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Impact of the global crisis on the achievement of the MDGs in Latin America*Marco V. Sánchez and Rob Vos*

Abstract

Progress towards the MDGs is expected to slow as a consequence of the global economic downturn. This study applies an economy-wide framework to analyze the impact of the crisis on MDG achievement in six Latin American countries. It finds significant setbacks towards the goals and, in the case of the region's low-income countries, the cost of achieving these would rise between 1.6 and 3.4 per cent of GDP per year between 2010 and 2015 as compared with a no-crisis scenario. The additional public spending would contribute to economic growth though not sufficiently for full recovery to pre-crisis growth.

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Impact of the global crisis on the achievement of the MDGs in Latin America

Marco V. Sánchez and Rob Vos

1. Introduction

Substantial slowdown in the progress towards the Millennium Development Goals (MDGs) should be expected as a consequence of the global economic crisis that emerged in 2008. Even prior to the crisis and despite significant progress, many countries were not on track to meet most MDGs, as shown by the United Nations' most recent MDG report (United Nations, 2008). Until recently, robust income growth helped accelerate progress towards reducing income poverty in many countries, providing every child with primary school education appeared to be within grasp, and important gains in assisted child delivery and coverage of vaccination programmes contributed to declining child and maternal mortality. However, the multiple crises of high food and energy prices first, and the most recent global economic crisis subsequently, have created significant setbacks. Lower government revenue and income per capita will also lead to lower public and private spending on social services, affecting the MDGs. The precise magnitude of the setback is difficult to estimate at this point and will vary from country to country according to existing fiscal policy space and institutional capacity to respond to the crisis.

If pre-crisis trends had continued unabated, Latin America and the Caribbean (LAC) would likely be able to attain the MDGs of net enrolment in primary education, gender equality in education, coverage of sanitation and drinking water, and possibly also that of child mortality. The speed of progress for achieving the goals for extreme poverty reduction and decreasing maternal mortality has been insufficient, though. Pre-crisis progress, however, is assessed on the basis of linear projections, even though the path towards the goals need not follow a linear pattern. For instance, once child mortality rates have been lowered substantially, reducing them even further may require other, possibly more costly, interventions. Furthermore, policies may have changed since 1990, and new policies in place may make it more—or even less—likely to achieve the goals.

The study of Vos, Ganuza, Lofgren, Sánchez, and Díaz-Bonilla (2008) applies a dynamic-recursive computable general equilibrium (CGE) framework labelled MAMS to 18 LAC countries, in order to generate a baseline scenario that more appropriately helps to assess if countries are on or off track towards the MDGs under a continuation of growth and public spending trends.¹ Moreover, the MAMS model duly takes account of non-linearities in the effectiveness of social spending in achieving the targets. After considering such aspects, the study of Vos and others finds that in the case of child mortality, for instance, LAC as a region no longer seems to be on track, contrary to the linear projection. Only two countries (Chile and Cuba) would be able to achieve the goal of reducing maternal mortality. Also, in spite of good progress in terms of net enrolment, the outlook is much less bright for primary school completion rates once the region's (high) repetition and drop-out rates are taken into account. In contrast, the region would be on track for meeting the poverty-reduction target, owing mainly to the projected performance of the region's larger economies (Brazil and Mexico).

The study further concludes that in all country cases (except for Chile and Cuba), social expenditure efforts would need to be stepped up (in comparison with a baseline scenario that projects business-as-usual policies) in order to achieve the goals in primary education, child and maternal mortality, drinking water

¹ The study has been published in Spanish but its comparative results for all 18 Latin American and Caribbean countries are available in English in Vos, Sánchez, and Kaldewei (2008).

and basic sanitation. The costs in terms of required additional spending on MDG-related services range from about 1 to 7 per cent of GDP per year.² For most countries, however, the additional cost would be less than 3 per cent of GDP, which seems moderate in macroeconomic terms. These results suggest that achieving the MDGs seemed quite affordable for most countries in LAC—before the global economic downturn erupted, but in order to avoid undesirable macroeconomic trade-offs many of the countries would need to change existing public financing strategies. The study finds that in most cases, increasing tax revenue would seem the better option as this would avoid major real exchange-rate appreciations eroding export competitiveness and/or increased public debt distress from alternative financing through domestic or external public borrowing.

The study of Vos and others, nonetheless, was completed before the global economic crisis erupted and continued pre-crisis rates of growth of GDP and public spending up to 2015 were assumed to apply in the baseline scenarios for most countries. However, as said, substantial slowdown in the progress towards the MDGs should be expected as a consequence of the crisis. Against this background, the present paper tries to answer the following questions: (i) to what extent will the global economic crisis affect MDG achievement?; (ii) how much additional public spending will be needed to achieve the MDGs by 2015 owing to the negative impact of the crisis; (iii) will governments still be able to find sustainable funding for their MDG strategies?; and (iv) to what extent will increased MDG spending operate as an effective counter-cyclical response for economic recovery?

To respond to these questions, this present paper applies the same economy-wide modelling methodology used in the study of Vos and others, though for six Latin American countries (Bolivia, Brazil, Chile, Costa Rica, Honduras, and Nicaragua). An alternative baseline scenario is generated to project a recession in 2009–2010 and a slow and gradual recovery towards pre-crisis growth levels by 2015. This new ‘crisis’ baseline scenario as well as the MDG scenarios, which target the achievement of the MDGs for primary education, child and maternal mortality, and drinking water and basic sanitation goals, are compared with the “pre-crisis scenarios” as reported in the study of Vos and others.³ In what follows, we first give a brief description of the contours of the MAMS modelling framework (section 2), then analyze the simulation results of the “crisis scenarios” (section 3), to end with a summary of the main findings and policy conclusions (section 4).

2. The MAMS framework

An economy-wide framework is required to examine the capacity and financing constraints of countries to achieving the MDGs and the macroeconomic trade-offs associated with different financing strategies

2 The upper bound cost of 7 per cent of GDP per annum is estimated for Honduras. As reported in the study of Vos and others, this cost would be a little more than 5 per cent of GDP per annum since spending in other public infrastructure is also scaled up in the MDG scenarios and this enables faster achievement of the goals owing to which the MDG strategy is less costly. Another country whose required additional spending on MDG-related services was found to be high was Guatemala for which a 6 per cent of GDP per annum was estimated.

3 The MAMS framework takes no account of specific interventions to reduce income poverty. As a consequence, whether the target for poverty reduction (MDG 1) is analyzed or not is irrelevant to estimating how much more additional public spending will be needed to achieve the other goals by 2015 owing to the negative impact of the crisis. For this reason, the target for poverty reduction is not analyzed here. In the study by Vos and others (2008), poverty outcomes are assumed to result from the employment and income effects generated throughout the economy under the baseline and MDG scenarios for which a method of microsimulations is applied using micro data sets. The study concludes that, in more than half of the 18 countries studied, increased MDG-related public spending does not induce sufficiently strong employment and income-distribution effects to make adequate progress towards the required level of poverty reduction. A future extension of the present paper is to determine how income poverty would be affected under the crisis scenarios.

for timely achievement of the goals. The existence of a wide range of interaction effects is the rationale for the use of a CGE model. The pursuit of a strategy towards the achievement of the MDGs will likely have strong effects throughout the economy. It will undoubtedly affect the demand for and supply of different types of goods and services, labour and capital, and foreign exchange, and the related adjustments may imply important trade-offs throughout the period for achieving the MDGs. The general equilibrium framework also takes into consideration the possible synergies between the different MDGs. Such synergies may influence the required expansion of services (e.g., greater coverage of drinking water supply may reduce the need for health service expansion) or the speed at which the various MDGs are achieved. Studies that take all of these general equilibrium and synergy effects into account may generate substantially different outcomes than studies that focus exclusively on sector analyses.

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

Dynamic CGE models for the simulation of policies aimed at human development goals have been developed before in studies during the 1970s and 1980s, especially in those providing analytical depth to the so-called basic needs approach to development (see, e.g., Kouwenaar, 1986; Hopkins and van der Hoeven, 1982). At the time, such exercises were very time-consuming and costly because of data and computational limitations. Later, the shift away from concerns about employment, income distribution and poverty towards macroeconomic stability and structural adjustment in mainstream development policies also de-emphasized the need for such modelling efforts. More recently, work undertaken at the World Bank has revived the approach in the context of the ongoing debate about scaling up resources to achieve the MDGs. This newly developed framework has been labelled MAMS (*Maquette* for **M**DG **S**imulation) and was originally presented in Lofgren (2004). A version with more limiting assumptions can be found in Bourguignon and others (2004). The framework was originally designed to deal in particular with low-income country contexts and the trade-offs associated with the scaling-up of aid inflows for MDG-related expenditures. It has been extended and applied in the context of the aforementioned study of Vos and others covering 18 LAC countries. In what follows we highlight some of the main features of MAMS relevant for the discussion around the simulation results in the following section.⁴

The MAMS framework has been built from a fairly standard CGE framework with dynamic-recursive features but incorporates a special module which specifies the main determinants of MDG achievement and the direct impact of enhanced public expenditures on MDG-related infrastructure and services. MAMS considers specific targets for the MDGs of poverty reduction (MDG 1), achieving universal primary education (MDG 2), reducing under-five and maternal mortality (MDGs 4 and 5) and increasing access to safe water and basic sanitation (MDGs 7a and 7b). In the case of MDG 2, the demand for primary and other

⁴ Chapter 3 of the study of Vos and others provides a detailed description of MAMS as applied for the LAC countries.

levels of schooling is a function of student behaviour (enrolment, repetition, graduation). Student behaviour, in turn, depends on the quality of education (identified by variables such as classroom availability and student-teacher ratios), income incentives (the expected wage premium from education), the under-five mortality rate (a proxy for the health status of the potential student population), household consumption per capita (a proxy for the capacity to pay for education and for opportunity costs) and the level of public infrastructure (a proxy for the effective distance to school). Under-five and maternal mortality are considered to be determined by the availability of public and private health services, household consumption per capita, the level of public infrastructure (a proxy for the effective distance to health centres and hospitals), and the coverage of water and sanitation services. Access to water and sanitation, on the other hand, is modelled as a function of household consumption per capita, the provision of such services by public or private providers and the level of public infrastructure. Achievements in the reduction of income poverty are measured as the outcome of the overall general equilibrium effects from dynamic adjustments in production, employment, wages and other relative prices, as well as changes in the quality of human capital through MDG-related expenditures.

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

The average skill level of the labour force will increase over time as more better-educated graduates leave the schooling system. This will in turn enhance productivity growth, with subsequent wage- and income-distribution effects. Output growth may be fostered as a result of those productivity gains, potentially triggering economy-wide effects which in turn will affect MDG achievement.⁵ Achievements in drinking water and sanitation supply also help to improve health conditions, and improved health status may in turn impact positively on education outcomes along with other determinants.

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

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

3. Scenario analysis

Assumptions of the “crisis scenarios”

The “pre-crisis scenarios” reported in the study of Vos and others (2008) take as a benchmark a baseline scenario of continued growth and public spending trends where most countries grow at respectable rates. The new assumption of the “crisis scenarios” as analyzed in this paper is that real GDP (at factor cost) and real public spending do not grow in 2009-2010 and they subsequently recover slowly and gradually towards pre-crisis growth levels by 2015.⁶ Given this new assumption, both public spending and GDP no longer grow at past trends during 2009-2015 in the baseline scenario, as in the study of Vos and others. In order to assess the extent to which scaling up spending in public infrastructure would affect both MDG achievement and economic recovery, the MDG scenarios that use the crisis baseline scenario as their benchmark were also generated under the assumption that public spending on non-MDG public infrastructure is 3 percentage points of GDP higher during 2010-2015. The main results of the “crisis scenarios” are presented and discussed below; supplementary results can be found in the statistical annex. For comparison, some results of the study of Vos and others are also presented.

Impact of the crisis on the MDGs

We find that the projected recession in 2009 and 2010, followed by the slow recovery towards pre-crisis growth levels by 2015, would put some of the region’s low-income countries (Bolivia, Honduras, and Nicaragua) substantially further off track towards the goals for primary school completion, child and maternal mortality and access to drinking water and basic sanitation. Brazil, Chile, and Costa Rica that seemed well on track towards achieving most of the MDGs by 2015 under a continuation of spending and growth trends, would fall short on several of the targets because of the crisis. As shown in Figure 1, there would be pronounced setbacks for primary school completion and child mortality. Progress towards the targets for reducing maternal mortality and increasing coverage of water and sanitation would also decelerate visibly as shown in Table A1.

Costs of achieving the MDGs by 2015

To make up for lost MDG progress owing to the crisis, Governments of Bolivia, Honduras and Nicaragua would need to spend an extra 1.6 (Bolivia) to 3.4 (Honduras) per cent of GDP per year on education, health, and basic services between 2010 and 2015 in order to achieve the MDGs, as compared with the pre-crisis scenario and if externally financed (see Figure 2 and Table A2). This would come on top of an additional required annual social spending of 2 per cent of GDP in Bolivia, 5 per cent in Nicaragua, and 7 per cent in Honduras in absence of the crisis.⁷ For Brazil, Chile, and Costa Rica, the required additional spending caused by the expected impact of the crisis would be in the order of between 0.5 and 1.5 per cent of

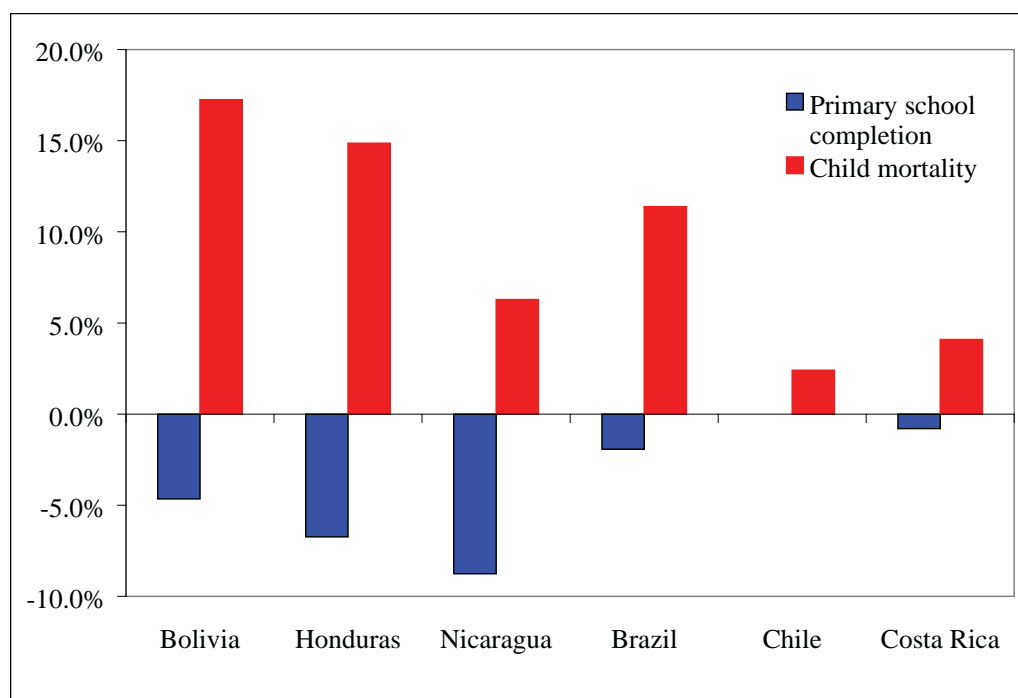
6 In the updated baseline forecast for 2009-2010 of the United Nations’ *World Economic Situation and Prospects as per mid-2009* (<http://www.un.org/esa/policy>), Brazil, Chile, and Honduras are expected to have negative GDP growth in 2009 and weakly positive growth in 2010 (assuming some global recovery in that year). Only Bolivia is projected to have meager positive growth of 1-1.5 per cent on both years, while Costa Rica and Nicaragua are projected to suffer negative growth in both 2009 and 2010. For the sake of comparability, in the present exercise it is assumed that all countries have no growth at all in 2009 and 2010. In subsequent analysis, the analysis will also be conducted for country-specific growth projections.

7 As mentioned in a previous footnote, the additional required annual social spending reported in Vos and others (2008) is about 5 per cent of GDP per annum for Honduras, since the MDG scenarios consider the synergy effect of increasing spending in public infrastructure on achieving the goals. In contrast, the 7 per cent of GDP additional required annual social spending reported here for Honduras is found for MDG scenarios in which public infrastructure spending is not scaled up at the same time.

GDP per annum. Clearly, additional costs of this magnitude may overstretch government finances and lead to unsustainable increases in public debt and become a source of macroeconomic instability further down the line if recovery and sustained growth do not set it swiftly.

Figure 1

Impact of the crisis on primary school completion and child mortality rates by 2015 in selected Latin American countries (percentage change)^a



Source: Vos and others (2008) for the pre-crisis scenarios and authors' MAMS simulation results for the crisis scenarios.

a Results refer to percentage change in primary school completion rates and child mortality rates, respectively, comparing outcomes for crisis and pre-crisis baseline scenarios by 2015. The pre-crisis scenario assumes continued growth trends for GDP and public spending up to 2015 from around 2000 to 2007. The crisis baseline scenario assumes significant growth deceleration for GDP and public spending during 2009 and 2010 and gradual recovery from 2011 to return to pre-crisis growth rates by 2015.

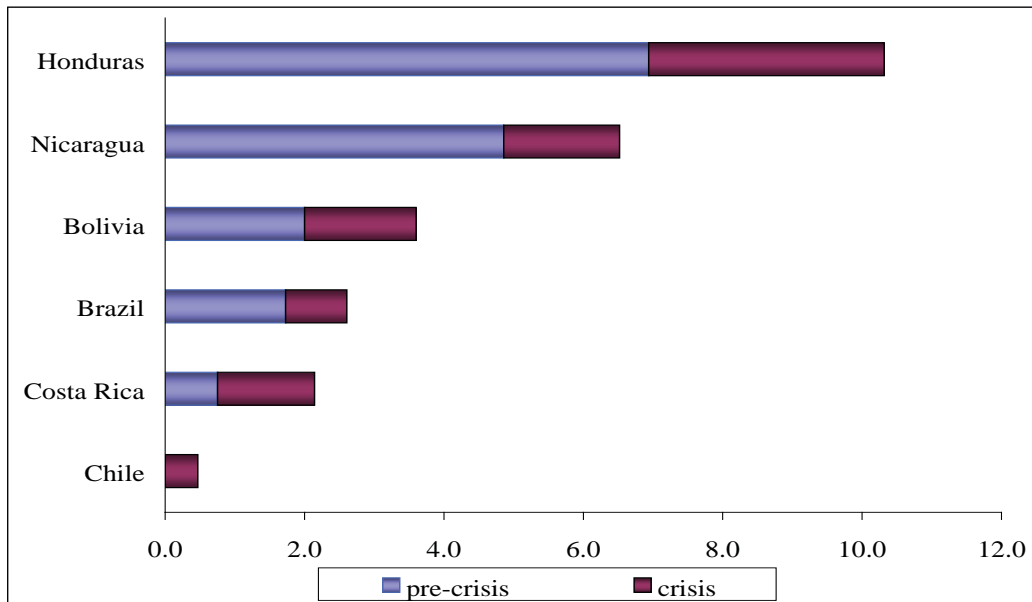
MDG spending and economic recovery

Further analysis shows that increased social spending as part of the MDG strategy is counter-cyclical and would contribute to growth recovery, albeit not enough to return swiftly to pre-crisis levels of economic growth (see Figure 3). This is so because spending on MDG-related services represents relatively low shares of aggregate demand in the countries under study. Stronger growth effects likely will emerge over time, however, as improved education and health outcomes should be expected to underpin stronger productivity growth. Not surprisingly, the short-term counter-cyclical effects of the MDG strategy spending are strongest where the required increase in public spending is strongest, as is the case in Bolivia and Honduras. The effect is surprisingly weaker in Nicaragua, where enhanced fiscal spending is causing stronger real exchange rate appreciation, such that the aggregate demand impulse is partially offset by a further weakening of exports.

The counter-cyclical response becomes much stronger if the MDG strategy is complemented by much needed investments in public infrastructure in these countries as also shown in Figure 3. Yet for all countries it holds that other factors need to contribute as well for full recovery, especially resumption of external demand is essential in light of the results that are explained next.

Figure 2

Additional public spending for MDGs needed to achieve education, health and water and sanitation targets by 2015 (percentage of GDP; average annual cost for 2010-2015)^a

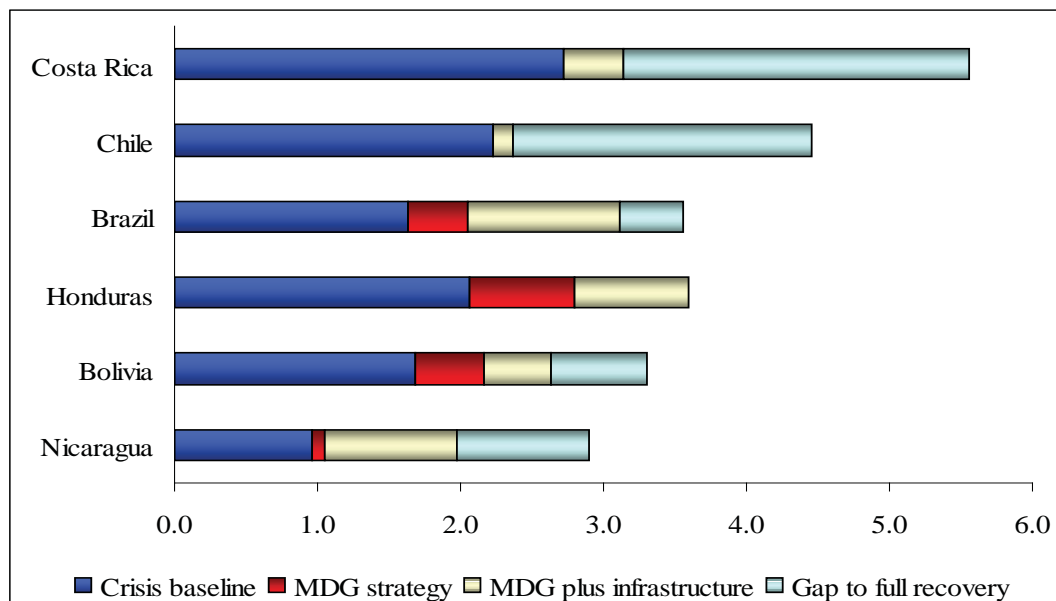


Source: Vos and others (2008) for the pre-crisis scenarios and authors' MAMS simulation results for the crisis scenarios.

- a Estimates refer to the difference between the levels of public spending needed to achieve the targets by 2015 in the MDG scenario with foreign borrowing and the baseline scenario under both pre-crisis and crisis baseline assumptions. MDG targets are for primary school completion (100 per cent), child and maternal mortality (two-third and three-quarter reductions, respectively, from 1990 levels), and drinking water and sanitation (reducing people without access by half).

Figure 3

Simulated countercyclical impact of increased MDG and public infrastructure spending on GDP growth, 2010-2015 (average annual rate of growth in per cent)^a



Source: Vos and others (2008) for the pre-crisis scenarios and authors' MAMS simulation results for the crisis scenarios.

- a For this figure the MDG strategy is one in which all additional public spending for MDGs needed to achieve education, health, and water and sanitation targets by 2015 is financed through foreign borrowing. The gap to full recovery is the difference between the pre-crisis rate of GDP growth and the simulated rate of GDP growth in the scenario of increased public spending for MDG achievement and expansion of infrastructure.

Feasibility of financing additional public spending for MDGs

The increase in the required additional spending to achieve the MDGs owing to the simulated effects of the crisis would likely make it implausible for some countries to finance the MDG strategy by increasing either taxes or public borrowing. For the pre-crisis scenarios, Vos and others (2008) had concluded that the required increase in the tax burden would seem feasible in those cases where this would be in the range of 1.0–2.5 per cent of GDP over the whole simulation period (to 2015). These cases included Brazil and Costa Rica, among others. Beyond the (somewhat arbitrarily chosen) upper bound of the indicated range, tax reform should be expected to be much more demanding for a variety of reasons, including political constraints. With this in mind, the feasibility of tax financing when the effects of the crisis are taken into consideration could be reassessed by computing the magnitude by which the annual average of income-tax revenue as a percentage of GDP for 2010–2015 in the MDG financing scenario would have to change with respect to the baseline scenario in order to achieve the MDGs. The estimated required tax increase in the crisis scenarios is then compared with that for the pre-crisis scenarios.⁸ By this measure, tax financing remains a feasible strategy only for Chile when the simulated effects of the crisis are taken into consideration (see Table A3). It may no longer be very feasible in the cases of Costa Rica and Brazil, which in the crisis scenario would have to raise income tax revenue, respectively, by about 4 and 3 percentage points of GDP. To achieve such a tax increase in the remaining five years to 2015 seems a tall order. In the other three countries, the required tax increases were already unfeasibly large in the pre-crisis scenarios. The crisis scenarios suggests that tax financing of the strategy would require raising the tax burden by 4.3, 13.2 and almost 6.4 per cent of GDP per annum in the cases of Bolivia, Nicaragua, and Honduras, respectively.

In the pre-crisis scenarios, total public debt was found to rise to 65 per cent of GDP or (much) more under the domestic and external borrowing scenarios in all 18 country cases except for Peru (see Table A.3 for the six countries under analysis). This would put public indebtedness beyond critical levels of sustainability in most countries—even under the much higher growth paths of the pre-crisis scenarios. The debt outlook worsens when the effects of the crisis are taken into consideration owing to the fact that, as explained earlier, the amount of spending that needs to be financed increases. A MDG financing strategy based on borrowing might perhaps only work for Chile where the pre-crisis debt stock is fairly small. If measured as earlier for the revenue-to-GDP ratio, Chile's GDP-to-debt ratio would only have to increase by about 2.5 percentage points.

Given the above, for Bolivia, Honduras, and Nicaragua, who are eligible for debt relief under the HIPC initiative and the multilateral debt relief initiative, aid financing of the additional MDG-spending would seem as the most feasible option in a time when these countries' economy is being seriously hit by the crisis. This, of course, would be provided that donors are willing to support countries like these, to whom they have already transferred significant amounts of development assistance under the HIPC initiative. Even if such financial support were readily available, these countries should consider enhancing domestic resource mobilization also, especially through tax reform, in order to reduce aid dependency over time. Brazil and Costa Rica will have no option other than seeking a combination of tax reform and very limited public borrowing. For all countries, it applies that an effective crisis response should also entail taking measures to increase in the efficiency of MDG-related spending.

⁸ This is a correct approach to the extent that the pre-crisis and crisis baseline scenarios are different such that tax revenue as a percentage of GDP is measured in different scales. This in fact explains why, for Bolivia and Chile, for example, annual average income-tax revenue as a percentage of GDP is lower in the crisis scenarios compared with in the pre-crisis scenarios (see Table A3).

4. Conclusion and policy implications

This paper used a comprehensive general equilibrium modelling framework for six Latin American countries to find that a projected recession in 2009 and 2010 and a slow and gradual recovery towards pre-crisis growth levels by 2015 would put some of the region's low-income countries (Bolivia, Honduras and Nicaragua) substantially further off track towards the MDGs for primary school completion, child and maternal mortality, and access to drinking water and basic sanitation. Brazil, Chile and Costa Rica that seemed well on track towards achieving most of these goals by 2015, would fall short in meeting several targets because of the crisis.

Governments of Bolivia, Honduras and Nicaragua would need to spend an extra 1.6 to 3.4 per cent of GDP per year on education, health and basic services between 2010 and 2015 to achieve the MDGs, as compared with the pre-crisis scenario. This would come on top of an additional required annual social spending of 2 per cent of GDP in Bolivia, 5 per cent in Nicaragua, and 7 per cent in Honduras in absence of the crisis. For Brazil, Chile, and Costa Rica, the required additional spending caused by the expected impact of the crisis would be between 0.5 and 1.5 per cent of GDP per annum. Clearly, additional costs of this magnitude may stretch government finances, lead to unsustainable increases in public debt, and become a source of macroeconomic instability in the future, if recovery and sustained growth do not set in swiftly.

Further analysis shows that increased social spending would contribute to growth recoveries. However, countries would not return swiftly to pre-crisis levels of economic growth and employment as spending on MDG-related services represents relatively low shares of aggregate demand in these countries. Stronger growth effects are likely to emerge over time as improved education and health outcomes underpin stronger productivity growth. The counter-cyclical response becomes much stronger if the MDG strategy is complemented by needed investments in public infrastructure. For a full recovery, however, other factors need to contribute as well, especially the resumption of external demand. This will require globally concerted stimulus measures to take effect.

External financial support in the form of aid and/or debt relief will be required to provide the additional fiscal space and avoid an insurmountable rise in external debt, especially in low-income countries. Careful macroeconomic management would nonetheless be required to avoid growth costs elsewhere in the economy—especially a loss of competitiveness in export sectors owing to appreciation of the real exchange. The upshot is that counter-cyclical macroeconomic policies can be feasibly aligned with long-term development objectives if carefully managed and supported by the international community.

Statistical annex

Table A1
Achievement of the MDGs under pre-crisis and crisis baseline scenarios in six Latin American countries, 2015

Country	MDG 2		MDG 4		MDG 5 ^a		MDG 7a		MDG 7b	
	Indicator ^b	Target	Indicator ^c	Target	Indicator ^d	Target	Indicator ^e	Target	Indicator ^f	Target
Bolivia										
Pre-crisis scenarios ^g	93.4	100.0	40.0	30.0	--	--	76.1	79.0	57.1	64.0
Crisis scenarios 1 ^h	89.1	100.0	46.9	30.0	--	--	72.2	79.0	46.3	64.0
Brazil										
Pre-crisis scenarios ^g	79.8	100.0	19.8	16.0	--	--	100.0	100.0	100.0	100.0
Crisis scenarios 1 ^h	78.3	100.0	22.0	16.0	--	--	99.8	100.0	99.9	100.0
Chile										
Pre-crisis scenarios ^g	98.0	100.0	5.0	6.4	10.0	10.0	99.4	99.0	98.9	97.2
Crisis scenarios 1 ^h	98.0	100.0	5.1	6.4	10.0	10.0	98.8	99.0	96.6	97.2
Costa Rica										
Pre-crisis scenarios ^g	99.1	100.0	7.0	6.0	25.4	20.0	80.5	80.5	93.5	93.5
Crisis scenarios 1 ^h	98.3	100.0	7.3	6.0	27.1	20.0	79.8	80.5	93.5	93.5
Honduras										
Pre-crisis scenarios ^g	90.7	100.0	32.6	24.0	90.0	69.9	85.2	95.0	81.5	95.0
Crisis scenarios 1 ^h	84.6	100.0	37.4	24.0	100.4	69.9	83.2	95.0	78.4	95.0
Nicaragua										
Pre-crisis scenarios ^g	71.9	100.0	24.3	22.7	48.9	40.0	83.3	85.3	65.4	72.5
Crisis scenarios 1 ^h	65.6	100.0	25.8	22.7	57.9	40.0	83.0	85.3	63.7	72.5

Source: Vos and others (2008) for the pre-crisis scenarios and authors' MAMS simulation results for the crisis scenarios.

- a Entries have been left blank when MDG 5 was not analysed for the corresponding country in the study for LAC.
- b On-time primary school completion rate.
- c Under-five mortality rate (per 1,000 live births). For Bolivia, the indicator is the infant (under-one) mortality rate.
- d Maternal mortality rate (per 100,000 live births except for Chile for which per 10,000 live births is used).
- e Percentage of the population without sustainable access to safe drinking water.
- f Percentage of the population without sustainable access to basic sanitation.
- g Baseline and MDG financing scenarios as reported in the study of Vos and others (2008).
- h Scenarios based on a baseline whereby real GDP (at factor cost) and real public spending do not to grow in 2009-2010 and recover steadily from 2011 until converging to the pre-crisis annual average growth rate by 2015.

Table A2

Required additional public spending for achieving the MDGs^a under alternative financing scenarios in six Latin American countries, 2010-2015 (percentage of GDP)

	Public spending in BAU scenario		Required additional public spending								
			MDG scenario with foreign grants		MDG scenario with income taxes		MDG scenario with foreign borrowing		MDG scenario with domestic borrowing		
	Total	MDG-related ^b	Total ^c	MDG-related ^c	Total ^c	MDG-related ^c	Total ^c	MDG-related ^c	Total ^c	MDG-related ^c	
Bolivia											
Pre-crisis scenarios ^d	17.5	4.1	1.3	1.5	3.4	3.5	1.8	2.0	3.4	3.5	
Crisis scenarios 1 ^e	15.4	4.1	3.3	3.6	4.1	4.3	3.3	3.6	3.3	3.6	
Crisis scenarios 2 ^f	15.4	4.1	5.8	2.9	6.5	3.6	5.8	2.9	5.8	2.9	
Brazil											
Pre-crisis scenarios ^d	20.6	9.4	--	--	2.1	2.3	1.4	1.7	2.2	2.3	
Crisis scenarios 1 ^e	23.1	10.5	--	--	3.1	3.4	2.0	2.6	3.2	3.4	
Crisis scenarios 2 ^f	23.1	10.5	--	--	3.5	3.5	3.0	2.6	3.7	3.6	
Chile											
Pre-crisis scenarios ^d	12.7	4.9	--	--	0.0	0.0	0.0	0.0	0.0	0.0	
Crisis scenarios 1 ^e	12.7	4.9	--	--	0.5	0.5	0.4	0.5	0.5	0.5	
Crisis scenarios 2 ^f	12.7	4.9	--	--	4.2	1.3	2.7	0.1	4.2	1.3	
Costa Rica											
Pre-crisis scenarios ^d	13.8	6.1	--	--	1.0	1.0	0.7	0.8	1.4	1.2	
Crisis scenarios 1 ^e	15.0	7.5	--	--	2.6	2.6	2.2	2.1	3.1	2.9	
Crisis scenarios 2 ^f	15.0	7.5	--	--	4.9	2.0	4.2	1.4	5.4	2.2	
Honduras											
Pre-crisis scenarios ^d	18.5	7.3	6.9	6.9	7.4	7.3	6.9	6.9	7.4	7.3	
Crisis scenarios 1 ^e	16.0	6.9	10.4	10.3	10.7	10.6	10.4	10.3	10.7	10.6	
Crisis scenarios 2 ^f	16.0	6.9	11.9	9.1	12.3	9.5	11.9	9.1	12.3	9.5	
Nicaragua											
Pre-crisis scenarios ^d	30.2	6.6	4.1	4.9	5.3	6.1	4.1	4.9	7.3	6.4	
Crisis scenarios 1 ^c	24.3	5.3	5.8	6.5	7.4	8.1	5.8	6.5	10.1	9.0	
Crisis scenarios 2 ^f	24.3	5.3	6.6	4.8	8.2	6.4	6.6	4.8	10.5	7.1	

Source: Vos and others (2008) for the pre-crisis scenarios and authors' MAMS simulation results for the crisis scenarios.

- The MDGs being achieved by 2015 are the following: MDG 2 (100 per cent on-time primary school completion rates for the relevant age cohort), MDG 4 (reduction of the under-five mortality rate by two-thirds from 1990), MDG 5 (reduction of the maternal mortality ratio by three-quarters from 1990), and MDG 7 (reduction of the proportion of people without sustainable access to safe drinking water and basic sanitation).
- MDG-related public spending comprises final-consumption and investment spending in primary education, health, and water and sanitation.
- Annual average public spending under the respective MDGs financing scenario minus the annual average public spending under the baseline scenario, all in percentage points of GDP. The additional public spending for achieving MDG 5 is not accounted for in the cases of Bolivia and Brazil. Some entries have been left blank because the MDG scenario with foreign grants is irrelevant in the context of the country.
- Baseline and MDG financing scenarios as reported in the study of Vos and others (2008).
- Scenarios based on a baseline whereby real GDP (at factor cost) and real public spending do not to grow in 2009-2010 and recover steadily from 2011 until converging to the pre-crisis annual average growth rate by 2015.
- These are the "crisis scenarios" assuming also that public spending on non-MDG public infrastructure is 3 percentage points of GDP higher during 2010-2015.

Table A3
Annual average income-tax revenue (2010-2015) and total cumulated public debt (2015) under the baseline and MDG financing scenarios in six Latin American countries (percentage of GDP)

	<i>BAU scenario</i>		<i>MDG scenario with income taxes</i>		<i>MDG scenario with foreign borrowing</i>		<i>MDG scenario with domestic borrowing</i>	
	<i>Revenue</i>	<i>Debt</i>	<i>Revenue</i>	<i>Debt</i>	<i>Revenue</i>	<i>Debt</i>	<i>Revenue</i>	<i>Debt</i>
Bolivia								
Pre-crisis scenarios ^a	8.1	52.4	11.0	51.6	8.1	95.6	8.1	111.4
Crisis scenarios 1 ^b	6.1	57.0	10.4	54.8	6.1	116.1	6.1	116.1
Crisis scenarios 2 ^c	6.1	57.0	10.5	52.5	6.1	126.9	6.1	126.9
Brazil								
Pre-crisis scenarios ^a	14.2	56.1	19.8	55.1	14.2	105.2	15.9	171.0
Crisis scenarios 1 ^b	18.2	56.6	25.4	54.8	18.3	109.9	20.7	161.4
Crisis scenarios 2 ^c	18.2	56.6	26.6	54.5	18.3	99.1	20.8	167.1
Chile								
Pre-crisis scenarios ^a	5.3	13.7	5.2	13.7	5.3	16.3	5.3	16.7
Crisis scenarios 1 ^b	4.5	16.5	4.9	16.5	4.5	21.4	4.6	22.1
Crisis scenarios 2 ^c	4.5	16.5	19.7	16.0	4.6	38.9	4.7	34.7
Costa Rica								
Pre-crisis scenarios ^a	3.6	51.8	4.8	52.1	3.6	66.5	3.7	86.0
Crisis scenarios 1 ^b	5.1	51.6	8.0	52.0	5.1	75.2	5.4	102.4
Crisis scenarios 2 ^c	5.1	51.6	10.1	50.9	5.1	80.1	5.4	112.1
Honduras								
Pre-crisis scenarios ^a	8.6	68.8	18.6	66.4	8.4	112.6	8.7	131.0
Crisis scenarios 1 ^b	3.9	80.1	17.1	77.4	3.8	130.4	4.0	162.1
Crisis scenarios 2 ^c	3.9	80.1	18.5	75.4	3.8	134.0	4.0	164.6
Nicaragua								
Pre-crisis scenarios ^a	2.6	127.8	6.5	124.6	2.6	158.3	2.7	192.7
Crisis scenarios 1 ^b	2.7	137.8	9.1	133.5	3.6	175.5	3.7	224.0
Crisis scenarios 2 ^c	3.2	137.8	10.0	131.8	4.2	174.3	3.8	221.1

Source: Vos and others (2008) for the pre-crisis scenarios and authors' MAMS simulation results for the crisis scenarios.

- a Baseline and MDG financing scenarios as reported in the study of Vos and others (2008).
- b Scenarios based on a baseline whereby real GDP (at factor cost) and real public spending do not to grow in 2009-2010 and recover steadily from 2011 until converging to the pre-crisis annual average growth rate by 2015.
- c These are the "crisis scenarios" assuming also that public spending on non-MDG public infrastructure is 3 percentage points of GDP higher during 2010-2015.

References

- Bourguignon, François, Maurizio Bussolo, Luiz Pereira da Silva, Hans Timmer, and Dominique van der Mensbrugge (2004). "MAMS: Maquette for MDG simulations". March, World Bank: Washington, D.C. (processed).
- Hopkins, Michael, and Rolph van der Hoeven (1982). "Policy analysis in a socio-economic model of basic needs applied to four countries", *Journal of Policy Modeling*, 4 (3): 425-55.
- Kouwenaar, Arend (1986). *A Basic Needs Policy Model*, Amsterdam: North-Holland.
- Lofgren, Hans (2004). "MAMS: An economy wide model for analysis of MDG country strategies", World Bank, Development Prospects Group, Washington, D.C. (processed).
- United Nations (2008). *The Millennium Development Goals Report, 2008*, New York: United Nations.
- United Nations (2009) World Economic Situation and Prospects as per Mid-2009, New York: UN-DESA (<http://www.un.org/esa/policy>).
- Vos, Rob, Enrique Ganuza, Hans Lofgren, Marco V. Sánchez and Carolina Díaz-Bonilla, eds. (2008). *Políticas Públicas para el Desarrollo Humano ¿Cómo lograr los Objetivos de Desarrollo del Milenio en América Latina y el Caribe?* Santiago de Chile: Uqbar Editores y Programa de las Naciones Unidas para el Desarrollo (PNUD). (Forthcoming also in English in 2009 as: Marco V. Sánchez, Rob Vos, Enrique Ganuza, Hans Lofgren, and Carolina Díaz-Bonilla (eds), *Public Policies for Human Development. Feasible Financing Strategies for Achieving the MDGs in Latin America and the Caribbean*, London: Palgrave Macmillan).
- Vos, Rob, Marco V. Sánchez and Cornelia Kaldewei (2008) "Latin America and the Caribbean's Challenge to Reach the MDGs: Financing Options and Trade-offs", *UN-DESA Working Paper Series* No. 68, New York: United Nations Department of Economic and Social Affairs.