Social Affairs

Constraints to achieving the MDGs through domestic resource mobilization

Rob Vos, Marco V. Sánchez and Keiji Inoue

Abstract

The present paper focuses on the role of domestic resource mobilization for financing poverty reduction strategies. Policy makers should be aware of important macroeconomic trade-offs associated with MDG strategies financed from tax increases or domestic borrowing. The trade-offs are largely intertemporal: can poor and middle-income countries absorb the initial financing costs in order to achieve expected gains in productivity and human development over time? This calls for a dynamic economy-wide framework to identify the importance of such trade-offs. The paper presents such a framework and illustrates its usefulness in applications for Costa Rica and Ecuador.

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Leaders from all countries have agreed to pursue the Millennium Development Goals (MDGs) and reach them by 2015 so as to secure a world with less poverty, hunger and disease, better-educated children, 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 staggeringly vast, 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 in the developing world 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 in all parts of the world, 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.

The MDG agenda reflects an awareness of such disparities and the challenges ahead, predominantly in the 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. Several countries have pledged to reach the United Nations (UN) target of 0.7 per cent of gross national income (GNI), and other donors have also made commitments to increase aid which are not linked to the UN target. Official development assistance (ODA) increased substantially in the first half of this decade, although the additional resources appear to be much more modest after excluding the special debt-relief assistance provided to Iraq and Nigeria. The modest increase in aid has come with a more significant shift in the allocation of funds towards sub-Saharan Africa, a region which now receives about 40 per cent of total development assistance, up from 25 per cent in 1999. In addition, about 40 of the poorest countries have benefited from relief on bilateral external debt under the Heavily Indebted Poor Countries (HIPC) Initiative. Further debt relief from multilateral creditors for the poorest countries was committed at the G-8 Summit in Gleneagles, Scotland. These commitments reflect the spirit of the Monterrey Consensus—reached at the 2002 International Conference on Financing for Development held in Monterrey, Mexico—to provide more and better aid to developing countries.

This focus on aid and the poorest countries is logical as the challenges in reaching the MDGs are greatest in Africa and other least developed countries, many of which lack the necessary resource base for financing the additional action required to meet the goals. According to estimates of the UN Millennium Project, in order to achieve the MDGs, the required additional public expenditures 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). In the central African region, estimates suggest most countries would require more than 20 per cent of GNP (UN Millennium Project, 2005). If these figures are accurate, it would be difficult for those countries to finance the required additional spending through increased taxation or domestic borrowing. Therefore, much of the financing would be expected to come from increased aid flows. This situation has spurred a new debate regarding the trade-offs that could 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,

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1 We are grateful to José Cuesta and Alex Izurieta for valuable comments on earlier drafts of this paper, and to José Rosero and Mauricio León for their support in generating simulation results for Ecuador.

2 See United Nations (2006a) for a recent update on progress with the MDGs.

e.g., Heller, 2005; Bourguignon and Sundberg, 2006), such as a lack of good governance and of sufficient absorptive and managerial capacity to efficiently absorb substantial aid flows for investment in MDG-related actions; the potential cost of an appreciating real exchange rate (RER) and the consequent undermining of export competitiveness (often labelled as "Dutch disease"); and constraints on managing macroeconomic policy, both fiscal and monetary, due to the 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. This, however, should not divert attention from what could be done in terms of domestic resource mobilization, which is another pillar of the Monterrey Consensus, but one that has been less at the forefront of the current debate on financing strategies to achieve the MDGs. Domestic resource mobilization will be central to most middle-income developing countries not eligible for increased aid flows and enhanced debt relief. While these countries tend to show indicators which set them closer to achieving the MDG targets, it is nonetheless true that about 40 per cent of the world's poor[3] live in middle-income countries. In addition, because of the inequalities in human development within these countries, as pointed out earlier, there remain tremendous challenges in this part of the developing world as well. While the less poor countries may have greater access to (private) foreign borrowing, it is not entirely obvious that governments would wish to use much of these sources for public investments in social sectors and poverty reduction programmes. Greater reliance on domestic resources may imply stronger redistributive effects within the economy which could pose political constraints to this kind of a financing strategy. However, more broadly, the issues faced by aid-recipient countries when shifting budgets to MDG-related programmes and the related relative price and resource shifts may equally apply to countries relying on domestic financing strategies.

In this paper, we will focus on a number of such trade-offs and (domestic) financing constraints. In the following section, we will review the main issues at stake and the policy options to address related challenges. In a next section, we present the contours of a general equilibrium framework to analyse the trade-offs empirically and which, subsequently, is applied to Costa Rica and Ecuador, two middle-income countries. Conclusions follow in the final section.

Constraints to domestic resource mobilization in developing countries

The Monterrey Consensus emphasizes that ensuring conditions to enable the mobilization of domestic resources is essential for development. This would entail good governance that is responsive to the people's needs; an appropriate policy and regulatory framework; the fighting of corruption at all levels; sound macroeconomic policies aimed at sustaining high growth rates, full employment, stability and poverty eradication; fiscal sustainability; investment in basic economic and social infrastructure; improvement in working conditions; strengthening and development of the domestic financial sector, enhanced by microfinance and credit for micro- and small and medium-sized enterprises, and the establishment of development banks to further facilitate access to credit.

As is the case with aid financing, domestic resource mobilization for achieving the MDGs may face several constraints, particularly in the short run. Without attempting to be comprehensive, we discuss below

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3   Poverty is measured 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). The group comprises just under half of the world's population. See World Bank (2006).

some key macroeconomic policy areas and related trade-offs associated with different financing strategies for the achievement of the MDGs: limited policy space for prudent and countercyclical macroeconomic management for growth and employment generation; competitiveness and RER constraints; creating fiscal space and maintaining fiscal sustainability; and labour market constraints.

Countercyclical macroeconomic policies

Economic growth is an essential ingredient for generating domestic resources to attend development needs, including human development. But volatile economic growth can hinder a government's ability to mobilize resources for different purposes. For instance, extended periods of booms and busts did not allow Latin American countries enough time to recover, while domestic savings rates remained practically stagnant during the nineties making multi-year planning impossible (ECLAC, 2001). Financial crises have also been the single most important cause of increases in urban poverty, particularly in East Asia after the crisis of 1997 (United Nations, 2003).

More generally, macroeconomic stability strongly influences the long-term growth performance of the economy. Macroeconomic stability should be understood in broader terms as entailing more than just preserving price stability and sustainable fiscal balances. It also entails avoiding large swings in economic activity and employment levels and, further, maintaining sustainable external accounts and avoiding exchange-rate overvaluation. The frequency of financial crises in developing countries indicates that macroeconomic stability involves, in addition, maintaining well-regulated domestic financial sectors, sound balance sheets within the banking system and sound external debt structures.

The boom-bust cycles in Latin America during the nineties have closely followed the trend of capital flows exacerbated in turn by cyclical macroeconomic policy responses (Ocampo, 2002; 2005). Thus the capacity to conduct countercyclical policies is a necessary condition to reduce volatility and to increase a government's degree of freedom in times of possible crisis and enable it to have enough resources to protect the socially vulnerable and prevent further regress in poverty reduction.

Fiscal policy has been pro-cyclical in many parts of the developing world. This is particularly true for Latin America where governments had excessive expenditures during periods of increased credit, such as in the seventies, resulting in unsustainable fiscal deficits and, consequently, the debt crisis of the eighties. This period was then characterized by both fiscal austerity and stagnation when the provision of public and social services was most needed. The United Nations *World Economic and Social Survey 2006* (United Nations, 2006b) shows that the fiscal policy stance in African and Latin American countries has been highly pro-cyclical on average since the 1960s, whereas in East Asia it has been either neutral or countercyclical. It further shows that the 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.

Social expenditures also have been found to be pro-cyclical in many developing countries, sometimes even more so than total expenditures, especially in Latin America (see, e.g., Martner and Aldunate, 2006). During downturns particularly, public investments in social and other infrastructure tend to be cut the most. In Africa and Latin America in particular, this has led to important shortfalls in the quality and availability of infrastructure. By some estimates, lagging infrastructural development could account for as much as one third of the difference in economic growth performance between East Asian and Latin American countries during the 1980s and 1990s (see Rodriguez, 2006; United Nations, 2006b).

Improvements in human development and infrastructural quality require adequate and sustained levels of public spending. Infrastructure development requires large-scale investments, which take time to mature. Improvements in education and health also entail longer-term efforts and require the sustained development and financing of social services. Good infrastructure, education and health can provide important social gains and this justifies the government's central role in ensuring that society invests in them sufficiently.

Countercyclical fiscal policies can help smooth the way towards maintaining adequate levels of current government spending and public investment and help ensure that spending on education, health and infrastructure is not unduly curtailed during economic downswings. For many developing country governments, 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 they face.

Uncertainty regarding the timing and levels of aid disbursements hamper budget planning and the scope for countercyclical policies in low-income countries which rely heavily on aid inflows. In addition, these countries often also face significant costs to aid efficiency arising from multiple donor programmes. The Paris Declaration on Aid Effectiveness of 2005 calls on all donor countries to align their aid programmes for recipient countries and provide more predictable multi-year aid commitments. Along these lines, aid could both enhance the space for conducting countercyclical fiscal policies and more effectively serve the resource mobilization for the achievement of the MDGs. As yet, this remains a major challenge and only limited progress has been made to date in achieving such harmonization among aid donors.

Moreover, if international measures, such as better-harmonized aid, actions to mitigate the impact of private capital flow volatility or debt relief are insufficiently pushed forward, there remains some scope for developing country governments to enhance the space for countercyclical policies by improving the institutional framework for macroeconomic policy-making. First, the more appropriate institutional setting for fiscal policy should strike a balance between fiscal prudence and fiscal flexibility in a way that ensures both policy credibility and fiscal sustainability. Setting fiscal targets that are independent of the short-term fluctuations in economic growth (so-called structural budget rules) can be effective in forcing a countercyclical policy stance. Some developing countries, such as Chile, have been able to manage such fiscal rules successfully. Furthermore, fiscal stabilization funds could help smooth the revenues from unstable tax sources, such as those based on primary export production, over time. The experience with the application of such funds in various parts of the world has varied. They are by no means a panacea, and careful management of such funds is required. Nonetheless, fiscal stabilization funds can constitute an effective instrument for resolving issues of intertemporal trade-offs in fiscal spending by protecting growth-enhancing, long-term public investment in infrastructure and human development even during periods of lower tax revenue ushered in by external shocks and economic downturns.

Second, a certain degree of discretionary power should be retained. Since the 1980s, governments of many developing countries have moved from discretionary macroeconomic policy arrangements to rule-based ones. This shift was founded on the belief that the latter would avoid policy-generated macroeconomic instability. About 20 economies, for instance, adopted inflation-targeting as the framework for monetary policy. Under this monetary regime, an independent central bank commits itself to price stability by publicly announcing the level of inflation it will permit. There are a number of advantages to this kind of policy arrangement, including its potential to enhance central bank policy transparency and credibility. At the same time, however, the narrow focus of monetary policy on a strict inflation target may be detrimental

to the simultaneous achievement of employment and growth objectives. Rule-based policies may function well for some time and when the economy is not suffering from major shocks. However, as the structure of the economy changes over time, so will vulnerability to external shocks. For instance, financial shocks may become more important than terms-of-trade shocks. In such a changing context, predetermined policy rules are likely to become less relevant or turn out to be too rigid. Moreover, as the risks and uncertainties facing an economy never present themselves in exactly the same way or with the same degree of intensity, a certain amount of space for discretionary policies is always needed in order for adjustments to be made that will minimize macroeconomic losses.

Third, macroeconomic policies should be well integrated with other areas of economic policy-making. A competitive RER seems to be critical in this regard. In the fast-growing East Asian economies, for example, macroeconomic policies were part of a broader development strategy, contributing directly to long-run growth. Fiscal policies in these economies have given priority to development spending, including investment in education, health and infrastructure, as well as subsidies and credit guarantees for export industries. Monetary policy was coordinated with financial sector and industrial policies, including directed and subsidized credit schemes and managed interest rates, to directly influence investment and saving, whereas competitive exchange rates were considered essential for encouraging exports and export diversification. In contrast, macroeconomic policies in many Latin American and African countries since the 1980s have been focused on much more narrowly defined short-term stabilization objectives, often resulting in exchange-rate overvaluation (see United Nations, 2006b; Ocampo and Vos, 2006).

Competitiveness and real exchange rate constraints

While 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. When financed through aid flows (or foreign borrowing for that matter), upward pressure will most certainly be put on the RER, resulting 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 into the economy at large. The RER appreciation is often labelled as the Dutch disease effect, but this relative price shift can only be called a "disease" if it leads to a resource allocation away from export industries resulting in an undesirable structural change away from dynamic production activities.

One way to define the RER is to see it as the relative price of "tradables" to "non-tradables". Government services, including education and health, and infrastructure are typically seen as "non-tradable commodities" and a lot of MDG-related expenditures are therefore considered non-tradables. Consequently, a large shift in domestic spending for MDG-related goods and services will push up demand for non-tradables. The price and cost of MDG-related services is likely to increase as a consequence since the government will try to hire, more teachers and medical personnel, among others, and may have to increase their wages if such workers are in short supply.[4] Rising costs of non-tradable services will shift relative prices against tradables, thus inducing an RER appreciation as defined above no matter how the increased spending is financed. Hence, RER constraints may also emerge with domestic resource mobilization for the MDGs.

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4   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.

The actual impact on the exchange rate and competitiveness will depend, however, on many factors. One factor relates to the impact on import demand. In the case of aid or foreign borrowing, the larger the share of foreign resources that is absorbed domestically and the lower the import demand elasticity, the greater the real appreciation effect. The impact on import demand will depend on the import intensity of MDG-related expenditures, as well as on the multiplier effect of MDG expenditures on aggregate demand and the import propensity of aggregate demand in general. The import intensity also matters in the case of domestic resource mobilization. Assuming, as already mentioned, that MDG expenditures tend to have low import intensity and that most of the effects of such expenditures on overall economic growth and productivity occurs with a time lag, then the pressure for the exchange rate to appreciate in the short run may be great, no matter the source of financing. Second, the short-run pressure on domestic prices will further depend on the existing production capacity and will be less if there is scope for extending the coverage of services without much additional investment. Third, MDG services like education and health may be heavily subsidized and offered with more or less fixed prices. Furthermore, under such conditions relative prices may still move against tradables, if taxation or domestic government borrowing crowds out private demand for tradables and lowers the price of such commodities. Fourth, the impact will depend on the exchange-rate regime and access to foreign borrowing. If the domestic resource mobilization for MDG achievement leads to a relative price shift against tradables, this could induce a growing trade deficit. If this can be covered by foreign borrowing or investment, then the tendency towards an RER appreciation will be strengthened. If there is insufficient access to foreign savings, the nominal exchange rate would need to devalue, thus counteracting the initial relative price shift. For countries with fixed exchange-rate regimes or dollarized economies and with limited access to foreign financing, something else will need to give. Most likely, private domestic spending would need to contract to compress import demand and thereby contain the ensuing increase of the trade deficit. Finally, the impact on competitiveness of upward pressure on the RER 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 intertemporal trade-off, because 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 in the 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, and the size of the effects largely depend on the relative demand and supply effects across sectors, and thus on country-specific circumstances (Bevan, 2005; Heller, 2005; Bourguignon and Sundberg, 2006; and Gupta, Powell and Yang, 2006). Similarly, the degree to which increased taxation or domestic government borrowing will change the composition of domestic demand will depend on how private investors respond to higher public indebtedness and possible higher domestic interest rates, and 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 also in the case of domestic financing, but one cannot say *a priori* that a poverty reduction strategy aiming at increased public expenditures for the MDGs would be harmful for growth or exports. The long-term economic gains from improved MDG achievement are difficult to predict, however, and the interactions with changes in the economic structure of the economy are highly complex and depend on the institutional features of the economy.

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. Many developing countries would seem to have significant scope for increasing the tax effort. In Latin America, for instance, average tax revenues amounted to only 17 per cent of GDP in 2004, less than half of the average for the Organization for Economic Cooperation and Development (OECD). Only Argentina, Brazil and Uruguay had tax revenues above 25 per cent of GDP (Martner and Aldunate, 2006). Total government revenues, which include gains from export commodities of public enterprises, capital revenues and social security contributions, are less than 25 per cent of GDP on average. Indirect taxation in Latin America accounts for the bulk of the revenues, with direct taxes bringing in only about one fifth of the revenues. Among the revenues from indirect taxation, the value-added tax (VAT) is the most important instrument in Latin America, especially now that most countries rely much less on import duties and other trade taxes as a result of trade liberalization. The smaller economies, such as those in Central America and the Caribbean, for example, have been highly dependent on trade taxes, but these revenues have been on the decline since the nineties (Escaith and Inoue, 2001). Although the VAT rate varies greatly by country in Latin America and is differentiated in some countries according to the type of product, the average rate is around 15 per cent, which is 5 points lower than the OECD average. Since raising the VAT rate can be politically difficult, VAT reforms should first concentrate on reducing evasion and increasing collection efficiency.

In most Latin American countries there is much scope for increasing fiscal space through direct taxation of personal and corporate incomes, although high evasion rates signal political constraints here also. Moreover, in recent years, income tax reforms in Latin America have focused in general on decreasing the high-end marginal tax rates by about 3 percentage points on average while increasing the lower-end marginal rates by more than two percentage points and reducing the number of taxable income brackets, making direct taxation more regressive (Martner and Aldunate, 2006).

Increased taxation may affect domestic demand as consumers will have less disposable income and investors may foresee lower net profits. 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 VAT and other indirect taxes could then offset some of the welfare gains the poor would have received from enhanced MDG expenditures. In addition, 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 effects would depend on the efficiency of these expenditures.

Efficient budget allocations

A great deal of focus has been given to the additional spending requirements in recent discussions about the costing of the MDGs. However, one should not lose sight of the ample scope in many countries for more effective budget allocations in favour of poverty reduction and other MDG-related programmes. These will likely be contentious political issues as well, since they will touch upon a broader social priority setting. In many developing countries, much of the budgeting process tends to involve debate around marginal increases from the previous year's budget evolving around pressures from various interest groups. Much of this

process also tends to have, at best, a very loose relationship with needs assessments and costing exercises of actual development programmes. This has become clear once more in the context of many of the Poverty Reduction Strategy Papers (PRSPs) prepared in the context of the debt relief offered as part of the HIPC Initiative. Links between proposed actions in the PRSPs and budget requirements and priorities have typically remained rather vague and poorly specified. Support to countries in the context of the Medium-Term Expenditure Framework (MTEF) developed by the World Bank intends to strengthen these links, but the implementation of the framework has not proven to be easy as some studies show (see, e.g., ODI, 2003; Vos and Cabezas, 2006; Vos, Cabezas and Komives, 2006). Much of the implied difficulties are of course political, but a well-defined MTEF could in principle help to overcome such hurdles by making the priority setting more explicit and by tying the budget allocations to actions and expected outcomes and, hence, making the budgeting process more transparent and enhancing accountability.

When trying to gain fiscal space for MDG-related spending, there are at least three levels at which one could seek greater effectiveness in government spending. First, resetting priorities across budget items could create more space for MDG-related spending. 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 the 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 dealt with, could entail important fiscal savings. 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 instance, 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 coverage of health services. For instance, doctors and nurses tend to be mostly present in the 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 larger 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; it could even be at zero extra cost if the rather generous existing pupil-teacher ratio in primary education was allowed to increase from 23 to 25 (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. More generally, comparisons of such cost-effectiveness analyses for education and health in different country contexts suggest that the bottlenecks in achieving MDG targets tend to be country-specific depending on existing delivery systems and socio-economic conditions, and hence are difficult to generalize. Nonetheless, there is no doubt that

more cost-effective budget allocations could yield important fiscal savings when compared to needs assessments based on existing allocation patterns.

In order to measure the quality and efficiency of social programmes, some countries have already adopted public investment registries and evaluation systems. In theory, these would accord policy makers a tool to identify the most efficient or cost-effective programmes and allocate resources accordingly. However, in practice, these systems may encounter opposition from stakeholders and may lack sufficient political support to achieve the objective of more efficient redistribution of resources (ECLAC, 2002; Vos and Ponce, 2004; Martner and Aldunate, 2006).

Domestic borrowing and fiscal sustainability

In the short run, revenues and expenditures determine an important part of the domestic resources available for social development. However, in the medium and long run, what happens "below the line" of fiscal accounts (i.e., the financing of deficits) will determine the sustainability of fiscal resources.

In the case of heavily indebted poor countries, the International Monetary Fund (IMF) and the International Development Association (IDA) monitor their debt situation and needs. More recently, a Debt Sustainability Framework was established to detect the debt-related vulnerabilities of the HIPCs and prevent unsustainable debt build-ups. Despite progress in the overall debt situation, it has been found that only a small percentage of the HIPC programmes have specifically considered the costs for achieving the MDGs (United Nations, 2006c). Even in those countries where costing has been done, the resulting resources made available from debt relief are not enough to achieve the MDGs by 2015 (United Nations, 2006d). In addition, scaled-up aid with external debt relief does not preclude increasing public indebtedness as some recent evidence shows (e.g., Gupta, Powell and Yang, 2006). This may particularly be the case if monetary authorities are concerned with the liquidity impact of increases in aid-induced spending and try to sterilize through the sale of government securities or central bank sterilization loans. This may reduce the potential inflationary impact of aid-financed public spending, but at the same time it will raise domestic debt accumulation, which may increase domestic interest rates and crowd out domestic credit supplies to private investors. With poorly developed domestic financial sectors and shallow capital and securities markets, this may further induce strong interest rate volatility with additional negative repercussions for investment demand, as occurred, for instance, in Uganda (Gupta, Powell and Yang, 2006).

Such issues may be even more relevant in the case of middle-income countries. These are typically not eligible for external debt relief, except perhaps in times of crisis, and must rely more on market-based instruments. Most developing countries have local currency bond markets to varying degrees of depth, liquidity and type of instrument. However, many tend to have rather poorly developed markets for long-term government and corporate bonds denominated in local currency. The lack of a domestic bond market makes it more difficult to finance long-term public infrastructure investments and major private modernization projects (see United Nations, 2006b). It also forces firms to use short-term debt to finance long-term investment, thereby accumulating maturity mismatches in their balance sheets, or to borrow abroad, leading to currency mismatches. The mix of such maturity and currency mismatches enhances the fragility of the financial system during periods of exchange-rate depreciation and rising interest rates. The insufficient development of the domestic bond market and the associated risk of financial fragility reduce in turn the policy space for monetary intervention when dealing with external shocks. A poorly developed bond market in conjunction with a relatively low level of financial savings in the economy may imply further that gov-

ernment demand for domestic financing of its deficits may have rather strong upward effects on domestic interest rates. Under such circumstances, heavy reliance on domestic borrowing to finance the MDG strategy could lead to a quickly rising domestic debt-service burden. 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.

The importance of the development of domestic bond markets was also made evident by the Asian crisis and led to a stronger focus of financial policies on this issue. As a result, domestic bond markets have grown rapidly since the late 1990s, not only in Asia, Latin America and the emerging market economies in Europe, but – to a lesser extent – also in Africa (see Ocampo and Griffith-Jones, 2006; United Nations, 2006b; Ocampo and Vos, 2006). Where such markets have been made to function, governments will have greater scope for domestic resource mobilization for the MDGs through the bond market along with a lower risk of crowding out private investment. The risks associated with rapid domestic government indebtedness may still exist and intertemporal trade-offs need to be assessed with caution, that is to say, governments will have to assess their debt sustainability. This will depend mainly on the extent to which the MDG-related investments will translate in a timely manner into economic returns (through productivity increases, crowding-in of private investments) to the extent that economic growth and sustained low interest rates will ensure a fiscally sustainable financing strategy.

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 will put high 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 for achieving the MDGs. Bourguignon and Sundberg (2006) suggests 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.

In middle-income countries, such constraints may also exist but are likely to be less severe as these countries tend to have higher initial average educational levels.[5] Trying to achieve the MDGs may induce other labour-market constraints over time, however. As the MDG target (and beyond) for education is achieved, the supply of skilled workers in the labour market will 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 will also likely 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 by far not the sole factor, but an important one nonetheless (Glewwe, 2002). Hence, insufficient creation of skilled jobs in the economy could jeopardize the achievement of the education MDG. This could induce additional efforts by the government to stimulate school

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5   As noted in one of the examples given above, some countries may already have sufficient availability of human resources, as may be derived, for instance, from the low pupil-teacher ratio and high teacher absenteeism in Ecuador (Vos and Ponce 2004) or from a high concentration of medical personnel in major cities at the expense of lower availability in rural areas (e.g., Vos and others, 2004), implying that the problem may be more the quality of personnel and/or its distribution across the country.

attendance, but in such a case, 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.

The way the indicated trade-offs present themselves will depend further on the functioning of the labour market, that is to say, the degree of labour-market segmentation and flexibility in real wage adjustment. Labour markets in developing countries are typically segmented owing to many factors that would not allow some workers to find a job in some sectors. High barriers to entry into MDG-related sectors may prevent the real wage from adjusting flexibly. For example, skill requirements may be very high in some MDG-related sectors, particularly in activities that should be relatively advanced from a technological point of view, for example, hospital attention. This may prevent certain types of workers with a higher education but who do not possess the required skills from having full access to jobs in MDG-related sectors. If skilled, but not highly-skilled, workers end up seeking employment in non-MDG-related sectors, the real wage in these sectors will likely 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.

In conclusion, reducing the aforementioned constraints – that is to say, by creating policy space in order to be able to execute countercyclical policies; shifting the objective of macroeconomic policies to a broader definition of stability and making full employment the primary objective; creating fiscal space through increased taxation; achieving greater efficiency in social expenditures; and reaching debt sustainability with competitive exchange rates – should in theory help mobilize domestic resources and enable countries to close in on the MDGs. As these factors tend to present themselves differently across countries, we need empirical tools to help us gauge the economy-wide implications of each of these trade-offs and the achievement of the MDGs in any given context.

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

Many of the issues discussed in the previous section require an economy-wide framework to examine the capacity and financing constraints to achieving the MDGs and the trade-offs with other economic policy goals. The existence of such interaction effects is the rationale for the use of a computable general equilibrium (CGE) model. The pursuit of a strategy towards the achievement of the MDGs will likely have strong effects throughout the economy. It will surely affect the demand and supply for different types of goods and services, for labour and capital, and for foreign exchange, and the related adjustments may imply both trade-offs and synergies throughout the achievement of the MDGs. These feedback effects may substantially alter the outcomes of studies that focus on sector analysis, such as the needs for and cost implications of separately pursuing the goals for education, health and so on. In addition, the general equilibrium framework, as depicted, 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 can be achieved.

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, or domestic borrowing could crowd out credit resources for private investment. Policy makers 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 and thereby enhance the need for foreign financing, and so on. The productivity gains which improved MDG achievement may generate will likely be attained with a time lag and thus have little impact on growth in the short and medium term. Therefore, it is critical that the short-run trade-offs do not offset potential economic and social gains.

Dynamic CGE models for the simulation of policies aimed at human development goals have been developed before in studies of 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 limitations and computational requirements. However, the shift away from concerns about employment, income distribution and poverty to 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 framework has been labelled MAMS (*Maquette* for **M**DG **S**imulation) as originally presented in Löfgren (2004) and 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. In an ongoing joint project coordinated by the United Nations Development Programme (UNDP), UN/DESA and the World Bank, this framework has been extended and applied in 19 Latin American countries. See Löfgren and Diaz-Bonilla (2006) for a revised version of MAMS incorporating the feedback from this experience.

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 the MDGs for 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 (MDG 7). 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), the income incentives (the expected wage premium from education), the under-five mortality rate (a proxy for the health status of the student population), household consumption per capita (capacity to pay for education and opportunity costs) and the level of public infrastructure (a proxy for the effective distance to school). Under-five and maternal mortality (MDGs 4 and 5) are seen 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 (MDG 7) are 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. The income poverty goal (MDG 1) is seen 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.[6]

The model includes a rather 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. In the model 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 (see figure 1). For this to happen, the government is assumed to resort to sufficient financing for the new investment mobilized either domestically or from abroad.

Figure 1.
MDG achievement and economy-wide effects in MAMS
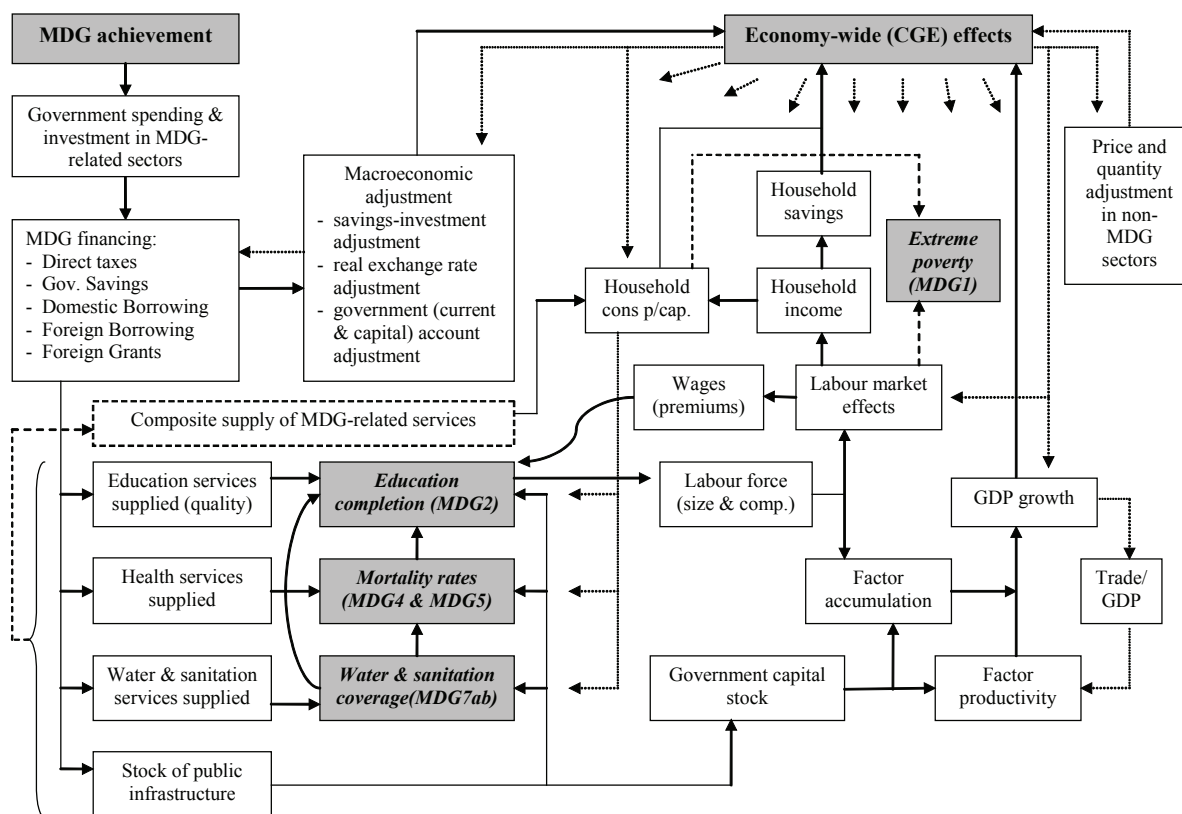
Source: Authors' construction based upon the mathematical summary presentation of MAMS in Löfgren and Diaz-Bonilla (2006).

6   The final outcome for income poverty (MDG 1) 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, which results in insufficient detail regarding changes in the distribution to be able to make robust statements regarding the poverty outcomes. In 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, which takes the labour market outcomes (relative remunerations, employment, changes in skill level) 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 details about income distribution for the poverty analysis. See Bourguignon and others (2002) and Vos and others (2006) for a discussion and application of such methods in conjunction with CGE model analysis.

Achievements in education involve the enlargement of school infrastructure and a higher premium wage for better-educated workers. The greater the availability of public infrastructure, including that in MDG-related sectors other than education, the larger the capital stock, leaving room for factor productivity growth in the model (see figure 1).[7] The quality of the stock of labour will improve over time as more better-educated prospective workers leave the schooling system. This will further enhance productivity growth with subsequent wage- and income-distribution effects. Growth can be encouraged as a result of the productivity gains; this has the potential to lead to economy-wide effects which in turn will affect MDG achievement (see figure 1). Achievements in drinking water and sanitation supply also help to improve health conditions, and in turn improved health status may impact positively on education outcomes along with other determinants. 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. Since this is an economy-wide model, per capita household consumption can also change as a result of relative price changes. 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.

Domestic resource mobilization for MDG achievement: country applications

As indicated, the MAMS framework is being applied in 19 countries in Latin America and the Caribbean in an ongoing joint project coordinated by UNDP, UN/DESA and the World Bank. Here, we focus on some of the simulation results of that project that are derived from the applications of Costa Rica and Ecuador. These are two middle-income countries with large differences in terms of initial levels of MDG achievement. On the one hand, Costa Rica achieved the MDGs in the areas of access to water and sanitation and extreme poverty before 2000; however, the country experienced a setback in extreme poverty thereafter, but the problem affects no more than 2.8 per cent of the population living on less than $1 per day. The country is also evolving quite satisfactorily towards the achievement of the other MDGs (Sánchez, 2006). Costa Rica's indicators for under-five and maternal mortality are already among the lowest in Latin America. Even though Costa Rica is close to achieving the MDGs, to such an extent that the additional resource requirements to reach them are likely to be relatively low, macroeconomic trade-offs will likely need to be considered. On the other hand, in contrast, Ecuador faces bigger challenges in meeting the goals. In fact, under the current growth outlook and with existing policies, this country is off track for reaching all the goals, except for MDGs 4 and 5. Extreme poverty stood at about 15 per cent by 2000, and not even tripling the historical average per capita income growth rate (to 3 per cent per annum) would be sufficient to achieve MDG 1 by 2015 (León, Rosero and Vos, 2006). The high income inequality in the country severely limits the trickling down of economic growth to the poor. Either much faster growth or a radical income redistribution programme would be needed to achieve that target. Net enrolment and completion rates in primary education reached 90 and 67 per cent, respectively, in 1990. There was little progress during the 1990s, but after the major economic crisis of 1999 several social programmes targeted towards the poor were boosted, including a cash-transfer programme conditioned to school attendance. These efforts helped to increase net primary enrolment to 95 per cent and the completion rate to 82.7 per cent by 2005. Progress has been more continuous in health, as under-five mortality fell from 43.0 to 20.7 per 1,000 live births in the same period and the scarce available data suggest that maternal mortality fell from 117 to 67 per 100,000 live births between 1990 and 2002.

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7   A productivity parameter for each MDG-related sector can also allow the simulation of efficiency improvements in the delivery of such services.

With continued (linear) trends, both health MDGs would be within reach by 2015. Coverage of drinking water supply and sanitation are still far off target, as 21 per cent of the population is without access to drinking water and 50 per cent without access to adequate sewerage systems.

In order to analyse the trade-offs associated with alternative financing strategies to reach the MDGs, we first define a baseline or "business-as-usual" (BAU) scenario. The BAU essentially identifies the economic trajectory from the base year to 2015, assuming that MDG-related government spending continues to grow at past trends and all other policy variables remain unchanged. The base-year solution of MAMS is calibrated using data and parameters defining the economic structure and key behavioural relationships. Most of the data and parameters are estimated using a Social Accounting Matrix (SAM). Key elasticities, in particular those that define the behaviour related to the achievement of the MDGs, have been derived from microeconometric analyses specific to each country. In the dynamic solution of the model, the size of the population and the composition of the labour force is updated recursively according to given growth rates and the degree of MDG achievement.

Subsequently, we run a number of "MDG scenarios" under alternative financing strategies in order to simulate a situation where all MDGs will be achieved in a timely manner, except that of poverty (MDG 1), which is seen to depend on the economic interaction effects taking place over time, as indicated earlier. For the MDGs in education, health, and water and sanitation, the model calculates the cost of achieving the targets given the existing shortfalls, the cost structure (and endogenous changes in relative prices) of providing MDG-related services, and household demand for these services. The cost requirements are estimated according to the financing strategy for which the model is solved. For instance, outcomes for relative prices (including real wages and the RER) may differ depending on whether the strategy is financed through increased taxes, domestic borrowing or foreign loans; this in turn may imply different impacts on unit costs for providing the MDG services. To determine the main trade-offs in mobilizing resources from different sources to achieve the MDGs, the results of the BAU are compared with those of the MDG scenarios.[8] We will discuss the results for the two country cases separately.

Costa Rica

As the targets for water and sanitation (MDG 7) had already been reached in Costa Rica by 2000, this millennium goal is not considered in the model simulations. BAU appears to be relatively adequate with regard to the goal for increasing the primary school completion rate and reducing under-five mortality. The related targets will be close to achievement in 2015 under the BAU scenario (see table 1). There will also be a considerable reduction in maternal mortality. Consequently, the extra costs of the aforementioned three MDG

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8   Several other scenarios not discussed here were also generated, including a situation in which each MDG is achieved separately next to that in which MDGs 2, 4, 5 and 7 are all achieved at the same time. Comparing these situations allows us to study possible synergies and trade-offs between trying to achieve all MDGs simultaneously or in a sequenced manner. Further, assumptions about macroeconomic closure rules are important when analysing CGE simulation results. The MAMS specification used for the present analysis allows for unemployment and hence imperfect wage adjustment in the different labour-market segments. The real exchange rate adjusts flexibly to generate just the amount of foreign savings that would clear any emerging imbalance of the current account with the rest of the world, assuming all other components of the capital account of the balance of payments remain fixed. Adjustment of the government balance depends on which financing strategy is adopted. In the case of tax financing, direct tax rates are increased endogenously so as to mobilize the resources for the additional public expenditures, while with regard to domestic borrowing direct tax rates stay fixed and the ensuing government deficit is financed through government-bond emissions. Aggregate investment is assumed to be savings-constrained in the model simulations reported here.

Table 1.
Costa Rica: MDG achievement in the BAU scenario

	2002	2005	2010	2015	Target
MDG 1: Extreme poverty[a] (%)	2.8	2.6	2.5	2.5	1.7
MDG 2: Primary school completion rate (%)	88.9	90.5	94.9	99.1	100.0
MDG 4: Child mortality (per 1,000 live births)	9.6	9.1	8.1	7.0	6.0
MDG 5: Maternal mortality (per 100,000 live births)[b]	41.0	37.9	31.7	25.4	20.0
MDG 7: Drinking water supply coverage (%)	78.4	78.7	79.4	80.5	79.6
MDG 7: Sanitation coverage (%)	93.4	93.4	93.5	93.5	93.5

Source: Sánchez (2006), based on the MAMS model for Costa Rica.

a Poverty results are estimated after running a microsimulation methodology (see footnote 6).
b A less ambitious national target for maternal mortality is used as justified in Sánchez (2006). The international MDG target for maternal mortality would be 8.3 deaths per 100,000 live births.

scenarios are not expected to be very large, although the degree of extreme poverty reduction is insufficient to meet the target.

In order to achieve MDGs 2, 4 and 5, final government consumption will have to increase by 1 percentage point of GDP per year over and above the level of spending of the BAU scenario. Public investment in education and health services will have to increase by , respectively, 0.3 and 0.8 percentage points of GDP per year compared to the BAU scenario (see table 2). These additional cost estimates are more or less the same under all financing scenarios; they are only slightly lower when the additional government spending is financed through foreign borrowing.

Dutch disease effects are visible both in the BAU and in the MDG scenarios. The baseline trend is already towards larger spending on non-tradables. There is some erosion of export competitiveness because the tendency towards RER appreciation is not fully corrected by Costa Rica's managed floating exchange-rate regime. In view of the country's MDG achievements, the degree of RER appreciation is not very strong (about 4 per cent for the whole period). The appreciation effect is initially stronger when the MDG strategy is financed through external borrowing (see figure 2).

Table 2.
Costa Rica: Simulated additional costs of achieving the MDGs separately or jointly in 2002-2015

Percentage of GDP[a]					
		Average annual extra costs (targeting MDGs separately and jointly)			
	Baseline spending	Only MDGs	Only MDGs 4 & 5	Only MDG 7	All MDGs
Primary education	**2.0**	**0.4**	**0.0**	**0.0**	**0.3**
- Current spending	2.0	0.3	0.0	0.0	0.2
- Investment	0.0	0.1	0.0	0.0	0.1
Health	**4.1**	**0.0**	**0.8**	**0.0**	**0.8**
- Current spending	3.9	0.0	0.6	0.0	0.6
- Investment	0.2	0.0	0.2	0.0	0.2
Water and sanitation	**1.1**	**0.0**	**0.0**	**0.1**	**0.1**
Total	**7.3**	**0.4**	**0.8**	**0.1**	**1.1**

Source: Sánchez (2006), based on the MAMS model for Costa Rica.

a The additional costs are for the foreign financing scenario and are measured as percentage deviations with respect to the BAU scenario. They only increase marginally when there is mobilization of domestic resources to finance the new public investment.

Figure 2.
**Costa Rica: Real exchange-rate appreciation under
the BAU and alternative MDG financing scenarios**
(Index, 2002=100)
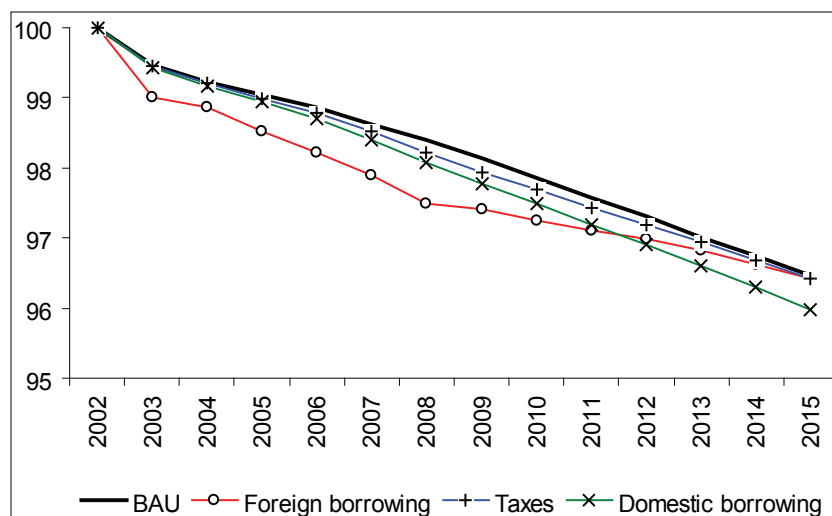
The alternative forms of resource mobilization have a greater effect on private investment. Specifi-cally, the model simulations suggest a strong crowding-out effect if the government resorts to bond financing (see figure 3). With greater government demand for private savings, less domestic credit becomes available for private investors and investment levels increase at a considerably slower pace under this financing sce-nario compared to the BAU or the other two MDG scenarios. In the case of tax financing, there is also some crowding-out of private investment, albeit only slight.

Figure 3.
Costa Rica: Private investment in the BAU and alternative MDG financing scenarios
(Values in local currency at constant prices)
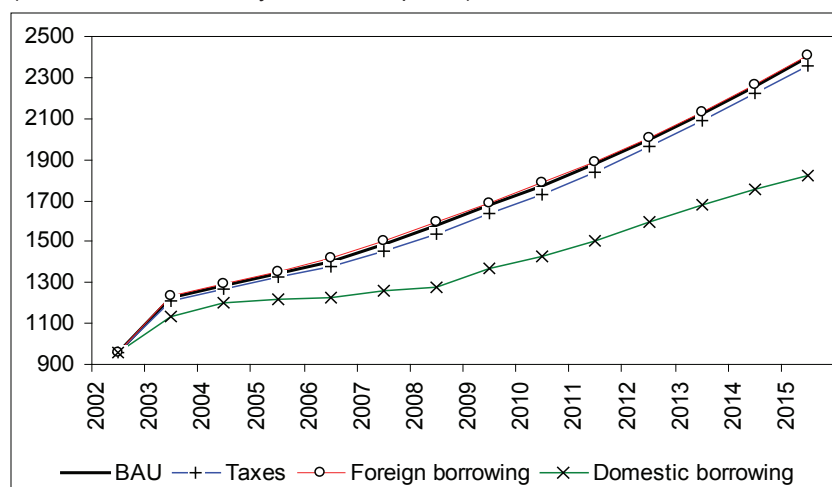
Both the RER appreciation and the impact on private investment affect export supply. Exports rep-resent more than 40 per cent of GDP in Costa Rica and are the engine of growth (see Sánchez and Sauma, 2006). As shown by Sánchez (2004), Costa Rican exports are highly sensitive to exchange-rate adjustments as well as to domestic credit supplies and investment in export activities. Consequently, as depicted in figure 4, the stronger the crowding-out and the RER appreciation effects, the slower the export growth becomes. In the same vein, GDP growth is slightly slower under the domestic financing scenario (see figure 5).

Figure 4.
Costa Rica: Exports in the BAU and alternative MDG financing scenarios
(Values in local currency at constant prices)
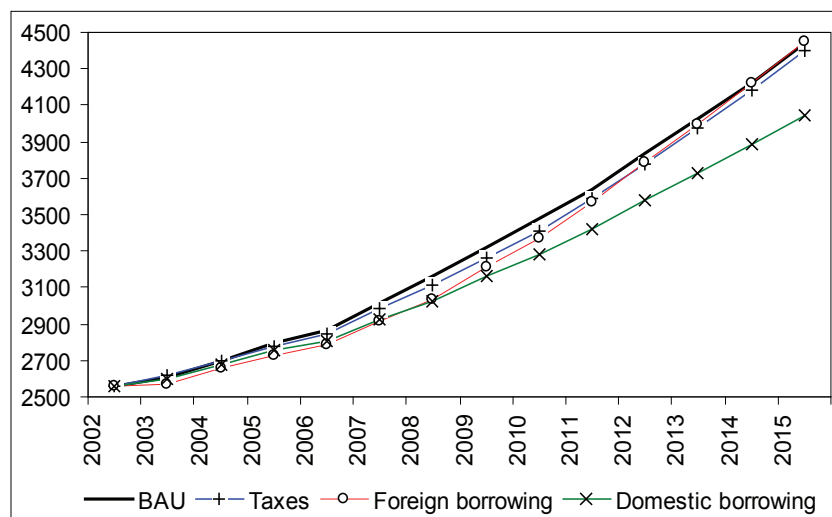
Figure 5.
Costa Rica: Real GDP in the BAU and alternative MDG financing scenarios
(Values in local currency at constant prices)
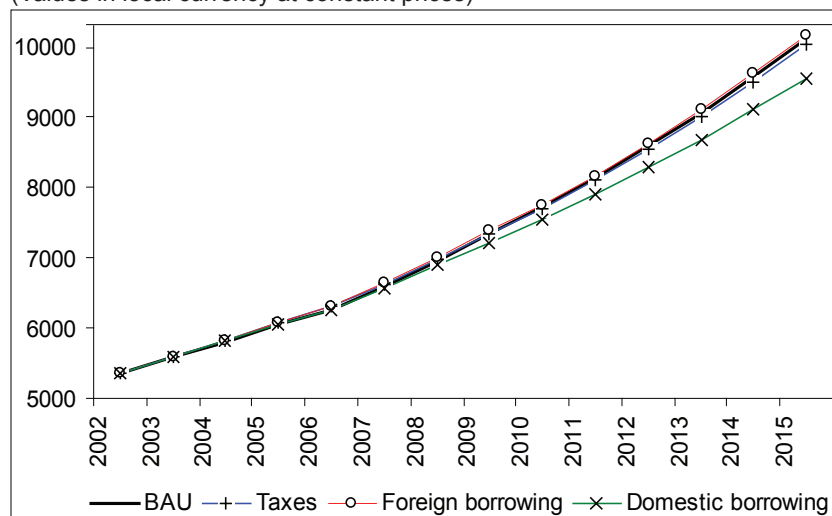
Except for the domestic financing scenario, the alternative financing mechanisms generally have a similar impact on employment and wage trends. Over time, improvements in education lead to increased supplies of semi-skilled and skilled workers. This is also the case under the BAU scenario. The composition of labour demand does not change commensurately; hence, each of the scenarios shows rising real labour incomes for unskilled workers (who start running in short supply) and the wage premium for better-educated workers falls. Both the rise in average real wages and the drop in wage inequality help reduce extreme income poverty, yet not to a sufficient enough degree as to achieve MDG 1 (see figure 6). The MDG scenarios, however, do not improve the degree of poverty reduction; this is mainly due to the loss of export growth associated with the RER appreciation, the crowding-out of private investment under the domestic borrowing scenario, and the initial loss of disposable household income due to increased tax rates under the tax-financing scenario. The results, while in the case of Costa Rica showing rather small variations among already low

Figure 6.
Costa Rica: Incidence of extreme poverty under the BAU and alternative MDG financing scenarios
(Percentage)[a]
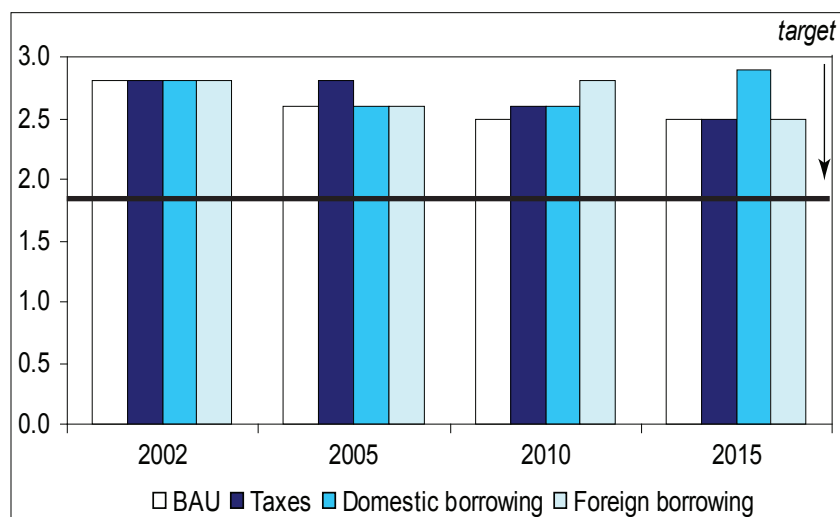
Source: Sánchez (2006), based on the MAMS model for Costa Rica.

a The incidence of extreme poverty is defined as the share of the total population living on less than 1$ a day. Calculations are based on labour-market outcomes for different types of workers as estimated in the MAMS model and after applying a microsimulation methodology (see footnote 6).

extreme poverty rates, could suggest that a mixed financing strategy might be better if only to avoid some of the related trade-offs. The tax-financing scenario shows a negative impact on poverty reduction early on in the strategy, while the foreign-financing scenario creates stronger RER appreciation with negative overall employment effects originating from the export sector around 2010. A crowding-out of private investment starts to hurt poverty reduction at a later stage.

Fiscal sustainability of the MDG strategy seems best preserved when recurring to tax financing.[9] Direct tax income would increase by 1.6 percentage points of GDP relative to the BAU scenario. The budget deficit would not increase, and domestic and external debt-to-GDP ratios would stay at current levels, which are considered sustainable at about 28 and 21 per cent of GDP, respectively. Financing of the MDG strategy through domestic borrowing would lead to rising fiscal deficits and a sharply rising domestic debt burden to possibly unsustainable levels. The domestic debt-to-GDP ratio would nearly double between 2002 and 2015: from 38.2 to 66.9 per cent (see figure 7). In recent history, the country's domestic government debt has never risen over 40 per cent of GDP. On the other hand, foreign financing of the MDG strategy would lead to a substantial increase in foreign debt, though likely staying below critical levels, as it would increase to 33 per cent of GDP in 2015, up from 19.5 per cent in 2002 (see figure 8).

In summary, there is a noticeable trade-off between the achievement of MDG 1 and the other MDGs under the domestic resource mobilization scenarios. In the case of tax financing, the government should avoid tax increases from falling on the poor, or compensate the poor through other income support measures, especially in the early years of the strategy. Bond financing clearly seems to be the lesser option for Costa Rica, where, in fact, the critical domestic-debt and fiscal situation are already a main concern to macroeconomic policy makers. Recurring to external borrowing could alleviate such a constraint, but this may be accompanied with possible dangers of strongly rising currency mismatches between liabilities and assets held by domestic investors. More foreign borrowing could also exacerbate the trend towards exchange-rate appreciation. For all financing strategies it seems to hold that the government should try to avoid further RER

9   In Costa Rica, total tax revenues only represented 13 per cent of GDP per year on average during 2000-2005.
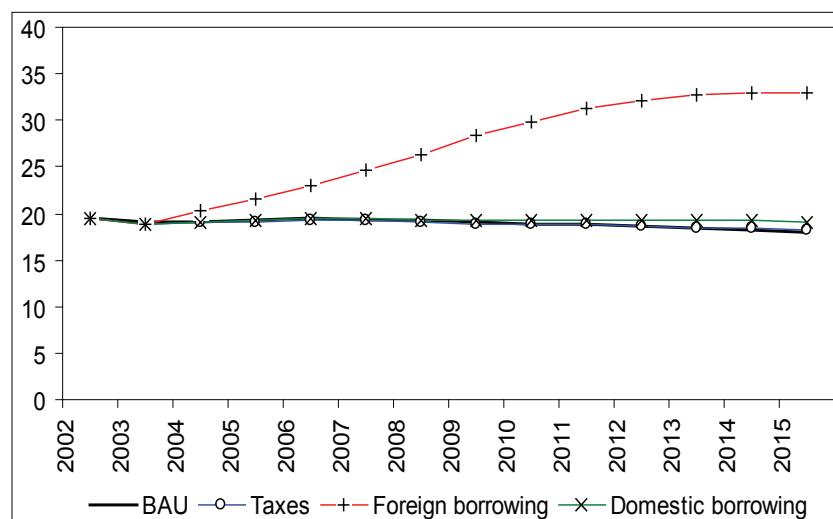
Figure 7.
Costa Rica: Domestic public debt under the BAU and alternative MDG financing scenarios
(Percentage of GDP)
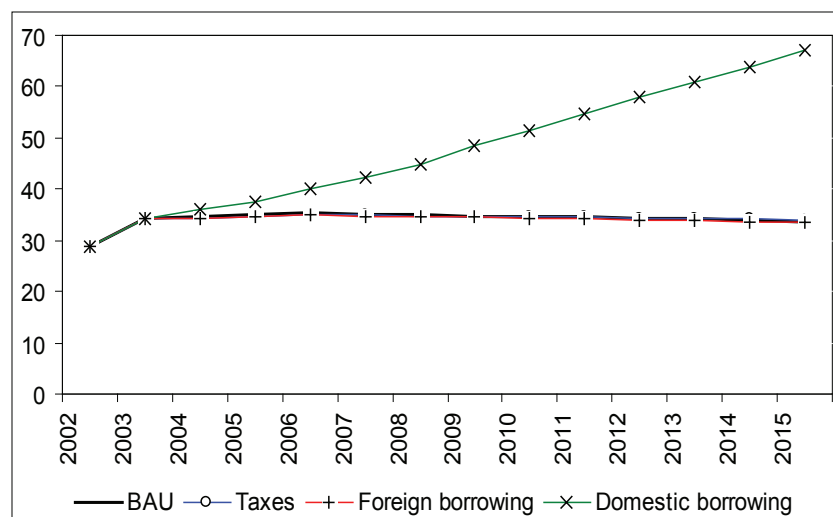
Source: Sánchez (2006), based on the MAMS model for Costa Rica.

Figure 8.
Costa Rica: External public debt under the BAU and alternative MDG financing scenarios
(Percentage of GDP)

Source: Sánchez (2006), based on the MAMS model for Costa Rica.

appreciation. It is not very likely that the recently introduced managed floating system allowing the *colón* to fluctuate within a pre-established band will actually avoid this, unless the band is defined in such a way as to keep the exchange rate competitive. MDG investments in education and other investments in public infrastructure may strengthen the competitiveness of export sectors through productivity increases over time and compensate for the exchange-rate appreciation. While the MAMS model considers the effects of education and infrastructure improvements on productivity, it is possible that these effects are underestimated in the present scenario. First, there is little empirical evidence for Costa Rica regarding the quantitative impact of these factors on productivity growth and, second, the current scenarios do not take into consideration additional investments in physical infrastructure, such as roads, ports, irrigation systems and so on.

Ecuador

Further progress in achieving the development goals is expected under the BAU scenario for Ecuador albeit not sufficient to meet the MDG targets by 2015 (see table 3). The continuation of the education policies initiated in the first few years of the new century would bring primary school completion rates to 95 per cent, just short of the target. Health outcomes would also fall short of the targets for MDGs 4 and 5 by a slight margin, implying that the BAU does not fully "reproduce" unchanged trends by which the target could be reached, as discussed above. The related assumptions for the BAU are considered reasonable as the impact of policies and other health determinants tends to be non-linear. Moreover, as mortality rates drop, relatively greater efforts are needed as the prevalence of more complicated causes of death tends to increase. The targets for water and, particularly, sanitation would fall short by a somewhat wider margin. The target for the reduction of extreme poverty (MDG 1) would not be reached either under the baseline scenario, as also predicted by the partial equilibrium analyses discussed above.

Table 3.
Ecuador: MDG achievement in the BAU scenario

	2001	2005	2010	2015	Target
MDG 1, Extreme poverty[a] (%)	17.0	13.7	10.4	9.4	7.7
MDG 2, Primary school completion rate (%)	76.4	82.7	91.4	95.4	100.0
MDG 4, Child mortality (per 1,000 live births)	23.5	20.7	17.6	15.7	14.3
MDG 5, Maternal mortality (per 100,000 live births)	87.3	67.2	46.6	36.0	29.3
MDG 7, Drinking water supply coverage (%)	77.6	79.1	81.6	83.6	89.0
MDG 7, Sanitation coverage (%)	46.3	50.0	56.0	60.9	73.0

Source: León, Rosero and Vos (2006), based on the MAMS model for Ecuador.

a Poverty results are estimated after running a microsimulation methodology (see footnote 6).

The model simulations suggest that the required additional costs of achieving the MDGs would reach between 2.5 and 2.8 percentage points of GDP by the end of the simulation period (2015), depending on the financing scenario. The scenarios for domestic resource mobilization are somewhat more costly as a share of GDP than the foreign borrowing scenario. The estimated extra costs increase towards the end of the period. This is so in part because with greater MDG achievement more children will be in school and more children and mothers will be using health services. The cost also increase, especially in health care, because the MAMS model assumes diminishing returns to MDG investments, that is as one gets closer to the target, it takes a bigger effort to get also the last children in school and further reduce infant mortality. The average additional costs per year for the full period 2001-2015 therefore are lower (see table 4).[10] Public expenditures for primary education would nearly have to be doubled from 1.1 to 1.8 per cent of GDP, while health expenditures would need to increase by no more than 0.3 percentage points to 2.3 of GDP per year on average for the period. Extra investments in water and sanitation infrastructure would incur an additional 0.3 per cent of GDP. To achieve all MDGs simultaneously, the Government would have to spend between 1.3 and 1.5 per cent more per annum than under the BAU.[11] Table 3 shows further that for primary education and infant and maternal mortality, achieving all the MDGs simultaneously is cheaper than the sum of the costs if, hypothetically, the MDGs were to be pursued separately. The savings are derived particularly from health costs. This

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10   In the case of Costa Rica MDG costs do not rise towards the end of the simulation period as it is already quite close to achieving the MDGs from the base year and in the simulations it manages to achieve most already by 2011.

11   The costs are slightly higher as a percentage of GDP under the increased taxation or domestic borrowing scenarios than under the foreign borrowing scenario.

result is driven by the synergies between the MDGs (achieving the education goal, for instance, helps achieve the health target faster) as well as by economy-wide effects (for instance, the reduction in wage costs as the wage premium for higher-educated workers falls with better education outcomes). Such synergies are typically not considered in other cost projections of education and health goals. In the Costa Rican case, similar synergies are less important (see table 2), because the country has already a high degree of MDG achievement in the baseline. Thus, for instance, only small gains are needed to achieve the child mortality target and hence its achievement will also have only a small spill-over effect on achievement of the education target.

Table 4. The simulated cost estimates do not take into consideration other efficiency gains which could be obtained by making budget allocations more cost effective or by trying to improve the efficiency in the delivery of services. As mentioned above, Vos and Ponce (2004) found in the case of education expenditures that by reducing the number of redundant teachers whilst enhancing the quality of other educational inputs, the MDG target might be reached at virtually no additional costs; however, the required measures (firing a considerable number of teachers) for such a low-cost scenario will likely be politically difficult to implement. The outcomes discussed below do not consider all such options of creating fiscal space through efficiency gains of this kind.

Table 4.
Ecuador: Simulated additional costs of achieving the MDGs separately or jointly in 2001-2015

Percentage of GDP[a]					
		Average annual extra costs (targeting MDGs separately and jointly)			
	Baseline spending	Only MDG 2	Only MDGs 4&5	Only MDG 7	All MDGs
Primary education	**1.1**	**0.8**	**0.0**	**0.0**	**0.7**
- Current spending	1.0	0.7	0.0	0.0	0.6
- Investment	0.1	0.1	0.0	0.0	0.1
Health	**2.0**	**0.0**	**0.6**	**0.0**	**0.3**
- Current spending	1.6	0.0	0.3	0.0	0.1
- Investment	0.4	0.0	0.3	0.0	0.2
Water and sanitation	**0.3**	**0.0**	**0.0**	**0.3**	**0.3**
Total	**3.4**	**0.8**	**0.6**	**0.3**	**1.3**

Source: León, Rosero and Vos (2006), based on the MAMS model for Ecuador.
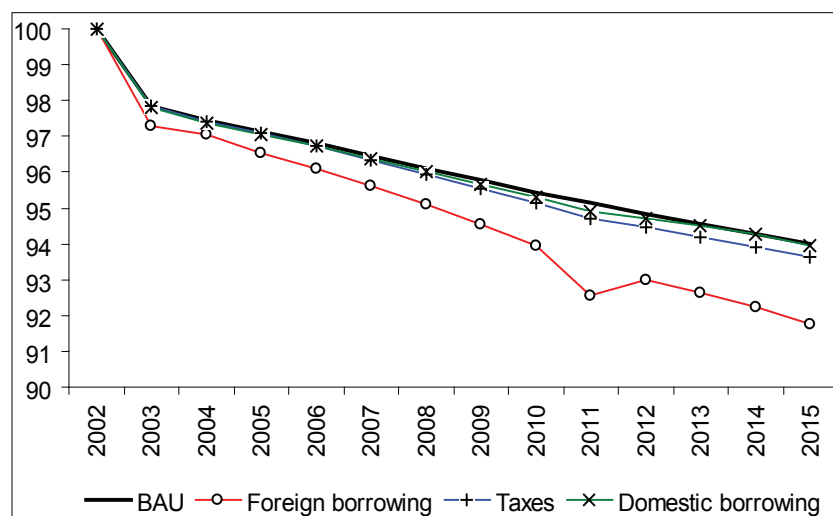
a The additional costs are for the foreign financing scenario and are measured as percentage deviations with respect to the BAU scenario. They only increase marginally when there is mobilization of domestic resources to finance the new public investment.

As in the case of Costa Rica, Ecuador's RER would appreciate in each of the scenarios, including the baseline, given the rise in non-tradable expenditures. The degree of appreciation is strongest, as expected, under the scenario involving foreign borrowing to finance the additional MDG expenditures (see figure 9). This will erode competitiveness of exports (see figure 10), particularly non-traditional exports, thereby further increasing the country's reliance on oil and other, mainly agricultural, primary commodities. The model simulations suggest further that in the given timeframe until 2015, the productivity gains of achieving the MDGs by themselves are not sufficient to stimulate export production with higher technology content.

The scenario involving increased government borrowing to finance the MDGs, as in the case of Costa Rica, would slow the increase in private investment demand owing to the crowding-out effect of credit available to the private sector (see figure 11). This effect by itself also implies in Ecuador's case that the trade-off between GDP growth and MDG achievement is largest in the scenario involving domestic borrowing. This trade-off is, however, only mild as can be seen from figure 12.
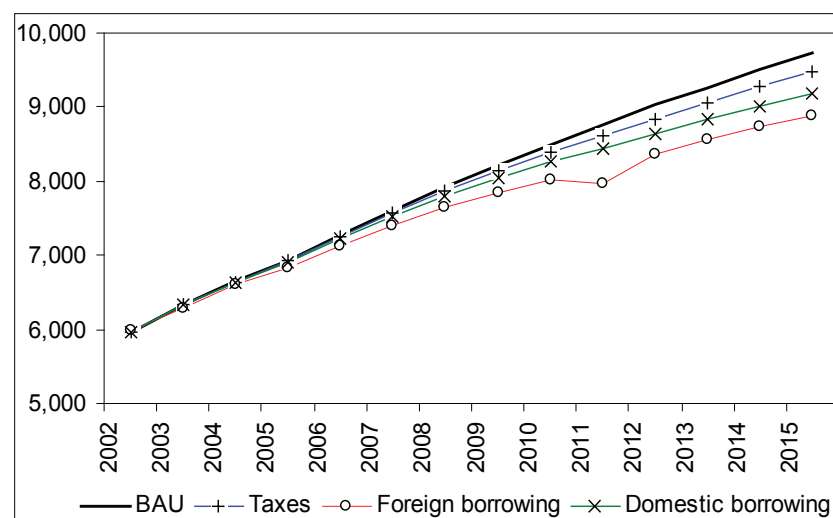
Figure 9.
Ecuador: Real exchange-rate appreciation in the BAU and alternative MDG financing scenarios
(Index, 2002=100)

Figure 10.
Ecuador: Export volume in the BAU and alternative MDG financing scenarios
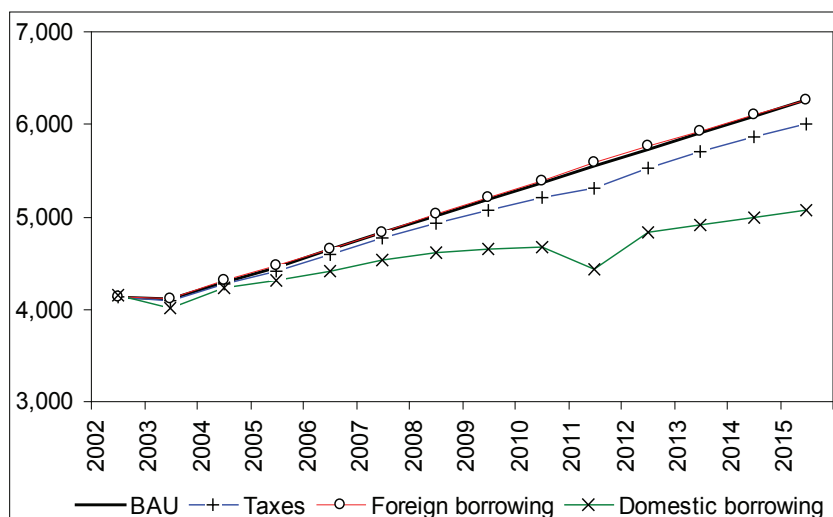(Values in millions of local currency at constant prices)

Labour-market outcomes are by and large similar across the financing scenarios, except that with the stronger real appreciation under the external-financing scenario, the average real wage increase is somewhat greater, allowing for a stronger impact on poverty. The supply of skilled workers outpaces demand in each of the scenarios, producing a drop in the wage premium for this category of workers. Unskilled workers gain the most from the MDG strategy, as they would see real labour incomes expand at 4.0 per cent per annum. This, unlike in the Costa Rican case, would lead to a substantial redistribution of income, lowering income inequality by more than 10 per cent (as measured through the Gini coefficient of per capita household incomes). This, in combination with the moderate growth of income per capita of about 2 per cent per annum, would result in remarkable poverty reduction, but insufficient to reach the MDG-1 target by 2015 in any of the financing scenarios (see figure 13).
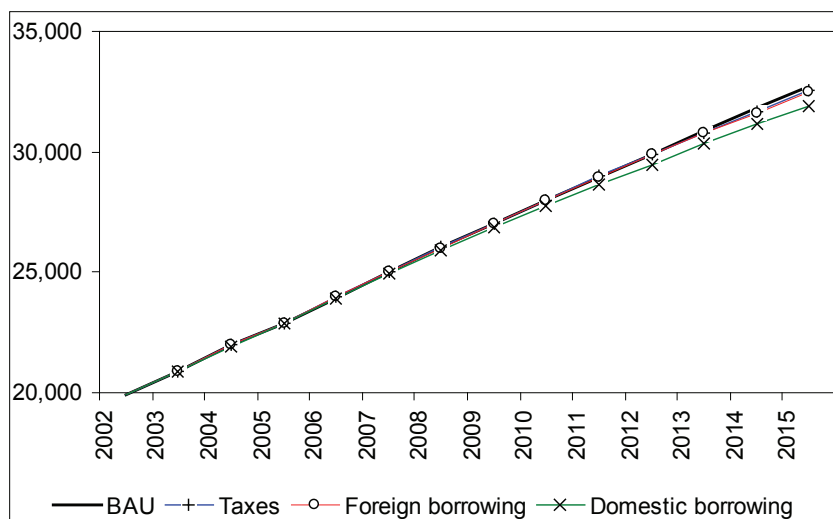
Figure 11.
Ecuador: Private investment in the BAU and alternative MDG financing scenarios
(Values in millions of local currency at constant prices)

Source: León, Rosero and Vos (2006), based on the MAMS model for Ecuador.

Figure 12.
Ecuador: Real GDP in the BAU and alternative MDG financing scenarios
(Values in millions of local currency at constant prices)

Source: León, Rosero and Vos (2006), based on the MAMS model for Ecuador.

Hence, as in Costa Rica, the growth path associated with achieving MDGs 4, 5 and 7 does not generate enough jobs or labour income improvements to achieve MDG 1 simultaneously. The domestic borrowing scenario appears to be the least favourable for reducing poverty, essentially because of the crowing-out effect on investment and growth. This scenario would furthermore seem less attractive because of the strong increase in public indebtedness. Besides trying to protect social expenditures, Ecuador's fiscal framework is also aimed at reducing the external debt overhang. In the case of the domestic-borrowing scenario, domestic public debt would increase to almost 30 per cent in 2015, up from about 13 per cent in the base year (see figure 14). Domestic public debt has been historically low in Ecuador for lack of a developed bond market. The model assumes such a market exists, however, hence allowing for the indicated rise in indebtedness at a given interest rate. This most likely underestimates the real cost of this financing strategy as, because of the

Figure 13.
Ecuador: Incidence of extreme poverty under the BAU and alternative MDG financing scenarios
(Percentage)[a]
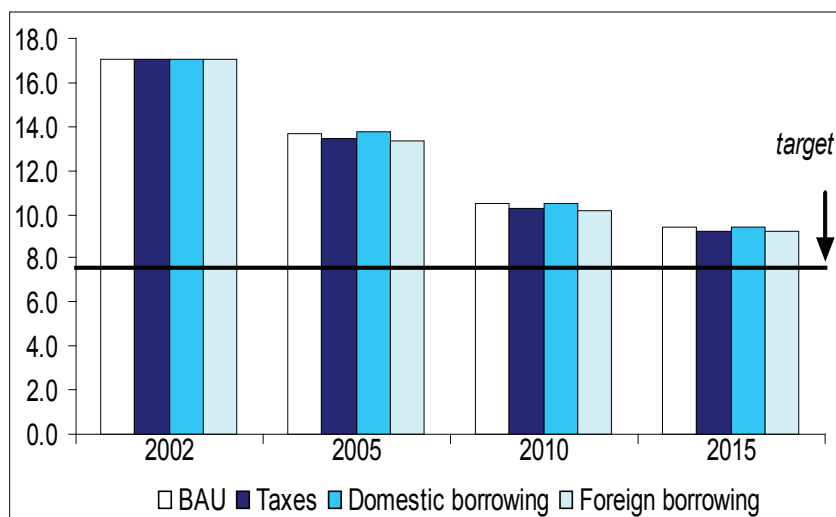
Source: León, Rosero and Vos (2006), based on the MAMS model for Ecuador.

a The incidence of extreme poverty is defined as the share of the total population living on less than 1$ a day. Calculations are based on labour-market outcomes for different types of workers as estimated in the MAMS model and after applying the microsimulation methodology (see footnote 6).

Figure 14.
Ecuador: Domestic public debt under the BAU and alternative MDG financing scenarios
(Percentage of GDP)
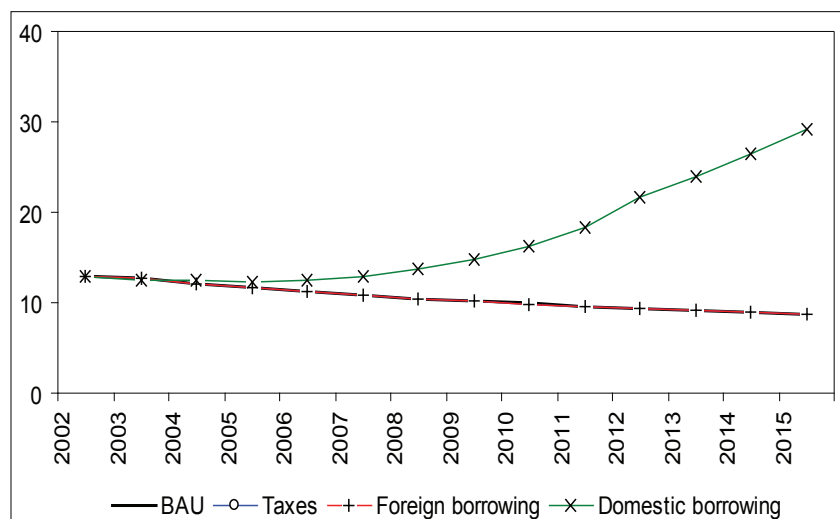
Source: León, Rosero and Vos (2006), based on the MAMS model for Ecuador.

underdevelopment of the domestic capital market, the government will only be able to issue bonds at very high rates.

Financing the MDG strategy with foreign borrowing would, in turn, lift external debt to unsustainable levels. The sustainable level of foreign indebtedness is defined at 40 per cent of GDP in the present fiscal policy framework (World Bank and Inter-American Development Bank, 2004). The MAMS model simulations suggest that this critical level would be surpassed by a substantial margin under the foreign-borrowing scenario, as the external debt-to-GDP ratio would move up to little more than 60 per cent by 2015 (see figure 15). The increase in the public debt overhang would be a concern under both scenarios as the total

Figure 15.
Ecuador: External public debt under the BAU and alternative MDG financing scenarios
(Percentage of GDP)
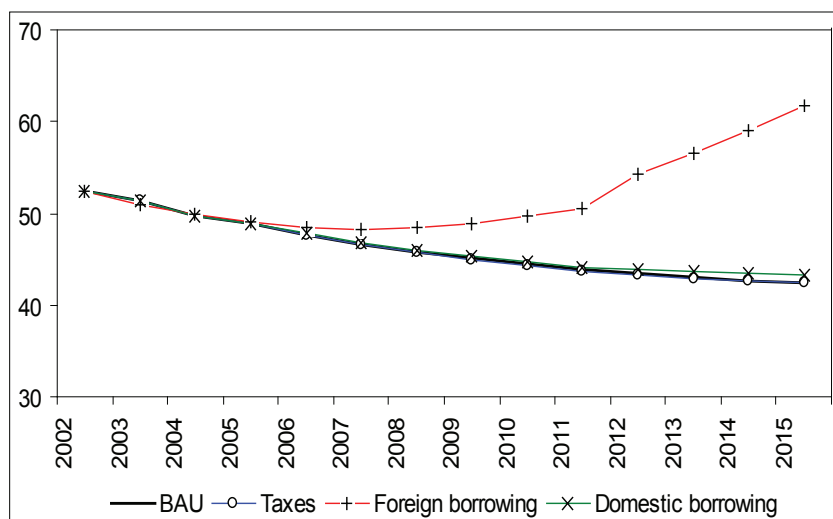
debt ratio would increase to nearly 70 per cent of GDP by 2015, which would be uncomfortably high even with the present high oil price levels.[12] Given Ecuador's track record of defaults on external debt, the foreign-financing scenario might raise most worries among international investors.

The tax-financing scenario would avoid such concerns, albeit at the cost of slower private investment and consumption growth compared to that of the baseline. The MAMS model suggests that direct income tax revenue would have to be raised by 3 percentage points of GDP in this case, but further reductions in public debt would be gained. Ecuador has ample scope for further tax reforms, particularly in improving direct tax collection. Income tax revenues represent just 1.5 per cent of GDP, which is low by any standard. Tax reforms are politically difficult in Ecuador, however; the more so, when they affect higher income groups. Hence, the challenge to policy makers will be to convince the elites to contribute some of their recurrent wealth to human development and the long-term benefit of the country. At the same time, with the current high oil prices, there is additional fiscal space to mobilize the resources for achieving the MDGs and the social goals that go beyond that. Thus, a further challenge is to make the existing framework for fiscal responsibility and stabilization of oil revenues work in order to effectively smooth adequate levels of public spending for poverty reduction and human development. This will require policies that enable public consumption-smoothing over a prolonged period of time—a challenge to Ecuadorian policy makers—but the fiscal responsibility law and fiscal stabilization fund established some time ago might provide, if consistently implemented, the right kind of framework to this end.

Conclusions

Poverty reduction and achievement of the other social goals defined in the Millennium Declaration should also be expected to yield a "growth dividend", as higher levels of human development facilitate productivity growth and economic development. While this may be true, additional public spending to achieve the

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12   It should be noted that the baseline scenario incorporates the recent increases in oil prices which have eased the country's financing constraints. It assumes that oil prices stay up during the simulation period, but this may be too optimistic as oil prices have historically shown strong fluctuations.

MDGs will also come with a cost, and adequate financing resources will have to be found in order to find the desired synergy between the economic and social gains of the poverty reduction strategy. The main trade-off, perhaps, is of an intertemporal nature. The growth dividend will take time to mature. For instance, keeping children in school longer for better educational outcomes also implies that there will be a time lag between the current investments in education and the productivity effects of having a better-trained workforce. As we have illustrated in this paper, the way investments are financed now may affect MDG achievements over time. Even in a middle-income country like Costa Rica, where the MDGs are within near reach, non-negligible macroeconomic trade-offs exist. In an economy reliant on export-led growth such as Costa Rica, Dutch Disease effects leading to RER appreciation, on the one hand, and tax increases that affect disposable incomes and domestic government borrowing that crowds out private investment, on the other, cause lower economic growth and less reduction of income poverty, at least in the short run. It makes clear once more that achieving the MDGs is not merely a matter of looking at aid effectiveness and effective social sector strategies and targeted poverty reduction programmes. It is, rather, more critical to adopt cautious macroeconomic policies that are consistent with poverty-reduction goals. As indicated at the beginning of this paper, this requires a view of macroeconomic policy-making that is broader than merely focusing on economic and monetary stability, as had been the mainstream approach of adjustment programmes in developing countries during the 1980s and 1990s.

The MAMS framework helps identify the main trade-offs, and this may better inform policy makers regarding how to conduct macroeconomic policies consistent with long-term development goals. Country contexts differ as well as the policy space available to pursue such policies, and more country-level analysis is required to understand fully all the trade-offs involved and the implications for the sequencing of policy interventions towards the MDGs. Furthermore, much more research is needed to understand the underlying quantitative relations. The MAMS framework as applied here goes a long way in establishing these, but as yet fairly little is known about the precise degree of synergy that exists between the different MDGs and the productivity gains that can be obtained from higher levels of human development. Moreover, much more analysis is needed of the scope for creating more fiscal space through more cost-effective public interventions in health, education and poverty reduction programmes. Existing studies are, by nature, programme- and sector-specific, but are rarely conducted with a view to serving broader macroeconomic policy discussions.

Such quantitative interactions have been imperfectly captured in the present general equilibrium analyses. Nonetheless, policy simulation analyses of this kind are indispensable when trying to obtain insight into the effectiveness of macroeconomic financing strategies towards the achievement of the MDGs and should therefore be helpful in informing and guiding national policy dialogues on these matters.

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