poverty at the household level, given the use of aggregated “representative households” (Vos and Sánchez, 2010). To deal with this limitation, most country applications in this volume use a microsimulation methodology that takes into account the full income distribution, and allows obtaining poverty and inequality estimates using the labour market results of MAMS-based scenarios and imposing these onto a micro-level household survey dataset (see Chapter 1). Lacking direct access to household survey data, the microsimulation analysis could not be implemented for Uzbekistan’s study. Instead, in order to make at least some inferences about how poverty could evolve under the simulated scenarios analyzed up until now, progress towards MDG 1 is examined using a simple constant-elasticity relationship between the headcount poverty rate and real household consumption per capita—thus essentially ignoring income distribution effects that would likely affect the final estimates on poverty.<sup>4</sup>

The main findings from these simplistic estimations are threefold: (i) the poverty target would not be met under the assumptions of the baseline and the non-poverty MDG-achieving scenarios, (ii) the remaining shortfall varies across scenarios, and (iii) meeting the targets for education, health and water and sanitation by means of increasing public spending on social sectors does not have a substantial impact on poverty outcomes during the simulation period.

The last finding would not come as a surprise since, as explained earlier, GDP grows relatively less when the MDGs are targeted in the MDG scenarios—compared to the baseline scenario, owing to the macroeconomic trade-offs. These, in turn, have different effects on the structure of the labour market that lead to different results in terms of household income per capita. The distance to the poverty target for 2015 varies across different simulations, with the more prominent progress being shown under the baseline and foreign borrowing scenarios (Figure 9.3). In the foreign borrowing scenarios employment and real wages improve for the more skilled workers over the period 2010-2015 relative to the baseline (Table 9.4), resulting in a lower poverty incidence. Poverty increases less in the domestic-borrowing scenario compared to that of increased taxation where private consumption is severely constrained (see Table 9.4 and Figure 9.3).

Figure 9.3:  
Uzbekistan: Distance to poverty reduction (MDG 1) target in the baseline and scenarios of simultaneous MDG achievement under different financing options, 2015



Source: Authors' estimates based on MAMS for Uzbekistan.

## CONCLUSIONS AND POLICY IMPLICATIONS

The scenario analysis presented in this chapter helps to conclude that, by and large, most MDGs under study can be achieved in Uzbekistan by 2015. But this will depend on the successful implementation of a growth-driven strategy that enables public resource mobilization to spur service delivery in health, water and sanitation and education.

Optimistic medium-term baseline projections existing at the time of elaborating this study suggest that the country would make significant MDG progress, but targets for child and maternal mortality rates, and water and sanitation delivery would not be fully met by 2015. The government would need to boost spending by about 4.6 to 4.8 per cent of GDP per year, depending on whether it resorts to tax revenue, external borrowing, or domestic borrowing to finance the additional expenditures. Most of this spending would be needed to scale up health services. The amount is slightly less compared to what the scenario analysis indicated would be needed if the strategy is one in which the health-related MDGs are targeted at the same time as the water and sanitation goals, given the latter's synergistic effect on diminishing mortality rates. In order to achieve the poverty goal, higher GDP and employment growth would be required, as the additional MDG spending (on health and water and sanitation) would trigger macroeconomic trade-offs that may limit production capacity in the short run.

With regard to public health expenditures, it is necessary to both increase resources for the modernization of the health sector and to improve the efficient use of those resources. Increased financing should be channelled to capital investment aimed at securing quantitative and qualitative improvements in the infrastructure as well as to operational costs such as remunerating health workers and maintaining and upgrading medical equipment. In the education sector, government policies should focus on upgrading the country's education profile, including improving the quality of education and further developing a lifelong training system for public and private sector workers. The current level of public spending on water and sanitation is far too low; it needs to be increased by more than ten times in order to improve access to safe water and sanitation, primarily in rural areas in Uzbekistan.

How to finance the additional public spending required to meet the MDGs was also addressed in the scenario analysis. Direct tax financing may lead to an expansion of the tax burden, and due to the high share of agriculture and informal economic activity in a transition economy like Uzbekistan's,

direct taxes (corporate and personal) would unlikely be a major source of domestic revenues in the short- to medium-term. Higher taxation would also sting household consumption, slowing poverty reduction. Meanwhile, domestic borrowing would affect economic growth by crowding out private investment and lead to a rapid build-up of public debt. In the case of foreign borrowing, heavy reliance on foreign resources would lead to real exchange rate appreciation, causing export growth to slow. This in turn could limit the economy's capacity to sustain growth in the medium run.

Despite these trade-offs, financing the required public spending through taxation seems to be the most convenient option since domestic revenue mobilization needed to achieve the MDGs could be generated at relatively low cost. Feasible policies that help generate additional revenues by broadening the tax base need to be explored and formulated. But also, measures to increase the efficiency of existing MDG-related spending need to be taken and some external resources may need to be attracted. Providing productive jobs to the growing labour population is particularly important in addressing the issue of poverty in Uzbekistan. In this regard, the development of labour-intensive sectors (including textile, shoemaking and food industries), higher territorial and sector mobility of the workforce, particularly in the rural areas, as well as the creation of a legal framework to increase employment through the legal and socially protected export of labour resources are among the policy priorities. Moreover, reducing informal sector employment by encouraging the legalization of such employment, particularly amongst start-up small businesses, could play an important role in mitigating poverty and inequality.

## NOTES

- 1 According to the Eastern Europe, Caucasus and Central Asia (EECCA) region definitions, "improved" water supply is a household connection, public stand-pipe, borehole, protected dug well and spring, and rainwater collection. "Improved" sanitation technologies include connection to a public sewer, connection to septic system, pour-flush latrine, simple pit latrine, and ventilated improved pit latrine.
- 2 At the same time, it could also be an underestimation considering that other MDGs are not being modelled here.
- 3 See Bourguignon and Sundberg (2006) for a detailed discussion of building absorptive capacity in order to reach the MDGs.
- 4 The estimated value for this elasticity turned out to be 0.32.

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# Chapter 10

## Yemen

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### INTRODUCTION

Yemen is one of the poorest countries in the Arab region with a per capita GDP of \$1,160 for 2008 (World Bank, 2010) and faces a wide range of developmental challenges, amplified in 2011 by deepened domestic conflict. In 2007, the country was ranked 140 out of 182 according to the Human Development Index (United Nations Development Program, 2009). Ever since reunification in 1990, Yemen's position on the HDI index has remained more or less unchanged, with very slow progress towards attaining the millennium development goals (MDGs). At 3 per cent, the country has one of the highest population growth rates globally, with the population expected to double in 23 years to around 40 million. This increases the demand for educational and health services, drinking water and employment opportunities. Even now, Yemen faces a severe water shortage, with available ground water being depleted at an alarming rate. Its oil production and reserves are declining with severe budgetary consequences. The Yemeni economy is caught in a jobless slow growth cycle leading to stagnant per capita incomes and rising levels of unemployment, particularly among youth. Unless resolved promptly, the political crisis that erupted in 2011 threatens to make Yemen's prospects for rapid growth and progress on MDGs even bleaker.

Social development indicators, such as child malnutrition, maternal mortality and educational attainment remain discouraging. The Household Budget Survey (HBS) of 2005/06 indicates that about 35 per cent of the population lives below the national poverty line, with poverty more widespread



and persistent in rural areas. However, given persistent increases in consumer prices, notably food prices, the poverty rate had increased to 42.4 per cent in 2010 (Ministry of Planning and International Cooperation, 2011).<sup>2</sup> There are large gender disparities, with significant gaps in women's access to economic, social and political opportunities. As indicated by its first and second MDG Reports, Yemen was off track with respect to meeting the MDG targets that the international community agreed to pursue at the 2000 UN Millennium Summit (Ministry of Planning and International Cooperation, 2003, 2010).

Nevertheless, Yemen's government has stated that it views accelerated MDG progress and, if possible, full achievement of the MDG targets as a high priority. Not only has the government issued several MDG reports in order to monitor progress in regard to development goals but it has also, using a bottom-up approach, conducted a Needs Assessment aiming at determining the requirements for full MDG achievements in terms of spending and service delivery (Ministry of Planning and International Cooperation, 2005). The analysis does not use an integrated approach but treats the sectors that are directly linked to the MDGs (most importantly health, education, and water-sanitation) in isolation from each other and from the rest of the economy.

This chapter examines the required service expansion and other changes that are needed to achieve the MDGs using the information in the 2005 Needs Assessment as its point of departure. However, it goes beyond that assessment by situating the pursuit of alternative MDG strategies in the context of Yemen's economy. We simulate the impact of different MDG-achieving and fiscal space scenarios on a wide range of interrelated economic indicators. In addition to key MDG indicators (related to poverty, health, primary education, and water and sanitation), the analysis covers the impacts on national accounts aggregates, macroeconomic balances (including the government budget and the balance of payments), the size of the government relative to the rest of the economy as well as production and trade in different sectors. One key aspect of the analysis is that it considers the repercussions of relying on different sources (foreign or domestic) for the additional government financing that is required.

In terms of method, the simulation analysis is based on MAMS, an economy-wide model developed at the World Bank for MDG and development strategy analysis. Results from MAMS scenarios are passed on to a microsimulation model that relies on household survey data to assess effects on poverty and inequality. Both methods are explained in Chapter 1.

More specifically, the initial set of simulations, which cover the period 2004-2015, addresses the macroeconomic feasibility of pursuing the

achievement of international MDG targets for education, health and water-sanitation under four alternative financing scenarios, two based on enhanced domestic resource mobilization (direct taxes and borrowing) and two based on foreign financing (grants and borrowing).

The main finding of the simulation analysis is sobering but not surprising considering the magnitude of the MDG challenge for Yemen. Given the requirements identified in the Needs Assessment, which feed into the model-based analysis, full, on-time MDG achievement by 2015 does not appear a realistic objective. The required financing is unlikely to be available and, if it were, it would be extremely challenging for the government to bring about the required increases in real service delivery without strong sacrifices in efficiency. This suggests that, in its pursuit to reduce poverty and improve human development, instead of relying on international targets, the government should set targets that, while remaining ambitious, are grounded in Yemen's reality and priorities.

In light of this main finding, a second set of simulations was designed to consider scenarios that are grounded in what seems feasible given Yemen's current situation, once the current internal conflict has been settled. In these simulations, exogenous increases are introduced for foreign aid or government allocative efficiency. The government makes use of the resulting addition to fiscal space to expand spending and service delivery in infrastructure and human development. The results suggest that substantial improvements could be achieved if fiscal space would increase as a result of one (or more) of these exogenous changes.

The rest of the chapter contains five more sections. Background on the Yemeni economy and MDGs since 1990 is provided in the next section, followed by another section that presents the methods and data, covering both MAMS and the microsimulation model. A fourth section discusses the first set of simulations and results that impose the full achievement of the MDGs. A fifth section discusses a second set of simulations that explore the economic impact of different options for creating and using fiscal space. The final section concludes and provides some policy recommendations.

### ECONOMIC PERFORMANCE AND MDG TRENDS<sup>3</sup>

#### *Main reforms, macroeconomic policy, performance and vulnerabilities*

The birth of a unified Yemen in 1990 was marred by the impact of the Iraqi invasion of Kuwait on Yemenis living and working in Gulf Cooperation Council (GCC) countries, as the return of up to one million Yemenis

deprived the country of a large annual inflow of remittances and added substantially to the numbers of persons who needed jobs, schooling, health and other basic social services. The country also had to absorb the costs of integrating two different civil service structures and economic systems. The decision to keep all civil servants serving in the pre-existing two governments and to apply the higher pay scale prevalent in the North to the unified civil service led to a substantial increase in the public sector wage bill. Yet despite all the disruptions associated with unification and the civil war of 1994 and external shocks, official data show positive (albeit highly variable) growth averaging 5.5 per cent over the period 1990 to 1999. Since 1999, growth has been more stable though significantly lower, at around 4 per cent. As will be seen below, the fast growth period of the 1990s coincided with rapid expansion for the oil sector which, during most of the period since 2000, has been more stable in nominal terms while shrinking in terms of real output. The decline in GDP growth in per capita terms has been mitigated by a decline in the population growth rate from 4 per cent in the early 1990s to less than 3 per cent since 1999. Still, current per-capita growth rates are not sufficient to permit a sustained reduction in poverty.

The initial period of a unified Yemen was marked by an increase in fiscal imbalances, related to high costs of unification, and leading to increasing rates of inflation. The government responded by introducing direct restrictions on imports, investments and movements of the exchange and interest rates. In 1995, it embarked on market-oriented reforms, focused on price stabilization and trade liberalization, fiscal adjustments and the exchange rate regime. The more liberal regime has continued, including a gradual reduction of subsidies on major items including petroleum products. Apparently, these efforts helped to stabilize the economy. However, in conjunction with other factors influencing Yemen's economy (including the halt to oil expansion), these policy changes were not able to sustain growth at the rates witnessed in the first half of the 1990s.

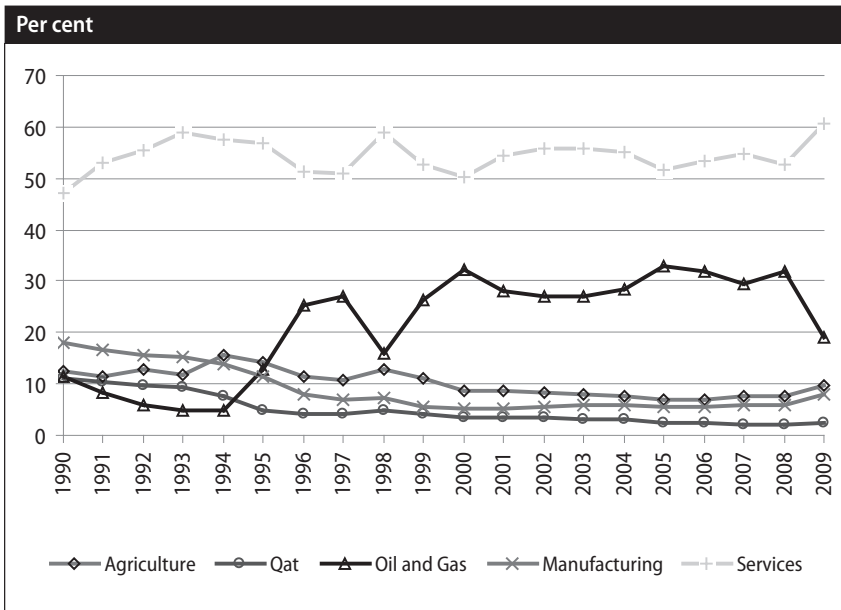
Since 2003, government policy has been guided by a Poverty Reduction Strategy Paper (PRSP) that aims to reduce poverty by means of increased allocations to basic social services and fostering more rapid, broad-based growth. However, progress reports demonstrate a lack of success in raising the shares of government spending allocated to social services (most importantly health and education).

The structure of the economy underwent fundamental changes over the period from 1990 to 2009, with the share of key sectors changing substantially. Figure 10.1 shows that the GDP shares (at current prices) have increased for oil (including gas) and services. For oil, the fluctuations

are strong, in part due to changing world prices. Manufacturing and qat have declined strongly while (other) agriculture is relatively unchanged.<sup>4</sup> In addition to its increased relative importance, the nature of the service sector has changed from mostly supporting agriculture and manufacturing in 1990 to responding to demands fuelled by oil revenues. Since 1990, all sectors have increased their real output, with the strongest increase for services; however, oil output has declined strongly in recent years, though it remains higher than in 1990.

As implied by the increased GDP share of oil at current prices, the sector has been a prime driver of economic growth, especially in the 1990s, making a dramatically increased contribution to the public treasury. Oil revenue has also allowed the government to adopt a relaxed attitude towards raising domestic resources. In addition, by strengthening the exchange rate of the Yemeni rial, oil has had a negative impact on the growth of sectors whose outputs are relatively tradable (agriculture and industry). The poor performance of the agricultural sector has meant that the country is now more dependent on imports for feeding its burgeoning population.

Figure 10.1  
 Yemen: GDP share by sector at current prices, 1990-2009



Source: Authors' calculations based on data from the Central Statistical Organization of the Government of Yemen.

Government current consumption has remained close to 14 per cent of GDP over the entire period 1990-2009. The reduction in the public deficit after 1996 led to a reduction in the spending share devoted to interest payments, from 10 per cent in the early 1990s to 7 per cent in recent years. Domestic borrowing by the government has remained within reasonable levels and external debt was cut substantially through debt reduction measures agreed with major lenders in the early 2000s. In 2009, the total stocks of external and domestic public debt were at 20.6 and 15.8 per cent of GDP, respectively, with the government being able to service these debts without difficulty.

Thanks to rising oil prices, export earnings and foreign exchange reserves expanded during the period 2002-2009; in 2009, reserves were sufficient to cover imports for 7.5 months (International Monetary Fund, 2010).<sup>5</sup> Up to and including 2009, Yemen gradually liberalized trade, with tariff rates on most items cut to single digits and most non-tariff barriers removed. However, oil reserves are expected to be depleted before 2020 (Economist Intelligence Unit, 2008, p. 3). In addition, Yemen is also facing the depletion of its groundwater. These challenges are compounded by population growth at rates exceeding 3 per cent, poor infrastructure, weak institutional capacity, a fragile security situation, and the widespread use of qat.<sup>6</sup> In addition, rising food prices pose a particularly difficult problem, given the very slow increase in domestic food production since unification, with the country currently dependent on imports for over 80 per cent of its basic food staples.

As an element of its inflation control policy, the Central Bank of Yemen has been maintaining a fairly stable nominal exchange rate of the Yemeni rial relative to the US dollar during the period 2002-2009, allowing an annual depreciation of 3-5 per cent. Nevertheless, given an average inflation rate of around 10 per cent during the same period, the real exchange rate has appreciated, boosting imports and undermining non-oil exports, a development that has been made possible by still high oil revenues.

The tax effort of the government has been limited. The share of total tax revenue to GDP fell from 10 per cent in 1992 to 7 per cent by 2009. This is due to a drastic reduction in indirect taxes, from 7.5 per cent of GDP in 1991 to 3.2 per cent by 2009. On the other hand, direct taxes increased gradually, from a mere 2.5 per cent of GDP in 1991 to 3.5 per cent by 2009. The share of oil revenue in public revenues rose from around 30 per cent in the early 1990s to over 70 per cent in the period since 2000.

Yemen's economy is highly integrated with the outside world. In 2008, foreign trade (the sum of exports and imports) accounted for around 67 per

cent of GDP, with a trade deficit of around 5 per cent of GDP. In 2009, these shares were at 56 and 10 per cent of GDP, respectively. The trade deficit (and higher levels of domestic final demand) have been made possible by foreign transfers (aid and remittances), which in 2008 and 2009 accounted for 7 and 5 per cent of gross national disposable income (GNDI), respectively. With regard to aid, the government of Yemen is receiving official development assistance from neighbouring Arab countries as well as from OECD donors, but the level of assistance has been negatively affected by political developments since the first Gulf War. The average level of assistance received by Yemen in the past 10 years has been between US\$13 and \$22 per capita, which is very low compared with levels of assistance received by other low-income countries. Yemen is also dependent on remittances to the tune of \$1-2 billion per year; due to the concentration of Yemeni expatriates in GCC member countries, this income has been vulnerable to political shocks.

The 2008 global financial crisis has affected the Yemeni economy negatively through declines in the world price of oil, foreign direct investment, and remittances of Yemeni expatriates (Central Bank of Yemen, 2010; Ministry of Planning and International Cooperation, 2010). In addition, the economic situation has been aggravated by internal factors, including the declining oil production and security problems that damage the investment climate, culminating in the internal conflict that erupted in early 2011. As a result of these developments, Yemen's fiscal and external accounts have faced growing deficits, among other things leading to depreciation of the Yemeni rial and increased inflation.

### *Evolution and structure of public spending*

In the period from 1990 to 1995, the government put greater emphasis in its budget policy on maintaining public services at the cost of running persistent budget deficits. However, following the adoption of a structural adjustment program from 1995, stability was given greater importance at the cost of reducing the quality of public services.

As noted, the PRSP adopted in 2003 called for a substantial real increase in spending on social sectors, with the ratio expected to reach 12.8 per cent of GDP by 2004. While spending on social sectors has followed an upward trend for the period since 1991, its 2004 GDP share fell short of the PRSP target. According to the MAMS database (see below), total spending on health and education, which represent the bulk of social spending, only reached 6.7 per cent of GDP in 2004. In 2006, total social spending had

increased to 8.4 per cent of GDP, still substantially short of the PRSP target, according to the government's finance statistics. The majority of this spending is on education (6.1 per cent of GDP) and health (1.7 per cent of GDP). A significant proportion of the budget is used to subsidize electricity and oil derivatives, mostly diesel. These subsidies rose from 3.1 per cent of GDP in 2002 to 6.3 per cent in 2004, and peaked at close to 10 per cent of GDP in 2006, substantially exceeding the allocation to education.<sup>7</sup> In 2005, the government started to reduce these subsidies on a gradual basis, bringing the petroleum subsidy down to 6.5 per cent of GDP in 2009.

The combined health and education share in total government spending increased by one percentage point between 1991 and 2009, from 18.7 to 19.8 (see Table 10.1). As a share of GDP, government spending in health and education increased only very marginally, from 5.5 to 5.7 per cent, during the same period. It is interesting that the share of health and education in total public expenditures peaked at 25.7 per cent in 1994 and, after reaching another high point in 2000 at 22.1 per cent, has been on a downward trend, falling to less than 20 per cent since 2006.

Table 10.1  
Yemen: Major government spending items, 1991-2009

Per cent of total government spending							
	1991	1994	1997	2000	2003	2006	2009
Defence	23.3	39.0	18.2	16.8	18.2	15.0	16.4
Health	3.7	4.1	3.3	4.1	4.0	3.9	3.5
Education	15.0	21.6	15.2	18.0	17.0	13.8	16.3

Source: Authors' calculations based on Bulletin of Government Finance Statistics.

### *Evolution of MDG indicators 1990-2009*

Yemen is off track with respect to meeting the MDGs (Ministry of Planning and International Cooperation, 2003 and 2010). As shown in Table 10.2, progress has been made for primary net enrolment (MDG 2), under-five mortality (MDG 4), and water and sanitation access (MDGs 7a and 7b, respectively). However, no target has been reached and Yemen is off track for all MDGs. On the malnutrition front, due to a combination of stagnating per capita income levels and worsening nutritional patterns (including rising consumption of junk food and qat), the situation has deteriorated over time, with the proportion of children under five who are underweight rising from 30 per cent in 1992 to 46 per cent by 1997/98 and remaining at that level through 2003.

Table 10.2  
Yemen: Key MDG indicators and targets by 2015

<i>MDG and associated indicator</i>	<i>1990<sup>1</sup></i>	<i>2004</i>	<i>Most recent<sup>2</sup></i>	<i>2015 target</i>
MDG 1: Poverty rate (per cent of population) <sup>3</sup>	40.1	34.8	42.4	20.1
MDG 2: Net enrolment rate in basic education (per cent)	52.7	62.5	69.8	100.0
MDG 4: Under-five mortality rate (per 1,000 births)	122.0	93.4	78.2	40.6
MDG 5: Maternal mortality rate (per 100,000 live births)	351.0	365.0	365.0	87.8
MDG 7a: Access to safe water (per cent of population)	34.9	43.9	48.0	67.4
MDG 7b: Access to improved sanitation (per cent of population)	10.6	15.9	23.0	55.3

<sup>1</sup> Nearest available year if data are not available for 1990; 2004 values for MDGs 4 and 7a interpolated using data for years close to 2004.

<sup>2</sup> Most recent: 2010 for MDG 1, 2008 for MDGs 2 and 7, 2006 for MDG 4, 2003 for MDG 5.

<sup>3</sup> The national poverty line is used to estimate the poverty rate; the rate in the 1990 column is for 1998.

**Source:** Authors' calculations based on the Central Statistical Organization (of the Government of Yemen), Ministry of Planning and International Cooperation (2010 and 2011).

The 2005/06 household budget survey (HBS) indicates that, in the survey year, 35 per cent of the Yemeni population lived under the national moderate (expenditure) poverty line, with a much higher rate in rural areas (40 per cent as opposed to an urban rate of 21 per cent). Disparities between different governorates are also strong, with poverty incidence highest in the Amran governorate (64 per cent), and lowest in Al Mahrah (9 per cent). The 2005/06 rate was significantly lower than the 1997/98 rate of 40 per cent, generated by a comparable household budget survey. The reduction was remarkable in urban areas, with the poverty rate falling by over one third, while the rural rate remained stubbornly high at above 40 per cent. However, according to more recent estimates, the poverty rate is once more on the increase, reaching 42.4 per cent in 2010, primarily as a result of increased food prices (Ministry of Planning and International Cooperation, 2011).

Analysis carried out based on data from the 2005/06 HBS also demonstrated that the substantial amounts spent on fuel subsidies only partially benefited the poor, with around 80 per cent of the benefits accruing to the non-poor, while the high cost of health care discourages the poor from seeking care (Government of Yemen and others, 2007). The survey



also confirms that public health care services and the increasing share of education expenditures allocated to the tertiary sub-sector do not target the poor. There are also major leakages in the public transfer schemes targeting the poor.

Trends over the last few years in primary education point to an increase in the gross enrolment rate (GER) in basic education from 58 per cent in 1997/98 to 66.5 per cent in 2003/04, with adult literacy reaching 50 per cent by 2006. Despite substantial progress in girls' education, the GER for girls only reached 51.5 per cent in 2003. These average rates of school enrolment in the country hide serious geographic disparities. Boys and urban children enjoy greater education opportunities and higher enrolment rates.

While the gender gap in primary enrolment decreased from 37.2 in 1990/91 to 24.8 in 2002, the female enrolment rate in the first year of basic education was only 75 per cent of the male enrolment rate. Both boys and girls intake rates in the past few years have increased in large measure due to the emphasis on improving primary school education. Boys are making greater gains in response to these improvements in education access, while girls' primary intake rate continues to lag.

Available data shows that both under-five and infant mortality rates had a clear downward trend from 1990 to 2006—especially during 1990-1997 and 2003-2006. On the other hand, maternal mortality in Yemen in 1990 was generally believed to exceed 500 per 100,000 live births. The ratio had fallen to around 350 by the time the 1997 Demographic and Health Survey (DHS) was carried out, but has not shown much change since, as illustrated by a figure of 365 in the 2003 DHS. Maternal mortality is the leading cause of deaths among women of reproductive age, accounting for 42 per cent of all deaths; 77 per cent of births took place at home, with less than 30 per cent attended by a qualified person. The high neonatal mortality rate, at 37 per 1,000 live births, is closely correlated with the maternal mortality rate.

Yemen is also unlikely to meet the MDG target of reducing the proportion of people without access to safe drinking water. The rate of progress in access to safe water has been slow and, without an improvement, the target is unlikely to be met. The same can be said about the target for access to improved sanitation.

The likely reasons for the slow pace of improvement for most MDG indicators include insufficient allocation of resources to MDGs and infrastructure, poor use of resources actually allocated to MDGs, and slow growth in household incomes. The persistence of population growth at rates exceeding 3 per cent further complicates the task of reaching the MDGs by requiring substantial increases in services provided simply in

order to maintain current coverage rates. While there are opportunities for improving the contribution that economic growth and social policies make towards attainment of MDGs, the gap between the targets and what has been achieved suggests the need to adopt realistic and country-specific targets that actually can serve as guides to action.

## METHOD AND DATA

Our quantitative analysis is based on MAMS, a recursive dynamic computable general equilibrium (CGE) model, and a (linked) microsimulation model. Taking as reference a baseline scenario for 2004-2015 that assumes continuation of major economic trends, simulations are conducted to analyze different aspects of MDG achievement. MAMS innovatively incorporates an MDG module that links specific MDG interventions to MDG achievements. The relatively detailed treatment of government activities in MAMS makes this link possible. Specifically, MAMS has a treatment of (1) government and private sector activities in MDG-related areas, in education extended to include higher levels, and (2) MDG outcomes as a function of relevant services (provided by the government and private sectors) and other determinants. A sequential “top-down” approach is followed to link the labour market results of MAMS to the microsimulation model, which is used to quantify the evolution of poverty and inequality. Chapter 1 highlights some of the salient features of MAMS and the microsimulation model; a more detailed description of these can be found in Lofgren and Díaz-Bonilla (2010) and Vos and Sánchez (2010), respectively. In this section, we describe the Yemen data used for the two models.

MAMS was calibrated to a 2004 social accounting matrix (SAM) and other data for Yemen.<sup>8</sup> The government is disaggregated into eight sectors: four cycles (levels) of education (basic grades 1 to 6, basic grades 7 to 9, secondary, and tertiary cycles), health, water and sanitation, other public infrastructure, and other government services. In the following, the basic grades 1-6 are referred to as primary education (following international standards for the length of primary education). In addition to other private services, the private service sector is also disaggregated into four education sectors (with the same cycles as in government education) and a private health sector.<sup>9</sup> The database also includes twelve non-service (agricultural and industrial) sectors.

The factors of production include three types of labour, each of which is linked to a level of education (less than completed secondary; completed

secondary; and completed tertiary). The growth in the labour force and changes in its composition in part depends on the functioning of the education system in the model. The non-labour factors include public capital stocks (one for each government sector, a private capital stock, and a natural resource used in oil and gas extraction. The database also includes current and capital accounts for institutions (household, government, and rest of world), investment accounts (one par capital stock), and auxiliary accounts for taxes and interest payments.

Data related to the different MDGs, the labour market, and various elasticities were also used to calibrate the model. These data include levels of service delivery required to meet the different MDGs, number of students at different educational levels, student behavioural patterns in terms of promotion rates and other indicators, and number of workers and initial unemployment rates by skill level (i.e., educational achievement). The elasticities include those in production, trade, consumption, and in the different MDG functions. The application of MAMS to Yemen covers MDGs 2 (primary education), 4 (under-five mortality) and 7 (water and sanitation access).<sup>10</sup> The elasticities for the MDG functions are informed by Sánchez and Sbrana (2009) and Sbrana (2009) for education and water and sanitation, respectively. However, rather than using the exact point estimates from the econometric partial equilibrium analysis, we use the relative importance of the determinants in choosing the (general equilibrium) elasticities. In addition, the MAMS elasticities were adjusted

Table 10.3

**Yemen: Elasticities for the determinants of MDGs**

<i>MDG and student behaviour indicator</i>	<i>Per student or per capita service delivery</i>	<i>Per-capita household consumption</i>	<i>Wage premium</i>	<i>Public infra-structure</i>	<i>Other MDGs<sup>1</sup></i>
Basic education (grades 1-6)					
First grade net intake rate	1.563	0.195	0.004	0.781	-0.031
Promotion rate	0.466	0.039	0.001	0.155	-0.004
Continuation rate <sup>2</sup>	0.733	0.105	0.001	0.105	-0.020
Under-five mortality rate	-0.865	-0.087		-0.087	-0.084
Access to safe water	0.261	0.010		0.010	-0.084
Access to basic sanitation	1.201	0.120		0.120	-0.105

<sup>1</sup> Refers to MDG 4 for education and MDG 7a and 7b for health.

<sup>2</sup> Refers to the post-base cycle (grades 7-9 among students who were promoted from grade 6).

**Source:** Authors' estimates based on Sánchez and Sbrana (2009) and Sbrana (2009).

in order to generate plausible trends under baseline conditions—and this procedure was, in fact, entirely used to define plausible elasticity values for MDG 4 in view of a lack of empirical studies and data to better inform the definition of these elasticities. Reflecting these adjustments, Table 10.3 shows the determinants in the MAMS functions that define MDG outcomes and the corresponding elasticities used in the model.<sup>11</sup>

For MDG 2, the treatment is slightly more complex. In this case, the arguments in Table 10.3 determine the shares of children that enter basic school (out of the cohort of six-year olds), and successfully complete their current grade (among those enrolled in the first basic cycle). The shares that repeat their current grade or drop out from it are determined residually. The service level is measured per enrolled student, an indicator of educational quality. For the secondary and tertiary cycles, student behaviour depends on a similar set of determinants. No continuation rate is defined for the tertiary cycle (as it is the terminal cycle).

In MAMS, the net (on-time) primary completion rate is the indicator that is targeted in relation to MDG 2—rather than the net enrolment rate which is the official indicator but is a less informative measure of the extent to which the relevant age group is able to complete the six-year primary cycle. More specifically, in any year, the net completion rate is defined as the share of the students that would complete primary school on time if this year's net intake and grade promotion rates were to prevail during the coming six years.<sup>12</sup> Considering the recent evolution of the school system in Yemen and the definition used for the MDG 2, the target for the net on-time primary completion rate was adjusted downwards to around 92.5 per cent, a rate that still is very ambitious. It could, for example, be the outcome of a 99 per cent net intake rate and 99 per cent promotion rates throughout the six years of primary schooling.

Generally speaking, the functions for educational outcomes and the other (i.e., non-education) MDGs have all been calibrated to assure that, under base-year conditions, base-year indicators are replicated and that, under a set of other conditions identified in the Yemen Needs Assessment (Ministry of Planning and International Cooperation, 2005), the target is fully achieved. Specifically, the Needs Assessment provides estimates of government sectoral spending needs (current and capital) for the period 2006-2015. In MAMS, these are used to identify parameters for real services in functions that define MDG achievements. The cost of providing real services will depend on scenario-specific input prices and efficiency in government service production.

For all the scenarios that it simulates, MAMS provides wage and employment by activity and labour category (with labour split between three educational levels) as well as non-labour incomes. In the microsimulation model, this information is used, in turn, to generate a full picture of the impact of changes in the labour market variables on the level and distribution of micro-level household incomes.

As the database for our microsimulation model, we use the Yemen 2005/06 HBS; it covers 98,941 individuals in 13,136 households. The information from the household survey is used to estimate the poverty and inequality impacts of different counterfactual scenarios, linking the microsimulation model to the results generated by MAMS. MAMS communicates with the microsimulation model in a “top-down” fashion (i.e., without feedback) via labour market variables and non-labour income, as described in Chapter 1 and in Vos and Sánchez (2010)—without the kind of extension used in this chapter to account for non-labour income. By altering each of the labour market variables and increasing/decreasing the (per capita) non-labour income—to match the change in per capita household income estimated using MAMS, we generate a new individual income distribution that is used to compute a counterfactual household income distribution. Then, standard inequality and poverty indicators are calculated.

## MDG SIMULATIONS AND ANALYSIS OF RESULTS

This section presents the simulations and analyzes the results for both MAMS and the microsimulation model. The first simulation (base) addresses the question of whether Yemen will achieve the MDGs under current policies and trends.

### *Base scenario*

For the base scenario, which serves as a benchmark for comparisons, we impose the observed growth rates in real GDP at factor cost for the period 2005-2010, and an average growth of 5.2 per cent starting from 2011, based on projections from the Fourth Five-Year Socio-Economic Development Plan for Poverty Reduction 2011-2015.<sup>13</sup> In addition, a decrease in the exploitation of the natural resource factor in the oil and gas extraction sector is also imposed to reflect the expected evolution of the oil and gas sector in Yemen.<sup>14</sup>

Government consumption of (or demand for) education and non-education services is kept fixed as a share of GDP at the base year value. Transfers from government to households are also kept fixed as a share of GDP. Tax rates are fixed over time, while the amount spent on commodity subsidies (basically, refined oil products) decreases gradually between 2011 and 2015, according to official projections. The ratio between domestic government debt stock and GDP increases from 10 per cent in 2004 to about 17 per cent during 2011-2015; domestic borrowing is adjusted accordingly. The ratio of foreign debt to GDP, which was 23 per cent in 2009, increases from 30 per cent in the base year to 33.6 per cent in 2015. These assumptions generate results that are consistent with recent trends (Central Bank of Yemen, 2010).

At the macro level, MAMS—as any other CGE model—has three underlying balances (Robinson and Lofgren, 2005). For the base scenario, the government fiscal account is balanced via adjustments in foreign borrowing. The base assumption for private investment is that it is fixed as a share of domestic absorption; given this, adjustments in private savings clear the savings-investment balance (i.e. savings is investment-driven). Across all simulations, the real exchange rate equilibrates inflows and outflows of foreign exchange, by influencing export and import quantities. The non-trade-related payments of the balance of payments (transfers and foreign investment) are non-clearing, kept fixed as shares of GDP. The CPI is the model numéraire.

Among factor stocks, growth is driven by investment and depreciation for the different capital types, by a combination of demographic factors and the functioning of the educational system for the different labour categories, and by an exogenous growth rate for natural resources used in the oil and gas extraction sector. For the different types of government capital, markets are not specified; however, it is required that investment be sufficient to ensure that stocks grow at the same pace as the services that are produced. For other factors, flexible wages (or rents) clear the markets. For the different labour types, the unemployment rate and the wage will both change following a “wage-curve” formulation (Blanchflower and Oswald, 1994); declines in the unemployment rate will be combined with wage increases and vice versa unless unemployment is at the minimum level (set at 5 per cent), at which point wage-clearing movements only will influence the demand side. For non-labour factors, supply curves are vertical, leaving the adjustments to the demand side.

In the base scenario, the economy evolves according to recent trends, with most macro aggregates growing at 5-6 per cent per year, at the upper

end of this range for public consumption and investment and at the lower end for exports. Relative to GDP, exports and imports decrease. Per-capita household consumption grows at a rate of 1.9 per cent per year. The exchange rate depreciates over time, reflecting the decrease in (real) oil exports. As explained, the foreign-debt-to-GDP ratio reaches 33.6 per cent in 2015, a level that is within the range observed for other countries at Yemen's income level. This increase in foreign borrowing brings about a net improvement in the non-trade balance (in foreign currency) and an increase in the trade deficit (also in foreign currency). However, the decline in oil exports is so large that some depreciation is still required to keep the trade deficit within the permitted limit.

Table 10.4 shows key results for the base and the MDG scenarios. Growth of GDP, government service provision and household per capita consumption underlie improvements in the indicators for primary school completion, child health, and access to drinking water and sanitation. Poverty also falls. Despite the progress, Yemen falls short of fully meeting the targets by the 2015 deadline under the base scenario.

### *MDG simulations*

As seen above, the MDGs are not achieved under the base scenario. Taking this base as a benchmark, the MDG simulations were generated to assess what would be required to achieve the MDGs in terms of changes in government spending and services as well as the costs involved, and the economy-wide effects of these actions.<sup>15</sup>

These simulations were run under alternative assumptions about the source of financing for required additional government spending: foreign transfers (fr), foreign borrowing (fb), domestic taxes (tax), or domestic borrowing (db). However, in spite of its label, the “domestic borrowing” scenario is a mixed scenario, combining an (exogenous) increase in domestic borrowing with an endogenous increase in direct taxes; each year the government borrows from the domestic private sector an amount equivalent to around 5 per cent of the GDP. This scenario formulation was necessary given that domestic borrowing levels would become unrealistically high in the absence of partial reliance on taxation for marginal financing.

Another change in these scenarios—with respect to the base—is that the rule for keeping the government account in balance is modified for most of them. Private investment adjusts endogenously to maintain balance between total savings (from different sources) and total investment (i.e., the

Table 10.4  
Yemen: Main results of MDG simulations

	2004	Base scenario	MDG scenarios			
			ftr	fb	tax	db
<b>Macroeconomic aggregate</b>	<b>Bil. YR<sup>1</sup></b>	<b>Per cent average annual growth rate, 2004-2015</b>				
Consumption – private	1,691	4.9	7.0	7.0	0.0	-2.0
Consumption – government	326	6.5	11.0	11.0	12.3	12.5
Fixed investment – private	274	4.8	7.8	7.8	-0.2	-12.7
Fixed investment – government	263	6.4	12.8	12.8	15.3	16.5
Exports	931	1.6	-2.7	-2.7	0.6	-0.1
Imports	909	3.8	8.3	8.3	3.5	2.6
GDP at factor cost	2,635	5.1	5.8	5.8	4.5	3.6
Total factor employment (index)	100	2.9	4.1	4.1	4.0	3.7
Total factor productivity (index)	100	2.1	1.7	1.7	0.4	-0.1
Real exchange rate (index)		2.7	-1.3	-1.3	2.2	2.0
<b>Government expenditure</b>	<b>Bil. YR<sup>1</sup></b>	<b>Per cent average annual growth rate, 2004-2015</b>				
Consumption						
Basic education (grd1-grd6)	55.8	5.8	15.2	15.2	15.8	16.1
Health	19.6	5.8	22.0	22.0	27.7	28.6
Water and sanitation	0.1	5.1	68.9	68.9	72.6	73.8
Capital stocks <sup>2</sup>						
Basic education (grd1-grd6)	8.9	6.2	14.8	14.8	15.4	15.5
Health	21.1	6.1	20.6	20.6	26.2	26.8
Water and sanitation	13.1	6.2	15.1	15.1	15.5	15.6
<b>Government expenditure</b>	<b>Per cent of GDP</b>	<b>Per cent average GDP share for 2004-2015</b>				
Consumption	3.0	2.8	6.8	6.8	8.4	8.7
Basic education (grd1-grd6)	2.2	2.0	4.2	4.2	4.4	4.5
Health	0.8	0.8	2.2	2.2	3.4	3.6
Water and sanitation	0.0	0.0	0.5	0.5	0.6	0.7
Fixed investment	1.7	1.8	7.5	7.5	12.5	13.7
Basic education (grd1-grd6)	0.3	0.4	1.1	1.1	1.3	1.3
Health	0.8	0.9	4.8	4.8	9.3	10.4
Water and sanitation	0.5	0.6	1.6	1.6	1.9	2.1
Total	4.6	4.6	14.3	14.3	20.8	22.5
<b>MDG indicator<sup>3</sup></b>	<b>Value</b>	<b>Value for 2015</b>				
MDG 1: Poverty rate	34.8	34.1	27.6	27.6	49.3	65.5
MDG 2: Net completion rate in primary education	16.8	55.2	92.6	92.6	92.5	92.5
MDG 4: Under-five mortality rate	93.4	64.6	40.6	40.6	40.6	40.6

Continued on next page



Table 10.4 (Continued)

## Yemen: Main results of MDG simulations

	2004	Base scenario	MDG scenarios			
			fr	fb	tax	db
MDG 7a: Access to safe water	43.9	48.2	67.4	67.4	67.7	68.0
MDG 7b: Access to improved sanitation	15.9	24.1	56.5	56.5	55.3	55.3
<b>Government financing</b>	<b>Per cent of GDP</b>	<b>GDP share for average 2004-2015 or 2015 (per cent)</b>				
Domestic debt (2015)	10.0	17.5	14.7	14.7	17.8	51.3
Foreign grants (2004-2015)	1.6	2.1	12.8	1.7	2.5	2.5
Direct taxes (2004-2015)	5.7	5.8	5.9	5.9	22.5	22.4

1 YR = Yemeni rials.

2 Value for 2004 refers to investment.

3 Units: per cent for MDGs 1, 2, 7a, and 7b; per 1,000 for MDG 4.

**References:** fb=foreign borrowing; db=domestic borrowing; tax=direct taxes; fr=foreign grants

**Source:** Authors' estimates based on results from simulations with MAMS and the microsimulation model.

model becomes savings-driven). Consequently, these scenarios capture the crowding-out of private investment when domestic sources of financing are used to achieve the MDGs through increased government spending.

In these scenarios—as in the base, MDG 1, the poverty headcount, is not targeted but monitored, both for technical reasons (the top-down approach followed when generating the poverty-inequality results in the microsimulation model) and, more fundamentally, because governments (including Yemen's) in practice cannot target specific poverty outcomes (as they are the result of processes that are not dominated by any available policy tool).

The other MDGs are targeted via endogenous variations in government demand (consumption) of the relevant services: primary education services for MDG 2, health for MDG 4, and water and sanitation for MDGs 7a and 7b. MDG 2 is targeted indirectly (not directly like MDGs 4, 7a, and 7b) by targeting, in each year during 2010-2015, the promotion rate for grades 1-6 of basic school.<sup>16</sup> Post-primary education services also expand in order to keep the same educational quality (defined as real services per enrolled student) as in the base scenario in the face of increases in the number of graduates from primary school. The resulting growth in government service production will require increases in government investment; a fixed coefficient relationship links government service provision to government capital demand and required stock growth. This is the key difference between these simulations and the baseline simulation, under which government demand growth follows an exogenous path.<sup>17</sup> For the MDG

simulations, GDP growth may deviate from the rates under the baseline scenario due to different growth rates for TFP (due to changes in the stock of infrastructure and trade openness) and factor stocks, as well as changes in labour unemployment rates.

The impact on the rest of the economy from reaching the MDGs will depend on the financing mechanism. In case the marginal financing comes from domestic sources (direct taxes or domestic borrowing), growth declines for private consumption, investment and GDP. These declines are stronger for the domestic borrowing scenarios, since borrowing directly reduces funding available for private investment, thereby bringing about stronger declines in GDP and private consumption. To make up for the loss in private consumption (which has a positive impact on MDG achievements), it is therefore necessary for the government to add to its spending increase when marginal financing is from domestic borrowing. On the other hand, when marginal financing comes from foreign sources (in the form of grants or borrowing), the negative impact from increased domestic resource mobilization on private investment will be absent. However, the inflow of foreign resources will give rise to a slower export growth and faster import growth, both will be induced by an appreciation of the real exchange rate.

The simulation results for the alternative options for financing simultaneous achievement of MDGs 2, 4, 7a and 7b are presented in Table 10.4. They show that a large and sustained increase in government spending relative to the amount spent under the base scenario is required in order to reach all the targets by 2015. In all instances, the required growth in current consumption spending and capital stocks is more than twice the baseline growth. The additional public spending relative to the base scenario in primary education, health, and water and sanitation reaches an average 9.7 per cent of GDP for the whole simulation period in the foreign financing scenarios, of which 4 per cent of GDP is for current expenditures and 5.7 per cent for additional capital spending.

At the macro level, GDP growth increases when marginal financing comes from foreign sources, as in the scenarios that use foreign financing. The GDP growth rate is 0.7 percentage points higher—whereas the unemployment rate in 2015 decreases 7.3 percentage points. In fact, spending on MDG-related sectors brings about a moderate boost to growth in production and household consumption, mainly by raising the supply of skilled labour and through increased employment generated by higher public and private investment. On the other hand, there is a strong decrease in GDP growth in the domestic borrowing scenario, from 5.1 per cent in the baseline to 3.6 per cent. The decrease in GDP growth is smaller under the tax financing

scenario. As explained, GDP growth in the domestic financing scenarios declines as a consequence of the crowding-out of private investment.

In the scenarios that use foreign financing, there is an exchange rate appreciation combined with deterioration in the trade balance as imports surge and export growth declines. As described in Sundberg and Lofgren (2006) for the case of Ethiopia, Dutch Disease effects can be a serious concern. In our case, aid-induced appreciation of the real exchange rate and the drop in exports are severe in view of the high cost of MDG financing. In fact, under the foreign transfers scenario, exports in 2015 are 37.8 per cent lower than in the base scenario, while the real exchange rate appreciates by 35.4 per cent.

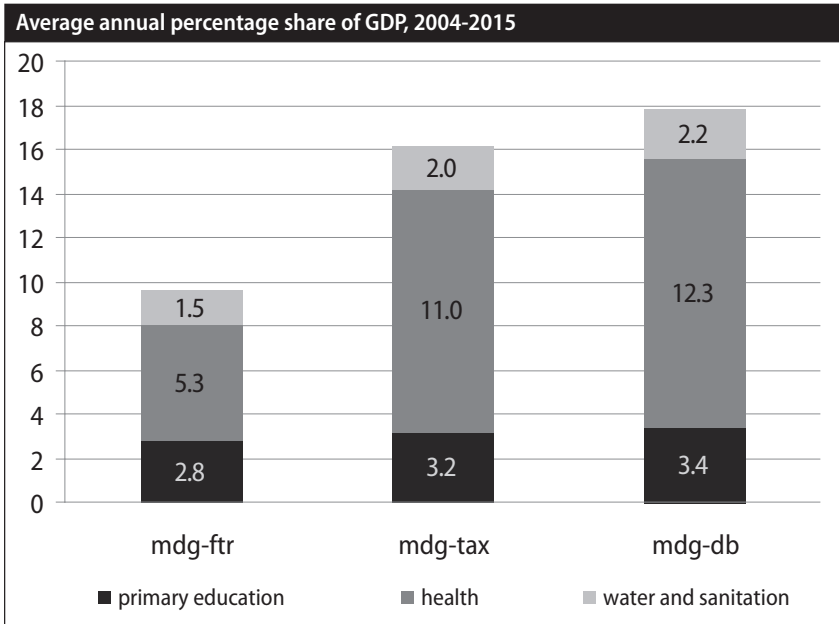
In case additional financing needs are met with foreign loans, the foreign debt-to-GDP ratio increases to 125.9 per cent in 2015 (see Table 10.4). This ratio is 92.3 percentage points higher than for the baseline. In the foreign transfer scenario, foreign grants to the government attain an average level of 12.8 per cent of GDP throughout the simulation period, compared to 2.1 per cent in the baseline. In the tax financing scenario, the average direct tax collection increases from 5.8 to 22.5 per cent of GDP between 2004 and 2015.

Compared to the baseline scenario, all four MDG simulations lead to lower stock growth for unskilled workers but higher growth for semi-skilled and skilled workers. This reflects that, instead of entering the labour force, more students remain in school, decreasing the supply of unskilled workers. On the other hand, as more students graduate from secondary and tertiary schooling, the supplies of semi-skilled and skilled workers increase. Consequently, the structure of the labour force changes. For example, in the foreign borrowing simulation, the (relatively large) stock of unskilled labour reaches a level in 2015 that is 3.5 per cent below that of the baseline, while the (smaller) stocks of semiskilled and skilled increase their participation in the total labour force. At the same time, demand for semi-skilled and skilled workers increases as the education and health sectors expand. As a result, wages of skilled workers grow faster than those of other workers.

In Figure 10.2, based on Table 10.4, the required additional government current and capital spending is disaggregated across education, health and water and sanitation. For example, the average GDP share of government recurrent and capital spending in primary education is 5.2-5.8 per cent in 2004-2015, as compared to 2.4 per cent for the baseline scenario. In turn, the average GDP share of government recurrent and capital spending on health is 7.0-14.0 per cent in 2004-2015 as compared to 1.7. In the latter case, the jump in investment reflects that the expansion of production in

Figure 10.2

Yemen: Additional government (current and capital) spending—relative to the baseline—under alternative financing scenarios



Source: Authors' estimates based on results from simulations with MAMS.

the sector also requires an expanded capital stock. Of course, it may be difficult to implement such a strong spending increase during this short time period. In relation to other Arab countries, this GDP share is high; for example, in 2007, the GDP spending shares on health in Morocco and Jordan were 5 per cent and 9 per cent, respectively (World Bank, 2010). The MDGs 7a and 7b are the least costly to achieve; the average GDP share of government current and capital spending in water and sanitation increases by 1.5-2.2 percentage points. However, the simulations do not take into account that Yemen is very poor in water resources and faces depletion of its groundwater. In fact, given that agriculture accounts for some 90 per cent of total water use—industrial and municipal water uses are 8 and 2 per cent per cent—reduced agricultural water use would be necessary (Food and Agricultural Organization, 2009).

In addition, targeting all MDGs together reveals the importance of cross-MDG complementarities in assessing the costs of reaching multiple MDGs. In fact, progress in the coverage of drinking water and sanitation (MDG 7) exerts a positive influence on health (MDG 4), and thus allows

for savings in the production of health services. In turn, a healthier student population more easily achieves completion of educational cycles (MDG 2). For example, improvements in water and sanitation alone have a positive impact on the under-five mortality rate; under a foreign financing scenario (not shown), the MDG 4 in 2015 is 5.1 per 1000 lower than in the base scenario. Overall, the savings in total spending due to cross-MDG synergies is equivalent 2.4 per cent of GDP.

In the case that marginal financing comes from foreign sources, the poverty headcount rate falls to 27.6 per cent, falling short of achieving MDG 1 target by 7.2 percentage points. The main drivers of this result are a decrease in unemployment, a higher average wage, and an increase in non-labour income. In addition, there is an increase in the wage gap between unskilled and semi-skilled labour. On the other hand, the poverty headcount rises relative to the base under the domestic financing scenarios. In the scenarios that use domestic resources, there is a sharp decrease in household income net of direct taxes and savings. Consequently, the poverty rate increases even though the labour market results are similar to those of the foreign financing scenarios. Specifically, employment and average wages increase as a result of the change in the sectoral structure of production, which shows increases in labour intensive sectors (i.e., MDG-related services and construction) and decreases in less labour intensive sectors.

## ALTERNATIVE SCENARIOS: AID AND GOVERNMENT

### ALLOCATIVE EFFICIENCY

In light of the above results, this second set of simulations was designed to explore options for the future, grounded in the situation that Yemen may face once it has emerged from the current political impasse. In these simulations, more fiscal space is created through exogenous increases for foreign aid (grants) or government efficiency. The government makes use of the resulting addition to fiscal space to expand spending and service delivery in infrastructure and human development. Thus, the purpose of this second set of simulations is to assess what those different options entail in terms of promoting economic growth, achieving the MDGs and reducing poverty.

The baseline scenario is the same as in the previous set of simulations; on the other hand, the counterfactual model closure rule assumes that adjustments in public spending on human development or infrastructure clear the government budget. The following additional simulations were implemented:

**aid-hd:** increase in transfers from the rest of the world to the government so that they reach an average of \$69 per capita for the period 2011-2015, close to the average for low income countries in 2007—aid per capita is increased from \$13.7 in 2010 to \$71.4 in 2011 and \$66.7 in 2015; under the base scenario per capita aid was \$13.3 during the period 2011-2015. In terms of GDP, aid reaches an average of around 10 per cent for the period 2011-2015. The increase in government receipts is used to finance an increase in government consumption of (demand for) MDG-related services (primary education, health and water and sanitation). In addition, post-primary education also expands sufficiently to keep the same educational quality (defined as real services per enrolled student) as in the base scenario as the sector faces increases in the number of graduates from primary school.

**aid-infra:** similar to the previous scenario, but the increase in government spending is used to finance an increase in the public infrastructure capital stock.

**eff-hd:** gains in the allocative efficiency of government spending via a 50 per cent cut in the growth rate for other government expenditures—that are not related to human development or infrastructure—in real terms, during 2011-2015, with expansion in human development-related spending sufficient to make use of the resulting fiscal space. Thus, we assume that cost savings are realized through efficiency gains such as reduction in wasteful spending or overlapping government functions. The increase in fiscal space is created through declines in current and capital spending in other government activities.

**eff-infra:** similar to the previous scenario, but the increase in government spending is used to finance an increase in investment in public infrastructure.

In this section we concentrate on the period 2011-2015 as shown in Table 10.5. As before, during the period 2004-2010, the baseline scenario is designed to capture the main developments of the Yemeni economy. The non-base simulations only deviate from the base for the period 2011-2015.

### *Aid scenarios*

In the scenarios aid-hd and aid-infra, foreign transfers are increased to around 10 per cent of GDP in 2011-2015. In the aid-infra scenario, GDP growth gains 0.9 percentage points and is accompanied by expansion, not only in government demands, but also in private consumption and private investment as additional infrastructure permit private incomes and savings to grow more rapidly with a positive feedback into the growth process (see Table 10.5). Moreover, an increase in the infrastructure capital

Table 10.5

**Yemen: Main results of aid and government efficiency simulations**

	2004	Base scenario	Non-base scenarios			
			aid-hd	aid-infra	eff-hd	eff-infra
<b>Macroeconomic aggregate</b>	<b>Bil. YR<sup>1</sup></b>	<b>Per cent average annual growth rate, 2010-2015</b>				
Consumption - private	1,691	4.3	5.5	5.3	4.4	4.3
Consumption - government	326	6.0	11.1	6.4	6.4	3.5
Fixed investment - private	274	4.6	6.3	6.0	4.7	4.6
Fixed investment - government	263	7.5	11.3	19.1	6.7	10.8
Exports	931	2.2	-0.3	1.3	2.0	2.7
Imports	909	3.7	6.2	7.2	3.6	4.1
GDP at factor cost	2,635	5.2	5.7	6.1	5.2	5.3
Total factor employment (index)	100	2.9	3.7	4.2	2.9	3.0
Total factor productivity (index)	100	2.3	1.9	1.9	2.3	2.3
Real exchange rate (index)		2.2	-0.1	0.7	2.2	2.5
<b>Government consumption</b>	<b>Bil. YR<sup>1</sup></b>	<b>Per cent average annual growth rate, 2010-2015</b>				
Water and sanitation	0.1	5.2	22.8	5.2	15.7	5.2
Other infrastructure	0.2	5.6	5.6	18.3	5.6	11.1
Health	19.6	5.4	23.0	5.4	15.9	5.4
Basic education (grd1-grd6)	55.8	4.7	22.3	6.2	15.3	5.3
Basic education (grd7-grd9)	16.0	6.9	9.7	7.8	8.2	7.2
Secondary education	19.5	7.0	7.5	7.7	7.1	7.3
Tertiary education	18.0	7.0	8.1	7.4	7.3	7.0
Other government	196.3	6.2	6.2	6.2	1.7	1.7
Total	325.4	6.0	11.1	6.4	6.4	3.5
<b>MDG indicator<sup>2</sup></b>	<b>Value</b>	<b>Value for 2015</b>				
MDG 1: Poverty rate	34.8	34.1	31.3	31.4	33.9	34.8
MDG 2: Net completion rate in primary education	16.8	55.2	88.7	70.4	78.9	62.4
MDG 4: Under-five mortality rate	93.4	64.6	52.1	59.3	57.8	93.4
MDG 7a: Access to safe water	43.9	48.2	49.0	49.3	48.4	43.9
MDG 7b: Access to improved sanitation	15.9	24.1	25.5	26.9	24.4	15.9

<sup>1</sup> YR = Yemeni rials.

<sup>2</sup> Units: per cent for MDGs 1, 2, 7a, and 7b; per 1,000 for MDG 4.

**Source:** Authors' estimates based on results from simulations with MAMS and the microsimulation model.

stock raises total factor productivity. The appreciation of the real exchange rate strengthens this process by adding to domestic purchasing power. It represents a response to the fact that, due to the aid, Yemen is now able to have a more negative trade balance, importing more and/or exporting less, and raising its total domestic final demand at any given level of GDP. As explained, such aid-induced Dutch Disease effects can be a serious concern if, in the future, these trade deficits are unsustainable and if the economy becomes locked into a structure that is unable to expand production of tradables. However, these concerns should be weighed against the benefits of foreign aid, indicated by the simulation results.

For the aid-hd scenario, the acceleration of growth in GDP is weaker—the GDP growth rate increases by 0.5 percentage points. MDGs 2, 4, 7a, and 7b all improve, as government consumption of primary education, health and water and sanitation increases. The average GDP share of government current and capital spending in MDG-related commodities reaches 10.5 per cent during 2010-2015, starting from 4.5 per cent for the baseline scenario. The additional public spending in education and health (i.e., scenario aid-hd) has a positive impact on the relative demand for skilled workers, initially pushing up their relative wage. In fact, the wage gap between skilled and unskilled workers is (on average) 11 per cent higher than in the base scenario—this result reflects a bottleneck in the form of a shortage of highly educated labour to provide these services; e.g., teachers and nurses. In the long run—beyond 2015, the end-year of our simulations, however, the combination of increased education spending and high wages for highly educated labour, both of which make it attractive for students to remain in school and obtain secondary and tertiary education degrees, would lead to an increase in the supply of highly educated labour and a decreasing wage gap between skilled and unskilled workers. In sum, expanding expenditure in human development requires careful preparation to align the speed of expenditure increases with the ability of education and training programs to deliver properly educated workers. There may also be a need to monitor wage pressures to avoid large increases in the wage bill that could crowd out other expenditures.

In the aid-infra scenario, infrastructure spending promotes growth and the MDGs. Infrastructure has a direct positive impact on education and health MDG indicators because it facilitates the delivery of these services (e.g., more infrastructure lowers the cost of getting to schools for both teachers and students). There is also an indirect effect through higher growth—higher per capita income increases private demand for education and health services.



The poverty impact captured in the microsimulation model depends essentially on two factors: the change in the labour market conditions and the increase in per capita disposable (i.e., net of taxes and savings) income. In both aid scenarios, the 2015 poverty rate is lower than for the baseline, mainly as a result of a decrease in unemployment, a higher average wage, a decrease in the wage gap between unskilled and semi-skilled labour, and an increase in non-labour income. Moreover, the poverty effect would be larger if a multidimensional measure of poverty were considered instead of only monetary poverty.

In this set of scenarios, it is important to consider the trade-off between the eventual competitiveness loss caused by aid-induced Dutch Disease and the long-term gains of improving MDGs. In addition, the aid scenarios show that making effective use of aid resources requires fully spending and absorbing the additional aid. The policy implication is that scaled-up aid requires consistent fiscal and monetary policies: fiscal policy needs to spend the additional resources, and monetary policy needs to allow the real appreciation required to bring about the increased absorption through a widening in the trade deficit (see Gottschalk and others, 2009).

### *Efficiency scenarios*

For the eff-infra scenario, annual growth in GDP accelerates by 0.1 percentage points. The government reallocates spending from consumption to investment, as infrastructure is more capital-intensive than other government services. MDGs 2, 4, 7a (water), and 7b (sanitation) all improve. For the eff-hd scenario, the acceleration of growth in GDP is weaker (i.e., positive but less than 0.1 percentage points). The government provision of primary education, health and water and sanitation services grows 5.7 percentage points more than in the base scenario. Certainly, this expenditure shift helps to advance the MDGs. The resulting improvements are stronger for MDGs 2 and 4 and less so for MDGs 7a and 7b. By 2015, the poverty rate is 0.3 percentage points lower than in the baseline. In terms of the comparison between the human development and infra scenarios, the results are similar to those reported for the aid scenarios.

Interestingly, these additional simulations show that spending in human development is better for poverty reduction than spending in infrastructure, in spite of more rapid GDP growth in aid-infra and eff-infra compared to aid-hd and aid-infra, respectively. This result reflects that, relatively speaking, the human-development scenarios benefit labor incomes and that labor is owned by the households, whereas the infrastructure scenarios

benefit capital and natural resource incomes, which to a significant extent are owned by the government and the rest of the world. As a consequence, in the infrastructure scenarios an important share of income leaks into spending that has a weaker link to household consumption and poverty reduction.

When comparing the outcomes for these scenarios relative to the situation in 2010 and/or other scenarios, it is important to keep in mind that the time period during which the changes are introduced (2011-2015) is much shorter than for the first set of simulations.

## CONCLUSIONS AND POLICY RECOMMENDATIONS

According to our results, under “business as usual” conditions up to 2015, Yemen will not reach the targets for the MDGs that are covered by our analysis: poverty, primary education, under-five mortality, water, and sanitation. At the time when this is written, in late 2011, a severe political crisis has pushed policies for development to the background. Unless the situation can be resolved soon, the actual evolution of Yemen’s economy may fall far short of what is assumed under a “business as usual” scenario.

In order to make significant progress toward attaining the full set of MDG targets, Yemen’s government would need to significantly expand social services and related spending. Although expansion of privately provided social services and synergies between different MDGs (for example, improvements in water and sanitation has a positive impact on the objective of reducing under-five mortality) reduce the burden on the government, they are far from sufficient to make a significant dent in the required expansion in government services.

More specifically, for the scenario that targets the achievement of all non-poverty MDGs (and benefits from synergies) with marginal financing from foreign grants, the required annual real growth in government services for the period 2004-2015 would have been at 22 per cent for health and 15.2 per cent for primary education. In 2015, the total (current and capital) spending on primary education, health, and water-sanitation would have reached close to 22.7 per cent of GDP as compared to 4.3 per cent in 2004. The GDP shares are significantly larger for scenarios that rely on domestic financing since growth is slower and the required real increase in government services larger (as growth in private incomes and demand for social services slows down). Total government consumption and investment reaches 43 per cent of GDP, compared to 23 per cent in 2004 and 25.6 per cent for the baseline in 2015.

The challenges would also be severe on the financing side, in part a reflection of the need to replace declining oil revenues with other sources of financing. For the scenario that targets all MDGs and relies on foreign transfers, these transfers would have to increase from 1.6 per cent of GDP in 2004 to 23.4 per cent of GDP (or \$231 per capita) in 2015.

If such an increase in grant aid had been forthcoming, it would have threatened macroeconomic stability and eroded the competitiveness of Yemen's production of tradables (exports and import substitutes) outside of the oil and gas sector. It would also have been extremely difficult to efficiently manage the required expansion in services, including mobilization of the skilled labour that would be needed in health and education.

This suggests that the government should set targets that are grounded in Yemen's reality and priorities and, in order to get a strong positive impact of available resources, strive to improve efficiency and to allocate a larger share of total spending to the areas that have the strongest payoffs in terms of growth and human development.

In light of this overall conclusion, we carried out additional simulations. Their underlying assumption is that the conflict that erupted in 2011 can be resolved promptly, permitting Yemen's government to assume its developmental functions at a level of efficiency that is similar to what has prevailed in the past. The results from these simulations indicate that, even though Yemen does not achieve the MDG targets, the country can still realize significant gains if additional resources can be used to generate improved infrastructure and/or additional human development services. In addition, progress can also be made if government spending efficiency is improved. Under scenarios that rely heavily on foreign aid, there is a Dutch Disease effect, which may harm growth in the production of tradables during the period of these simulations. However, this drawback should be weighed against the medium and long-term socioeconomic benefits of improved MDG indicators. In future analysis, it would be important to assess the effects of different policies on socioeconomic indicators under scenarios with different degrees of disruption due to conflict and considering the fact that, over a longer time horizon, improvements in human development have long-run developmental payoffs.

## NOTES

- 1 The authors are grateful for helpful comments from Marco V. Sánchez.
- 2 The Fourth Five-Year Socio-Economic Development Plan for Poverty Reduction 2011-2015 is an official document that, among other things, provides projections for several variables useful for generating the MAMS reference scenario as further explained below.
- 3 This review covers the period up to 2009, the last year for which relatively comprehensive data was available when this chapter was written. The current political turmoil is having a strong impact on the economy, including GDP growth, foreign trade, and foreign exchange reserves.
- 4 At constant prices (not shown here) the importance of the oil sector has shrunk sharply (indicating a decline in physical output) while the decline for qat is less drastic; for other sectors, the changes under constant and current prices are quite similar. Qat is a mild narcotic accounting for over one third of agricultural production.
- 5 In the context of the ongoing conflict, reserves of foreign exchange declined drastically during the first half of 2011, according to IMF's Arab News on 3 August 2011, downloaded from <http://arabnews.com/economy/article482640.ece>.
- 6 The production of qat requires a quarter of Yemen's total water resource use. Furthermore, according to the Yemen Poverty Assessment (Government of Yemen and others, 2007, p. 43), "qat impacts the economy in a negative manner through the opportunity cost of lost savings as well as lost work-hours. Although the authorities have developed public awareness campaigns, citing the drawbacks of qat consumption, discouraging qat consumption is a complex and difficult task; it is far too well integrated into the Yemeni economy and social structure to be eliminated on a short-term basis without adverse effects".
- 7 It should be noted that the fiscal cost of the petroleum subsidy depends on the world price of petroleum products, as the domestic price is fixed.
- 8 See Pacheco (2009) for details on the construction of this SAM.
- 9 According to official estimates, the share of students in private institutions is 2.3 per cent, 2.0 per cent and 14.9 per cent for basic, secondary and high education, respectively.
- 10 Data were insufficient to include MDG 5 (maternal mortality).
- 11 Sensitivity analysis shows that the overall qualitative results do not change as a result of changes in elasticities within plausible ranges.
- 12 Mathematically,  $NPCR_t = NIR_t \cdot (PR_t)^y$  where NPCR = net primary completion rate; NIR = net intake rate ( $0 \leq NIR \leq 1$ ); PR = promotion rate ( $0 \leq PR \leq 1$ ); and  $y$  = number of grades in the primary cycle. As a simplification, MAMS assumes a uniform PR for all primary grades. This version of the NPCR is a period measure; the corresponding cohort measure would use the relevant rates over a series of six years.
- 13 The exogenous part of TFP growth is adjusted to generate such a growth path. GDP growth is endogenous for all non-base scenarios.
- 14 Specifically, our assumption is based on past and expected evolution of the oil and gas extraction sector real GDP; data was taken from official sources.
- 15 In addition, scenarios that target one MDG at a time are presented in Al-Batuly and others (2011).

- 16 The target for the promotion rate for grades 1-6 is set at 0.99; given that the net intake rate to the first grade (out of the population that is in the right age to enter first grade) also reaches 0.99 in 2015, the target value for the MDG 2 in 2015 is around 92.5 per cent (100 times 0.997).
- 17 In addition, the following assumptions are made regarding government consumption of non-MDG related commodities (i.e., “other government”) in the MDG simulations: (1) absorption share is fixed for scenarios with domestic financing (i.e., those in which absorption decreases), and (2) real growth is the same as in the base for scenarios with foreign financing (i.e., those in which absorption increases). In effect, we assume that the domestic financing option requires not only raising additional domestic resources (via more borrowing or more taxes) but also some domestic reallocation of government resources. As a result, the government items that expand more rapidly under the MDG scenarios are those directly related to the relevant MDG(s), as well as post-primary education, given that expansion is unavoidable when the number of graduates from primary schooling increases.

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