Constraints to Achieving the MDGs with Scaled-Up Aid

François Bourguignon and Mark Sundberg

Abstract

This paper examines the macroeconomic and structural constraints to scaling up aid flows to developing countries to meet the Millennium Development Goals in 2015, including infrastructure, competitiveness and the real exchange rate, labour markets, fiscal constraints, governance, and aid volatility and fragmentation. The impact of these constraints on cost-efficient sequencing and composition of scaled-up aid flows is considered, using a dynamic computable general equilibrium model applied to Ethiopia. The main conclusions are that: (i) accelerating growth through productivity-enhancing infrastructure investment (and improved governance) is key to achieving the MDGs; (ii) large increases in aid risk undermining competitiveness and future growth; and (iii) skilled labour constraints require careful aid sequencing that limit the scope for frontloading.

JEL classification: O11 (Macroeconomic Analyses of Economic Development); O12 (Microeconomic Analyses of Economic Development); O21 (Planning Models; Planning Policy).

Keywords: Millennium Development Goals (MDGs), aid effectiveness, scaling up aid, absorptive capacity.

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The international community is preparing to embark on a grand experiment, something never attempted before. A new compact is being designed to both scale up aid and change the way it is delivered and how it is used by recipient countries. The goal is to make dramatic progress in advancing human development in the world's poorest countries. The complexity of the task is enormous; but so is the promise of improving the lives of millions of people and building a safer, more stable and more prosperous world.

The main element of this experiment is a new "mutual accountability" on the part of both the donor community and the recipient countries. It aims to overcome the dilemma at the heart of scaling up aid: whereas donors are unwilling to transfer large resources to developing countries without guarantees that credible plans and competent institutions are in place to use resources to advance the Millennium Development Goals (MDGs), developing countries need a credible guarantee of sustained support in order to build sound plans and undertake the necessary institutional strengthening. The essence of the Monterrey Consensus of 2002 is that donors and International Financial Institutions (IFIs) work together to improve the quality of aid mobilization and delivery, to improve aid predictability and stability, and to ensure that aid is aligned with national development strategies. Recipient governments must for their part have credible financial management capacity, governance and service delivery mechanisms to ensure that resources will be used effectively.

This paper addresses the macro and structural challenges facing aid recipients and donors that lie at the heart of the Monterrey Consensus and its implicit accountabilities. How can developing countries approach macroeconomic and structural constraints that potentially prevent new aid flows from being effectively employed or that present intertemporal tradeoffs? How can labour market constraints to scaling up aid be handled? How should countries sequence aid inflows to reduce price effects that could reduce growth potential? Does aid risk undermining fiscal sustainability in otherwise stable economies? What does improving aid quality and predictability imply for developing countries embarking on the preparation of ten-year development strategies? These were all important questions during 2005, the "Year of Development", and remain so.

Several papers have been written recently on this subject (including IMF 2005a, 2005b; Heller, 2005; Foster, 2003; World Bank, 2004a, 2005d). These papers discuss the potential short-run macroeconomic issues that may arise from large increases in aid, depending on how the aid is utilized and given the different structural characteristics of the recipient country. There has been little effort, however, to systematically gauge the impact on poor countries of higher aid flows targeting the MDGS. One reason is that there is little experience with such rapidly scaled-up assistance targeting the social and development needs of developing countries. Another reason is that it requires an understanding of the complex interactions of both the macroeconomy and the underlying characteristics of the specific MDG services to which aid is being directed. Both of these factors pose special challenges to planners and economists examining these interactions.

This paper contributes to this literature by revisiting the main macro and structural issues posed by a rapid scaling-up of aid inflows, with particular reference to typical structural features of low-income African economies. It examines both the implications of aid flows from the perspective of recipient countries and the issue of improving the external quality of aid from donors and IFIs. Following a discussion of the main policy issues, the paper presents one modelling approach that captures some of the main macro and institutional characteristics of aid recipients, which is then applied to the case of Ethiopia. The simulations presented are aimed at helping to think through the effects of higher ODA flows, but of course models simplify reality and the actual response will always vary—there will inevitably be surprises.

The next section of the paper reviews the main macroeconomic and structural issues posed by a rapid scaling up of external assistance. The third section briefly presents a modelling framework for examining macro and sectoral interactions surrounding scaling up to reach the MDGs. The fourth section examines the case of Ethiopia and presents the results of a simulated scaling up of aid that would be adequate for reaching the MDGs by 2015.

Constraints to scaling up aid to reach the MDGs

There are several constraints to achieving the MDGs and to external aid as an instrument for reaching the MDGs, particularly in the short run. The constraints that are frequently cited revolve around macro-economic features of developing country markets, structural constraints to scaling up service delivery, limitations to economic policy management and issues concerning how aid itself is provided (for instance, Heller, 2005; World Bank, 2004a, 2005d). Macroeconomic issues arise from the magnitude of aid relative to the domestic economy and the impact of large externally financed public expenditures on relative prices in the economy. The potential costs of large aid inflows appreciating the local currency and undermining traded goods competitiveness (Dutch disease) is often cited.

Structural constraints to scaling up relate to skilled labour shortages, weak capital markets and potential infrastructure bottlenecks. Each of these potentially act to increase the marginal costs of increasing delivery of public services essential to achieving the MDGs—such as education, health care, water and sanitation services. The quality of governance and institutions will also influence the outcome of scaling up, presenting both risks of higher corruption or "capture" as aid flows increase as well as opportunities to strengthen anti-corruption measures and reinforce accountability mechanisms that can improve governance.

Finally, the volatility of aid flows, fragmentation of external support and the multiplicity of donor objectives independent of government development strategies can exact significant "compliance costs" associated with aid flows. These are largely outside the control of aid recipients but can impose serious costs on the capacity to manage and plan for the use of aid in recipient countries.

Each of these concerns has been discussed widely in the literature on aid effectiveness. The empirical evidence relevant to the current debate over scaling up aid is, however, quite limited for two reasons. First, there has been no historical experience with regard to increasing external support in the amounts being discussed today. Second, the mechanisms and modalities of aid are changing: aid is becoming more selective and focused on countries that demonstrate capacity and stronger performance; geopolitics are less of a force in aid allocation; and international discourse on aid modalities has come to

focus on results and outcomes rather than on counting inputs alone. This has largely been in recognition of the failed aid programmes of the past.

This section discusses six factors affecting the ability of scaled-up aid flows to help developing countries achieve the MDGs. The first of these is the contribution of aid to growth. Without increasing growth rates, it will not be possible for most low-income countries to reach Goal 1 of the MDGs (MDG 1) of halving income poverty. A second factor is the macroeconomic management of large aid inflows to minimize the erosion of export competitiveness and reduced growth opportunities in the future. Third, for many countries, the second major constraint to scaling up public service delivery (after financing) is labour. Skilled labour shortages have major implications for the timing and scope of scaling up public service delivery. Fourth, large aid inflows will require competent management of public resources and budgets, and management of the allocation of funds to meet capital and recurrent expenditures to ensure fiscal sustainability. Fifth, related to all of these is the quality of overall governance. Governance is the catalyst behind creating conditions in which not only does aid reach its intended purpose but, more generally, the business environment is such that development finance of all types can generate growth and encourage innovation. Finally, the quality of external aid also impacts on development outcomes. Aid volatility, predictability, fragmentation and alignment with the development objectives of recipients are key parameters in the effective scaling up.

Scaling up aid and accelerating growth

Accelerating growth performance is critical if scaling up aid to developing countries is to help them achieve and maintain the MDGs. Based on average growth rates over the most recent decade, many developing countries, including most in sub-Saharan Africa, are unlikely to achieve MDG 1 (the halving of income poverty from 1990 levels). Growth serves to both reduce poverty directly and generate jobs that will be needed to keep people permanently out of poverty, but it also generates domestic resources that will be needed to reach and sustain the non-income MDGs.

Can scaled-up aid flows help low-income countries accelerate growth performance, however? This is a complex and controversial topic. The association between aid and growth has spawned considerable debate over whether aid helps or harms the process. Cross-country regression analysis has been used in dozens of papers attempting to identify how aid and growth are related (Rajan and Subramanian, 2005a; 2005b: Clemens, Radelet and Bhavnani, 2004: Burnside and Dollar, 2000; 2004: Easterly, Levine and Roodman, 2003, to name only a few recent examples). This topic will not be explored in depth here, but there are several reasons to discount the recent analytic work that suggests that aid does not contribute to growth, or that it may even retard it.

First, there are serious methodological problems with cross-country regression analysis in dealing with aggregation and with identifying the direction of causality. Second, the purpose and uses of aid have changed historically, particularly since the end of the Cold War, and aid today is much more targeted towards good performers and less driven by geopolitical interests than was true even a decade ago (World Bank, 1998; Dollar and Levin, 2004). Moreover, aid is highly heterogeneous and serves many purposes unrelated to growth (including emergency assistance, such as the recent Tsunami relief), or indirectly related thereto (such as technical assistance). Third, much of the aid allocated to the social sectors may significantly affect growth, but only in the long run, and this is not captured by the cross-country regression work that typically examines growth over a short-term horizon. Finally, there have been major devel-

opments in aid architecture that are rapidly changing the role and parameters of aid. The Paris Declaration, discussed below, is one example, but in addition, from the recipient's side, there is a greater impetus towards ownership and country control of the aid process.

By contrast, there is considerable evidence suggesting high rates of return and aid effectiveness based on micro evidence from specific projects and applications. Well-documented cross-border efforts to eradicate water-borne diseases, or to protect and jointly manage natural resources, are frequently cited examples. In other projects, rigorously prepared impact evaluations have shown high returns to many aid-supported projects (for example, China's South-West Poverty Reduction Project and Indonesia's Kecamatan Development Project).[1]

Country case studies can also shed light on the contribution of aid to development and can allow consideration of unique circumstances and contributing factors that are lost in cross-country analysis. There is ample evidence from individual case studies of enormous waste and leakages in aid flows, particularly during the period of the Cold War, with no evidence supporting a positive growth impact in these cases. But there is also a growing case study literature providing insights into more recent experience. A recent study of aid to African countries shows that, in a group of 11 relatively "high performance" countries, high aid flows are associated with improved growth performance, although more work is needed for a clearer examination of causality (Bourguignon, Gelb and Versailles, 2005). Individual country evidence underscores the importance of country circumstances; there is no simple set of rules linking aid flows to stronger performance.

This broad conclusion—that there are no blueprints linking aid flows to growth performance and that individual country circumstances must be assessed to identify strategic priorities—is similar to the overall conclusion of the recent World Bank report on growth performance in the 1990s (see World Bank, 2005c), which reflects contributions by Rodrik (World Bank, 2005c; World Bank, 2005e) and other development economists examining the lessons of development experience in the 1990s. The proposal stemming from their work is that the specific constraints to growth must be carefully analysed in each country case in order to identify where constraints are binding and, hence, where resources and policy reforms are needed to unlock innovation and realize growth potential.

The implication of this with regard to the scaling up of aid flows and the critical need to generate growth is that scaling up must be built around a thorough understanding of the binding constraints to growth, and public investment supported by aid should be directed towards addressing these constraints in order to unleash growth potential. This is, of course, extremely difficult in practice. It requires a thorough understanding of both technical constraints, in particular critical infrastructure needs and skill requirements, as well as institutional needs, key governance parameters and even demographics. Investment in human immunodeficiency virus/acquired immunodeficiency syndrome (HIV/AIDS) prevention and treatment may be one of the most important elements in improving growth performance in some African countries, as discussed in Heller, 2005.

Among the many factors that may contribute to or constrain growth, access to quality infrastructure is one for which aid has a potentially important and catalytic role to play. There is increasing evidence that infrastructure has an important role in growth performance (Estache, 2004, on Africa; World

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1   See Ravallion and Chen, 2005, and Alatas, Guggenheim and Wong, 2005, for impact evaluations of these projects.

Bank, 2004b). National transport networks and telecommunications linking markets, water management and control to benefit agriculture, and availability of reliable power to manufacturing are key factors influencing opportunity, innovation and growth. As infrastructure networks are developed (roads, energy and irrigation), linking producers and consumers to national and international markets, important network effects are captured which may help generate the necessary growth. Another avenue is through the role of infrastructure investment, which helps reduce the indirect costs (affected by factors such as reliability of power, transport logistics and timing, etc.) and losses related to the business environment that depress firm productivity, as highlighted in recent work on African economies by Eiffert, Gelb and Ramachandran, 2005. A sufficient level of investment will be required to capture these gains and reach a threshold where economy-wide network effects will support higher productivity.

Infrastructure is also costly, requires large-scale investments and is vulnerable to corruption, weak management and inadequate budgeting for operations and maintenance. External aid working through governments can potentially play an important role in financing large infrastructure, and can put in place sustainable regulatory and budgetary systems. Aid to support public investment in health, education or sanitation services may also generate growth, but that is likely to be over the longer term and may not be evident until new cohorts of better-educated and healthier workers enter the work force.

Competitiveness and real exchange-rate constraints

The scaling up of aid both to meet infrastructure needs and to realize investment in basic social services in order to achieve the MDGs is estimated to require new financing flows that would double, or even quadruple, current aid levels in some cases. Aid flows could account for 20 per cent, 40 per cent or even higher shares of gross domestic product (GDP). A well-recognized risk to economic performance in the presence of large foreign aid inflows is through upward pressure on the real exchange rate and the resulting reduced competitiveness of exports and import-competing goods. The export sector is often considered likely to be the most dynamic and an important contributor to growth. Price effects that could undermine dynamic export growth potential could prove very costly to the economy over time.

The impact of aid flows on relative prices, the exchange rate and competitiveness will depend on many factors. One factor is the share of aid that is spent and the share absorbed, as highlighted in recent International Monetary Fund (IMF) case studies (IMF 2005a). The more aid that is spent, rather than accumulated as domestic reserves, and the less that is absorbed through the sale of foreign exchange to meet import demand, the greater the pressure on the exchange rate to appreciate. A second factor is the relative import intensity of aid-financed expenditures. The greater the import content of aid projects, the less impact there will be on domestic prices. A third factor is the level or surplus capacity in the economy. To the extent that supply can expand to meet new demand without placing upward pressure on domestic prices, there will be less pressure on the real exchange rate to appreciate. A fourth factor is the impact of aid expenditures on growth and productivity. The more that aid finances investment, rather than consumption, and new technologies, or enhances factor productivity and generates a positive growth dynamic, the less the pressure on domestic prices to rise and the real exchange rate to appreciate.

The impact of aid flows on competitiveness has both static, short-run effects as well as a dynamic impact on productivity and growth, with implications for how aid affects the economy over time. A large increase in aid flows that are spent and absorbed may generate problems in the short run as relative price effects dominate, but over time this situation is likely to ease if the initial jump in aid finances investments that help to accelerate growth.

The empirical literature on Dutch disease reveals a wide range of real exchange-rate responses to aid surges, ranging from significant real appreciation to real depreciation. As stressed in Bevan (2005), the extent to which aid flows are associated with the problem of real exchange-rate appreciation depends largely on the relative impact on real demand and supply across sectors. A survey of the literature on empirical studies of country-level evidence on Dutch disease from high aid inflows has generally concluded that the effects are ambiguous and depend on country-specific circumstances.

Even if scaling up aid leads to an erosion of competitiveness and a drag on growth over the medium run, it does not imply that these costs outweigh the benefits of aid. Lost growth opportunities must be weighed against the social and human development gains that aid can help to advance—improving health outcomes, education levels or access to water and sanitation. Moreover, many of these investments have a long-term impact on human capital development that may improve growth performance in the long run, but this is very difficult to measure.

In summary, the risks of Dutch disease appear to be real and potentially serious, particularly when scaling up aid, and heavy aid dependence is likely to extend over many years. There is, however, no general *a priori* case against scaling up based on competitiveness arguments. Both theory and empirical evidence suggest that the long-term interactions are highly complex, very difficult to predict and cannot be simplified into general rules. The long-run response of the economy will depend on several factors affecting the underlying productivity and growth dynamics across sectors, including the care with which domestic policy makers will handle the issue of the real exchange rate. These factors must be examined on a case-by-case basis drawing on the structural and institutional features of the economy.

Labour markets and absorptive capacity

Structural features of low-income economies are likely to constrain the capacity to scale up aid. For many countries, because of skilled labour requirements for meeting the MDGs, labour markets in particular are likely to pose constraints to absorptive capacity and the pace of scaling up. Public expenditures centred on meeting the MDGs will in most cases require a major expansion of basic social services in health and education. For many low-income countries, this will place a much greater demand on the scarce pool of skilled labour that is currently available or that is expected to be trained over the coming decade. Increasing demand for large numbers of teachers, clinicians, accountants and engineers will either not be met in the short run or will need to be accommodated through drawing skilled labour from other parts of the economy (public or private sector), or through importing skilled labour. Importing labour, however, is often not an option for basic service delivery, owing to considerations of affordability and special requirements (language, cultural issues, and so forth).

Expanding the supply of basic education and health services requires increased public spending, largely on non-tradable inputs with high labour intensity but low import intensity. Constraints on skilled labour serve to bid up the skill premium in order to attract skilled labour and increase the overall labour costs of the public sector. Even in a labour-abundant economy, specific skill shortages can greatly exacerbate these pressures.

A sequenced approach to scaling up the MDG-related social services is clearly needed in order to avoid disruptive pressures and associated costs due to skill bottlenecks. Investing in the expansion of teacher and medical training capacities should precede large-scale ramping up of school and clinic

construction and staffing. In other words, the sequencing of aid outlays will have a significant impact on associated costs, the optimal path being one that will allow the supply of labour to expand in tandem with increased demand for scaled-up services.

Fiscal sustainability

Large-scale aid flows and long-term aid dependence also raise the basic issue of fiscal sustainability, as has been pointed out in a recent discussion of scaling up (Heller, 2005). There are several aspects of fiscal sustainability worth noting. The first is the relation of aid flows to indebtedness. For many low-income countries, both Highly Indebted Poor Countries (HIPC) and non-HIPC countries, national indebtedness is a significant constraint on external borrowing. For HIPC countries, borrowing constraints as a result of compliance with regulations governing the HIPC process delimit the scope for new borrowing, even on highly concessionary terms. For many low-income countries, the scale of resource transfers required to meet the MDGs makes scaling up investments with non-grant financing out of the question. The recent Gleneagles debt-relief initiative should help alleviate this situation.

Second, even with full grant financing through 2015, fiscal sustainability would remain an issue. Domestic revenue capacity is unlikely to increase rapidly enough to cover costs. Recurrent costs alone are likely to outstrip total revenues for many low-income countries. Improving domestic revenue capacity and thinking beyond the current 2015 MDG target date is essential for maintaining fiscal sustainability.

A third issue concerns the impact of aid and high *aid dependence* on fiscal behaviour, particularly as regards weakening the revenue effort. The revenue effort will decline, it is suggested, in the presence of continued aid flows, particularly if higher aid flows are associated with lower domestic revenue capacity. However, unambiguous empirical evidence of this is hard to find. Brautigam and Knack (2004) find a significant statistical relationship between higher levels of aid and a lower share of tax to GDP, although causality is difficult to establish. On the other hand, a recent examination of 11 African countries concludes that the tax effort actually increased during the 1990s, when aid flows increased (Bourguignon, Gelb and Versailles, 2005). A simple correlation between tax/GDP and aid/GDP shows that the relationship is not significantly far from zero. Selecting only highly aid-dependent countries does not alter this finding. Country-by-country analysis is needed to have a better understanding of this, in particular to clarify the relationship between prolonged aid dependence and its impact on fiscal policies, governance and institution-building.

Finally, there is the related question of public expenditure management and the capacity to manage expenditure needs across sectors in order to maintain the right balance between recurrent and capital spending and to develop systems for financing the recurrent costs necessary for long-run sustainability of scaled-up service delivery levels. This problem is common and applies to all public finance, not just to aid. But higher aid dependence is likely to intensify the fiscal planning challenge. The problem is greatly intensified in the current context since large levels of aid are needed to finance labour-intensive public services, such as schools and clinics, especially where it will take years to train adequate numbers of skilled staff. If aid levels fall for some unanticipated reason—missed disbursement triggers, cumbersome processing requirements or for political reasons—then the ability of the government to continue meeting required recurrent needs is in question. Potential costs can be large. These concerns are better understood now and are reflected in the Paris Declaration (see discussion below).

Role of governance

There is a broad range of institutional and governance issues that generally lie at the heart of national reform programmes and Poverty Reduction Strategies. These include measures to improve public expenditure management, strengthen accountability mechanisms, reduce resource loss through "capture" and corruption, and deregulate excessive government controls. From a narrow standpoint, governance includes fiduciary standards that governments must meet in order to receive aid commitments, particularly for budget support: sound accounting procedures, budget management capacity, a well-functioning treasury system and a process for audit and oversight that provides confidence that resources are being spent where they are allocated.

More broadly, governance and institutional reforms can be thought of as measures to improve the efficiency of public resource utilization. They affect the underlying productivity of public services and aim to both directly and indirectly reduce unit costs of public service provision—through lower teacher absenteeism, reduced waiting times for public services, improved regulatory oversight and lower leakage in the use of central government resources for delivery of services to end-users. Simple reforms can sometimes yield major benefits.[2]

At the same time, there is concern that aid and extended aid dependence may also contribute to a downward spiral of worsening governance, ranging from clientelistic governments feeding on aid flows to the less obvious, but potentially costly, impact of aid that results in shifting priorities and resources towards donor preferences and away from domestic voices in the shaping national development strategies.

Clearly, governance is a vast and crucial issue, covering much more than public finance –and including the investment climate for growth and the rule of law, for instance– and is relevant to all public activities, not just those that may be aid financed. Sorting through the linkages between aid flows and governance outcomes is complex and is an important analytic issue with respect to scaling up aid flows.

Volatility and fragmentation of aid flows

The costs to aid efficiency arising from multiple donor programmes, poor alignment with the recipient's development agenda and uncertainty over aid flows is well recognized, although not readily quantified. Uncertainty over the timing and levels of aid disbursements make budget planning difficult and potentially costly, as expenditures crucial to project success can be delayed or put on hold. Aid directed to the priorities of donors may not conform to the development needs and priorities of recipient countries, potentially diverting resources away from more important and higher yielding uses. Moreover, the burden of complying with multiple donor processing requirements and logistical support can place a large "compliance tax" on developing countries. In the context of low-income countries with capacity limitations, these costs are not trivial. And they become undoubtedly worse as the number of donors and magnitude of lending increases.

The 2005 Paris Declaration on Aid Effectiveness is designed to address these concerns and raise donor awareness. It calls on all donor countries to align their programmes with recipient priorities,

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2   One often-cited example is from Uganda, where a newspaper campaign to boost the ability of parents to monitor local officials' handling of school grants helped to sharply reduce losses. With greater public awareness and transparency, 'capture' or leakage of budget resources fell from 80 per cent to 20 per cent between 1995 and 2001 (Reinikka and Svensson, 2003).

eliminate duplication of effort and provide more predictable multi-year aid commitments. It also calls for the integration of global programmes and earmarked support into recipient countries' development programmes. Adjusting the incentives of donors and IFIs to implement this programme remains a major challenge, and only limited progress has been made to date.

Under a programme that is fully harmonized with country systems, and aligned with the recipient's development strategy, the costs to aid efficiency would essentially disappear. Aid would flow through the budget directly to support the expansion of public services and would be administered and overseen using the same standards and practices as other public resource flows. Project implementation units, if necessary, would be common across donors and IFIs. Missions and donor reporting would be minimal, except where necessary to show results and evidence of progress.

The mechanics of aid commitments, allocation and disbursement are a very long way from this standard at present, but the harmonization and alignment agenda is clearly intended to be a central element of efforts to further scale up aid and assist aid recipients with their management challenges.

In conclusion, this section has briefly reviewed the main factors affecting capacity to scale up aid flows and put aid to effective use in achieving the MDGs. It has noted the complexity of the process in terms of both macroeconomic and microeconomic aspects of aid absorption. It has also argued that both the governance environment in developing countries and the governance and design of aid flows by donors and IFIs can profoundly affect the scope for, and impact of, scaling up aid. Strategic planning for scaling up needs to bring these different elements together to consider how aid flows should be sequenced in light of absorptive capacity, which instruments and investments are likely to be most effective and which specific interventions will address the most binding constraints to development and aid effectiveness. Few modelling tools approach this set of concerns to allow both an analysis of the macroeconomic environment and consideration of more microeconomic, sector-specific constraints to scaling up. The next section describes one such approach that has been developed at the World Bank to assist in identifying scaling up scenarios.

A framework for simulating scaling up to achieve the MDGs

The framework used for projecting attainment of MDG targets is known as MAMS (Maquette for MDG Simulation) and examines capacity constraints and trade-offs in achieving the MDGS. MAMS is a dynamic computable general equilibrium (CGE) model which has been extended to include a module that covers MDGs related to poverty, health, education, and water and sanitation. As noted in the introduction, the rationale for the use of a model of this type is that the pursuit of MDG strategies has strong effects throughout the economy via markets for foreign exchange, factors (especially labour) and goods and services, with feedback effects that may significantly alter the findings of more narrow sectoral analyses. For example, the amount of real health or education services that a dollar in aid can purchase may change significantly in light of changes in exchange rates, prices and wages. In addition, existing relationships between different MDGs (e.g., health and education) may influence the expansion in real services that is required—improvements in water and sanitation, for example, may reduce the expansion in health services that is required to reach health MDGs.

In the application described in the following section, the model is applied to an Ethiopian database and solved for the period 2002-2015.[3] More specifically, building on the recent literature and sector studies on health and education outcomes, MAMS considers the following MDGs:

- (MDG 1) halving, between 1990 and 2015, the headcount poverty rate;
- (MDG 2) achieving universal primary education (100 per cent completion rate by 2015);
- (MDG 4) reducing by two-thirds, between 1990 and 2015, the under-five child mortality rate by 2015;
- (MDG 5) reducing by three fourths, between 1990 and 2015, the maternal mortality rate; and
- (MDG 7) reducing by half, by 2015, the number of people without access to safe water and basic sanitation.

The model allows for a relatively detailed treatment of government activities related to the MDGs. Government consumption, investment and capital stocks are disaggregated by function into four education sectors, three health sectors, sectors for water and sanitation, public infrastructure and other government activities. The major government revenue sources are taxes (direct and indirect), foreign borrowing and foreign grants. The non-government economy is represented by a single sector producing tradable and non-tradable goods and services. The primary factors of production are divided into public capital, private capital and three types of labour (unskilled, skilled and highly-skilled). GDP growth is a function of growth in the stocks of labour and capital, and productivity growth. The composition and overall growth of the labour force depends on the evolution of the education sector, whereas capital stock growthing depends on investments. Productivity growth is also endogenous, depending on growth in the stock of public capital in infrastructure.

The core MDG module specifies how changes in the different MDG indicators are determined. To the extent possible, it is parameterized on the basis of detailed sector studies on Ethiopia. In the module, the government has an annual primary education budget covering teacher salaries, recurrent operations and maintenance costs, and capital investment (for example, in new classrooms). Recurrent expenditures and the capital stock in primary education together determine the supply side.[4] Demand for primary schooling and student behaviour—the population share that enrols in the first grade, graduation shares among the enrolled and the shares of the graduates that choose to continue to next grade—depend on the quality of education (student-teacher and student-capital ratios), income incentives (using current wages as a proxy, the expected relative income gain from climbing one step on the salary ladder), the under-five mortality rate (a proxy for the health status of the school population), household consumption per capita and the level of public infrastructure services.

This specification of sector demand and supply captures lags between investment and outcomes and is one strength of the approach. Based on sector studies, it can be seen that the lags between increased enrolments and outcomes at different education levels are related to the number of years required for completion, and actual completion rates.

The specification of health services draws on a World Bank health sector strategy report for Ethiopia. Improvement in under-five and maternal mortality rates (MDGs 4 and 5) are determined by the

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3   The model is presented in detail in Bourguignon and others, 2004; 2005: Lofgren, 2004. Preliminary applications to Ethiopia are discussed in Lofgren and Diaz-Bonilla, 2005; Sundberg and Lofgren, 2005. This remains work in progress.

4   Private supply of education services has not been separately included since it is relatively small in Ethiopia, but it could be elaborated for countries where it is important.

level of health services per capita (public and private services), per capita consumption and the population shares with access to improved water and sanitation services (MDG 7). The package of health services that achieves MDGs 4 and 5 also includes sufficient HIV/AIDS prevention services to halt its spread (part of MDG 6). For water and sanitation, the population shares with access to improved services are modelled as functions of per capita household consumption and provision of government water and sanitation services.

The provision of the additional government services needed to achieve the MDGs clearly requires additional resources—capital, labour and intermediate inputs—which then become unavailable to the rest of the economy. The effects of a programme depend on how it is financed—from foreign sources, domestic taxes (which reduce consumption) or domestic borrowing (which crowds out private investment). Even with 100 per cent foreign grant financing for additional services, which minimizes domestic resource costs, the rest of the economy is affected through two main channels—labour markets and relative prices. Expanding the provision of health or education services increases demand for teachers, nurses and doctors, thereby reducing the number of skilled workers available in other sectors. Increased school enrolment also reduces the size of the overall labour force (since it removes a larger part of the school-age population from the labour force), though in the medium run it adds to the share of skilled labour in the labour force. Two forces drive changes in relative commodity prices. First, domestic demand switches towards MDG-related government services, which impacts on economy-wide production costs and prices. Second, increased aid flows lead to an appreciation of the real exchange rate, which is reflected in increased prices of non-traded relative to traded outputs. These manifestations of Dutch disease can bring about long-lasting changes in the structure of production, which is diverted from exports and import-competing goods.

The limitations on absorptive capacity are captured through three main channels. Two channels have just been mentioned, the labour market and changes in the real exchange rate (relative price of the domestic good and international prices). The third channel is represented by potential infrastructure bottlenecks, particularly in transport and energy. Large investments in education services, for example, will tend to reduce further absorptive capacity as skilled labour is diverted to education, as the relative price of non-tradables rises (e.g., real wages are bid up, reflecting the Dutch disease effect) and if infrastructure bottlenecks reduce the efficiency of public service delivery. Moreover, the impact will not be limited to the education sector but will affect costs throughout the economy, including other public services and the private sector.

Policy makers thus face important trade-offs: increased investment in public service delivery is essential for improved MDG outcomes but, beyond a certain point, the unit costs begin to rise along with indirect costs to other sectors. The challenge is to keep costs down while, at the same time, targeting social outcomes over time. Building absorptive capacity is clearly a central element in this process.

There are also important complementarities across spending on different MDGs—represented by cross-elasticities in our modelling framework—where progress for one MDG may contribute to progress for other MDGs. For example, progress in the provision of improved water and sanitation services has a positive impact on heath outcomes. In addition, the provision of education services (primary, secondary and higher) helps to expand the skilled workforce needed both to increase productivity of the private sector and to work in publicly funded schools and clinics.

Scaling up aid: a country application

Results from the simulations using the MAMS model, calibrated for Ethiopia, suggest that the MDGs could be achieved by 2015 under certain circumstances; however, this would require large levels of grant financing and careful attention to the allocation and sequencing of investments. Although the simulations are presented for Ethiopia, they have general relevance for other low-income countries with weak capacity and large ODA requirements for reaching the MDGs.[5]

Two assumptions are particularly critical for the simulations that follow. First, all of the incremental costs of scaling up aid are treated as fully financed by foreign grants. As domestic revenues grow, they help offset total costs, but the bulk of financing is external and in grants rather than loans. This sets aside important issues over the stability of financing and restrictions that are imposed by Ethiopia's heavy indebtedness and limitations imposed by the HIPC process. Second, constraints on governance and public expenditure management are also set aside: financing for development is managed at current levels of efficiency and the institutional or governance impact of foreign financing is set aside. The importance of these assumptions is considered below.

Based on present trends, Ethiopia is expected to fall far short of achieving most of the MDG targets by 2015, including income poverty, primary school completion and water and sanitation. Lack of financing is the single largest constraint to accelerating progress. Results from the Ethiopia MAMS model suggest that the MDGs can be reached but will require large increases in grant financing and careful sequencing of grant-financed public investment.

Figure 1 shows the foreign grant financing requirements under four scenarios to illustrate differences in the costing achievements of the MDGs. In all scenarios, the deficit of the public budget is covered by foreign grants. In the status quo or "base case", the different areas of government services and GDP all grow at an annual rate of about 4 per cent. This performance is similar to Ethiopia's past growth trend. Government domestic revenues are assumed to grow somewhat faster so that aid as grant financing expands at an average rate of 1.5 per cent a year, while foreign loans are assumed to remain constant.

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5   Presented in Bourguignon and others, 2004; 2005.

Figure 1:
Foreign grant financing (US $ per capita)
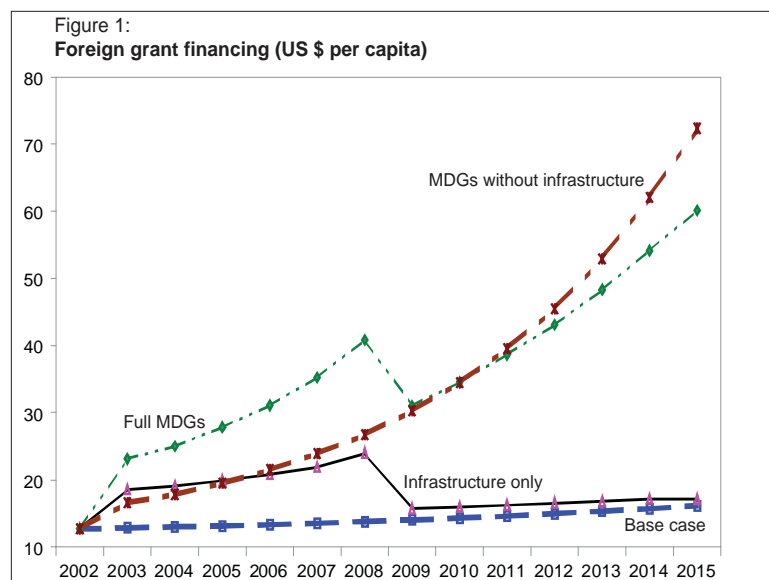
The base scenario is contrasted with three other scenarios that include foreign grants directed towards meeting the MDGs. The first case, "full MDGs", expands foreign grant financing to reach each of the targeted MDGs—reducing income poverty along with education, health, and water and sanitation targets. The two other cases shown separate out the investment in basic national infrastructure required to boost economic growth ("infrastructure only") and investment in the five education, health, and sanitation MDGs in the model ("MDGs without infrastructure").

The achievement of both the social and income poverty MDGs by 2015 is estimated to require grant financing of around US$60 per capita by the end of the period, or approximately 40 per cent of GDP, compared with current levels in Ethiopia of just below 20 per cent. If foreign grants target only physical infrastructure to accelerate growth and income poverty reduction (excluding the other MDGs), much lower levels of grant financing are required. Over the first half of the period, financing roughly doubles to US$24 per capita at its peak in 2008 and then subsides as productivity improvements and revenue response to higher growth cut financing needs.[6]

By contrast, the scenario targeting *only the social MDGs* to the neglect of core infrastructure requires higher financing than in the full MDG scenario. Financing needs rise to US$70 per capita by the end of the period. Although the full MDG scenario includes added investment in core infrastructure, it also serves to lift total productivity, accelerate growth and boost government revenues, which together act to reduce overall aid requirements.

Growth is clearly essential for reaching the MDGs. It not only underpins the achievement of the income poverty target but also reduces the costs of achieving the human development MDGs. The following sections explore six "constraints" to achieving the MDGs through scaled-up aid. Starting with growth, this section also considers the implications of macroeconomic constraints, skilled labour, fiscal policies, governance reforms and aid volatility for scaling up aid.

Accelerating growth

It is well established that growth is central to long-term, sustained gains in poverty reduction (Kraay, 2005).[7] Less is known, however, about the drivers of growth and about which elements are critical to ensuring sustained growth accelerations in a given country (see World Bank, 2005c). Analysis of constraints to growth in Ethiopia indicates three key elements to accelerating growth: first, focusing public investment on infrastructure to strengthen urban-rural marketing linkages; second, investing in improved water management to improve agricultural productivity; and third, improving the investment climate and strengthening security of land tenure to reduce risk facing private producers and investors (see World Bank, 2005d). The first two of these elements require investment in core infrastructure.

Core infrastructure considered key to accelerating growth in Ethiopia includes a basic transport system and the expansion of power generation and distribution, to better link the urban, peri-urban and

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6   Note that the 'kink' in grant financing requirements in 2008/09 corresponds to a threshold effect of initial investment in infrastructure on productivity. It is indeed reasonably assumed that there is a five-year gestation lag in the effect of infrastructure on the productivity of the private and public sectors. Financing needs are reduced when higher productivity gains kick in. A more continuous representation of this phenomenon could have been used; however, the interest of the discontinuous specification used here is to illustrate the crucial role of the productivity effect of infrastructure.

7   Note that equity—in particular expanding opportunity and access to services for poor people—is also a fundamental policy parameter (see World Bank, 2005a) which is not explored here.

rural economies. Large-scale investments in water management and irrigation systems are also included to help raise agricultural productivity. All of these investments help reduce the indirect costs to private investment (affected by such factors as the *reliability* of power, and transport logistics and timing) and business-related losses that depress firm productivity, as highlighted in a recent work on African economies by Eiffert, Gelb and Ramachandran (2005).

Figure 2 illustrates the impact of the different MDG investment scenarios on economic growth in Ethiopia. Under current trends, illustrated by the base case, poverty is forecast to decline to around 29 per cent of the population—compared with 38 per cent in 1990 (not shown)—far short of the MDG target of 19 per cent of the population. In the full MDG case, however, investment in basic infrastructure helps accelerate the growth rate relative to the base case by about 1.5 per cent annually and is critical for the halving of poverty incidence from its 1990 level of 36 per cent of the population. Growth in household consumption[8] helps drive poverty down to the MDG target of 19 per cent by 2015 (using a conservative estimate of poverty elasticity of –1 with respect to mean household consumption per capita).

Between these two scenarios are the cases where increased investment in core infrastructure is separated from investment in the human development MDGs. In the case of spending on only the MDGs independent of core infrastructure, growth is also increased, but by far less than spending on infrastructure. This occurs mainly through raising the supply of skilled labour and through increased employment generated by higher public investment.[9] Relative to the investment share, however, the contribution from basic infrastructure is much greater, reducing the poverty incidence to 22 per cent by 2015, compared with 26 per cent in the case of investments in the human development MDGs only.

The argument being presented is not that investment in infrastructure alone will suffice to accelerate growth. Indeed, investment in non-income MDGs clearly contributes to growth and poverty reduction,

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8   Income growth is assumed to be distributionally neutral across household income groups. Ongoing work with MAMS disaggregates the economy by major sectors—agriculture, services and manufacturing—allowing greater refinement in the treatment of sector growth rates, intersectoral migration and more differentiated returns to labour.

9   Also contributing to higher growth and consumption is the exchange-rate effect of the currency's appreciation, which helps raise average real purchasing power.

Figure 2:
**MDG1 — Share of Production Living on \$1 (PPP) per day or less (%)**
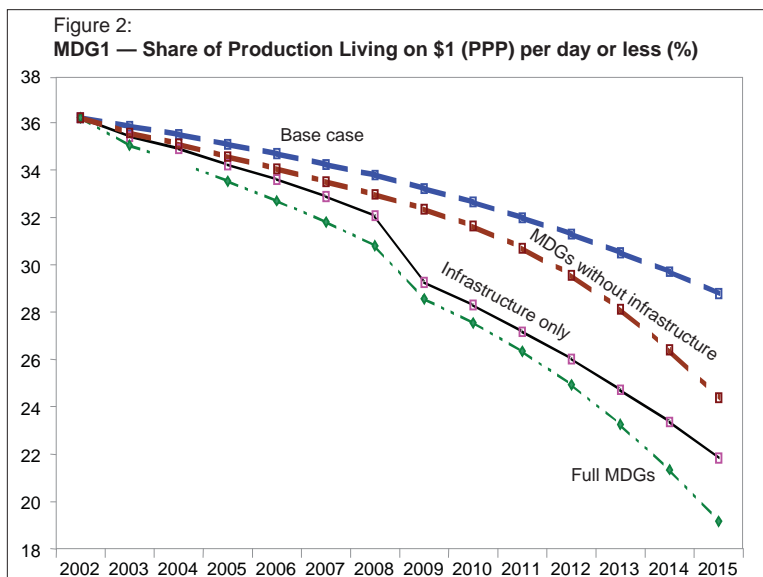
as figure 2 illustrates. The suggestion is, however, that with adequate governance and institutions in place to regulate infrastructure, there is a need to lead with strong infrastructure investment in order to both accelerate growth and reduce the unit costs of achieving non-income MDGs. The suggestion is also that there are significant trade-offs between investing in infrastructure and social services.

Figure 3 illustrates the trade-offs suggested by these simulations for investing in infrastructure-targeting growth versus investment for reaching the human development MDGs. For a fixed level of real resources (expressed in present discounted terms), there are different combinations of the poverty reduction and human development targets that can be achieved. At full financing (indicated as 100 per cent), all of the targeted MDGs can be reached. Point A illustrates this level where all of the MDG targets have been reached. As can be seen, trade-off here between human development targets and growth is almost flat, i.e. there is little scope for increasing the human development indicators at the expense of growth. On the other hand, if total financing over the ten years is reduced by one fourth, the impact is pronounced. As shown, poverty reduction could be held to the level needed to achieve the MDG target (at point B) and the trade-offs would be steeper. Full achievement of the poverty target can be achieved, but only with a 15 per cent shortfall in meeting the other MDG targets. By reallocating resources from growth-oriented infrastructure to investment in social services for human development, a one per cent fall in income growth would lead to an increase in meeting the human development MDG targets by around 2.5 per cent.

These changing trade-offs are essentially due to the rapidly decreasing marginal returns to spending in human development on getting close to full completion of the MDGs. In other words, reaching the last children to send them to school, or reaching the most remote communities to improve health or to bring water, is much more expensive than when the economy is relatively far away from completion of the MDGs. As a result, giving up on non-income MDGs gives a much higher return in terms of private output and income MDGs when close to the goal—with all the aid that is needed—than when the economy is far away from the goal because of insufficient aid.

Figure 3:
Poverty reduction vs. human development MDGs
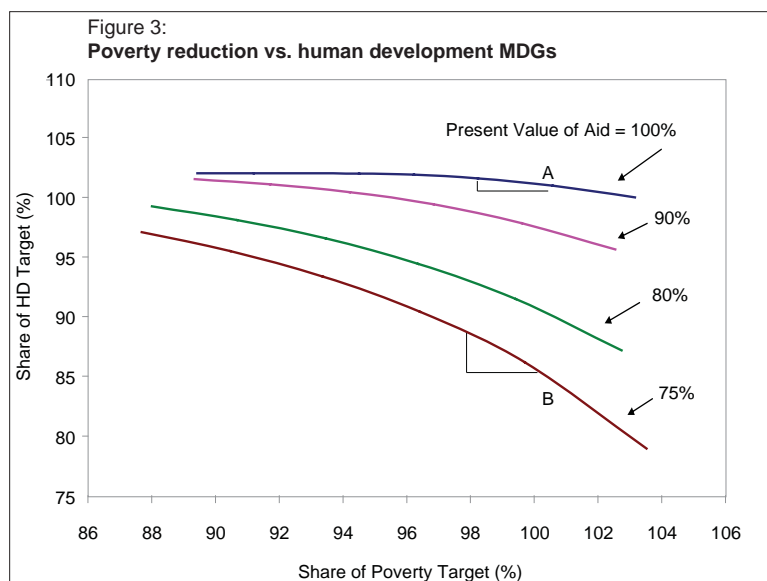
Macroeconomic constraints and competitiveness

As discussed above, aid flows permit a much larger trade deficit, draw resources to non-traded sectors and place upward pressure on the real exchange rate, thereby reducing competitiveness and resources flowing to traded goods and services. These concerns are well recognized.[10] As stressed in Bevan (2005), the extent to which aid flows are associated with the problem of real exchange-rate appreciation depends largely on the relative impact on demand and supply. The supply response, depending on the effects of aid on productivity across sectors, largely determines the depth and duration of adverse effects following the surge in aid.

In all of the Ethiopian scenarios, there is evidence of exchange-rate appreciation, rising real wage rates and a deterioration in the trade balance as imports expand and export performance is weakened. Figure 4 shows the path of real exports through 2015. Deteriorating export competitiveness (Dutch disease effects) is clearly a concern. Aid-induced appreciation of the exchange rate and the collapse in exports are severe. Under the full MDG scenario, exports fall from around 14 per cent of GDP to 8 per cent by 2015, and the real exchange rate appreciates by close to 20 per cent. However, the impact on real GDP growth over this period of high aid flows and public investment is quite limited.

Public spending on infrastructure and MDG services differ in their effects on the supply side and in their import intensities. Infrastructure spending has a positive but lagged impact on productivity, whereas spending on MDG services has only a very modest impact on productivity in the short run but affects supply through adding to the stock of skilled labour. Infrastructure spending initially leads to exchange-rate appreciation, until productivity improvements raise growth of GDP, household incomes and demand. The import intensity of basic infrastructure in Ethiopia is also high, reducing the adverse price impact and resource switching effects.

By contrast, investment in social services takes longer to impact on productivity and hence has less effect over the ten-year time frame for the MDGs. This places greater pressure on the real exchange

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10   Heller and Gupta, 2002, provide a clear overview of the issues and cite several country studies.

Figure 4:
Real exports as a share of GDP, 2002-2015
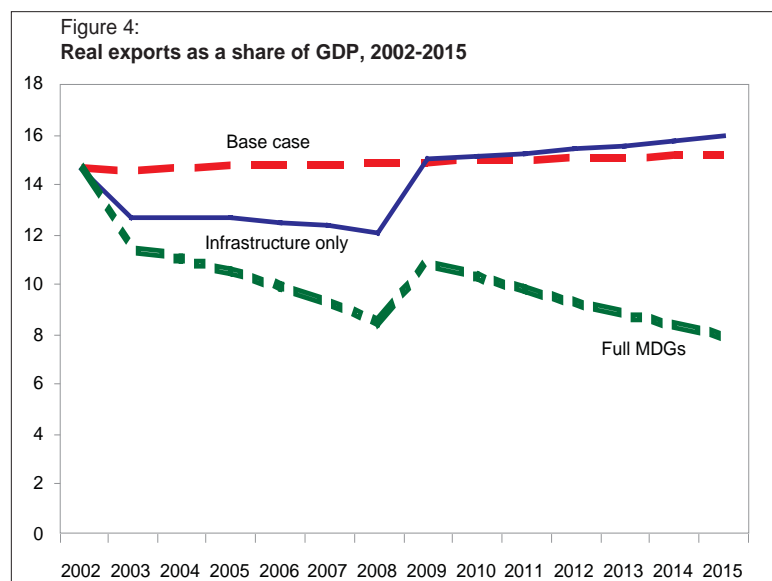
rate. In the case of the use of foreign aid to support human development and forego investment in core infrastructure, the real exchange rate appreciates by about 30 per cent and dramatically reduces the exports to less than half their initial share of GDP by 2015. Appreciation of the real exchange rate (the change in relative prices of the domestic good) also reduces the purchasing power of foreign grants, requiring larger commitments to finance investment in the human development MDGs.

If export performance is taken to be a key dynamic driver for long-term economic performance, then the loss in export share could pose a long-term, and potentially serious, trade-off between scaling up aid inflows to meet the non-income MDGs and poverty reduction. The dynamic cost to foregone output could be potentially large and points to the need for careful consideration of macroeconomic policy options and policies to contain harmful effects on competitiveness.

Skilled labour constraints

Severe labour constraints pose a further challenge to scaling up in Ethiopia. Scaling up spending will increase demands on skilled labour in particular—physicians, nurses, teachers, engineers, etc. The case of expanding primary enrolment is illustrative. Between 2002 and 2015, around 75,000 additional teachers are needed for the system to achieve the 100 per cent completion target and to meet quality standards in education.[11] This requires investment in teacher training facilities and expansion of the number of higher education graduates to meet this target. In the short run, skilled labour can be hired from other sectors, in particular the private sector, but at the cost of both higher wages and lost output as labour exits the private sector. Accelerating this process imposes higher costs on output.

Figure 5 shows the path of real wages under three scenarios: the base case and the full-MDG case examined earlier, and a third case in which aid is frontloaded to accelerate the hiring of teachers and the boosting of enrolment targets. As more funds are spent on hiring skilled labour into education, real wages increase significantly to induce labour away from other uses, raising unit costs of production. Wages for skilled labour rise both in education and in the private sector, as well as elsewhere in the public sector. In

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11   This assumes a 40:1 student teacher ratio, compared to the current 75:1 ratio. Higher ratios reduce the quality of education services and may reduce demand for schooling, although some argue for lower and less costly standards.

Figure 5:
Real wages of workers with secondary school education
(in local currency)
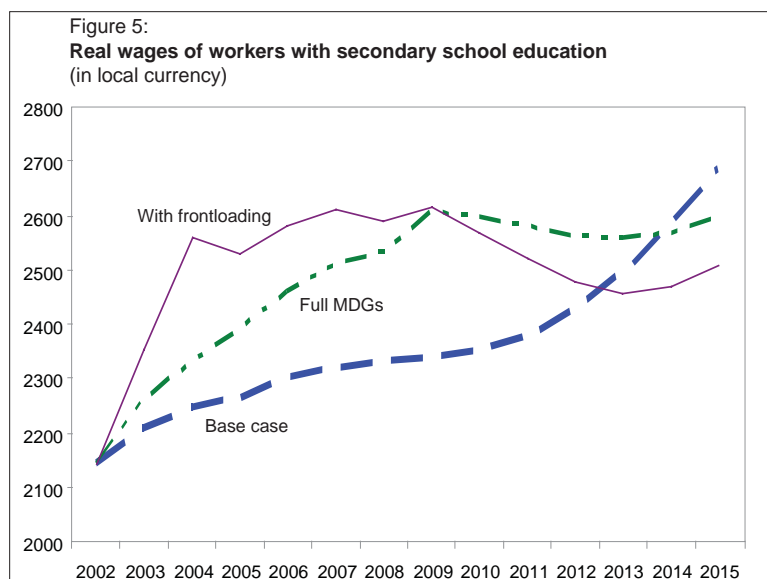
the scenario in which aid outlays are frontloaded to accelerate primary education expenditures, real wages spike to levels close to 25 per cent above their starting values. By the middle of the projection period, however, the path moderates, and real wage growth not only moderates but begins to decline. This is because investment in teacher training and other secondary and higher education programmes helps expand the supply of skilled labour *with a lag*, and wage pressures begin to moderate. The appropriate sequencing of investment in teacher training, capital inputs and possible adjustment of quality standards are clearly important determinants of the labour supply and wage response.

There are plausible conditions under which the market-clearing wage for skilled labour, as suggested by the model, is not sufficient for the generation of adequate supply. Skilled labour may be attracted abroad by higher wages—a chronic problem for many developing countries—new graduates may not be of sufficient quality or there may not be adequate incentives for skilled workers to relocate to remote areas. Under these circumstances, skilled wages would have to rise more sharply in order to recruit and retain adequate teachers, generating even higher costs to overcome capacity constraints.

Fiscal constraints

Most of the potential fiscal constraints to scaling up aid discussed earlier cannot be readily illustrated in the MAMS model. All external support is assumed to be in the form of grants, for example, and public debt is not a constraint to increased financing. If this were not the case, Ethiopia would be highly constrained in mobilizing the funds needed to invest in meeting the MDGs. The May 2005 initiative at the G-8 summit in Gleneagles towards broad debt relief for the poorest countries (on liabilities outstanding to the IMF and the major development banks) may help ease constraints on new financing flows. Given the scale of resource requirements to meet the MDGs by 2015, however, it is clear that this would have to be on a grant basis.

Concerning the potential effect of aid flows in discouraging the national revenue effort, Ethiopia has managed to increase its revenue effort in recent years, even as aid levels have increased. The same may not apply at much higher levels of grant financing, but it is difficult to argue this case. Indeed, existing tax instruments might be expected to enhance revenue collection as growth and domestic demand accelerate, unless aid-financed activities are treated differently for tax collection purposes (an issue in aid harmonization and avoidance of distortions arising from unequal treatment).

Evidence from the MAMS modelling on the ability to sustain the *recurrent* cost burden of scaling up aid suggests this is unlikely to be a major burden. Over the simulation period to 2015, the share of total incremental spending required on recurrent costs is around one third, two thirds of which is being on capital goods. Total incremental recurrent costs for education, health, water and sanitation, and infrastructure spending amount to around 5.6 per cent of GDP in 2005 and roughly double to around 10 per cent of GDP by 2015 (see figure 6). As a share of total tax revenues over this period, this represents a much smaller increase, from just under 18 per cent in 2005 to about 24 per cent by 2015. The recurrent cost burden is clearly increasing, with capital maintenance costs assuming an increasing share in this regard, but there is no a priori reason to consider this an unmanageable burden.

Of greater concern is the quality of public expenditure management and the capacity of the government to adequately budget and disburse for recurrent costs in the budget. This is a challenge in all countries—including those of the Organization for Economic Cooperation and Development (OECD)—

Figure 6:
**Incremental recurrent and capital spending**
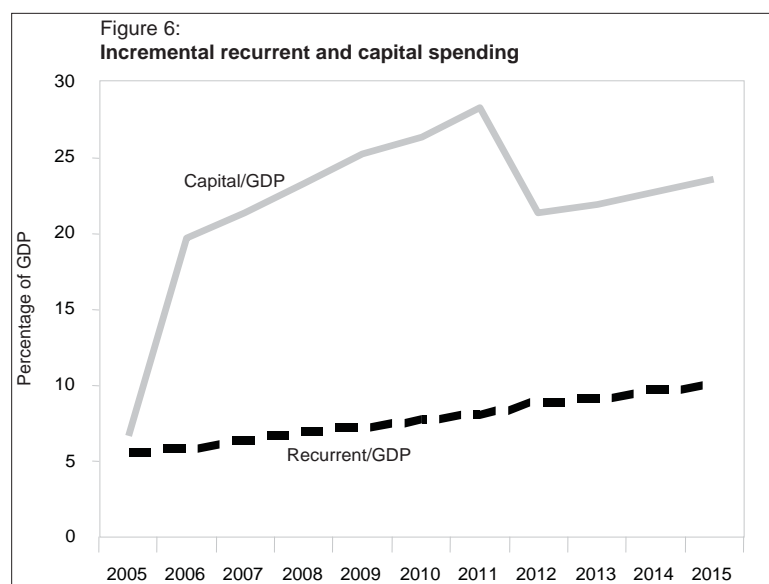
where political incentives and economic efficiency are often not well aligned. It is a particularly acute problem in low-income countries, such as Ethiopia, and requires investment in institutional strengthening and measures to insulate public expenditures from political discretion. Public expenditure management in Ethiopia is being tracked under the HIPC tracking process and has shown some improvement since 1999/2000, when the tracking process began, but major challenges to the quality of budget preparation and execution remain.

An additional fiscal issue that arises concerns the timing of aid disbursements to minimize the total costs of reaching the MDGs. Some argue that more resources are required up front in order to generate the push needed for escaping the "poverty traps" that afflict the poorest countries. The arguments for "frontloading" aid are difficult to validate empirically on a purely macroeconomic basis (see Kraay and Raddatz, 2005).

In MAMS, a simplistic test of the costs and benefits of investment frontloading can be seen from figure 7. Consider the effect of frontloading aid, i.e., of adjusting the share of total expenditures spent in the first five-year period (2005-2010). The resulting U-shaped curve shown in figure 7 shows how the present discounted value of foreign aid required to reach the MDGs changes as the share of resources spent in the first 5 years (i.e., the frontloaded share) increases from very low to high levels. The upper curve shows that, at a level of around 20 per cent, costs are minimized and then rise at an accelerating pace as capacity constraints become more binding (labour costs rise, infrastructure congestion costs increase, exchange-rate appreciation reduces the purchasing power of aid, etc.). In the extreme, at some point, with around 70 per cent frontloading, costs sharply accelerate until the MDGs cannot be achieved. Frontloading a substantial share of resources is not cost-minimizing in this case.

Governance and institutional reform

Foreign grant financing for scaling up services to meet the MDGs can drive *demand* for more and better services, but whether the *supply* is forthcoming depends in large measure on the quality of institutions and governance for translating external financial resources into the required goods and services. In an environ-

Figure 7:
Expenditure frontloading and foreign aid requirements
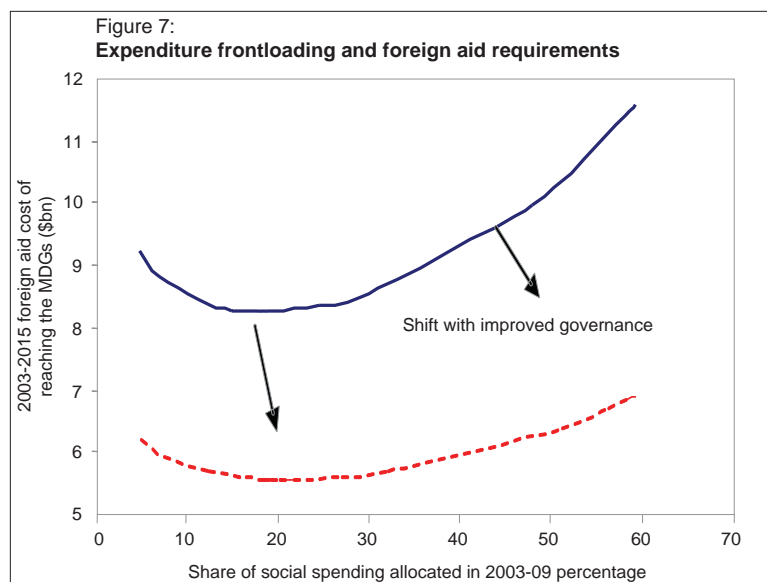
ment of good governance and policies, there is relatively little leakage or loss of efficiency involved in scaling up. This environment would include a healthy investment climate in which private entrepreneurs can start up business and take advantage of new opportunities.

Institutional quality and governance issues cannot be explicitly modelled in this framework, but they are key to managing many of the constraints to scaling up. Although the MAMS model does not directly address the critical question of how underlying institutional capacity and governance can be improved, it can help to illustrate the basic importance of institutional strengthening and governance vis-à-vis the costs and sustainability of scaling up. The recent Country Economic Memorandum on Ethiopia (World Bank, 2005b) identifies the investment climate as one of the main areas for strengthening in order to improve growth performance.

A heuristic illustration of the impact of governance and institutional reforms can be seen by assuming that on average the net impact of governance improvements raises cost efficiency by two per cent, compounded annually, independent of the rate of public investment. Using figure 7 again to illustrate the impact of these reforms and frontloading, a new U-curve is shown to depict the cost of achieving the MDGs under different ratios of resource frontloading. The lower U-curve in figure 7 suggests several effects. First, the productivity gain reduces the cost of achieving the MDGs along all points of the curve and "flattens" it, reducing the total variation in costs. The total cost of achieving the MDGs by 2015 in present value terms would fall by around one third as a result of the productivity gains derived from improved governance.

Second, the new point of cost minimization suggests greater frontloading. This may seem contrary to the expectation of less frontloading in anticipation of lower unit costs in the future. The ambiguity arises from the relative strength of two underlying effects pushing in opposite directions. The efficiency gain is like a relative price change, as the present value of expenditures in the first period falls by less than it does in the second period, shifting expenditure shares to the first period. The behavioural response, however, is to shift consumption to the second period.

One implication of this analysis is that anticipated incremental gains in underlying governance or productivity should not be a reason to delay public expenditures towards capacity-building and service delivery. Even if there are underlying efficiency gains that reduce costs over time, they do not constitute a reason to delay investment in the MDGs, but rather suggest that the same constraints to absorptive capacity –labour costs, macroeconomic constraints, infrastructure congestion– guide the investment path. Good governance is the catalyst for creating an environment in which development finance can generate growth more generally and accountability mechanisms can be built to help ensure service delivery

The quality of aid and aid volatility

Not only the quantity of aid but the quality of aid –the way in which aid is provided– is vital to development outcomes. Aid that is tied to specific imports or import origin, or aid that is uncertain, volatile or fragmented across donors significantly reduces the value of total aid flows. Many donors also require different reporting standards and accounting, often affected outside normal budgetary channels, which impose a "compliance tax" on recipient countries.

One important element in this regard is aid volatility. Empirical work on aid volatility shows that aid flows, on which some countries depend for more than half of total government expenditures, are more volatile than fiscal revenues. Moreover, shortfalls in aid and domestic revenues tend to coincide; amplifying swings in fiscal capacity (see Bulíř and Hamann, 2003). Some argue that the scaling up of aid that is now anticipated is likely to increase aid volatility and compel countries to take further steps towards buffering against such volatility (Eiffert and Gelb, 2005).

The MAMS model is not well designed to test the implications of aid volatility for the MDG outcomes. Consider, however, two different paths for aid disbursements containing the same present discounted value of total aid. In one case, there is complete predictability and control of timing, and the government can plan and sequence outlays to maximize social and growth outcomes. In the second case, aid is expected to be constant and, over the first five years, high aid flows are maintained—then aid suddenly stops. Clearly, the second case will have worse implications. Higher aid flows for the first half of the period would have allowed more rapid progress, although with decreasing returns, but thereafter there would be a sudden shock to the system leading to the serious problems that developing countries face not infrequently: a collapse in revenues leading to politically expedient (or legal) cutbacks—typically in public investment and operations and maintenance expenditures rather than salaries and debt service obligations. Simulations can aim to estimate the cost of these two patterns. The consequences of a sudden stop in aid can be severe social stability, public service delivery, institutional continuity and, of course, politics—extending well beyond factors captured in most models.

Conclusions

The constraints to scaling up aid to low-income counties and their ability to effectively absorb scaled-up aid is an issue of major concern in the debate over international financing of MDG efforts. This paper has explored six aspects of grant financing for scaling up public service delivery, drawing on a modelling framework that brings together a macroeconomic consistency framework with country specific microeconomic issues affecting sector response to scaled-up aid efforts. Four main points arise from this analysis.

First, a focus on improving growth performance in tandem with strengthening service delivery is essential. Growth performance depends to a significant extent on improving the quality and access of households and businesses to core infrastructure services—transport, power, water and communications. Strengthening infrastructure to improve growth in low-income countries both underpins income poverty reduction and has widespread benefits for reducing the cost and foreign financing requirements for reaching human development MDGs.

Second, the macroeconomic impact of large aid flows on the competitiveness of the tradables sector (Dutch disease) can be serious, resulting in a significant decline in the share of exports in the economy. The costs to future growth depend largely on the impact of aid and policies in generating productivity growth of both traded goods and domestic goods and services. Strategic investments to boost productivity and address trade constraints are important for avoiding adverse macro effects, and the potential tradeoffs need to be carefully weighed.

Third, sequencing of investments is important for minimizing the costs of reaching the MDGs, particularly in light of skilled labour demand for scaling up service delivery and short-run labour supply limitations. Skilled labour supply can only be expanded with a lag, requiring sequencing together with investment in complementary inputs and infrastructure. Large-scale frontloading of capital and labour investments is costly as it pushes against absorptive capacity constraints, intensifies the premium on skilled wages and bids labour away from the private sector, thereby depressing growth.

Fourth, improvement in the underlying governance and institutional structures, including improvement of public expenditure management, help to secure broad productivity improvements in public service delivery and should underpin development strategies. Their cumulative effect can significantly reduce the overall costs of achieving the MDGs and secure long-term productivity gains.

Finally, this work suggests that several elements of country-specific development strategies need to be in place to ensure that large increases in aid can be effectively used to achieve the MDGs in low-income countries. Quantitative simulation research to analyse alternative strategies can capture some of these key elements and provide insights into aid effectiveness and to reaching the MDGs. Simulations can only be approximate, but can help to guide decision making.

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