DESA Working Paper No. 68
ST/ESA/2008/DWP/68

September 2008

Latin America and the Caribbean's Challenge to Reach the MDGs: Financing Options and Trade-offs

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Abstract

The present study analyzes the determinants of improving outcomes in education, health and basic sanitation and the macroeconomic trade-offs caused by scaling up public spending for the Millennium Development Goals (MDGs), using an integrated modelling approach. At variance with other assessments, the analysis shows that most countries in Latin America and the Caribbean are "off track" towards many of the goals. The study shows that while achieving the goals is affordable for most countries in the region, governments will need to put greater emphasis on tax reforms to mobilize resources for increased social spending while avoiding undesirable macroeconomic trade-offs.

JEL Classification: C68; D3; I3; F35; O11

Keywords: Computable General Equilibrium Models; Distribution; Welfare and Poverty; Foreign Aid; Macroeconomic Analyses of Economic Development

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Latin America and the Caribbean's Challenge to Reach the MDGs: Financing Options and Trade-offs

Rob Vos, Marco V. Sánchez and Cornelia Kaldewei[1]

1 Introduction

Leaders from all countries have agreed to pursue the Millennium Development Goals (MDGs) and to reach them by 2015 with a view to securing a world with less poverty, hunger and disease, with better-educated children, more gender equality, greater survival prospects for infants and mothers, and a healthier environment. With less than ten years to the time horizon, the challenges ahead are still staggering, though there are some signs of progress. In most developing countries, providing every child with primary school education appears to be within our grasp. In the developing world as a whole, income poverty has been on the decline and there have been important gains in assisted child delivery and coverage of vaccination programmes, which have contributed to declining child and maternal mortality.[2] Progress has been uneven, however. Most of the gains in declining income poverty have been concentrated in much of Asia. Sub-Saharan Africa tends to lag far behind for most of the MDG indicators. Child mortality has been on the decline globally, but again with the least relative progress in Africa. Disparities in progress are also vast within countries and many of the poorest tend to be left behind, particularly in rural areas.

In Latin America and the Caribbean (LAC), poverty indicators tend to be lower on average than in most other regions of the developing world. By and large, the region also scores better on education and health performance indicators. At the same time, however, progress on many of these indicators has been slower than in many parts of East and South Asia. Yet it is safe to argue that countries in the LAC region have made important progress on average towards the MDGs (see figure 1). According to the United Nations MDG report (United Nations, 2007), with unchanged trends in past achievement, the region should be able to attain the goals regarding net enrolment in primary education, gender equality in education, coverage of sanitation and drinking water, and possibly also that of child mortality. The speed of progress for achieving the goals for extreme poverty reduction and decreasing maternal mortality seems to be insufficient.[3] The region as a whole would thus seem to be "off track" for those two goals and "on track" for the former set of goals, under the assumption that progress towards the goals will continue linearly according to the observed trend since 1990.

There can be no reason for complacency, however, since such linear projections should be taken with extreme caution. First, the path towards the goals need not follow a linear pattern. For instance, once child mortality rates have been lowered substantially, reducing them even further may require other, possibly

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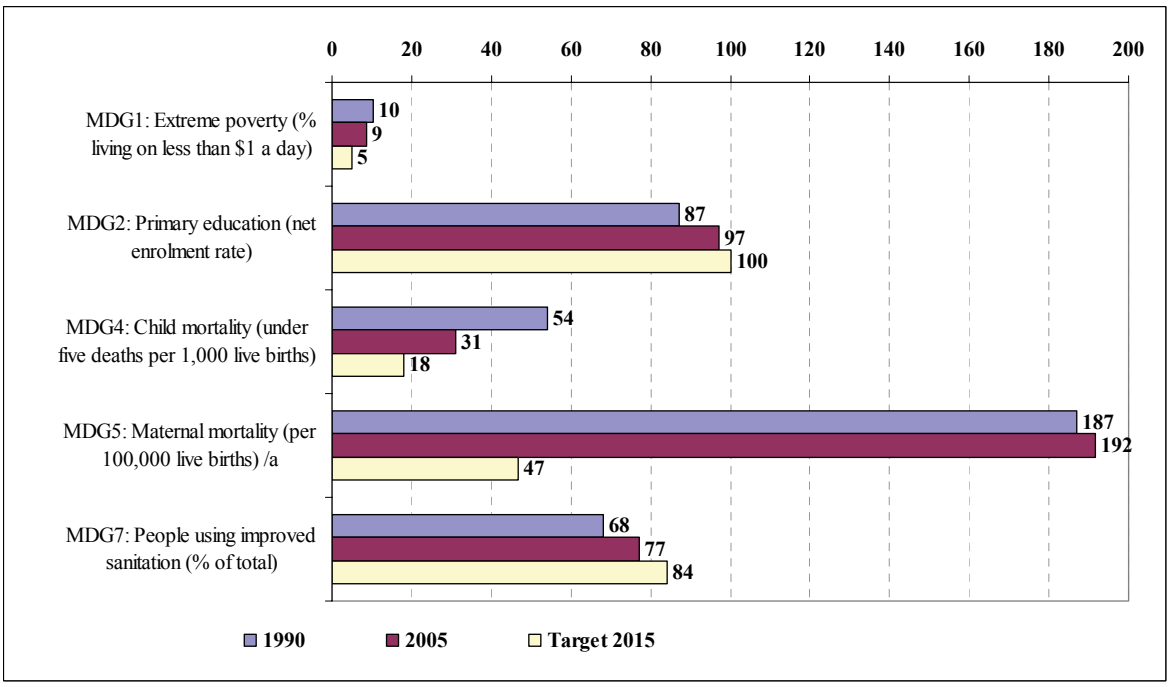
1 Forthcoming as chapter 2 of a volume on *Public Policies for Human Development. Feasible Financing Strategies for Achieving the MDGs in Latin America and the Caribbean*, edited by Rob Vos, Enrique Ganuza, Hans Lofgren, Marco V. Sánchez and Carolina Díaz-Bonilla. The volume reflects outcomes of a joint project of UNDP, UN/DESA, UN/ECLAC and the World Bank. We are grateful to Carolina Díaz-Bonilla, Enrique Ganuza, Hans Lofgren and Martín Cicowiez for helpful comments and suggestions to a first draft of this paper and to all country case authors for country-specific inputs.

2 See United Nations (2007) for a recent update on progress towards the MDGs.

3 The present analysis addresses MDGs 1, 2, 4, 5 and 7, reflecting the main focus of the 18 country studies carried out in the LAC region, whose results are discussed in this chapter.

Figure 1 **Progress towards the MDGs in Latin America and the Caribbean** [a]



Source: United Nations, *The Millennium Development Goals Report, 2007*; and United Nations, MDG database.

[a] In the case of MDG 5, data for 2005 refers to 2000 (latest year available).

more costly, interventions. Second, a "business-as-usual" (BAU) scenario would need to be defined more appropriately as policies may have changed since 1990, and new policies in place may make it more—or even less—likely to achieve the goals. Using a model-based analysis of the economy-wide implications of a continuation of BAU policies, we find that, in the case of child mortality, for instance, LAC as a region does not appear to be on track, contrary to what a linear projection based on the data in figure 1 would suggest. In contrast, the region would be on track for meeting the poverty-reduction target as defined by the BAU scenario, owing mainly to the projected performance of the region's larger economies, including Brazil and Mexico. Third, caution is also needed when looking more precisely at how the goals are defined. In the case of education, for instance, good progress is being made in terms of net enrolment, but the outlook is much less bright for primary school completion rates. Persistently high repetition and drop-out rates in primary education continue to pose a major challenge, and only four out of the 18 countries of the LAC region in the study (Chile, Costa Rica, Cuba and Mexico) are expected to achieve the goal of 100 per cent primary school completion by 2015 with unchanged policies. Of course, the above picture only represents regional averages and disguises important differences between countries, as well as disparities in human development within the countries of the region.

The MDG agenda reflects awareness of such differences and of the challenges ahead, faced predominantly by the world's poorest countries. In this context, many donor countries have made explicit commitments to "scale up" aid over the medium term to meet the development goals. This focus on aid and on the poorest countries is understandable, as the challenges in reaching the MDGs are greatest in sub-Saharan

Africa and other least developed countries, many of which lack the necessary resources for financing the substantial increase in public spending that would be required to meet the goals.[4] Therefore, much of the financing would be expected to come from increased aid flows. This situation in turn has spurred a debate about the trade-offs that would be associated with a "scaling-up" of aid by such magnitudes. The effectiveness of such a financing strategy has been questioned on several grounds (see, e.g., Heller, 2005; Bourguignon and Sundberg, 2006), such as a lack of good governance or sufficient absorptive and managerial capacity to efficiently utilize substantial aid flows for investment in MDG-related action; the potential cost of an appreciating real exchange rate (RER) and the consequent undermining of export competitiveness (often labelled "Dutch disease"); and constraints on managing macroeconomic policy, both fiscal and monetary, owing to an increased reliance on multiple and volatile external sources of financing, as aid flows are typically provided by many donors subject to annual allocation processes.

Such issues are highly relevant for the poorest countries and require careful examination before embarking on strategies of massive foreign assistance. At the same time, this should not divert attention from what could be done in terms of domestic resource mobilization, which—next to increased and more effective aid—is another pillar of the Monterrey Consensus on Financing for Development (United Nations, 2002, annex), but one that has been less at the forefront of the current debate on MDG financing strategies. Domestic resource mobilization will be central to most middle-income developing countries, including those in LAC, which—except for Bolivia, Guyana, Honduras and Nicaragua—are not eligible for increased aid flows and enhanced debt relief under the Heavily Indebted Poor Countries (HIPC) Initiative. While middle-income countries are closer to achieving the MDGs, it is nonetheless true that about 40 per cent of the world's moderate poor live in these countries.[5] Moderate ($2 a day) and extreme poverty ($1 a day) also remain pervasive in LAC as they affect 40 and 10 per cent of the population of the region, respectively. In addition, the inequalities in levels of human development and the income distribution within these countries, as pointed out earlier, add to the tremendous challenges in this part of the developing world.

While the less poor countries may have greater access to (private) foreign borrowing, it is not entirely clear that Governments would wish to use much of these sources for public investments in social sectors and in poverty-reduction programmes. On the other hand, greater reliance on domestic resources may imply stronger redistributive effects within the economy, which could impose political constraints on this kind of financing strategy. In addition, the issues faced by aid-recipient countries when shifting budgets to MDG-related programmes—including the associated relative price and resource shifts—may equally apply to countries relying on domestic financing strategies.

In the present paper, we will focus on a number of such trade-offs and financing constraints and provide a comparative analysis for 18 LAC countries, based on the case studies prepared by experts from each of those countries. In section 2, we will review the main issues at stake and the policy options for addressing related challenges. Section 3 outlines the contours of a modelling framework designed to analyse the trade-offs empirically—which is presented in detail in Lofgren and Diaz-Bonilla (2008). The comparative

4 According to estimates of the UN Millennium Project, for instance, in order to achieve the MDGs the required additional public expenditures per year for a typical low-income country with an average per capita income of $300 could amount to 10-20 per cent of its gross national product (GNP) (United Nations Millennium Project, 2005). If these figures are accurate, it would be hard to imagine that those countries would be in a position to finance the required additional spending through increased taxation or domestic borrowing.

5 Moderate poor are defined here as the population living on less than $2 a day. The middle-income country group refers to 86 developing countries with per-capita incomes of between $826 and $10,000 (2004 data). This group comprises just under half of the world's population. For more details, see, World Bank (2006).

analysis of feasible financing strategies to achieve the MDGs in LAC is provided in section 4. The final section summarizes the main findings and presents the policy lessons that can be learned from the comparative analysis.

2 Constraints to financing MDG-oriented development strategies

The Monterrey Consensus emphasizes that ensuring conditions to enable the mobilization of domestic and external resources is essential for development. This would entail, among other things, good governance that is responsive to the people's needs and sound macroeconomic policies aimed at sustaining high growth rates, full employment, stability and poverty eradication. This should be supported by sustainable debt financing and debt relief and sufficient and effective provisioning of official development assistance (ODA).

Against this backdrop, financing for achieving the MDGs may face several constraints, particularly in the short run. Below we discuss some key macroeconomic policy areas and related trade-offs associated with different financing strategies for the achievement of the MDGs in LAC. Without attempting to be comprehensive, these include: limited policy space for prudent and countercyclical macroeconomic management for growth and employment generation; competitiveness and RER constraints associated with both domestic and external financing strategies; the creation of fiscal space and maintenance of fiscal sustainability; and, labour-market constraints.

Countercyclical macroeconomic policies

Economic growth is an essential ingredient for generating domestic resources to address development needs, including human development. But it is likely that, at any given growth rate, a higher degree of volatility limits the ability of Governments to mobilize a steady stream of resources for different purposes. For instance, extended periods of booms and busts over recent decades did not allow Latin American economies enough time to recover or to draw on stable tax revenues.

More generally, macroeconomic stability strongly influences the long-term growth performance of an economy. In turn, the capacity to conduct countercyclical policies is a necessary condition to reduce volatility and increase a Government's degree of freedom in times of possible crisis, and to enable it to have enough resources to protect the socially vulnerable and prevent further regress in poverty reduction. Against this backdrop, countercyclical policies may therefore be seen as a prerequisite for preventing the MDG-related achievements of developing countries from regressing during times of macroeconomic instability and crises. History has shown, however, that the fiscal policy stance in both African and Latin American countries has been highly pro-cyclical on average since the 1960s, whereas in East Asia it has more typically been either neutral or countercyclical (United Nations, 2006b; Ocampo and Vos, 2008). It further shows that a pro-cyclical macroeconomic policy stance has been generally detrimental to long-term growth by exacerbating the short-run volatility in the economy and increasing perceived investment risks and uncertainty. The boom-bust economic cycles in Latin America during the 1990s closely followed the trend of capital flows. The upward and downward swings in the economy were typically exacerbated by pro-cyclical macroeconomic policy responses (Ocampo, 2005; Ocampo and Vos, 2006).

Social expenditures also have been found to be pro-cyclical in many developing countries, sometimes even more so than total public expenditures, especially in Latin America (see, e.g., Martner and Aldunate, 2006). This was very much a characteristic of fiscal policy during the 1990s, but more recently policy-

makers seem to have managed to protect social spending better. This is evidenced by a study of the United Nations Economic Commission for Latin America and the Caribbean (ECLAC, 2005) which showed that, during the period 1991-1997, the variation in overall social spending was almost three times higher than the variation in GDP, implying significant overshooting of social spending in both directions during cyclical up- and downswings. Between 1998 and 2003, this relationship weakened as the fluctuations in social spending were actually lower than those in GDP. According to the ECLAC study, most social spending sub-categories in the region became less volatile, except for health spending, which showed increased volatility and pro-cyclicality from 1998-2003.

In summary, improvements in human development require adequate and sustained levels of public spending. For many developing country Governments, however, the space for conducting countercyclical macroeconomic policies is limited, as the available fiscal and foreign-exchange resources tend to be small relative to the size of the external shocks these countries face. Against this backdrop, mobilizing and committing fiscal resources for MDG achievement on a sustained basis for the medium-to-long run could in itself help attenuate the pro-cyclicality of fiscal spending and support more growth-oriented macroeconomic policies.

Competitiveness and real exchange-rate constraints

While sustained growth is important to ease the path towards MDG achievement, in most countries much greater priority will need to be given to public spending to meet infrastructure needs and improve the quality and coverage of basic social services. Public spending injections for these purposes may, however, put upward pressure on the RER. One way to define the RER is to see it as the price of "tradables" relative to "non-tradables". Government services, including education, health, and infrastructure are typically seen as "non-tradable commodities" and many MDG-related activities are therefore considered non-tradables.[6] Consequently, a large shift in domestic spending towards MDG-related goods and services will push up demand for non-tradables. As a result, the price and cost of MDG-related 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.[7] Rising costs of non-tradable services will in principle shift the relative price against tradables, thus inducing an RER appreciation as defined above.

Financing MDG-related spending through aid flows or foreign borrowing will likely exacerbate the appreciation of the RER, as it will increase the supply of foreign exchange in the economy.[8] In any case, the appreciation 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. RER appreciation may result in what is often labelled 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.

6 The production of some of these services, such as telecommunications, may nonetheless have a high import content.

7 While a shortage of this nature may put upward pressure on wages for skilled workers of this kind, arguably such a wage adjustment need not immediately eliminate the labour shortage, since the "generation" of new teachers, nurses and doctors will take several years of training.

8 MDG-related spending includes all expenditures that are directly related to the achievement of the MDGs, such as spending on primary education, on health care aimed at reducing child and maternal mortality and combating major diseases like malaria, tuberculosis and HIV/AIDS, and on the provisioning of basic sanitation infrastructure and services.

The actual impact on the RER and competitiveness will, however, depend on many factors, including the import intensity of aggregate demand and of MDG-related expenditures in particular, and on the existing slack in production capacity (see e.g., Vos, Sánchez and Inoue, 2007). The impact on competitiveness will also depend on how greater achievement of the MDGs 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 RER appreciation would erode export competitiveness in the short run, while productivity gains and faster economic growth from increased MDG achievement 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.

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, Powell and Yang, 2006). Similarly, the degree to which increased taxation or domestic government borrowing changes the composition of domestic demand will depend on how private investors respond to higher public indebtedness and, possibly, higher domestic interest rates, and on which parts of the population have to carry the extra tax burden, and so on.

In summary, the risk of a loss of export competitiveness due to larger MDG expenditures is clear and present both in the case of external and of domestic financing. Nonetheless, one cannot say *a priori* that a poverty reduction strategy aimed at increased public expenditures for the MDGs would be harmful for growth or export capacity.

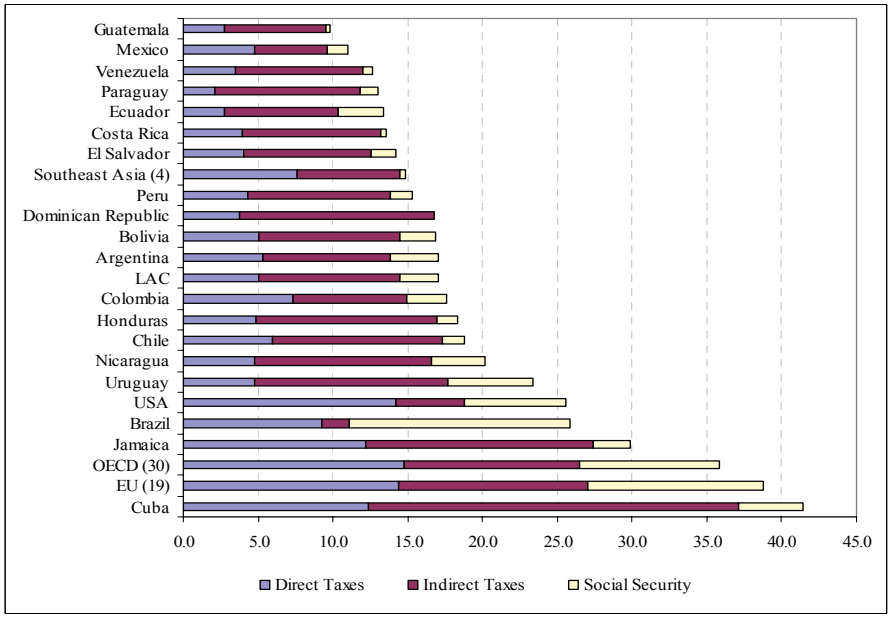
Creating fiscal space for MDG investment

Tax reform

Taxation should be central to any strategy for domestic resource mobilization aimed at enhancing public expenditures for social development. In most Latin American and Caribbean countries, there appears to be ample scope for increasing fiscal space through an expansion of the tax base and an increase in tax rates. The average level of tax revenues in LAC amounted to only 17 per cent of GDP around 2005 (see figure 2); less than half of the average for the Organization for Economic Cooperation and Development (OECD). Only Argentina (including provincial governments), Brazil, Jamaica and Uruguay had tax revenues above 23 per cent of GDP (Martner and Aldunate, 2006).

An important caveat with regard to increasing taxation as a means of financing MDG-related spending is the impact on domestic demand, as consumers will have less disposable income and investors may foresee lower net profits and therefore choose to reduce investments. Moreover, reduced disposable income and profits are likely to constrain private savings for investment financing. The domestic demand effect will also depend on who is to carry the additional tax burden. If indirect taxes have a greater effect on low-income households, reforms pushing for increases in the value-added tax (VAT) and other indirect taxes could offset some of the welfare gains the poor would receive from enhanced MDG expenditures. Even if increased tax efforts are more distribution-neutral, they could affect the poor through lower economic growth in the short run as private domestic demand would fall. Increased public expenditures would compensate for this, but the long-run growth gains would depend on the efficiency of these expenditures.

Figure 2 **Average tax revenues of central Governments in Latin America and the Caribbean and selected other countries and country groups, around 2005** [a] (*percentage of GDP*)



Sources: For Latin America and the Caribbean (LAC): ILPES-CEPAL on the basis of official country data; for OECD, EU and USA: OECD Revenue Statistics 1965-2005; for Southeast Asia and Jamaica: IMF Government Finance Statistics and IMF, International Financial Statistics, various issues.
[a] General government for OECD, European Union (EU) and United States (USA); 2002 for Southeast Asia (4); 2004 for OECD, EU, USA, Brazil and Bolivia; 2003 for Cuba. Southeast Asia (4) includes Indonesia, Malaysia, Singapore and Thailand.

Another important caveat relates to possible limits on how much additional tax revenue can be generated through tax reforms. If the experience of tax reforms of recent decades is indicative, one should not be overly optimistic in this regard. Latin American countries have been able to increase tax revenue (excluding social security contributions) since 1990 by about 2 percentage points of GDP on average (see e.g., Tanzi, 2000; Martner and Aldunate, 2006). While there is quite some variation across countries, the upper bound in the increases would be between 3 and 4 percentage points, though typically taking about a decade to achieve such increases. Studies for other developing countries also suggest that significant increases in tax revenue are not easy and are time-consuming to achieve (McKinley, 2007; Thirsk, 1997). In other words, while there seems to be clear scope for significant tax reform in Latin America, in practice the actual gains in mobilizing the necessary revenue for MDG-related spending may well be limited in the time span leading up to 2015. Another, potentially more promising, way to increase fiscal space for MDG-related public spending would therefore be an increase in efficiency in budget allocations.

More efficient budget allocation

There are at least three mechanisms for more efficient budget allocation through which one could seek to create more fiscal space for MDG spending. First, there may be scope for redefining priorities across budget items. This could entail readjustments across government sectors or ministries (e.g., from defence spending to education and health), or across subsectors within ministries or programmes (e.g., from higher education to primary and secondary education).

Second, there may be scope for improving efficiency in the delivery of services. The quality and efficiency with which public services are provided will differ from country to country, and inefficiencies can emerge for a variety of reasons. In some cases, there may be blatant inefficiencies, however, such as absenteeism among teaching and medical personnel, which, if addressed, could generate important fiscal savings and social benefits. For instance, primary school teacher absence rates have been found to be as high as 27 per cent in Uganda, 25 per cent in India, 19 per cent in Indonesia and 14 per cent in Ecuador (see Rogers *and others*, 2004). In the case of Ecuador, for example, it has been estimated that reducing primary school teacher absenteeism by half could "save" about 2 per cent of the overall budget for the education sector. In the health care sector, a shortage of medical personnel may not be the only, or even the main, problem for improving the coverage of health services. For instance, doctors and nurses tend to be present mostly in Ecuador's main urban centres, leaving the rest of the country uncovered (see, e.g., Vos *and others*, 2004; World Bank, 2004). Problems such as these and many others suggest that with a more efficient delivery of services the same amount of resources could yield much higher outcomes in education and health.

Third, even without such inefficiencies in delivery systems, MDG-related spending could be made more cost-effective by ensuring that within programmes and subsectors, resources are prioritized towards those "inputs" and activities which produce the greater outcome per dollar spent. For instance, a cost-effectiveness analysis of the actions needed to meet the target of universal primary education in Ecuador suggested that with a more efficient allocation of resources it would be possible to achieve the education MDG at an annual extra cost of 0.2 per cent of GDP (Vos and Ponce, 2004). Specifically, a more cost-effective allocation of resources would entail focusing incremental budget resources on hiring better-trained teachers, expanding a conditional cash transfer programme to stimulate school attendance by the poor and improving the availability of rural schooling infrastructure.

Public borrowing and fiscal sustainability

In the short run, overall fiscal revenues and expenditure decisions determine an important part of the resources available for social development. However, in the medium and long runs, what happens "below the line" of fiscal accounts (i.e., the financing of deficits) will determine the sustainability of fiscal resources. Therefore, while public borrowing may be used as a source of financing for MDG-related public spending, this will have to be subject to medium- and long-term debt sustainability considerations.

While it is difficult to establish any standardized benchmark for sustainable public debt levels, assessments by Governments in consultation with the IMF and the World Bank suggest that public debt distress in LAC decreased substantially during the 1990s, and even more so in recent years (see table 1). More prudent fiscal policies (albeit sometimes at the expense of social spending and public infrastructure investment) and substantial debt relief in the HIPC countries have contributed to this trend, as well as to improved economic performance in a number of cases. As seen in the assessments of debt sustainability reported in table 1, most economies in the region have sailed away from acute debt distress. Nonetheless, it also holds for most countries that sustainability problems could easily return when faced with a growth slowdown, terms-of-trade shocks or exchange-rate pressures. Hence, while for most countries there would at present appear to be scope for financing an MDG strategy through domestic or external borrowing, such measures would have to be cautiously assessed in the light of the country's ability to maintain enhanced MDG spending alongside sustained economic growth.

Borrowing on domestic capital markets may be limited in some countries of the region as they have rather poorly developed markets for long-term government and corporate bonds denominated in

Table 1 **Public debt-to-GDP ratio and debt sustainability in Latin America and the Caribbean, 1990-2006**

	Average 1990-2000	Average 2001-2006	Around mid-point [a/]	Debt sustainability [b/]
Argentina	36.3	100.1	138.2	Sustainable over medium term, some risks in near term; sensitivity to growth performance and real exchange rate (Art. IV, 2005)
Bolivia	56.3	74.5	60.7	Sustainable; some sensitivity only to significantly lower oil prices (Art. IV, 2007)
Brazil	24.0	32.9	34.0	Improved sustainability (Art. IV, 2006)
Chile	23.0	11.1	13.0	Sustainable (Art. IV, 2006)
Colombia	18.7	47.2	50.3	Sustainable, as long as primary fiscal surplus does not decrease significantly below 1 per cent of GDP (Art. IV, 2006)
Costa Rica	40.2	40.1	43.6	Sustainable, assuming fiscal reforms; without reforms, sensitivity to growth performance, real exchange rate shock or contingent liability shock (Art. IV, 2006)
Cuba [c/]	49.3	40.0	38.4	
Dominican Republic	..	20.5	21.2	Improved sustainability; further fiscal prudence (primary surplus!) needed to reach more manageable levels over time (Art. IV, 2005)
Ecuador	67.6	43.4	56.9	Improved sustainability; further fiscal prudence (primary surplus!) needed to reach more manageable levels over time (Art. IV, 2005)
El Salvador	26.2	36.1	35.2	Improved public debt situation; further decrease in public debt levels (through fiscal consolidation) needed to achieve sustainability, since current debt levels imply vulnerability to growth and real interest rate shocks (Art. IV, 2006)
Guatemala	18.2	20.5	20.2	Sustainable (Art. IV, 2005)
Honduras	66.3	59.8	70.1	Improved sustainability, moderate risk of distress; severe exogenous and endogenous shocks could lead to distress, fiscal discipline is needed to reduce the risk of distress in the medium-to-long term (WB/IMF joint DSA, 2006)
Jamaica [d/]	100.7	140.0	111.0	High risk of distress; reduction of public debt levels must be a policy priority (Art. IV, 2007)
Mexico	31.6	23.2	24.2	Sustainable; only a severe oil shock in both quantity and prices could imply a risk of distress (Art. IV, 2006)
Nicaragua	189.0	107.5	113.0	Improved sustainability, moderate risk of distress; exogenous and endogenous shocks could lead to distress, further debt relief and fiscal discipline are needed to reduce the risk of distress in the medium-to-long term (Art. IV, 2005)
Paraguay	16.8	39.8	41.1	Low risk of distress; exchange-rate shocks and a return to primary fiscal deficits of about 1.6 per cent of GDP (historical average) could lead to distress (Art. IV, 2004)
Peru	54.2	41.3	41.8	Moderate risk of distress; especially a non-interest current-account shock and a contingent liabilities shock could trigger distress (Art. IV, 2007)
Uruguay	24.8	72.6	67.0	Improved sustainability, but public debt remains highly vulnerable to interest rate, exchange rate, and rollover risks; also, continued fiscal prudence (target: primary surplus of 4 per cent of GDP) is needed to maintain downward trend of public debt ratio in baseline scenario without shocks (Art. IV, 2006)

Source: ECLAC (for debt-to-GDP ratios). See notes for additional sources.
[a/] Mid-point of the MDG-relevant period 1990-2015. The selected year varies between countries and is defined in accordance with the base year of the period for which MDG achievement is modelled for the relevant country (see table 3).
[b/] Based on World Bank and IMF debt sustainability assessment in most recent year available.
[c/] Data for Cuba are taken from the Economist Intelligence Unit (EIU).
[d/] Data for Jamaica are taken from the World Bank's World Development Indicators database (WDI). The latest available figure is for 2005.

local currency. A deficient domestic bond market makes it more difficult to finance long-term public infrastructure investments and major private modernization projects (see United Nations, 2006b; Ocampo and Vos 2006, 2008). A poorly developed bond market in conjunction with a relatively low level of financial savings in the economy may further imply that government demand for domestic financing of its deficits would have rather strong upward effects on domestic interest rates and limit financing available for private investment. Under such circumstances, heavy reliance on domestic borrowing to finance the MDG strategy could lead to a quickly rising domestic debt-service burden. As mentioned above, rising interest rates will

also increase the cost of borrowing for private investors and hence domestically financed MDG investments could crowd out private investments and lower economic growth.

Labour-market constraints

For low-income countries, large-scale investments for the achievement of the MDGs could meet severe skilled-labour constraints in the short-to-medium run. Public expenditures centred on 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. 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.

Such constraints may also exist in LAC, but they are likely to be less severe as most countries in the region rank as middle-income with higher initial educational levels. Trying to achieve the MDGs in the region may induce other labour-market constraints over time, however. As the MDG target for primary education is reached and more students are also likely to complete higher levels, the supply of skilled workers in the labour market will gradually increase. If the economy's structure does not adjust commensurately to absorb the increased supply of better-educated workers, the skill premium will likely fall. While this, in turn, may lower the cost of achieving the MDGs, it is also likely to provide a disincentive to invest in education. Most empirical studies of the determinants of access to education indicate that expected private returns to education are not the sole determinant by far, but an important one nonetheless (Glewwe, 2002). Hence, insufficient creation of skilled jobs in the economy could jeopardize the achievement of the education MDG. While this could be counteracted by additional efforts by the Government to stimulate school attendance, the real problem would be how to improve the environment for stimulating a structural change in the economy towards technologies and activities that can absorb larger amounts of skilled labour.

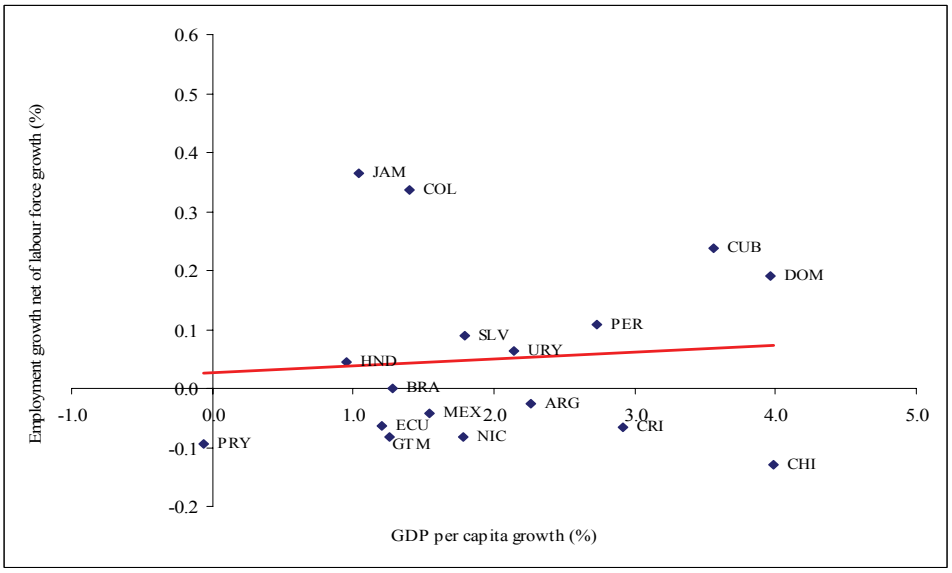
How the indicated trade-offs present themselves will depend further on the functioning of the labour market, that is to say, on the degree of labour-market segmentation and the flexibility in real wage adjustment. Labour markets in developing countries are typically segmented owing to many factors that prevent certain workers from finding a job in some sectors (Agénor, 1996). High barriers to entry into MDG-related sectors may prevent the real wage from adjusting in a flexible way. For example, skill requirements may be very high in some MDG-related sectors, particularly in activities that are relatively advanced from a technological point of view (for example, hospital services). This may prevent certain types of workers who have a higher education but do not possess the required skills from having full access to jobs in MDG-related sectors. If skilled but not highly-skilled, workers may end up seeking employment in non-MDG-related sectors where, as a consequence, the real wage will probably fall. Should the real wage adjustment be insufficient to clear the labour market, unemployment and, most likely, underemployment will emerge, resulting in negative repercussions in terms of rising income inequality and poverty.

These changing patterns in the demand for labour could limit the degree to which aggregate income growth translates into poverty reduction. A strategy based on increased public spending for MDG-related services could alter the employment-growth pattern by increasing the skilled labour supply and, at least in

the short run, expanding employment in non-tradable services. What this means in terms of reducing poverty will depend on country-specific conditions and will be discussed in more detail in section 4.

Such labour-market concerns and their implications for inequality and poverty are particularly pressing against the backdrop of recent labour-market developments in LAC. In most countries of the region, employment creation just about kept pace with GDP growth during the 1990s and early 2000s, indicating employment generation with little to no productivity growth. For half of the countries, employment growth has been less than labour-force growth, as reflected in the negative "net" employment growth rates in figure 3. More atypically, Jamaica and Colombia witnessed the strongest net job creation rates at about 0.3 per cent per year between 1990 and 2005, even as their per capita GDP growth remained relatively modest. Among the faster-growing economies of the region since 1990, Cuba and the Dominican Republic managed to sustain a relatively labour-intensive growth pattern, whereas in Chile and Costa Rica productivity growth has implied insufficient employment generation for these countries' growing labour forces. Overall, employment growth has been rather limited in all countries. In addition, especially in the countries with slower growth, much of the job creation has been in the informal sector (ECLAC, 2005).

Figure 3 **Net employment and GDP growth in Latin America and the Caribbean, 1991-2006**
(*annual average growth rates*)



Sources: ILO, Key Indicators of the Labour Market (KILM) and the World Bank, World Development Indicators database.

3 An economy-wide framework to assess feasible financing strategies for achieving the MDGs

An economy-wide framework is required to examine the capacity and financing constraints to achieving the MDGs and the trade-offs discussed in the previous section. The existence of a wide range of interaction effects is the rationale for the use of a computable general equilibrium (CGE) model. As discussed above, 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 throughout the period for achieving the MDGs. The general equilibrium framework also takes into consideration the possible synergies between the different MDGs. Such synergies may influence the required expansion of services (e.g., greater coverage of drinking water supply may reduce the need for health service expansion) or the speed at which the various MDGs are achieved. Studies that take all of these general equilibrium and synergy effects into account may generate substantially different outcomes than studies that focus exclusively on sector analyses.

The outcomes will also depend to an important extent on the way in which the strategy is financed. Foreign financing may induce RER effects of the type discussed above, while financing through domestic taxes could reduce private consumption demand, among other things, and domestic borrowing could crowd out credit resources for private investment. Policymakers thus may face important trade-offs. No doubt increased public spending is essential for achieving the MDGs, but adjustments in the RER, real wages and other relative prices may increase the unit costs for achieving the MDGs along with the costs for other sectors, or discourage exports, thereby widening the external deficit that needs to be financed, and so on. The productivity gains from greater MDG achievement will take some time to materialize and are thus unlikely to impact growth visibly in the short and medium terms. Therefore, it is critical that short-run trade-offs not offset potential economic and social gains in the longer run.

Dynamic CGE models for the simulation of policies aimed at human development goals have been developed before in studies during the 1970s and 1980s, especially in those providing analytical depth to the so-called basic needs approach to development (see, e.g., Kouwenaar, 1986; Hopkins and van der Hoeven, 1982). At the time, such exercises were very time-consuming and costly because of data and computational limitations. Later, the shift away from concerns about employment, income distribution and poverty towards macroeconomic stability and structural adjustment in mainstream development policies also de-emphasized the need for such modelling efforts. More recently, work undertaken at the World Bank has revived the approach in the context of the ongoing debate about scaling up resources to achieve the MDGs. This newly developed framework has been labelled MAMS (***Ma****quette* for **M**DG **S**imulation) and was originally presented in Lofgren (2004). A version with more limiting assumptions can be found in Bourguignon *and others* (2004). The framework was originally designed to deal in particular with low-income country contexts and the trade-offs associated with the scaling-up of aid inflows for MDG-related expenditures. It has been extended and applied in the context of the present study covering 18 Latin American and Caribbean countries. Lofgren and Diaz-Bonilla (2008) provide a detailed description of the version of MAMS applied to these country cases. Here, we only highlight some of the main features relevant for the subsequent discussion.

The MAMS framework has been built from a fairly standard CGE framework with dynamic-recursive features 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 the MDGs of poverty reduction (MDG 1), 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 variables such as classroom availability and student-teacher ratios), 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.

The final outcome for income poverty can be estimated by looking at the outcomes for per capita household income and consumption for different household groups. However, CGE models can typically only specify a limited number of representative households, resulting in insufficient detail regarding changes in the distribution for making robust statements regarding the poverty outcomes. As a consequence, the CGE analysis needs to be supplemented by certain assumptions (such as fixed within-group distributions) or, as has been done for the empirical analysis reported here, by a method of microsimulations that takes the labour-market outcomes (unemployment, employment structure, relative remunerations and skill composition) from the CGE for different types of workers and applies them to a micro data set (such as a household survey) to obtain the required detail about income distribution for the poverty analysis. See Bourguignon, Robilliard and Robinson (2002) and Vos *and others* (2006) for a discussion and application of such methods in conjunction with CGE model analysis. The appendix gives further details of the method as applied to the 18 country studies covered in the present study.

MAMS includes a relatively detailed specification of social services related to the MDGs, spelling out different levels of education, different health sectors, sectors for drinking water and sanitation, and other public infrastructure. According to the model's specifications, these services may be provided publicly or privately. Nonetheless, it is only new government investment and current expenditures that will lead to a policy-driven increase in the supply of MDG-related services and public infrastructure. For this to take place, the Government has to mobilize sufficient - domestic or foreign - resources to finance those new investments and expenditures.

The average skill level of the labour force will increase over time as more better-educated graduates leave the schooling system. This will in turn enhance productivity growth, with subsequent wage- and income-distribution effects. Output growth may be fostered as a result of those productivity gains, potentially triggering economy-wide effects which in turn will affect MDG achievement.[9] Achievements in drinking water and sanitation supply also help to improve health conditions, and improved health status may in turn impact positively on education outcomes along with other determinants.

9 A productivity parameter for each MDG-related sector can also allow the simulation of efficiency improvements in the delivery of such services. While the MAMS framework in principle allows the capture of such efficiency gains, the key problem is to obtain quantitative estimates for such externalities. This would require further country-level investigation. The MAMS-based country analyses discussed in section 4 do not consider such productivity gains and therefore, potentially, may underestimate the possible welfare gains from the MDG strategy. It could be argued, however, that because of the time lags involved between MDG investments today and enhanced productivity of workers tomorrow, most gains are likely to become effective after 2015, assuming that with better access to education, most children will remain in the schooling system for ten years or more.

Per capita household consumption responds positively to the Government's increasing the supply of MDG-related services, and this may have further favourable implications for MDG achievement. However, since MAMS is an economy-wide model, per capita household consumption can also change as a result of relative price changes or could be affected by increased taxes to finance the additional MDG-related spending. Furthermore, all domestic income changes affect the economy's capacity to generate savings. The macroeconomic viability of financing the new MDG-sector investment will depend on the macroeconomic constraints of the country, the initial debt burden, the source of financing, and the productivity of public investments towards the MDGs, among other factors.

4 MDG financing strategies for LAC: a comparative country analysis

In this section, the outcomes of the MAMS-based analyses for 18 countries in the LAC region are scrutinized and compared. The following key questions guide the discussion:

- Will the countries of the region be able to achieve the MDGs with essentially unchanged public spending and financing strategies?
- How much additional resources would be needed, if any?[10] Are there important cost-saving effects from the synergies among the various MDGs? Are there decreasing returns to MDG spending; that is to say, as one gets closer to achieving the MDGs, do the marginal costs of the policy interventions in education, health and sanitation increase?
- Which financing strategy seems to be the most feasible in each context? Which macroeconomic trade-offs are the most important when comparing financing of the MDG strategy through increased aid flows, taxation, domestic borrowing or external borrowing?
- Is there a trade-off between trying to achieve the MDGs for education, health and sanitation and the achievement of the MDG for income poverty?

The country studies referred to in the present paper have tried to answer these questions by running and analysing a number of alternative policy scenarios with the country-specific application of MAMS. These policy scenarios are compared to a baseline or BAU scenario, which aims to replicate observed performance and policy stance in each country case. The common denominator in each of these policy scenarios is that—unlike in the baseline—MDG spending is scaled up in such a way that MDGs 2, 4, 5 and 7 are achieved by 2015. There are two kinds of policy scenarios: one simulates the achievement of each MDG target separately (or two simultaneously, as in the case of the health and the sanitation goals), whereas in the other, public spending is scaled up as much as required to ensure the simultaneous achievement of all MDG targets—excluding that of poverty reduction. All these MDG scenarios are performed under alternative financing rules, that is to say, the required increase in public spending is financed through, alternatively, increased foreign grant aid, foreign borrowing, domestic borrowing or direct taxation. These scenarios allow us to assess synergy effects among the MDGs (by comparing the "individual" with the "simultaneous" MDG-achievement scenarios) as well as the MDG-related spending requirements and macroeconomic trade-offs under different financing settings.

Is "business as usual" good enough for MDG achievement?

The BAU scenarios have been tailored to each country context, assuming in all cases what are considered to be realistic rates of economic growth and levels of public spending under a scenario of unchanged policies and absence of external shocks.

10 The country studies also answer a related question: what social sectors would require the most additional spending?

Table 2 gives an overview of the regional and country achievement of the MDGs by 2015 under the BAU scenarios. The regional aggregates are computed by using weighted averages following the same meth-

Table 2 **Achievement of MDGs by 2015 under the BAU scenario in Latin America and the Caribbean** [a/]

	MDG 1 [b/]	MDG 2 [c/]	MDG 4 [d/]	MDG 5 [e/]	MDG 7a [f/]	MDG 7b [g/]
Argentina				--		
Bolivia				--		
Brazil	✓			--	✓	✓
Chile	✓	✓	✓	✓	✓	✓
Colombia	✓				✓	✓
Costa Rica		✓			✓	✓
Cuba		✓	✓	✓	✓	✓
Dominican Republic					✓	✓
Ecuador					✓	
El Salvador						✓
Guatemala	✓					
Honduras						
Jamaica	✓					
Mexico	✓	✓			✓	✓
Nicaragua						
Paraguay						
Peru	✓			--		
Uruguay				--	✓	✓
LAC [h/]	✓	--			✓	✓

Sources: Authors, based on country studies referred to in the present paper, and UN/DESA Population Division (World Population Prospects: The 2006 Revision Database) and United Nations (2007) for the construction of weighted regional averages.
Legend: ✓ = YES; blank = NO; and - - = not analysed.
[a/] The achievement of MDGs by 2015 is defined with respect to the situation in 1990, the base year of the MDG timeline, and is indicated in the table by including a checkmark. Due to data limitations, for some countries MDG achievement is seen starting from the nearest available year to 1990.
[b/] Halve, between 1990 and 2015, the percentage of the population living on less than a dollar a day.
[c/] Ensure that, by 2015, children, boys and girls alike, will be able to complete a full course of primary schooling. The on-time primary school completion rate for the relevant age cohort is used as the MDG 2 indicator. A less ambitious national goal is being used for Peru and Jamaica (i.e., 71.4 and 95 per cent, respectively). Chile, Costa Rica and Mexico essentially meet the target (i.e., their projected primary school completion rates for 2015 are 98.9, 99.1 and 98.2 per cent, respectively, and thus these would be very difficult to be reduced further).
[d/] Reduce by two-thirds, between 1990 and 2015, the under-five mortality rate. For Bolivia, the analysis refers to the infant (under-one) mortality rate. Cuba essentially achieves the national target of 4.4 deaths per 1,000 live births. Cuba's under-five mortality rate levels off at 5 deaths per 1,000 live births by 2015, which is the lowest in the region and for that very reason difficult to reduce much further.
[e/] Reduce by three-quarters, between 1990 and 2015, the maternal mortality ratio. Bolivia, Brazil, Peru and Uruguay are not included because MDG 5 was not analysed in these country studies. A less ambitious, national target is being used for Costa Rica (i.e., 20 deaths per 100,000 live births).
[f/] Reduce the proportion of people without sustainable access to safe drinking water. The "international" goal set here is to halve this percentage from 1990 to 2015.
[g/] Reduce the proportion of people without sustainable access to basic sanitation. The "international" goal set here is to halve this percentage from 1990 to 2015.
[h/] Weighted averages are used for the region as a whole. These are calculated using the same aggregation methods as applied in United Nations (2007). The weights used are total population for MDG 1, 7a and 7b; population under five for MDG 4; and number of births for MDG 5. For MDG 2, no regional average was computed because the age cohorts corresponding to the primary cycle differ across countries.

odology used in United Nations (2007). However, the present study uses a different definition of whether the countries and the region are on or off track in achieving the MDGs. In the absence of a better measure, the aforementioned publication (like many other studies) simply assumes the linear continuation of past trends in order to project whether any particular MDG would be achieved by 2015. In contrast, the BAU scenarios present better benchmarks for assessing whether countries are on or off track towards the MDGs, because the scenarios identify the currently expected growth scenario and assume continuation of current public spending policies; moreover, the MAMS model duly considers non-linearities in the effectiveness of social spending in achieving the targets.

Taking these factors into consideration, we find that, on average, the region appears to be on track to achieve MDG 1—to halve, between 1990 and 2015, the percentage of the population living on less than a dollar a day—under the BAU scenario. By the mid-point of the timeline from 1990 until 2015 (around 2002-2003),[11] the region had already achieved about 75 per cent of the target (see Statistical Annex, figure A.1). However, this is almost entirely on account of progress in poverty reduction in Brazil and Mexico, the region's most populous countries. Eleven of the eighteen countries considered appear to be off track under the BAU scenario. Next to Brazil and Mexico, Chile, Colombia, Guatemala, Jamaica and Peru also appear to be on track, whereas the remaining countries would have to undertake additional efforts to reach the income poverty target. It is important to note, however, that extreme poverty, as measured using the poverty line of one dollar per person a day, is already very low in a number of the countries that are identified here as presumably being off track, such as Argentina, Costa Rica, Cuba and Uruguay, whose extreme poverty incidence was below 3 per cent at around the mid-point of the trajectory to 2015. National poverty lines in LAC are generally more in the order of two dollars a day, and thus define a poverty challenge of much larger magnitude in the region. The present analysis concentrates on the international target for reasons of comparability; most country studies, however, assess the challenges for both moderate and extreme poverty measured with national poverty lines.[12]

This analysis suggests, contrary to other reports, that the region is off track in achieving the education target. The region has made considerable progress in improving net enrolment rates and by this standard the region might be on track, as reported elsewhere (e.g., United Nations, 2007). However, all country studies considered here use 100 per cent primary school completion rates as the target for MDG 2.[13] The approach illustrates that the main challenge for the region is to keep children in school and to improve the internal efficiency of the primary schooling system by reducing both repetition and drop-out rates. This is also important in order to ensure sufficient transition of students into secondary education, thereby helping to reduce existing deficiencies in the supply of skilled labour, which has been identified as a bottleneck for the ability of the region's economies to adapt to the technological demands emanating from their increased exposure to global markets (see, e.g., Vos *and others*, 2006).

11 The mid-point, 2002-2003, also roughly corresponds to the base year for most of the country models (see table 3).

12 Fifteen country studies also report poverty outcomes for one or more nationally defined poverty line (those with more than one include a national poverty line for "extreme" poverty and one for "moderate" poverty). The three countries reporting international poverty lines only are Brazil and Ecuador (one dollar per day only) and Cuba (one dollar per day and two dollars per day). Results for the BAU scenario appear consistent for all poverty lines in terms of the direction and relative extent of poverty reduction and in terms of whether the target for MDG 1 is likely to be attained. The exceptions are Costa Rica and El Salvador (where MDG 1 would be achieved using national poverty lines but not when using the one dollar per day poverty line) and Colombia and Mexico (where MDG 1 would be achieved under the BAU scenario for the international poverty line but not for the national one).

13 It should be noted that completion rates are defined in a strict sense in the country studies: that is to say, completion on time, without repetition, for the relevant country-specific age cohort for primary school.

Only four countries in the region (Chile, Costa Rica, Cuba and Mexico) meet the target under the BAU scenario, and only one of these (Mexico) and two others (Peru and Nicaragua) have been able to achieve 50 per cent or more of the target for primary completion by mid-point (see table 2 and figure A.2).[14] A continuation of existing policies does not seem to ensure further progress in Nicaragua, and this may also prove problematic in Guatemala. In all other countries, economic conditions like those simulated in the BAU scenario would produce substantial improvements in primary school completion rates by the year 2015, but not enough to meet the established target.

The region also appears to be off track for the health goals for reducing child mortality and improving maternal health (see table 2). Child mortality rates have declined substantially throughout the region over the past decades. By mid-point, 14 out of the 18 countries had achieved 50 per cent or more of the targeted reduction in child mortality (see figure A.3). Observed trends in Jamaica, Uruguay, Costa Rica and Colombia suggest less progress in these countries. Projected trends in health spending and progress on other determinants of reductions in child mortality (such as improved education and higher real consumption levels) are expected to produce further important reductions in child mortality in most countries, though to a lesser extent in Honduras, Peru, Guatemala and El Salvador. Only Chile, and most likely Cuba also (the country with the lowest child mortality rate in the region), would be able to meet the target under the conditions of the BAU scenario. All other countries would fall short of the target. It should be noted, however, that child mortality rates are already quite low in some of these countries (such as in Argentina, Chile, Costa Rica, Cuba and Uruguay) and that further reductions will have relatively high marginal costs.

Progress in terms of maternal mortality has been much less and, on average, the countries of the region had achieved just one third of the required progress towards the target by mid-point (see table 2 and figure A.4).[15] Only two countries (Cuba and Chile) would achieve the goal on time under the BAU scenario.

A more optimistic picture emerges concerning the achievement of goals 7a and 7b, the provision of access to safe drinking water and basic sanitation. The region as a whole is on track, and many countries already achieved the international goals around mid-point (see table 2 and figures A.5 and A.6). More precisely, 10 out of the 18 countries had already achieved more than 50 per cent of MDG 7a by around the mid-point. Six of these countries (Brazil, Chile, Costa Rica, Cuba, Mexico and Uruguay) have already achieved the internationally defined target for MDG 7a and have set more ambitious national targets, which they would also achieve on time under the BAU scenario. Several countries, however, would remain far-removed from achieving the international goal under the BAU scenario, including Guatemala, El Salvador, Peru and Paraguay.

Six countries (Brazil, Chile, Costa Rica, Cuba, the Dominican Republic and Uruguay) had already achieved the international goal of halving the percentage of the population without sustainable access to basic sanitation by mid-point. These countries and some others that have not yet achieved the international goal (Colombia, Ecuador, Honduras and Peru) have set more ambitious national goals. Under the BAU scenario,

14 In the country studies of Chile, Costa Rica and Mexico, the authors argue that the target for MDG 2 will not be achieved, as the primary completion rates in 2015 level off at 98.9%, 99.1% and 92.2%, respectively. In the present paper, however, MDG 2 is considered to be achievable in practical terms in view of the relatively small margin by which these figures fall short of 100% and the difficulty in further reducing this margin.

15 Argentina, Bolivia, Brazil, Peru and Uruguay are not included because MDG 5 is not analysed in the respective country studies. It should be noted, however, that data on maternal mortality generally suffer from major deficiencies. The country studies which did include maternal mortality in the analysis made an effort to ensure that the best possible data were used.

the region on average is on track towards the internationally defined target for MDG 7b, but would be off track when considering the more ambitious goals that some countries have established. One country (Costa Rica) would achieve its more ambitious national goal well in advance under the BAU scenario and six others (Brazil, Cuba, Chile, Colombia, the Dominican Republic and Uruguay) are on track. Mexico is on track to achieve the less ambitious international goal. Argentina, Bolivia, Ecuador, Guatemala, Honduras, Nicaragua, Paraguay and Peru are among the countries that require substantial additional efforts to meet this goal.

In summary, the region as a whole seems on track (as more appropriately defined) for the targets for income poverty reduction (MDG 1) and off track for the targets for reducing child and maternal mortality (MDGs 4 and 5). While by and large on track for meeting universal access to primary education as measured by net enrolment rates, the region is off track when it comes to ensuring school completion on time by all that enrol in primary education. The (international) targets for water and basic sanitation appear to be achievable under existing policies in 9 of the 18 countries. Since these include Brazil and Mexico, the regional average suggests adequate progress towards these goals in the LAC region, although increased efforts will be needed in half of the countries.

How much will it cost to achieve the MDGs?

As discussed above, the MDG scenarios analysed with MAMS delineate a path towards the full achievement of the targets for goals 2, 4, 5 and 7a and 7b, as defined above (see notes to table 2). In these scenarios, the MAMS model allows an estimation of the required additional public spending based on what were found to be core determinants of primary school completion rates, child and maternal mortality and access to drinking water supply and basic sanitation. Apart from overall general equilibrium effects, the model considers three important factors which may influence these cost estimates considerably.

First, the complementarities or synergies among the various development goals; for instance, extra public spending on primary schooling leading to better educational outcomes may positively influence health behaviour and thus simultaneously help reduce child mortality. Such synergy effects can be captured by comparing the cost estimates for the scenarios under which the Government aims to achieve each of the MDGs separately with those for meeting them simultaneously.

Second, the source of financing for the additional public spending could influence the required cost of achieving the MDGs. For instance, when additional MDG-related public spending is financed through direct taxes, disposable household incomes may be affected and hence also private spending on education, health and sanitation, which in turn may require the Government to step in with additional efforts in order to achieve the MDGs. In the event that increased domestic borrowing by the Government crowds out private investment, future GDP growth would be affected, thus impacting the cost estimate of MDG-related spending relative to GDP.

Third, the MAMS model assumes that there are increasing marginal costs for achieving each of the development goals. This is captured through (logistic) functions calibrated with parameters that in most cases were estimated on the basis of country-specific sector analyses. It is thus possible that the required additional public spending for countries that are already close to achieving the goals may still be substantial because of the higher marginal costs.

Below, we analyse the required additional MDG spending for the 18 LAC countries, where "additional MDG-related public spending" is defined as the difference between the estimate for total spending on MDG-related services under the MDG scenarios and that under the BAU scenario for each country model.

In the cases of Cuba and Chile, in particular, the MDGs can be achieved at no additional cost. The model analysis for these two countries suggests that MDGs 2, 4, 5 and 7 will be achieved under the BAU scenario (see table 2). For the other 16 countries, additional MDG-related public spending ranges from 0.9 per cent of GDP on average per year between the base year and 2015 for Peru, to 6.1 per cent of GDP per year for Guatemala (see table 3).

Synergies among MDGs yield cost savings

Progress on all MDGs creates cost-saving synergies. Such synergies are observed for all countries needing to increase MDG-related spending in order to reach the goals, except for Honduras and Uruguay. The synergy effect can amount to more than 1 per cent of GDP per annum, as in the case of Guatemala (see table 3). Significant cost savings of more than 0.5 percentage points of GDP per annum originating from positive interaction effects between education, health and sanitation are also estimated for Nicaragua, Bolivia, Paraguay, Brazil and Colombia, although not for all financing scenarios discussed below. In any case, the existence of such synergy effects is a strong argument—including from the point of view of the efficiency of public spending—for a simultaneous, rather than a phased, achievement of the MDGs.

The financing strategy matters for MDG cost estimates

In seven countries (Argentina, Colombia, Costa Rica, Ecuador, Jamaica, Paraguay and Peru), the additional costs are 2 per cent of GDP per annum or less regardless of the financing scenario (see table 3). The cost would be of a similar magnitude for Bolivia, if that country were able to finance the MDG strategy fully with foreign financing (grants or borrowing), and for Brazil, if financed through external borrowing. The MDG scenario is more costly for these two countries when the additional spending is financed through domestic resource mobilization. Guatemala, Honduras and Nicaragua require the largest extra public spending effort (more than 3.5 per cent of GDP per year), regardless of the financing scenario. The Dominican Republic and Mexico also fall into this category, but only if the MDG strategy is financed through domestic resource mobilization; for these countries, external financing would be a cheaper option.

These results illustrate that the financing strategy has an important bearing on the cost estimates. The required additional MDG-related public spending is generally lower when financed from abroad, since both sources of domestic finance come at a price. As indicated above, domestic borrowing may crowd out private investment. Not only does this have implications for GDP growth, it also hurts the private provisioning of MDG-related services, and the Government would have to spend more to achieve the MDGs. On the other hand, an increase in income taxes may affect disposable household income, which could also affect private investment through lower private savings; more importantly, it causes a "consumption-compression effect" which results in a decrease of private demand for MDG-related services compared to the other financing scenarios. Again, in order to achieve the MDGs, the Government needs to compensate the reduction in private demand for MDG-related services by further increasing MDG-related public spending.

For a large number of the country cases analysed, the estimated cost of the required additional MDG-related public spending is lower under the tax financing scenario than under that of domestic borrowing (see table 3). In three countries, however (Colombia, Ecuador and Nicaragua), the "consumption-compression" effect of higher taxation is relatively strong, making taxation the more expensive financing strategy. Raising income taxes is unambiguously more costly than mobilizing resources from abroad but, as discussed below, this does not necessarily mean that domestic resource mobilization could not be the better financing option, as countries may face external borrowing constraints, as well as other macroeconomic trade-offs

Table 3 **Required additional MDG-related public spending for achieving all MDGs simultaneously under alternative financing scenarios in Latin America and the Caribbean, 2000-2015** [a/] (*percentage of GDP*)

Country	Base year [b/]	Base-year MDG-related public spending	MDGs scenario with foreign grants			MDGs scenario with foreign borrowing			MDGs scenario with domestic borrowing			MDGs scenario with income taxes		
			Additional MDG-related public spending [c/]	Incre-mental MDG-related public spending [d/]	Synergy effect on MDG-related public spending [e/]	Additional MDG-related public spending [c/]	Incre-mental MDG-related public spending [d/]	Synergy effect on MDG-related public spending [e/]	Additional MDG-related public spending [c/]	Incre-mental MDG-related public spending [d/]	Synergy effect on MDG-related public spending [e/]	Additional MDG-related public spending [c/]	Incre-mental MDG-related public spending [d/]	Synergy effect on MDG-related public spending [e/]
Argentina	2003	3.8				1.3	0.4	0.3	1.6	0.6	0.2	1.4	0.4	0.2
Bolivia	2000	4.8	1.7	0.0	0.7	2.0	0.0	0.3	2.8	0.6	0.2	2.8	0.6	0.3
Brazil	2003	9.5				1.7	0.0	0.6	2.2	0.1	0.0	2.2	0.1	0.0
Chile	2003	5.0				0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Colombia	2002	7.3				1.4	0.9	0.1	1.6	1.0	0.5	1.7	1.1	0.0
Costa Rica	2002	9.6				1.1	0.0	0.1	1.4	0.0	0.1	1.4	0.0	0.0
Cuba	2002	13.8	0.0	0.0	0.0	0.0	0.0	0.0						
Dominican Republic	2004	2.7				3.3	1.1	0.1	4.1	1.7	0.0	3.7	1.3	0.0
Ecuador	2001	3.6				1.3	1.1	0.3	1.4	1.2	0.3	1.5	1.2	0.2
El Salvador	2002	5.3	2.6	0.2	0.3	2.6	0.2	0.3	2.8	0.2	0.2	2.8	0.2	0.2
Guatemala	2001	3.3	4.8	1.9	1.1	4.8	1.9	1.1	6.1	3.1	1.3	6.1	3.1	1.3
Honduras	2004	2.7	4.3	1.0	0.0	4.3	1.0	0.0	5.1	1.5	0.0	4.6	1.1	-0.5
Jamaica	2000	5.4				1.3	1.3	0.2	1.5	1.9	0.2	1.4	1.6	0.2
Mexico	2003	3.3				2.9	1.4	0.3	5.5	3.3	0.0	5.5	3.3	0.0
Nicaragua	2000	5.6	3.6	1.3	0.8	3.6	1.3	0.8	4.4	2.0	0.9	4.7	1.4	0.3
Paraguay	2001	5.3				2.0	0.6	0.9				2.1	0.7	0.9
Peru	2004	1.3	0.9	0.5	0.4	0.9	0.5	0.4	0.9	0.5	0.4	0.9	0.5	0.4
Uruguay	2005	5.4				2.5	0.4	0.0	3.3	0.5	0.0	3.3	0.5	0.0

Source: MAMS country model simulation results reported in country studies.

[a/] MDG-related public spending comprises final-consumption and investment spending in primary education, health, and water and sanitation. Some entries have been left blank because the MDGs financing scenario in question is irrelevant in the context of the country.

[b/] First year of the simulation period.

[c/] Annual average MDG-related public spending (in percentage points of GDP) under the respective MDGs financing scenario minus the annual average MDG-related public spending (in percentage points of GDP) under the BAU scenario. The additional public spending for achieving MDG 5 is not accounted for in the cases of Bolivia, Brazil and Peru.

[d/] Annual average additional MDG-related public spending (in percentage points of GDP) during the period 2010-2015 minus the annual average additional MDG-related public spending (in percentage points of GDP) during the entire simulation period.

[e/] Annual average additional MDG-related public spending saved (in percentage points of GDP) when achieving the MDGs jointly instead of separately.

which also need to be considered.

MDG costs rise as countries get closer to the target

The average additional annual MDG-related public spending during the last five years (2010-2015) is larger than during the entire simulation period (that is to say, from the base year to 2015) in 13 countries out of 16 (see table 3). This difference—or "incremental MDG-related public spending"—is the result of a rise in the marginal public spending that is necessary to achieve the MDGs towards the end of the period, as the goals are already closer to being achieved.

The "incremental MDG-related public spending" tends to be higher when resources are mobilized domestically because the crowding-out and consumption-compression effects magnify over time. Incremental spending is substantial in some countries. It is estimated at about or above 1 per cent of GDP per year in eight countries (Colombia, the Dominican Republic, Ecuador, Guatemala, Honduras, Jamaica, Mexico and Nicaragua), regardless of the MDG financing strategy, and even slightly above 3 per cent of GDP per annum in two countries (Guatemala and Mexico) in the case of domestically mobilized resources. This evidence should be seen as a reminder to Governments that sustained higher public spending efforts will still be required when the MDGs are (close to being) achieved.

"Feasible" financing scenarios

In order to establish the "optimal" financing strategy for the increased MDG-related public spending, a number of factors must be considered. One possible criterion for assessing the desirability of certain financing options is the effect that these will have on the estimated costs of delivering MDG services, as discussed above. There are other important considerations, however. As discussed in section 2, borrowing strategies will need to take into account the implications for public debt sustainability over time. Foreign aid financing may not be a feasible option for most of the middle-income countries of the region, and those that do have access to this financing source will need to consider consistency of policy conditionality with the MDG strategy and the desirability of prolonged aid dependency. Each of the financing strategies will need to take into account possible macroeconomic trade-offs, such as RER appreciation and possible erosion of export competitiveness, which are likely to be stronger in the case of external borrowing or foreign aid financing. Meanwhile, domestic financing strategies risk the crowding-out of private consumption and investment.

There are no absolute benchmarks for rigorously establishing the feasibility or optimality of the various financing strategies. For instance, the critical level of public indebtedness will vary from one country context to another. Furthermore, the degree to which Governments will be able to raise tax revenues to the required levels will depend on the initial levels of tax burden and, no less importantly, on political economy considerations. Hence, in the analysis below, the choice of financing strategy recommended by the country studies is used as the initial reference, and is then reassessed in the light of the macroeconomic trade-offs and political economy considerations.

One caveat here is that the analysis of the financing scenarios only allows the comparison of situations in which the additional MDG-related spending is fully financed through one of the four options considered. While this has the advantage of helping to understand the merits of one financing option vis-à-vis another, it has the disadvantage of not giving explicit consideration to possible "mixed" financing strategies which might avoid or mitigate certain undesirable trade-offs. The question of the feasibility of mixed strategies will be addressed below.

Table 4 summarizes some key results of the country studies regarding the assessment of financing strategies. Upon initial inspection, three main findings stand out. First, most country studies recommend financing the MDG strategy through increased taxation. This is the case for all but five countries: Bolivia and Honduras recommend aid financing, in line with the poverty-reduction strategy framework they adopted in the context of the HIPC Initiative. Despite a high public debt overhang, the authors of the Jamaican study see external borrowing as the more desirable financing strategy, since the alternative of tax financing is considered to be less feasible in the light of an already high tax burden and recent increases in rates. The authors of the studies for Guatemala and Uruguay do not rank any single financing option superior to another.

Second, while tax financing appears the most favoured option, external borrowing or aid financing is in all cases cheaper in terms of the required additional public spending on MDG-related services. The country studies, nonetheless, typically prefer tax financing, as further external borrowing is considered to lift public debt beyond a critical level of sustainability and/or entails other important trade-offs, such as significant declines in export competitiveness.

Third, no country study recommends a strategy exclusively based on domestic government borrowing. Not only would domestic borrowing generally be more costly in terms of the required extra spending, as indicated above, but in many cases it would also raise the total public debt burden to unsustainable levels. In the cases of Colombia, Ecuador and Nicaragua, where this financing strategy would be (slightly) less costly than increasing taxes (see table 3), the weakly developed domestic bond market and the possible consequences for levels of total public indebtedness (should the Government indeed be able to borrow domestically) would render such a strategy untenable.

Given these recommendations, the question remains: How "feasible" are those "recommended" financing strategies and what would be the alternatives?

The scope for tax financing

As discussed in section 2, most LAC countries have comparatively low tax burdens, suggesting ample space to increase some of that burden in favour of achieving the MDGs. As shown in table 4, the required increase in tax revenues may differ from the estimated increase in MDG spending because of general equilibrium effects; in other words, the increased public spending may affect output and employment differently across sectors and this may have a bearing on overall tax revenue.[16] In a number of cases (6 out of 13) reported in table 4—including Guatemala and Uruguay for which the respective country studies did not recommend any preferred financing strategy—tax revenue would have to increase by about 0.4 per cent of GDP more than the estimated MDG costs.[17] This is due to a resource shift towards activities that on average tend to be taxed less (such as services which are produced in large parts by the Government itself or by the informal sector). In Brazil, the Dominican Republic and Nicaragua, the tax burden needs to rise by less because of opposite resource shifts, whereas in Paraguay the tax burden would need to rise in proportion to the estimated additional MDG-related spending.

16 If tax revenue ultimately falls short of financing all—and not only MDG-related—public spending, then direct taxes will tend to increase beyond what is strictly required to finance new MDG-related spending in order to keep a fiscal deficit from emerging. This in turn leads to an added tax burden to finance the additional MDG-related spending.

17 In the case of Guatemala, this difference is found to be substantially larger than anywhere else. According to the country case study, an increase in income taxes to finance MDG achievement would greatly reduce household incomes. Consequently, the resulting "compression effect" on private spending on MDG-related services is also strong, lowering aggregate demand and the tax base of the economy. This then requires rather significant increases in the direct tax rate to be able to finance the large additional public spending needed to meet the MDGs, including the spending needed to offset the drop in private spending. The magnitude of this outcome for Guatemala is, of course, driven by the specific parameter values used in the country model.

Table 4 **MDG financing strategies and required increases in tax or public debt burdens in Latin America and the Caribbean** [a/]

Country	Recommended financing strategy [b/]			Least costly financing strategy [c/]			memo items (% of GDP)			
	Strategy	Additional MDG-related public spending (% of GDP) [d/]	Additional burden (% of GDP) [e/]	Strategy	Additional MDG-related public spending (% of GDP) [d/]	Additional burden (% of GDP) [e/]	Base-year tax revenue [f/]	Total Public debt		
								Base year	2015 in BAU scenario	2015 in foreign borrowing scenario
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Argentina	Taxes	1.4	1.7	Foreign borrowing	1.3	3.3	23.9	128.2	70.3	87.5
Brazil	Taxes	2.2	2.0	Foreign borrowing	1.7	4.5	34.0	57.5	50.7	76.1
Colombia	Taxes	1.7	2.3	Foreign borrowing	1.4	2.8	18.5	60.6	67.8	91.4
Costa Rica	Taxes	1.4	1.6	Foreign borrowing	1.1	0.9	14.2	48.2	51.8	66.5
Dominican Republic	Taxes	3.7	2.8	Foreign borrowing	3.3	5.8	14.9	52.2	37.5	62.5
Ecuador	Taxes	1.5	1.7	Foreign borrowing	1.3	4.0	14.0	67.0	51.1	70.5
El Salvador	Taxes	2.8	3.2	Foreign borrowing	2.6	5.1	10.2	44.6	47.3	90.4
				Foreign grants	2.6	3.1				
Mexico	Taxes	5.5	6.0	Foreign borrowing	2.9	9.8	15.7	25.6	24.1	65.3
Nicaragua	Taxes	4.7	4.4	Foreign borrowing	3.6	3.0	14.8	130.6	127.8	158.3
				Foreign grants	3.6	3.5				
Paraguay	Taxes	2.1	2.1	Foreign borrowing	2.0	4.0	12.6	36.4	50.6	76.1
Peru	Taxes	0.9	1.3	Foreign borrowing	0.9	2.6	13.5	47.2	38.6	49.6
				Foreign grants	0.9	1.1				
Bolivia	Foreign grants	1.7	3.1	Foreign grants	1.7	3.1	17.8	73.0	52.4	95.6
Honduras	Foreign grants	4.3	7.7	Foreign borrowing	4.3	16.3	15.8	94.5	46.0	113.6
				Foreign grants	4.3	7.5				
Jamaica	Foreign borrowing	1.3	5.3	Foreign borrowing	1.3	5.3	31.9	102.3	103.5	115.1
Guatemala	None	6.1 [g/]	12.7 [g/]	Foreign borrowing	4.8	18.1	9.8	23.0	22.3	137.5
				Foreign grants	4.8	9.6				
Uruguay	None	3.3 [g/]	4.1 [g/]	Foreign borrowing	2.5	5.1	28.3	80.7	80.8	109.9

Sources: MAMS country model simulation results and analysis from country studies.

[a/] Chile and Cuba are not considered in this section as they do not need to finance any additional public spending to achieve the MDGs.

[b/] These are the recommended financing strategies in the country studies referred to in the present paper and not necessarily considered the most feasible in terms of this analysis.

[c/] Least costly strategy in terms of additional MDG-related public spending.

[d/] Annual average difference (in percentage points of GDP) between MDG-related public spending under the BAU scenario and under the respective MDGs scenario.

[e/] Annual average increase (in percentage points of GDP) in tax revenue, foreign borrowing or foreign grant aid, depending on the financing strategy, compared with the BAU scenario.

[f/] Tax revenue of the general government. The country studies referred to in the present paper mostly report tax revenue of the central Government.

[g/] No financing strategy is suggested in the country study, but the results for the tax financing scenario are included for informative purposes.

Having said this, among those countries for which the tax-financing strategy is recommended in the respective country studies, the required additional tax burden would range between 1.3 per cent of GDP in Peru to 6.0 per cent in the case of Mexico. For seven countries (Argentina, Brazil, Colombia, Costa Rica, Ecuador, Paraguay and Peru), the required increase in tax revenue would be between 1.0 and 2.5 per cent of GDP. This seems to be a feasible range of effective tax revenue increase, which countries conducting tax reforms have been able to achieve on average over more or less a decade, as discussed in section 2. Beyond this, admittedly arbitrary, upper bound of the indicated range, tax reform should be expected to be much more demanding for a variety of reasons, not least owing to political economy concerns. Such is the case for the Dominican Republic, El Salvador, Mexico, Nicaragua, Uruguay and Guatemala. This is not to suggest that these countries should not pursue tax reform for the MDG financing strategy, but they will have to give cautious consideration to how far out they can effectively push the tax revenue curve. For all countries, it is probably the case that increasing tax revenue, even by a few percentage points of GDP, may not be something that can be achieved overnight, but may take years to effectuate. In the meantime, this would require some kind of mixed financing strategy as discussed below.

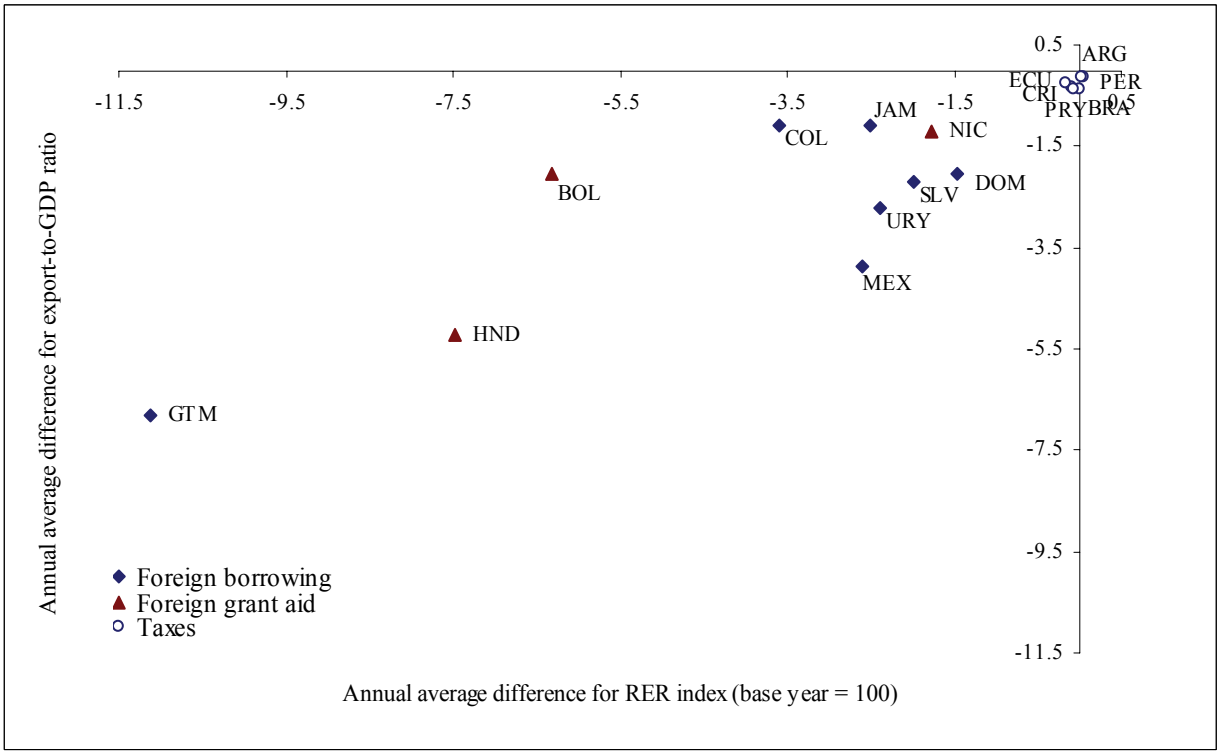
More aid?

The possibility of financing the MDG strategy through increased grant aid is considered in the modelling of a few of the country cases only, since most countries in the region lack significant access to this type of funding. Where this does apply (i.e., in the cases of Bolivia, El Salvador, Honduras, Nicaragua and Peru), aid financing is least costly in terms of required additional public spending (see table 4).[18] Only Bolivia, Honduras and Nicaragua are eligible for debt relief, however, and have to varying degrees already received significant amounts of development assistance under the HIPC initiative. In order to finance the required additional public MDG-related spending, aid flows to these countries would have to increase by 3.1, 7.7 and 3.5 percentage points of GDP on average per year, respectively. In the case of Honduras, current levels of aid inflows are about 8 per cent of GDP and, hence, would almost need to double. Such an increase may be difficult to negotiate with donors. Dutch disease effects explain why the required aid inflows for this country (16.3 per cent of GDP per annum) are so much higher than the required additional public spending (4.3 per cent of GDP per annum): the average rate of RER appreciation under the aid-financing scenario would be about 7.5 per cent compared to the BAU scenario, causing the exports-to-GDP ratio to drop by more than 5 percentage points and the trade deficit to widen (see figure 4).

This effect is also present in Bolivia, but to a much lesser extent, and appears to be absent in Nicaragua. In the case of Nicaragua, however, aid dependence is already quite high (ODA amounted to more than 18 per cent of GDP on average during 2000-2005), which is why the country authors recommend a tax financing strategy rather than proposing a further increase in aid dependence. However, given the rather substantial required increase in the tax burden (4.4 per cent of GDP) that is estimated for Nicaragua, it may be more realistic to pursue a combination of a tax increase and, at least in the short run, additional foreign aid. On the other hand, aid flows to Bolivia currently average about 8 per cent of GDP per year and the required increase of 3.1 per cent to achieve the MDGs would be substantial, though perhaps negotiable, and could be replaced by higher tax revenues over time.

18 It should be noted, however, that at present Peru and El Salvador receive rather small amounts of official development assistance (ODA). In 2005, net ODA receipts by these two countries amounted to 0.5 and 1.2 per cent of gross national income, respectively. In the other countries, especially, Bolivia, Nicaragua and Honduras, ODA receipts, historically and in recent years, have been much more substantial, in part owing to their HIPC status.

Figure 4 **Annual average difference of the RER and the export-to-GDP ratio under the "feasible" MDGs financing scenario relative to the BAU scenario in Latin America and the Caribbean** [a/]



Sources: MAMS country model simulation results and analysis from country studies.
[a/] The "feasible" MDGs financing scenario is indicated in table 5. The foreign borrowing scenario is also used for all countries for which no single "feasible" financing scenario is indicated in table 5, as well as in the case of the Dominican Republic.

More public borrowing?

While foreign borrowing is typically least costly in terms of required additional spending, it also seems to entail substantial trade-offs in the form of RER appreciation and a loss in export revenue. This explains much of the difference between columns (5) and (6) in table 4. Such trade-offs are much less substantial under the tax financing scenarios, for example (see figure 4). In addition, in all country cases (with the exception of Peru), total public debt would rise to 65 per cent of GDP or (much) more under both the foreign borrowing (table 4) and the domestic borrowing scenarios. This would put public indebtedness beyond critical levels of sustainability in all countries (except perhaps Peru) based on the information in table 1 above.[19] The country studies confirm this, concluding that financing the MDG strategy fully through either internal or external government borrowing is not feasible, with the possible exception of Jamaica for the reasons indicated above.

"Feasible" financing strategies

The policy scenario analysis of the MAMS framework involved assessing alternative single financing options for the MDG strategies. Based on our further assessment of these options, however, it appears that only in a

19 Chile and Cuba are not considered here, as these two countries are expected to reach the MDGs under their respective BAU scenarios.

few countries would a "one-legged" financing strategy seem feasible, as summarized in table 5. For Bolivia, aid financing would seem a feasible option, provided that donors are willing to support it. Of course, it would remain advisable for the Bolivian Government to consider enhancing domestic resource mobilization also, especially through tax reform, in order to reduce aid dependency over time.

Table 5 **"Feasible" financing strategies for the achievement of the MDGs in Latin America and the Caribbean** [a/]

	Foreign aid	Tax increase	Tax increase combined with foreign aid	Tax increase combined with foreign borrowing	Tax increase with public expenditure reform and more efficient service delivery
Argentina		✓			
Bolivia	✓				
Brazil		✓			
Colombia					✓
Costa Rica		✓✓		✓	
Dominican Republic				✓	
Ecuador		✓			
El Salvador					✓
Honduras			✓		
Jamaica					✓
Guatemala					✓
Mexico					✓
Nicaragua			✓		
Paraguay		✓			
Peru		✓✓		✓	
Uruguay					✓

Sources: MAMS country model simulations, country studies and analysis in text. The cases of Cuba and Chile are not considered here, as they are expected to meet MDGs 2, 4, 5 and 7 under the BAU scenario.
[a/] Two checkmarks indicate that the main emphasis in the financing strategy should be on taxation, where more than one option is indicated.

Tax financing would seem a feasible strategy for Argentina, Brazil, Costa Rica, Ecuador, Paraguay, Peru, and possibly also the Dominican Republic—if combined with foreign borrowing, as will be explained below—given the degree of tax revenue increase that would be required as well as the milder macroeconomic trade-offs generated by tax increases compared to alternative financing scenarios. Peru, the Dominican Republic and Costa Rica have manageable baseline levels of public indebtedness and hence would have space to distribute the financing burden by combining tax revenue increases and foreign borrowing.

In the other country cases, a mixed financing strategy would also seem the most realistic. For Honduras and Nicaragua, this could consist of a combination of initiating tax reform and seeking more foreign aid. As already discussed, in the case of Nicaragua, tax financing (as recommended in the country study) would require a rather substantial increase in government revenue (4.4 per cent per annum), more than any tax reform is likely to accomplish in the short-to-medium run. For Honduras, foreign aid financing is recommended in the country study, but considering the presumably strong erosion of export earnings this would generate, a "two-legged" strategy of tax-cum-aid financing might be better suited to mitigating the trade-offs.

All other country cases would probably need to seek a combination of tax reform, very limited public borrowing, and a change in public spending priorities and/or increases in the efficiency of MDG-related

spending. In those cases (Colombia, El Salvador, Guatemala, Jamaica, Mexico and Uruguay), either the required tax increase would be too high in relation to what a well-executed tax reform might be able to achieve, or levels of public indebtedness are already close to or above critical points of sustainability—or both.

A mixed financing strategy should possibly be recommended for all 18 countries in order to minimize detrimental macroeconomic trade-offs. Even so, our comparative analysis makes it clear that in most countries the emphasis should be on increasing tax revenue. For many countries, however, this will most likely not be sufficient, and they would need to supplement this strategy with some (limited) degree of foreign financing and/or improved efficiency in MDG-related expenditures.

Poverty reduction (MDG 1), inequality and growth

As discussed above, the MAMS scenario analysis treats the results for MDG 1 as endogenous to economy-wide adjustments as manifested in labour-market shifts that are then translated into expected outcomes for poverty and inequality at the household level, using the microsimulation methodology described in the appendix. Using this approach, we find that the income poverty reduction target is expected to be met under the BAU scenario in Brazil, Chile, Colombia, Guatemala, Jamaica, Mexico and Peru (see table 2 and figure A.1). The inclusion of Mexico and Brazil sets the region at large on track for the goal. BAU does lead to poverty reduction for the other countries,[20] but not by enough of a margin to meet the target.

The question is, then, whether a strategy of increased public spending for the achievement of the MDGs in education, child and maternal health, and water and sanitation will also help reduce income poverty beyond what is achieved under the BAU scenario. Results for the poverty incidence of those living on less than one dollar a day show that in 10 countries, the "feasible" MDG strategy—as defined in table 5 for each country—would lead to further poverty reduction compared to the BAU scenario, but only Honduras is expected to join the countries that are anticipated to meet the target for MDG 1 by 2015 (see tables 6 and A.1). Substantial reductions in extreme poverty by 2015 are also expected in Ecuador, Guatemala, Nicaragua and Paraguay, but this would largely also be achieved under the BAU scenario, and whatever further poverty reduction may be expected under the MDG scenario would not be sufficient to meet the target for MDG 1 in these countries. For most countries, the degree of poverty reduction under the MDG scenario is either the same as or greater than under BAU. Only in the cases of Paraguay, Peru and Uruguay would there actually be slight losses in poverty reduction, mostly explained by relatively small changes in income distributions triggered by the MDG strategy.

The results of the microsimulations suggest that most of the progress towards MDG 1 is explained by average income and employment growth under both the BAU and MDG scenarios. In fact, employment and GDP growth tend to move together. Figure 5 shows that this pattern is more or less the same under the BAU and the MDG scenarios (using the "feasible" financing scenario for the latter). Only in the cases of Guatemala and Honduras would the implied employment-output elasticity fall significantly under the MDG scenario (by 47 and 23 per cent, respectively), apparently because of the lower labour intensity of MDG-related services sectors compared to the average for tradable sectors. In the other country cases, the implied employment-output elasticity is more or less the same under both scenarios and ranges from a low of 0.2 for Uruguay to a high of 0.9 for Nicaragua, with a regional average of about 0.5.

20 The only exception is El Salvador, where observed extreme poverty in 2005 is lower compared with that in the BAU scenario in 2015. This setback is depicted in figure A.1 and, according to the study for this country, is due to the fact that labour income distribution deteriorates for informal and underemployed workers and for workers that are paid below the minimum wage.

Table 6 **Labour market, inequality and poverty indicators in the simulation period under alternative scenarios in Latin America and the Caribbean** [a/]

	Employment (annual average growth rate)		Unskilled/skilled employment ratio (annual average growth rate) [b/]		Real wage per worker (annual average growth rate)		Unskilled/skilled wage ratio (annual average growth rate) [b/]		Gini coefficient of per capita household income (absolute change from the base year)		Poverty (MDG 1) indicator (absolute change from the base year) [c/]	
	BAU scenario	MDG scenario [d/]	BAU scenario	MDG scenario [d/]	BAU scenario	MDG scenario [d/]	BAU scenario	MDG scenario [d/]	BAU scenario	MDG scenario [d/]	BAU scenario	MDG scenario [d/]
Argentina	1.8	2.0	-0.9	-1.2	2.1	2.3	0.3	0.1	-0.01	-0.01	-1.3	-1.4
Bolivia	2.2	2.2	-0.1	-0.4	1.4	1.9	0.1	0.2	0.00	0.00	-2.4	-3.0
Brazil	2.5	2.7	-1.6	-1.9	0.9	1.0	1.6	1.5	-0.12	-0.12	-4.7	-6.9
Chile	1.2	n.a.	-1.6	n.a.	4.4	n.a.	2.8	n.a.	-0.09	n.a.	-1.7	n.a.
Colombia	2.4	2.4	-1.2	-1.4	2.4	2.6	1.3	1.2	-0.03	-0.03	-2.0	-2.0
Costa Rica	1.8	1.8	-3.0	-3.0	1.1	1.6	1.0	1.1	-0.02	-0.02	-0.3	-0.3
Cuba	1.1	n.a.	-3.2	n.a.	8.2	n.a.	4.2	n.a.	0.00	n.a.	-0.2	n.a.
Dominican Republic	3.3	3.4	-1.0	-1.9	2.1	2.9	1.0	0.7	-0.04	-0.04	-1.9	-2.1
Ecuador	1.4	1.4	-3.0	-3.1	2.2	2.3	0.3	0.2	-0.07	-0.07	-7.6	-7.8
El Salvador	1.0	1.2	0.2	0.1	1.9	2.1	-0.2	-0.4	0.00	0.00	-0.5	-0.9
Guatemala	1.4	0.9	2.0	1.3	3.3	7.0	-3.4	-5.5	-0.04	-0.05	-8.6	-11.0
Honduras	2.6	2.6	-0.1	-0.5	1.7	3.3	-0.7	-1.5	0.01	0.01	-5.5	-7.4
Jamaica	1.3	1.3	-0.2	-0.2	1.7	2.0	0.1	-0.1	-0.01	-0.01	-3.8	-3.8
Mexico	3.4	3.5	-1.5	-2.0	2.2	3.2	1.5	0.8	-0.03	-0.03	-1.4	-1.6
Nicaragua	2.7	2.7	-3.3	-3.7	1.4	1.6	2.8	3.2	-0.05	-0.02	-10.7	-12.3
Paraguay	2.4	2.4	-1.0	-1.1	1.1	1.1	0.1	0.1	-0.07	-0.06	-12.9	-12.4
Peru	1.9	1.9	0.0	0.0	2.7	2.8	0.3	-0.4	0.02	0.03	-1.0	-0.8
Uruguay	0.4	0.4	-1.9	-2.0	2.6	2.9	2.5	1.5	-0.02	-0.01	-0.8	-0.7

Sources: MAMS country model simulation results and analysis from country studies. No results for the MDG scenario are shown for Cuba and Chile as these countries reach the MDGs in the BAU scenario.

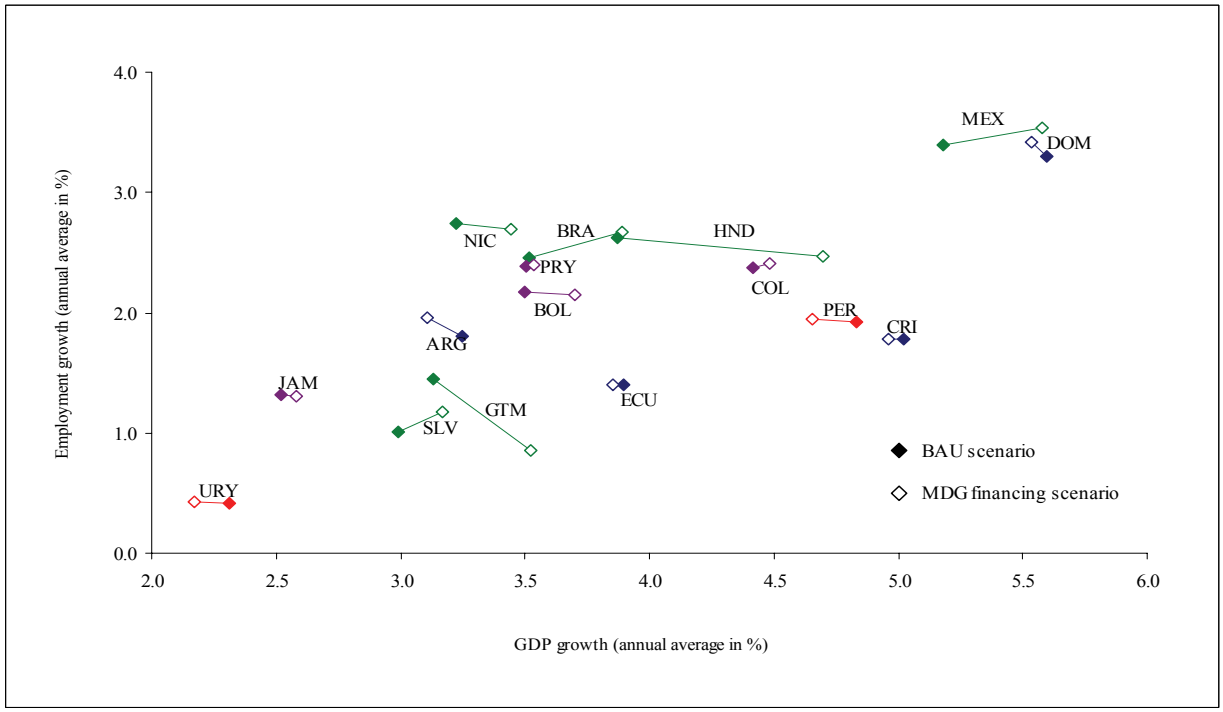
[a/] Some entries are missing (n.a.) because the MDGs financing scenario is not relevant in the context of the country.

[b/] Unskilled labour includes workers who have less than a complete secondary education, whereas skilled labour includes workers who have completed secondary education or above.

[c/] Refers to the percentage of the population living on less than a dollar a day.

[d/] The reported results are for the MDG strategy under the "feasible" financing scenario as defined in table 5 for each country. Simulation results are for the foreign borrowing scenario for those countries with no single feasible financing scenario indicated in table 5.

Figure 5 **Employment-output nexus under the BAU scenario and the "feasible" MDG financing scenarios in Latin America and the Caribbean** [a/]



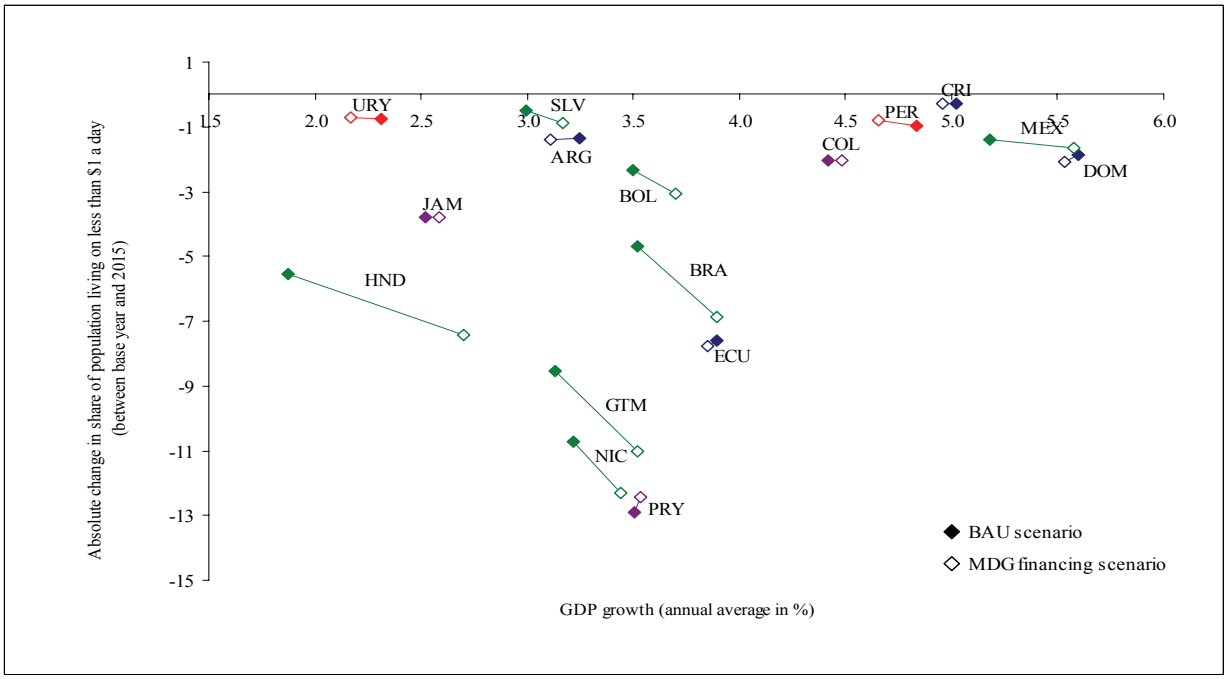
Sources: MAMS country model simulation results and analysis as reported in the country studies.
[a/] The MDG financing scenarios are considered "feasible" as defined in table 5 for each country. Simulation results are for the foreign borrowing scenario for those countries with no single feasible financing scenario indicated in table 5.

Countries with above-average employment-output elasticities (Brazil, Bolivia, Guatemala, Honduras, Nicaragua and Paraguay) are also the ones which would see greater absolute changes in poverty reduction (see figure 6). Other countries with employment elasticities above the regional average, like Argentina, Mexico and the Dominican Republic, have low base-year values for income poverty and show only limited further poverty reduction.

Initial poverty levels and income distribution patterns would also seem relevant in explaining why countries like Mexico, Costa Rica, Colombia, the Dominican Republic and Peru show relatively little absolute poverty reduction while sustaining relatively high growth rates under both the BAU and MDG scenarios. On the other hand, Brazil, Bolivia, Guatemala, Honduras, Nicaragua and Paraguay show more visible absolute poverty reduction (5 percentage points or more) at moderate per capita GDP growth rates (between 0.7 and 2.5 per cent per annum). In those cases where the MDG scenario yields greater poverty reduction than the BAU scenario, the former also yields a higher growth rate than the latter, and vice versa.

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 (see table 6). During the simulation period to 2015, little income redistribution is generally achieved under either the BAU or the MDG scenario. As a general finding, this might be surprising, as the MDG scenario, in particular, should help raise education levels and labour-market opportunities for all, with most of the gains benefit-

Figure 6 **Change in income poverty and per capita GDP growth under the BAU scenario and the "feasible" MDG financing scenarios in Latin America and the Caribbean** [a/]



Sources: MAMS country model simulation results and analysis as reported in the country studies.
[a/] The MDG financing scenarios are considered "feasible" as defined in table 5 for each country. Simulation results are for the foreign borrowing scenario for those countries with no single feasible financing scenario indicated in table 5.

ing the poor who currently tend to have a lower education level. The MDG strategy, as discussed in section 2, should be expected to raise both the demand for and supply of skilled workers. One should, however, also expect a timing disparity: 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 LAC countries, much progress was already made in improving access to education during the 1990s, and hence skilled labour-supply growth may already be relatively strong without the MDG 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 strategy.

The results shown in table 6 indicate that in nearly all countries the demand for unskilled labour falls relative to that for skilled labour, and in most cases this shift is more predominant under the MDG scenario, confirming the hypothesis outlined above.[21] In the presence of a time lag, this shift towards greater employment opportunities for skilled workers would likely push up income inequality. However, as table 6 also indicates, in most cases this inequality-increasing employment shift tends to be offset (more than proportionately in most cases) by increasing relative labour incomes for unskilled workers. This reflects the fact that, indeed, in most countries, the growth of the supply of skilled workers is already outpacing that of unskilled workers, while production technologies in most sectors of the LAC economies remain fairly intensive

21 Only in El Salvador and Guatemala under both the BAU and the MDG scenarios does growth in the demand for unskilled workers outpace that for skilled workers.

in the use of unskilled labour. In other words, their economies are not yet able to absorb fully the growing numbers of skilled workers; this in turn is putting downward pressure on the wage premiums for education and, on balance, reduces the wage gap between skilled and unskilled workers in most country cases.

These opposing shifts in the skill composition of employment and in the unskilled-skilled wage ratios explain the minimal effects on income distribution. Both labour and per capita household income inequality tend to fall in most country cases, but by small margins only. The only real exception is Brazil, which shows stronger income redistribution effects; these are, however, expected to occur under both the BAU and MDG scenarios where income poverty falls remarkably (see table 6). Income distribution in Brazil appears to be particularly sensitive to changes in the mean wage and in the wage of a large population of unskilled workers relative to skilled workers. Only in a few countries do very small changes in inequality weigh substantially enough to offset partially the income-poverty reduction of the BAU scenario. As mentioned above, in Paraguay, Peru and Uruguay, poverty reduction in the MDG scenario is lower relative to that in the BAU scenario. Income distribution in these countries would actually be slightly more unequal under the MDG scenario than under the BAU scenario.

5 Conclusions and policy recommendations

The results from the country studies referred to in the present paper demonstrate that achieving the MDGs in LAC is within reach for most countries, but BAU alone is inadequate; even if it comes at a modest cost, the financing of an MDG strategy will require careful macroeconomic management. The main findings and policy conclusions of the present analysis can be grouped under four headings.

Business as usual is (for the most part) not good enough

The region is on track for MDGs 1 and 7 (poverty reduction and access to safe drinking water and basic sanitation), but appears to be off track for the education (MDG 2) and health goals (MDGs 4 and 5). "On track" and "off track" have been defined more appropriately here than elsewhere, where progress towards the goals is usually projected linearly based on the trend observed since 1990. The present analysis is instead based on a benchmark or baseline scenario which allows an assessment of whether the MDGs are likely to be achieved assuming unchanged policies (BAU) and taking into account non-linearities in the progress towards the outcomes for education, health, and water and sanitation.

Considerable differences across countries are evident. The poverty-reduction target is within reach for LAC as a whole, essentially because the baseline scenario for the region reflects continued good economic performance and policies in Mexico and Brazil; but existing growth performance and policies would not suffice to meet this goal for 11 out of the 18 countries. The goals for safe drinking water and basic sanitation are more uniformly achievable with the continuance of existing efforts in most countries of the region. The region is also making good progress in improving access to education, but—as highlighted in the present study—keeping all children in primary school until timely graduation remains a big challenge in nearly all of the countries of the region. Most countries are relatively off track in terms of meeting the ambitious target of 100 per cent completion rate, with the exception of Cuba, and, possibly, Chile, Costa Rica and Mexico. All countries have made significant progress in reducing child mortality, but efforts will need to be stepped up in most countries in order to reduce early childhood deaths by two thirds by 2015. Only Chile and Cuba appear to be on track for this goal. Estimates of maternal mortality are subject to measurement errors, but the available evidence for the region suggests very little progress and, again, only Chile and Cuba seem to be on track for the target.

The analyses conducted in the country studies assume that additional resources are spent effectively on improving the availability and quality of education services, health care delivery systems and basic sanitation and water provisioning. Precisely what this entails for sector-level policies at the country level varies (depending on initial conditions), but it would typically imply a focus on improving school inputs and enhancing teacher quality, as well as providing increased access to health services and enhanced coverage of vaccination programmes and basic sanitation. The studies also find that improving general infrastructure (including roads and energy supply) would improve the accessibility of health and education services and hence help support the achievement of the goals indirectly. However, meeting the MDGs is clearly not only a matter of expanding social spending in these directions. The country studies show strong effects from improved socio-economic conditions at the household level, as better education helps improve health outcomes and vice versa, and improved income situations of households generally also contribute to enhancing access to health and education. The latter implies that reducing income poverty should also help achieve the other MDGs.

MDG 1 requires stronger employment growth and less income inequality

In most countries, additional policies will be required to meet the target for MDG 1. The present analysis does not consider specific interventions to reduce income poverty, but rather assumes poverty outcomes to result from the employment and income effects generated throughout the economy under the BAU and MDG strategy scenarios. It appears that the MDG strategy, through increased public spending on education and health services, and on water and sanitation, does not induce sufficiently strong employment and income-distribution effects to make adequate progress towards the required level of poverty reduction in more than half of the countries of the region. Moderate-to-high average GDP growth under both the BAU and MDG scenarios only leads to modest employment growth effects. Only in a few countries, such as Brazil, Guatemala, Honduras and Nicaragua would the MDG strategy lead to significantly stronger aggregate demand growth and a larger decrease in poverty levels than under the BAU scenario. In the case of Honduras, this additional growth effect would enable the country to reach the target of halving extreme poverty by 2015. Brazil and Guatemala would already reach it under the BAU scenario, whereas the additional output and employment growth would not be sufficient for Nicaragua to achieve MDG 1.

High income inequality remains an obstacle to the trickling down of stronger aggregate growth to the poor in the LAC countries. As the country studies show, and as expected, the MDG strategy generally reduces the supply of unskilled workers as boys and girls at primary-school age enrol in the education system. It further raises the relative demand for skilled workers, owing to the expansion of skill-intensive social services. In some cases, the net effect is a shift in real wages in favour of unskilled workers, but where the increase in the demand for skilled workers is relatively strong, the reverse distributional shift may take place. Overall, the impact on income inequality at the household level is rather weak, at least over the time period under consideration.

Consequently, without additional policy interventions, most of the poverty-reduction effects of the MDG strategy depend on the aggregate effects on employment and mean incomes. However, macroeconomic trade-offs, such as the compression of private consumption and investment or slower export growth, weaken the aggregate demand effects of the growth in MDG-related public spending. Hence, as discussed further below, careful management of the financing of the MDG strategy is required. Some of the poverty-reduction gains may be felt more at a later date as improved education and health of the working population produce greater externalities in the form of total factor productivity growth. Arguably, however, most of these effects will manifest themselves only after 2015, bearing in mind, in particular, the length of schooling cycles.

To sum up, in order to make more progress towards a timely achievement of MDG 1, most countries would require complementary policies to strengthen employment growth and income opportunities for the poor.

MDG strategies will require sustained increases in social spending

The costs in terms of required additional spending on MDG-related services range from about 1 to 6 per cent of GDP per year, except for Cuba and Chile, which should be able to achieve the goals under BAU policies. For most countries, however, the additional cost would be less than 3 per cent of GDP, which seems moderate in macroeconomic terms, although it would imply substantial increases (in some cases a doubling) from base-year levels. For the Dominican Republic, Guatemala, Honduras, Mexico, Nicaragua and Uruguay, the estimated additional cost would be higher than 3 per cent of GDP per annum. For nearly all countries, synergies between greater needs satisfaction in terms of primary education, child and maternal health, and water and sanitation entail cost savings when striving to achieve all goals simultaneously. Such notional savings could range from 0.1 to about 1 per cent of GDP per annum compared to the (higher) estimated cost under a phased strategy for achieving the MDGs separately or under a purely sectoral approach to assessing MDG costs. The country analyses also suggest that the required MDG-related spending tends to increase as the targets approach achievement. This might imply that increased levels of social spending need to be sustained not only up to 2015 but also beyond that milestone, in order to avoid slippage from the achieved levels of human development.

Tax and spend

The financing of the additional social spending may involve important macroeconomic trade-offs and influence the MDG cost estimates. The country studies suggest that foreign financing (either through more borrowing or grants) would generally be cheaper in terms of the required additional public spending. However, foreign financing would generate other important trade-offs as it would engender significantly stronger RER appreciation and deceleration of export growth than under the scenarios of domestic resource mobilization. Furthermore, a financing strategy based solely on foreign borrowing would lift public debt to unsustainable levels in virtually all country cases. The appreciation pressure on the RER could be manageable to the extent that countries have the necessary policy space to keep their exchange rates competitive, but in many cases this space may be limited in circumstances of rapidly increasing foreign debt and could cause currency mismatches in public finances and the financial sector (for a discussion, see, e.g., Ocampo and Vos, 2006). Financing the strategy through foreign aid is not a realistic alternative for most countries, except for Bolivia, Honduras and Nicaragua; in the case of Honduras, however, foreign aid financing appears to generate rather strong Dutch disease effects, raising the need for foreign financing well beyond the increased fiscal needs; in Nicaragua, aid dependency is already quite high and increasing it further may therefore not be desirable.

These limitations to foreign financing put more weight on the role of domestic resource mobilization. Domestic government borrowing, however, appears to generate a relatively strong crowding-out of private spending and would also lift public debt to unsustainable levels in most country cases. The crowding-out effect is essentially "model driven", of course, but is likely a realistic approximation of insufficiently developed domestic bond markets in the countries of the region, making it difficult and costly for Governments to borrow from the private sector. Consequently, increased taxation is left as the core option for countries to consider. Effective tax burdens in LAC are low by any standard, suggesting ample scope for a tax-financed MDG strategy. This should probably be a priority in all countries, but a number of associated caveats deserve consideration.

First, tax financing generally raises the required additional social spending as it compresses private spending, including that on MDG-related services, and hence the Government would have to step in more forcefully. Governments could try to avoid this by ensuring that tax increases are mainly paid for by higher income groups. This may not be easy given the existing scope for tax evasion, but the objective of keeping the MDG strategy affordable would make closing such loopholes even more imperative.

Second, tax reforms take time to become effective and the scope for significantly raising government revenue may be limited. In the present analysis, we suggest that over the period remaining between now and 2015, it might be possible to increase tax revenue at best by 2.5 percentage points of GDP—relative to the base year of the analysis—with a successful and swiftly implemented tax reform. If such a move on tax reform can be made politically acceptable, then tax financing would seem a feasible option for financing the MDG strategy in Argentina, Brazil, Colombia, Costa Rica, Ecuador, Paraguay and Peru. For other countries, this would likely remain a tall order, and those countries may have to employ mixed financing strategies after weighing the different trade-offs.

Most likely, a combination of financing sources will have to be considered in all cases. Measured foreign borrowing could be considered in an initial period during which a tax reform is to be implemented. Furthermore, all countries should assess the scope for creating more fiscal space by enhancing the efficiency of public spending and tax collection. The model analyses assume that the additional fiscal allocations for achieving the MDGs are targeted towards effective interventions. Even so, there may be scope for improving efficiency where existing resources for education, health, and water and sanitation are underutilized, as discussed in section 2. The country models do not assess the scope for such efficiency gains, as this would require further in-depth sector analysis in each of the countries, nor do they gauge efficiency in tax collection; however, it is generally assumed that there is ample space for improvement on this front in most countries of the region.

Bearing these caveats in mind, achieving the MDGs is within reach and clearly affordable for all LAC countries in the study. It is clearly more than a matter of priority-setting or finding the additional resources, however; it also entails carefully managing and integrating macroeconomic and social-sector policies. It is also clear that enhanced spending on MDG-related services and the progress towards the education, health, and water and sanitation goals do not guarantee strong income redistribution and poverty reduction results in the short-to-medium run. Most countries will have to make additional efforts in this direction. What is more, for most countries it appears that the improved educational performance in recent decades is already accelerating the supply of skilled workers, but their economies have not sufficiently adjusted to accommodate the changing composition of the labour force and they are therefore not reaping the potential benefits in terms of productivity improvements. This shows that further economic reforms are needed to adjust to higher levels of human development for the population of the region. It also suggests that while upholding the promise of achieving the MDGs, policymakers also need to stretch their horizons well beyond these goals.

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Appendix:

Microsimulation methodology

The computable general equilibrium (CGE) model used for generating the BAU and MDG scenarios (MAMS) provides only relatively aggregate outcomes for employment and wages by labour category. Similarly, the model typically only distinguishes between a few groups of households for assessing the impact of alternative policy scenarios on per capita household consumption and income. CGE simulations therefore only allow us to draw conclusions about the differences in impact for these aggregate labour and household groups—thus ignoring income distribution changes within those groups. Hence, we revert to a microsimulation methodology to take account of the full income distribution. In line with recent practice of methodologies studying the economy-wide effects of economic policies, we adopt a top-down approach. That is to say, we take the CGE simulation results and apply them to the full distribution as given by a micro data set (i.e., the household survey) and assume there are no further feedback effects.

The top-down causal chain works from policy changes or exogenous shocks through the operation of factor and product markets yielding prices, wages and employment, and finally to household income and expenditure. A crucial part of analysing and modelling distributional outcomes at the household level is the specification of the various sources of income at that level and of how those sources are linked to the operation of factor and product markets.

For current purposes, we focus on the labour market as the main transmission channel of the modelled impact of the simulated scenarios on poverty and income distribution. To go from the counterfactual labour-market effects simulated with the CGE model to poverty and income distribution at the household level, we need to deal with two methodological issues. First, how can both between- and within-group effects be incorporated into the distribution analysis? That is to say, how can we account for the full distribution and thus for the heterogeneity of the population within households when assessing the poverty and inequality effects? Second, people may change position in the labour market (and hence also affect household income) due to external shocks, trade reforms, or other policy changes such as the MDG strategies examined in this study. Workers may shift from one sector to another, change occupation or lose their jobs. The methodological issue is to find a procedure that can account for such labour-market shifts and identify which individuals are most likely to shift position in order to be able to simulate a new, counterfactual income distribution.

Various microsimulation methodologies have been proposed in the literature to deal with these problems.[a] We note two types that attempt to answer the type of questions raised in this study. The first involves the estimation of a microeconomic, partial-equilibrium household income generation model through a system of equations that determine occupational choice, returns to labour and human capital, consumer prices and other household (individual) income components (see, for instance, Bourguignon, Fournier and Gurgand, 2001; Bourguignon, Ferreira and Lustig, 2001). Combining this methodology in "top-down" fashion with a CGE model has been probed by Bourguignon, Robilliard and Robinson (2002) for the case of Indonesia.

a See Bourguignon, Pereira da Silva and Stern (2002) for an overview of related methods. It should be noted that the approach is relatively new in its application to the developing country context, but that combinations of macro or CGE policy models and microsimulations, for instance to assess distributional effects of tax reforms, are quite common in applications in developed countries.

A second microsimulation approach of less modelling intensity assumes that occupational shifts may be proxied by a random selection procedure within a segmented labour-market structure. This procedure allows the imposition of counterfactual changes in key labour-market parameters (participation rate, unemployment, employment composition by sector, wage structure, and so on) on a given distribution derived from household survey data, and the estimation of the impact of each change on poverty and income distribution at the household level. This is the approach used here, based on the methodology developed in Ganuza, Paes de Barros and Vos (2002) and more widely applied in Vos and others (2006). The basic intuition behind this approach is as follows.

Total per capita household income is defined as:

$$ypc_{hi} = \frac{1}{n_h}\left[\sum_{i=1}^{n_h} yp_{hi} + yq_h\right] \qquad (1)$$

where n_h is the size of household h, yp_{hi} the labour income of member i of household h, and yq_h the sum of all non-labour incomes of the household, defined as:

$$yq_h = \sum_{i=1}^{n_h} yqp_{hi} + yqt_h \qquad (2)$$

In equation (2), yqp_{hi} equals individual non-labour income of member i of household h and yqt_h equals other household incomes. In the simulations, yp_{hi} is altered for some individuals i of household h as a result of changes in the labour-market parameters. Ganuza, Paes de Barros and Vos (2002) define the labour-market structure in terms of rates of economic participation P_j and unemployment U_j among different groups j of the population at working age (defined according to sex and skill), the structure of employment (defined according to sector of activity S and occupational category O) and remuneration W_1, as well as overall level of remuneration W_2. The skill composition of the employed population is represented by variable M. The labour-market structure can be written as $\pi = \pi(P,U,S,O,W_1,W_2,M)$. In the application of the methodology in the country studies referred to in the present paper, the labour-market structure was defined in a somewhat more limited fashion as $\pi = \pi(U,S,W_1,W_2,M)$, as changes in participation rates P are not explicitly modelled in MAMS and the labour factor was not classified by occupational group O.

For all types of individuals, the unemployment rates determine part of the labour-market structure. The latter is further determined by the structure of employment. The employed workforce is classified according to segment k, defined on the basis of sector of activity. For the three skill groups (unskilled, semi-skilled and skilled workers) within segments k in the labour market, the average remuneration is calculated and these averages are expressed as a ratio of the overall average. The effect of altering each of the parameters of the labour-market structure on poverty and inequality can then be analysed using the accounting identities of equations (1) and (2). The impact of changes in the labour market can be analysed both separately and sequentially.

The Ganuza-Paes de Barros-Vos approach introduces a number of important assumptions about the labour market. First, as indicated, for lack of a full model of the labour market, a randomized process is applied to simulate the effects of changes in the labour-market structure. That is to say, random numbers are used to determine which persons at working age change their labour force status; who will change occupational category; which employed persons obtain a different level of education; and how new mean labour

incomes are assigned to individuals in the sample.[b] Hence, the assumption is that, on average, the effect of the random changes 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.[c] This allows constructing 95 per cent confidence intervals for the indices of inequality and poverty, except in the case of the simulations of the effect of change in the structure and level of remuneration, which do not involve random numbers. In each simulation, a number of poverty and inequality measures are calculated.

The approach outlined above is fairly straightforward when applied with static CGE models; in other words, when generating just one change from a given base year which is also (close to) the base year of a household survey. The present analysis, however, covers a simulation period that runs from the country-specific base year to 2015, the point at which the MDGs are expected to have been achieved. Therefore, the application of the microsimulation method needs to be situated in a dynamic setting.

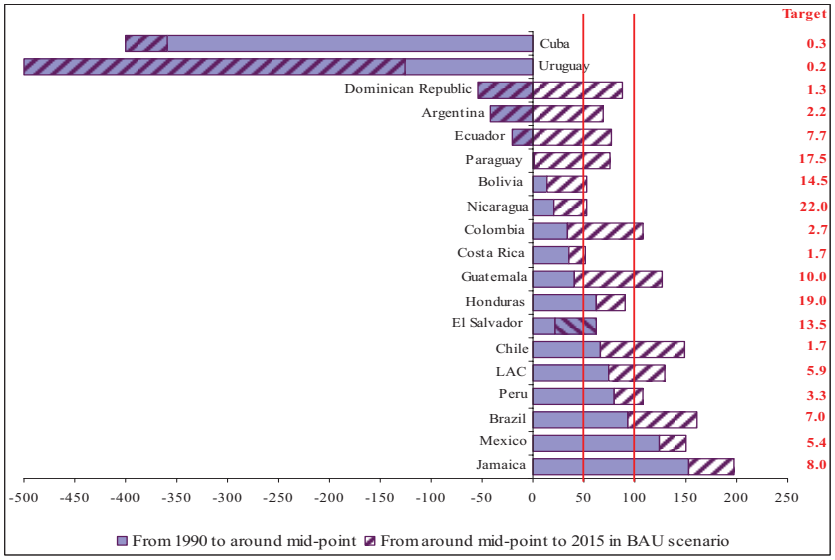
For the application of the methodology in a dynamic setting, we follow the procedure spelled out in Sánchez (2004) and Sánchez and Vos (2005 and 2006). As indicated in these studies, a number of additional, restrictive assumptions are required, as observed survey data may only be available for the base year and perhaps a few years beyond that, but not for the entire projected forward period. In the microsimulations beyond the base year of the household survey data and for lack of additional modelling of demographic shifts and labour participation, it is assumed that no changes in the population structure (such as migration or population ageing) take place during the simulation period. This is an obvious limitation of the methodology, but justifiable to the extent that the CGE model does not consider such demographic changes either.

b Mean incomes per decile are calculated in the simulations. These means are subsequently assigned to newly employed or to already-employed persons who changed sector of employment, occupational category or moved from one educational group to another. In principle, to assess the impact of changes in the labour-market structure, one would have to calibrate the database prior to simulating the effect of said changes — that is to say, to replace the original labour incomes by mean incomes per decile. A test showed that neither the direction of change nor the magnitude of the effect altered when using the original values of the labour incomes instead of calibrated values.

c Experiments with the methodology for several household survey data sets show that about 30 iterations are sufficient. Further iterations do not alter the results.

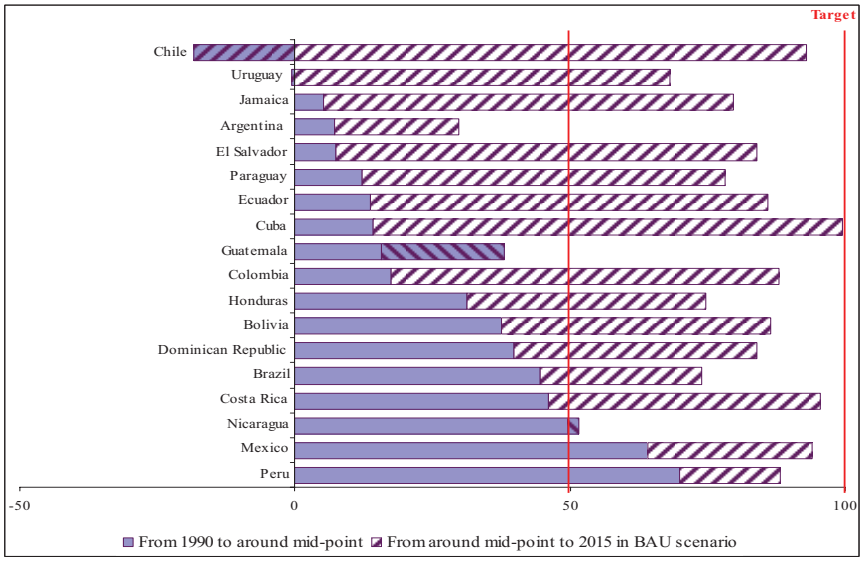
Statistical Annex

Figure A.1 **Percentage level of achievement for MDG 1 by 2002/2003 and under the BAU scenario in Latin America and the Caribbean** [a/]



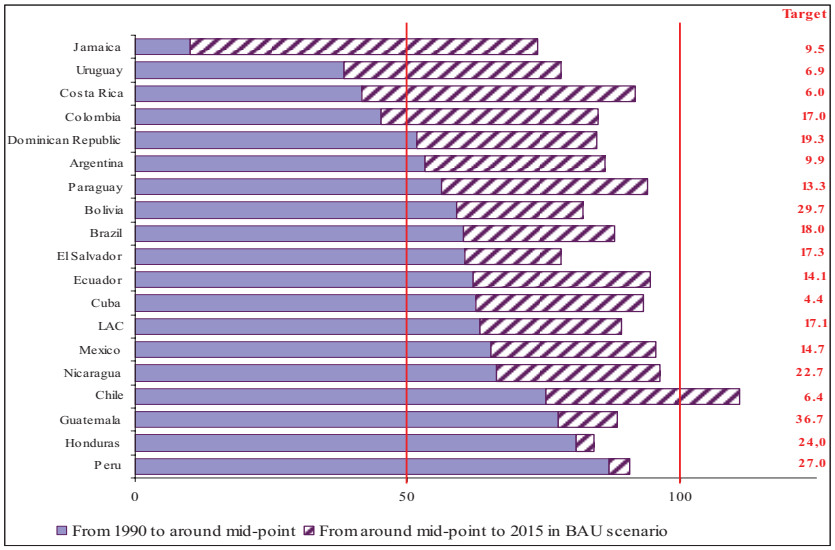
Source: Authors' construction, based on country studies referred to in the present paper.
[a/] Based on the evolution of the percentage of the population living on less than a dollar a day from 1990 (or nearest available year) to about the mid-point of the time span for achieving the MDGs, and further to 2015 under the BAU scenario. The bar for LAC presents the regional average, weighted by each country's total population.

Figure A.2 **Percentage level of achievement for MDG 2 by 2002/2003 and under the BAU scenario in Latin America and the Caribbean** [a/]



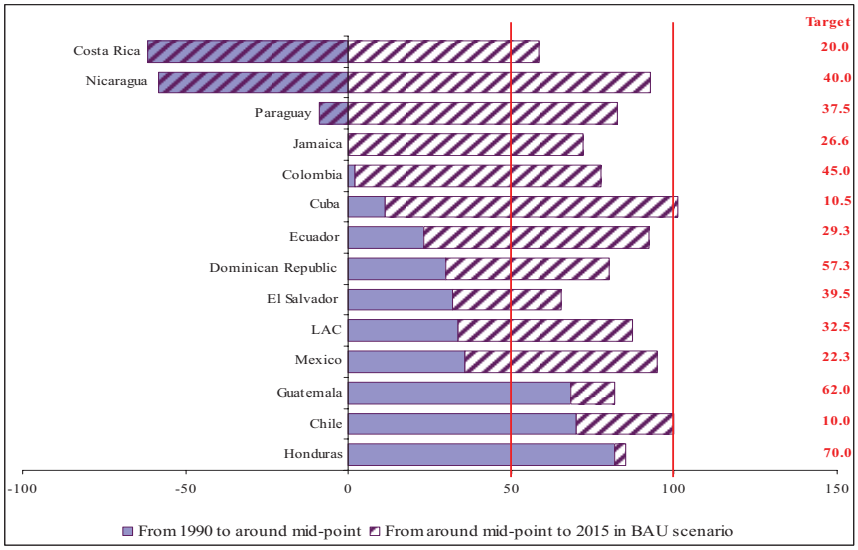
Source: Authors' construction, based on country studies referred to in the present paper.
[a/] Based on the evolution of the on-time primary school completion rate from 1990 (or nearest available year) to about the mid-point of the time span for achieving the MDGs, and further to 2015 under the BAU scenario. See notes to table 2 for additional methodological details.

Figure A.3 **Percentage level of achievement for MDG 4 by 2002/2003 and under the BAU scenario in Latin America and the Caribbean** [a/]



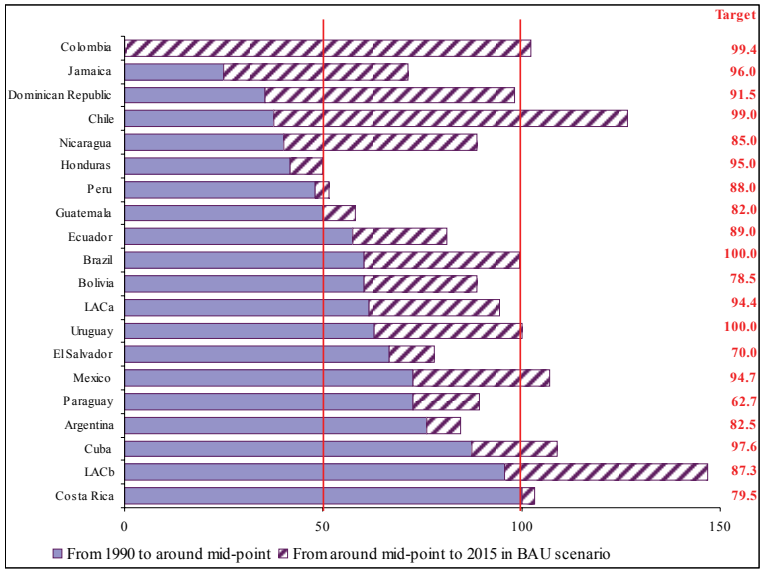
Source: Authors' construction, based on country studies referred to in the present paper.
[a/] Based on the evolution of the under-five mortality rate from 1990 (or nearest available year) to about the mid-point of the time span for achieving the MDGs, and further to 2015 under the BAU scenario. The bar for LAC presents the regional average, weighted by each country's population under five. See notes to table 2 for additional methodological details.

Figure A.4 **Percentage level of achievement for MDG 5 by 2002/2003 and under the BAU scenario in LAC** [a/]



Source: Authors' construction, based on country studies referred to in the present paper.
[a/] Based on the evolution of the maternal mortality rate from 1990 (or nearest available year) to about the mid-point of the time span for achieving the MDGs, and further to 2015 under the BAU scenario. The bar for LAC presents the regional average of these 13 countries, weighted by each country's total number of births. See notes to table 2 for additional methodological details.

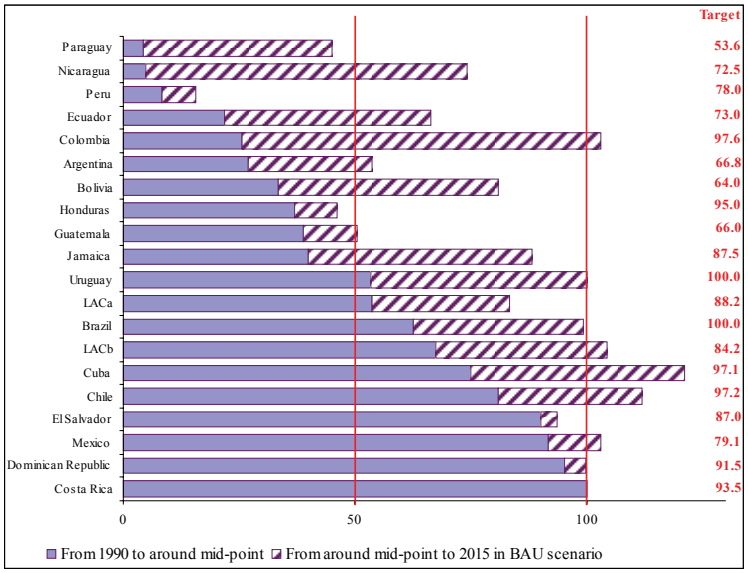
Figure A.5 **Percentage level of achievement for MDG 7a by 2002/2003 and under the BAU scenario in Latin America and the Caribbean** [a/]



Source: Authors' construction, based on country studies referred to in the present paper.

[a/] Based on the evolution of the percentage of the population without sustainable access to safe drinking water (or nearest available year) to about the mid-point of the time span for achieving the MDGs, and further to 2015 under the BAU scenario. The international goal set here is to halve this percentage from 1990 (or nearest available year) to 2015. A national goal is instead being used for those countries that have already achieved the international goal (i.e., Brazil, Chile, Costa Rica, Cuba, Mexico and Uruguay). An ambitious national goal (rather than the international one) is being used for some countries that have not yet achieved the international goal (i.e., Colombia, Ecuador, Honduras and Peru). A national goal less ambitious than the international one is being used for Guatemala. Bars LACa and LACb present the regional average progress for the national and the international goals, respectively, weighted by each country's total population.

Figure A.6 **Percentage level of achievement for MDG 7b by 2002/2003 and under the BAU scenario in Latin America and the Caribbean** [a/]



Source: Authors' construction, based on country studies referred to in the present paper.

[a/] Based on the evolution of the percentage of the population without sustainable access to basic sanitation from 1990 (or nearest available year) to about the mid-point of the time span for achieving the MDGs, and further to 2015 under the BAU scenario. The international goal set here is to halve this percentage from 1990 (or nearest available year) to 2015. A national goal is instead being used for those countries that have already achieved the international goal (i.e., Brazil, Chile, Costa Rica, Cuba, the Dominican Republic and Uruguay). An ambitious national goal (rather than the international one) is instead being used for some countries that have not yet achieved the international goal (i.e., Colombia, Ecuador, Honduras and Peru). A national goal less ambitious than the international one is being used for Guatemala. Bars LACa and LACb present the regional average progress for the national and the international goals, respectively, weighted by each country's total population.

Table A.1 **MDG indicators in 1990, mid-point (around 2002-2003), and 2015 in both the BAU and the MDG scenarios and target for 2015 in Latin America and the Caribbean** [a/]

Country	MDG 1					MDG 2				MDG 4			
	1990 [b/]	Mid-point	BAU scenario (2015)	MDG scenario (2015) [c/]	Target (2015)	1990 [b/]	Mid-point	BAU scenario (2015)	Target (2015)	1990 [b/]	Mid-point	BAU scenario (2015)	Target (2015)
Argentina	4.3	5.2	2.8	2.7	2.2	80.2	81.7	86.1	100.0	29.6	19.1	12.6	9.9
Bolivia	29.0	27.0	21.4	20.8	14.5	52.0	70.0	93.4	100.0	89.0	54.0	40.3	29.7
Brazil	14.0	7.5	2.7	0.5	7.0	16.8	53.8	78.3	100.0	54.0	32.3	22.3	18.0
Chile	3.5	2.3	0.8	n.a.	1.7	84.5	81.6	98.9	100.0	19.3	9.6	5.0	6.4
Colombia	5.4	4.5	2.5	2.5	2.7	29.0	41.4	91.5	100.0	37.4	28.2	20.1	17.0
Costa Rica	3.4	2.8	2.5	2.5	1.7	80.3	89.4	99.1	100.0	18.0	13.0	7.0	6.0
Cuba	0.6	1.8	1.7	n.a.	0.3	98.6	98.8	100.0	100.0	13.2	7.7	5.0	4.4
Dominican Republic	2.6	3.3	1.5	1.3	1.3	22.0	53.0	87.5	100.0	58.0	38.0	25.3	19.3
Ecuador	15.5	17.0	9.4	9.2	7.7	67.4	71.9	95.4	100.0	42.3	24.8	15.7	14.1
El Salvador	27.0	18.6	21.6	21.2	13.5	25.0	30.5	87.9	100.0	52.0	31.0	24.9	17.3
Guatemala	20.0	16.0	7.3	4.9	10.0	43.7	65.1	52.5	100.0	110.0	53.0	45.0	36.7
Honduras	38.0	26.3	20.7	18.8	19.0	64.7	75.9	91.1	100.0	58.0	30.5	29.4	24.0
Jamaica	16.0	3.8	0.2	0.2	8.0	75.0	76.0	90.4	95.0	28.5	26.6	14.5	9.5
Mexico	10.8	4.1	2.7	2.5	5.4	70.1	89.3	98.2	100.0	44.2	25.0	16.0	14.7
Nicaragua	44.0	39.4	32.3	30.7	22.0	44.3	73.1	71.9	100.0	68.0	38.0	24.3	22.7
Paraguay	35.0	34.8	21.9	22.4	17.5	43.0	50.0	87.5	100.0	40.0	25.0	14.9	13.3
Peru	6.6	4.0	3.0	3.2	3.3	22.7	56.8	65.6	71.4	81.0	34.0	32.0	27.0
Uruguay	0.4	1.4	0.7	0.8	0.2	69.4	69.2	90.3	100.0	20.6	15.3	9.9	6.9
LAC [f/]	11.8	7.4	4.1	3.3	5.9	n.a.	n.a.	n.a.	n.a.	50.3	29.3	20.7	17.1

Table A.1 (continued)

Country	MDG 5				MDG 7a					MDG 7b				
	1990 [b/]	Mid-point	BAU scenario (2015)	Target (2015)	1990 [b/]	Mid-point	BAU scenario (2015)	International target (2015) [d/]	National target (2015) [e/]	1990 [b/]	Mid-point	BAU scenario (2015)	International target (2015) [d/]	National target (2015) [e/]
Argentina	n.a.	n.a.	n.a.	n.a.	65.1	78.4	79.9	82.5		33.6	42.5	51.4	66.8	
Bolivia	n.a.	n.a.	n.a.	n.a.	57.0	70.0	76.1	78.5		28.0	40.0	57.1	64.0	
Brazil	n.a.	n.a.	n.a.	n.a.	75.9	90.4	99.9	88.0	100.0	85.8	94.7	99.9	92.9	100.0
Chile	40.0	19.0	10.0	10.0	97.4	98.0	99.4	98.7	99.0	82.6	94.4	98.9	91.3	97.2
Colombia	100.0	99.0	57.4	45.0	92.0	92.0	99.6	96.0	99.4	82.0	86.0	98.1	91.0	97.6
Costa Rica	33.0	41.0	25.4	20.0	50.0	79.5	80.5	75.0	79.5	75.8	93.5	93.5	87.9	93.5
Cuba	42.0	38.5	10.1	10.5	81.6	95.6	99.0	90.8	97.6	88.7	95.0	98.9	94.4	97.1
Dominican Republic	229.0	178.0	91.7	57.3	83.0	86.0	91.4	91.5		60.0	90.0	91.5	80.0	91.5
Ecuador	117.2	96.9	36.0	29.3	60.8	77.0	83.6	80.4	89.0	37.1	44.9	60.9	68.6	73.0
El Salvador	158.0	120.0	80.9	39.5	40.0	60.0	63.4	70.0		74.0	85.7	86.2	87.0	
Guatemala	248.0	121.0	95.9	62.0	68.0	75.0	76.1	84.0	82.0	35.0	47.0	50.6	67.5	66.0
Honduras	280.0	108.0	101.7	70.0	73.0	82.2	84.0	86.5	95.0	66.0	76.7	79.4	83.0	95.0
Jamaica	106.2	106.2	48.8	26.6	92.0	93.0	94.9	96.0		75.0	80.0	86.0	87.5	
Mexico	89.0	65.2	25.7	22.3	75.4	89.4	96.1	87.7	94.7	58.1	77.3	79.7	79.1	
Nicaragua	160.0	230.0	48.9	40.0	70.0	76.0	83.3	85.0		45.0	46.3	65.4	72.5	
Paraguay	150.0	160.0	57.2	37.5	25.4	52.5	58.7	62.7		7.2	9.2	28.1	53.6	
Peru	n.a.	n.a.	n.a.	n.a.	63.0	75.0	75.8	81.5	88.0	54.0	56.0	57.8	77.0	78.0
Uruguay	n.a.	n.a.	n.a.	n.a.	89.5	96.1	100.0	94.8	100.0	85.2	93.1	100.0	92.6	100.0
LAC [f/]	115.6	87.7	43.1	32.5	74.7	86.8	93.3	87.3	94.4	68.3	79.0	84.9	84.2	88.2

Source: Country studies.

[a/] For the MDG scenario, the 2015 indicator is only presented for MDG 1 as this is the only goal that might not necessarily be achieved by 2015. For a definition of the MDG indicators, see notes to table 2 and figures A.1-A.6.

[b/] For some countries, data are for the nearest available year.

[c/] The simulation results are for the MDG financing scenario considered "feasible", as defined in table 5 for each country. Simulation results are for the foreign borrowing scenario for those countries with no single feasible financing scenario indicated in table 5. No results for the MDG scenario are shown for Cuba and Chile as these countries reach the MDGs in the BAU scenario. The 2015 BAU indicator for those two countries has been used for the estimation of the regional average.

[d/] International goal consisting of halving the related percentage of people from 1990 (or nearest available year) to 2015.

[e/] National goal set in some country studies.

[f/] A regional average, weighted by each country's relevant population group is presented for LAC for all MDGs except MDG 2, owing to the use of varying indicators by country.