

Reaching the MDGs: An International Perspective

Edited by
John Cockburn
Martin Valdivia



The Poverty and Economic Policy (PEP) Network promotes the monitoring and measurement of poverty in its multiple dimensions. The causes and consequences of poverty are also analyzed in order to provide an empirical basis for policymakers to design and implement appropriate policies to combat poverty. For a more thorough analysis, the PEP Network supports research on the impact of past policies and those considered for the future. PEP researchers expand the frontiers of knowledge by developing new concepts and innovative methodologies to analyze poverty.

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Finally, and perhaps most importantly, the PEP Network is a permanent tool that enables researchers from the South to better participate and independently define the poverty research agenda and establish their scientific credibility both nationally and internationally.

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Introduction

The MDG movement has intensified since the UN Millennium Summit of 2001 when 147 heads of state endorsed this international effort and committed to foster progress in all eight MDGs. Multilateral organizations have supported this movement in various ways, especially in the development of indicators and the refining of commitments from key international stakeholders. However, seven years from the deadline of 2015, there is consensus that progress has been limited, notably in the case of the poorer countries with the worst initial conditions. Thus, much of the recent discussion focuses on the search for a proper assessment of the challenges ahead and the identification of clear action paths to overcome political, institutional and economic constraints that have limited progress so far, especially in poorer countries.

The papers selected for this volume were presented at the international conference “Reaching the MDGs: An International Perspective”, organized during the annual meeting of the Poverty and Economic Policy (PEP) Research Network that took place in Lima, Peru on June 12, 2007. The conference was organized by the Grupo de Análisis para el Desarrollo (GRADE) in collaboration with PEP, the Universidad del Pacífico, and the Network on Inequality and Poverty (NIP). Sponsors included the UN Development Programme (UNDP), the Corporación Andina de Fomento (CAF), and the Peruvian Ministry of Economics and Finance (MEF). Situated at the midpoint of the MDG process, the meeting was a good opportunity to assess the progress in the MDGs and the challenges ahead. Nearly 200 researchers, policy makers, representatives of multilateral institutions, and other stakeholders from Peru, Latin America, and other parts of the developing world gathered to listen to and debate a total of eight presentations by prestigious international experts from around the world.

Five papers that cover a wide variety of challenges to reaching the MDGs were selected for inclusion in these conference proceedings. The first two papers - by Jere R. Behrman and Nora Lustig - offer insightful comments about the way to realign efforts toward reaching the MDGs. Behrman and Lustig both have vast experience in advising policy actions against poverty around the developing world. The following two papers by Yamada and Castro and Bussolo and Medvedev adopt economy-wide models and other methods in an attempt to capture the interactions among the various MDGs and obtain as precise an estimate as possible of the actual cost of attaining the MDGs in a variety of countries. In line with the MDG perspective of going beyond a strictly income-based definition of poverty, the final paper by Ki, Faye and Faye explores techniques to measure poverty in a multidimensional framework.

Behrman's article offers an insightful perspective on how we can and should use research to shape the design and implementation of social and economic policies to spur progress towards the MDGs. Without pretending to be exhaustive, he discusses several important principles that need to be considered when choosing the appropriate indicators to monitor the MDGs, identifying effective policies, and estimating their costs. Although some of them may appear straightforward and well-known for both researchers and policy makers, Behrman offers examples that clearly show the need to re-emphasize them now and in the context of the movement to reach the MDGs.

With respect to the programs or policies that should be prioritized, he reminds us of the convenience of identifying win-win policy options that can help raise productivity and reduce inequality at the same time. For example, he emphasizes the importance of alleviating market imperfections that are particularly deleterious to the poor. At the same time, though, Behrman warns that externalities and other market imperfections complicate the estimation of the social costs of policy alternatives, a crucial requirement in setting the correct

priorities. He points out recent efforts made within the Copenhagen consensus as particularly relevant for the prioritization efforts within the MDG movement. Behrman also stresses the importance of accompanying the implementation of policy innovations with data collection that can make proper monitoring of policy effectiveness more feasible. Finally, he also argues in favor of investing in impact evaluation strategies, as prioritization may vary by country or region. He points out that, whenever possible, randomized control trials are likely to provide valuable information about policy and program effectiveness that are well worth the moderate costs involved, especially from an international perspective as such learning can become an international public good of high value.

In turn, Lustig's article complements Behrman's points regarding the design and costing of policy alternatives and adds valuable assessments about monitoring progress on the MDGs and about the use of external resources in their financing. Lustig argues that, although the MDGs have proven to be a great advocacy tool, they face great challenges as a policy tool. In part, this is explained by the proliferation of indicators associated with the eight goals for which many of the poorest countries do not have sufficiently good data to monitor progress. Thus, caution is needed when evaluating progress and extra effort is required in focusing monitoring on a small subset of indicators, namely poverty, infant and maternal mortality, and gender-disaggregated data on access to education. Next, Lustig discusses the advantages and limitations of the three main approaches used to identify policies and cost them: The needs assessments, poverty-growth elasticities, and CGE models, and argues in favor of an approach that combines rigorous methods with heuristic approaches to identify obstacles, trade-offs, and synergies. Finally, she reviews the financing requirements to effectively pursue MDGs in the coming years. She supports the idea that external funds are required in all cases and argues that rich countries need to comply with their commitments, offering predictability to recipient countries. The paper

by Gustavo Yamada and Juan Francisco Castro summarizes three recent research efforts to assess the feasibility of achieving the MDGs in Peru, the budgetary costs involved, and the policy adjustments required. Their studies combine partial and general equilibrium approaches and argue that the MDGs are feasible at the rate the Peruvian economy has been growing in the last six years. The key challenge for the government is to quickly increase its social spending while sustaining the efficiency levels of its current programs and policies, not an easy task by any means. Special attention should be put to public safety nets that can protect the poor from adverse shocks. In addition, they argue that investments in secondary and tertiary education may be particularly crucial to make the poverty goal feasible, but indicate that further research is needed with respect to the synergies among the different MDGs.

Bussolo and Medvedev explore the feasibility and cost of attaining MDGs in an African (Ghana) and Central American (Honduras) country using an economy-wide modeling approach (MAMS) developed by the World Bank combined with household survey-based microsimulations. The MAMS framework integrates health, education, infrastructure, and access to water into a CGE model so as to explore the costs, interactions, and trade-offs among the various MDGs. They find that these costs are substantial – ranging up to 10 to 12 percent of GDP annually by 2015 – although there is scope to reduce these costs by improving the currently low efficiency in the social services sector of both countries. The authors also compare various methods for financing these costs, emphasizing their respective advantages and disadvantages. Foreign aid would relieve pressure on domestic sources, but would cause a real exchange rate appreciation that would reduce the international competitiveness of the two countries' exports. In contrast, domestic borrowing could crowd out private investment to the detriment of overall growth and income poverty alleviation. There are also trade-offs between investment in infrastructure to spur growth and social service spending to directly address non-income poverty dimensions.

The final paper, by Jean-Bosco Ki, Salimata Faye and Bocar Faye, addresses the issue of analyzing poverty in the multidimensional framework adopted by the MDGs and exemplified in their case study on Senegal. Adopting the basic needs approach, they construct a composite indicator that integrates various poverty dimensions common to the MDGs including health, education, access to water, nutrition, housing, and sanitation. For each dimension, several indicators are adopted as is the case in the pursuit of the various targets associated with each of the MDGs. The authors find that Senegalese households vary in the types of poverty they experience, although the most common forms are related to education, living conditions, and access to basic infrastructure (health facilities, schools, water, etc.). Whereas slightly less than half of the Senegalese population suffers from income poverty, this ratio exceeds 60 percent when poverty is analyzed in a multidimensional framework. While rural areas are poorer from both perspectives, the difference is much larger in terms of multidimensional poverty. The multidimensionally poor are contrasted with the income poor according to various other household characteristics to obtain a better portrait of the populations involved.

Together, these five papers provide a fresh and essential perspective on the challenges ahead and the winning strategies to attaining the Millennium Development Goals in all countries, including the poorest, by the deadline of 2015.

John Cockburn and Martin Valdivia

What have we learned, and what's next? One Researcher's Viewpoint on Policy Issues Relating to the MDGs

Jere R. Behrman

Abstract

What have we learned from extensive research on developing countries that is germane to policies related to the MDGs? This paper summarizes the author's six-point answer to this question as follows: (1) It is essential to place research and policy implications within a framework for the basic policy motives of efficiency/productivity and distribution (including poverty) and related policy hierarchies; (2) Assessing policy options in terms of their relative economic costs is important; (3) Policies usually have unintended or indirect effects; (4) Policies are likely to be more effective the more closely they are targeted to the real objective; (5) The effectiveness of policies depends on the social, economic, and policy environment, so policies that are effective in one environment might not be effective in another and should not be blindly emulated; and (6) The gains from collecting good information and undertaking good systematic analysis of policies are likely to be considerable.

Keywords: Policy evaluation, MDGs, benefits/costs, efficiency, distribution

In 2000 eight Millennium Development Goals (MDGs) were established by the international community in order to focus attention on efforts to accelerate attainment of important dimensions of development by 2015:

- MDG 1: Eradicate extreme poverty and hunger
- MDG 2: Achieve universal primary education
- MDG 3: Promote gender equality and empower women
- MDG 4: Reduce child mortality
- MDG 5: Improve maternal health
- MDG 6: Combat HIV/AIDS, malaria and other diseases
- MDG 7: Ensure environmental sustainability
- MDG 8: Develop a global partnership for development

Quantitative targets were established for each of these goals, with annual reviews of the attainments to date. The last available review (United Nations 2006) indicates some important progress in attaining these goals, but also some substantial shortcomings, with considerable variance among African, Asian, and Latin American experiences both in the conditions at the turn of the millennium and in progress towards attaining these goals. At the same time there has been considerable and increasing research on these and related issues in the developing world. Given these experiences, the question naturally arises: what have we learned from this research that is germane to policies related to the MDGs? This paper gives the perspective of one development economics researcher with experience in Africa, Asia, and Latin America on this question. Inevitably it reflects the understanding and knowledge of that researcher, which leads to relatively more emphasis on some of the MDGs than others (the first six), but some of the lessons are more general and have broader implications for MDGs not explicitly addressed here or not addressed much, as well as for other policy issues.

While some might wish that a research perspective would result in an identification of a set of magic bullets – “Do this, do not do that” – the world is too complicated and information is too limited to provide such a simple list. But hopefully the following six general points constitute a perspective that is helpful for policy considerations.

It is essential to place research and policy implications within a framework for the basic policy motives of efficiency/productivity and distribution (including poverty) and related policy hierarchies.

There are two basic economic policy motives:

- (a) To increase efficiency or productivity (which can make some better off without making anyone else worse off) because private incentives for behaviors differ from socially-desirable incentives due to market failures (e.g., absence of capital markets for human resources investments) or policy failures (e.g., limiting certain health and educational services only to public-sector or NGO providers or providing public subsidies only to such providers); and
- (b) To improve distribution of the command over resources (with poverty reduction as the leading example).

The MDGs are primarily directed towards the second of these policy motives. But it is important to recognize that there are generally multiple ways to attain any policy objective so that there are *policy hierarchies* in terms of the costs of alternative ways of reaching the same MDG target and that there often are interactions between the pursuit of the two policy motives – either complementarities or tradeoffs.

For example, poverty might be reduced in the short run and in the long run (MDG 1) by instituting permanently high taxes on incomes above the poverty line and transferring the tax resources to those who are below the poverty line, with a tradeoff of introducing distortions between private and social rates of return that reduce private incentives for productivity gains and reducing economic growth. On the other hand there may be ‘win-win’ options, at least for longer-run anti-poverty goals that both reduce poverty and increase efficiency. Examples include: human resource investments in the poor related to MDGs 1 to 6 that may improve the productivity and income of the

poor (and thus reduce poverty) and create efficiency gains if there are spillovers due to human resource investments such as in the dissemination of knowledge or lessening the spread of contagious disease.

There is some evidence of such externalities, such as neighboring farmers learning about adopting and adapting new technologies from more-school farmers in India (Foster and Rosenzweig, 1995). Another possible win-win policy is the improvement of markets that currently limit investments and that particularly affect the poor because those who are better-off have more knowledge and more options – for example, capital, insurance, and information markets. Systematic empirical studies find some but limited support for such possibilities in countries ranging from Peru (Jacoby, 1994) to India (Jacoby and Skoufias, 1997).

Assessing policy options in terms of their relative economic costs is important.

As noted in point 1, generally there are a range of policy options for obtaining any specific MDG, or any other goal, and different policies are likely to have different economic costs (i.e., using resources that otherwise could be used by public or private entities for other desired purposes). For instance, given limited economic resources in any developing country – indeed in any society – there is an opportunity cost to using economic resources to pursue reducing child mortality (MDG 4) in terms of what is available to pursue universal primary schooling (MDG 3). Different policy options to approach a particular MDG are likely to vary, perhaps substantially, in terms of their economic costs, or their benefit-to-cost ratios.

It also is important to realize that the relevant costs are the economic costs borne by society (both public and private sectors) due to resources directly used to implement the policy and due to distortions induced by raising public resources for policies (e.g., estimates of the distortion costs of raising revenues for public policies,

which are estimated to be on the order of magnitude of 25 percent of such revenues; see references in Knowles and Behrman, 2005). It should be noted that these resource costs are *not* the same as the governmental budgetary costs for two reasons: (i) many government policies involve transfers that basically shift command over resources but involve much smaller resource costs than the values of the transfers (e.g., the time of those running the program and the distortion costs of raising governmental revenues for the program); and (ii) the private sector is likely to incur real resource costs for most programs (e.g., time to attend school for MDG 2 or to attend parental training sessions or to take children to health clinics for MDG 4 or to participate in community water management programs for MDG 6 and 7 – all with the opportunity cost of working in economic activities, caring for children, etc.).

For such reasons, estimating the relative economic costs of pursuing different policies to obtain any of the MDGs (or other goals) or benefit-cost ratios (or internal rates of return) for pursuing alternative policies can be very informative about alternative strategies for pursuing MDGs or other goals, and for ranking different policies for different goals. Comparisons that focus only on governmental budgetary costs (and thereby ignore the private costs and include the transfer components of governmental expenditures) as in Banjeree (2006) do *not* provide useful guidance for the relative economic benefits in comparison with economic costs of alternative policies.

The Copenhagen Consensus (Lomborg, 2004) is an interesting recent effort to use benefit-to-cost ratios to suggest priorities among proposals for confronting the ten great global challenges in developing countries, almost all of which are related to MDG 1 and MDG 8 and some of which are related to other MDGs (as indicated below). These ten challenges were selected from a wider set of issues identified by the United Nations:

1. Civil conflicts
2. Climate change (MDG 7),

3. Communicable diseases (MDG 6)
4. Education (MDG 2)
5. Financial stability
6. Governance
7. Hunger and malnutrition (MDG 1)
8. Migration
9. Trade reform
10. Water and sanitation (MDG 6)

Such estimates are subject to a number of qualifications because of the limited information on benefits and costs over long periods of time (e.g., over the life cycle for investments in infants and young children), because of the sensitivity of the estimates to critical assumptions (e.g., how to value averted mortality, what discount rate to use to reflect that saving resources or increasing productivity sooner is better than saving the same resources or increasing productivity by the same amount later because the gains can be reinvested), and because of difficulties in estimating differences between private and social rates of return (as would be desirable for the efficiency concern noted above).

To illustrate some of these points, I consider one of the projects proposed under Copenhagen Consensus Issue 7 on hunger and malnutrition, the benefits from shifting a baby from below to above the standard cutoff for low birth weight status (2.5 kgm). Columns 1 and 2 in Table 1 give estimates of the present discounted value (PDV) of such benefits under the assumption that the discount rate is 5 percent. These estimates suggest that moving a baby from below to above the low birth weight cutoff has a number of benefits over the life cycle and indeed across generations that have a PDV of US\$510. Considering the assumptions underlying these estimates, the largest share of the benefits are not the more immediate ones of averting infant mortality and reducing the costs associated with infant morbidity, but from increased productivity as an adult. However, these estimates are sensitive to critical assumptions. Columns 3 and 4

indicate, for example, how the estimates change if the discount rate is 3 percent, with an increase in the overall present discounted value of 63 percent in the benefits and a shift more in composition towards benefits that occur later in the life cycle.

Table 1. Present discounted value (PDV) of benefits of shifting one baby from below to above the cutoff for low-birth rate

Components of Benefits	5% discount rate		3% discount rate	
	\$ Value (1)	% Share (2)	\$ Value (3)	% Share (4)
1. Reduced infant mortality	\$93	18.2%	\$95	11.4%
2. Reduced neonatal care	\$42	8.2%	\$42	5.0%
3. Reduced costs of infant/child illness	\$35	6.9%	\$36	4.3%
4. Productivity gain from reduced stunting	\$85	16.7%	\$152	18.3%
5. Productivity gain from increased ability	\$205	40.2%	\$367	44.1%
6. Reduction in costs of chronic diseases	\$15	2.9%	\$49	5.9%
7. Intergenerational benefits	\$35	6.9%	\$92	11.0%
Sum of PDV of seven benefits	\$510	100.0%	\$832	100.0%

Despite the sensitivity of the estimates to critical assumptions, they are indicative of what should be relative priorities – in some cases suggesting much higher benefits relative to costs than in others. Table 2 gives estimates for the whole set of projects under the Copenhagen Consensus's hunger and malnutrition challenge, particularly related to MDGs 1, 4 and 5. Table 3 gives a summary of the Copenhagen Consensus rankings by the panel of eight leading economists (half of whom are Nobel Laureates), suggesting high priorities for MDGs 6, 1, and 4 but a relatively low priority for MDG 7. Similar efforts (or estimates of the relative economic costs of different policies to attain particular goals), even if crude, would be informative for deciding on what policies to use to pursue any particular MDG in a particular context, and the relative gains from policies directed towards different MDGs (which becomes increasingly relevant for the many countries for which it appears that obtaining all the MDGs may not occur) in any particular context.

Table 2. Ranges of benefit-cost ratios for different projects to reduce hunger and malnutrition in the developing world

Opportunities and targeted populations	Benefits/Costs
1. Reducing LBW for pregnancies with high probabilities LBW (particularly in S. Asia)	
1a. Treatments for women with asymptomatic bacterial infections	0.6-4.9
1b. Treatment for women with presumptive STD	1.3-10.7
1c. Drugs for pregnant women with poor obstetric history	4.1-35.2
2. Improving infant and child nutrition in populations with high prevalence of child malnutrition (fairly widespread in poor populations in developing countries)	
2a. Breastfeeding promotion in hospitals in which norm has been promotion of use of infant formula	5.6-67.1
2b. Integrated child care programs	9.4-16.2
2c. Intensive pre-school program with considerable nutrition for poor families	1.4-2.9
3. Reducing micro nutrient deficiencies in populations in which they are prevalent ^b	
3a. Iodine (per woman of child bearing age)	15-520
3b. Vitamin A (pre child under six years)	4.3-43
3c. Iron (per capita)	176-200
3d. Iron (pregnant women)	6.1-14
4. Investment in technology in developing agriculture	
4a. Dissemination of new cultivars with higher yield potential	8.8 – 14.7
4b. Dissemination of iron and zinc dense rice and wheat varieties	11.6- 19
4c. Dissemination of Vitamin A dense “Golden Rice”	8.5 - 14

Policies usually have unintended or indirect effects.

Policies often are, though not always, targeted towards fairly specific goals e.g. raising primary schooling enrollment for MDG 2, reducing child mortality for MDG 4, and so on. But policies also usually have other effects because they increase resources for some groups and change incentives for behaviors for both individuals and families and for other entities, including service providers (e.g., in health and education) and governmental bureaucrats (e.g., who can gain rents from policy-created restrictions or use policies for patronage). Therefore, for example, policies ostensibly directed towards particular targets such as improving nutrition (MDG 1) or improving education (MDG 2, possibly MDG 3) may have some important effects that are different from those intended.

To illustrate, estimates indicate that a substantial share of the resources devoted to in-kind food programs intended to benefit the poor go towards running and administering those programs or 'leak' to better-off members of society (Levy, 2006) and that a substantial share of the food or nutritional supplements provided by such programs to infants and children (related to MDGs 1, 2 and 4) effectively go to other household members possibly for non-food purposes by reducing the household-provided food to offset part of the program food (Afridi 2007 for India, Islam and Hoddinott 2008 for Guatemala, Jacoby 2002 for the Philippines). Concerns about such unintended and indirect effects underlie some of the recent advocacy for conditional cash transfer programs, with the cash transfer arguably lessening leakages through large bureaucracies that administer the programs and with the conditionalities assuring that the added resources are used for the purposes that the policy makers deem desirable (Levy, 2006). Such programs have been used or are under consideration in many parts of the world, with the Mexican *PROGRESA/Oportunidades* anti-poverty human resource investment program probably being most visible, but other efforts are also ongoing or under consideration not only in other countries in Latin America but in countries ranging from South Africa to Morocco to Bangladesh to the United States (Behrman 2007, Levy 2006). The possible importance of unintended and indirect effects reinforces the importance of systematic monitoring and evaluation of policies (see Point 6 below).

Policies are likely to be more effective the more closely they are targeted to the real objective.

Often, and arguably including for some of the MDGs, policies are targeted towards what might be thought to be intermediate objectives rather than the ultimate objectives. The MDGs related to schooling (MDGs 2 and 3) provide some examples. The target is in terms of school enrollments. But presumably what really is of interest is

schooling attainment or, better yet, cognitive achievement or other indicators of what is learned in school that will benefit the individual being schooled in later life. The indicator chosen can make a difference. For example, school enrollment rates are lower on average for girls than for boys in many societies, which have led to concern about gender disparities disadvantaging girls. In many of these cases however, ranging from Malawi to Mexico, average schooling attainment is greater for girls than for boys because boys fail and then repeat or drop out and re-enter school more often than girls. As a result, though enrollment rates are higher for boys than for girls, the gender gaps in schooling attainment are less than or even opposite to those in enrollment rates (Behrman, Sengupta and Todd 2005 for Mexico, Grant 2007 for Malawi, Grant and Behrman 2008 for 34 countries aggregated to six developing country regions).

Therefore, some policies that favor girls based on gender gaps in enrollments may even increase gender disparities in schooling attainment by favoring girls who had higher schooling attainment prior to the policy (e.g., the Mexican *PROGRESA* program has higher scholarships for girls based on lower pre-program enrollment rates for girls than for boys even though pre-program girls on average had higher schooling attainment; see Behrman, Sengupta and Todd, 2005). Likewise, programs directed towards enrolling and attending school may increase incentives for school administrators to over-report enrollments and attendance, but not increase student achievement. For a positive example of directing policies to the problem, if teacher absence is understood to be a problem that limits student learning, incentives directed towards lessening teacher absenteeism may be effective. In rural India for example, in a recent policy evaluation experiment schools were provided cameras with unalterable time/date mechanisms and teachers were paid bonuses depending on how many days at the start and end of the school day these cameras indicated that the teachers were present with students, which increased teacher presence and student test performance (Duflo and Hanna, 2006).

Table 3. Copenhagen consensus ranking of proposed projects (Lomborg): Some proposals not ranked

Project rating		Challenge	Opportunity	MDG
Very Good	1	Diseases	Control of HIV/AIDS	6
	2	Malnutrition	Providing micronutrients	1
	3	Subsidies and Trade	Trade liberalization	1?
	4	Diseases	Control of malaria	6
Good	5	Malnutrition	Development of new agricultural technologies	1
	6	Sanitation and Water	Small-scale water technology for livelihoods	1
	7	Sanitation and Water	Community-managed water supply and sanitation	1,6
	8	Sanitation and Water	Research on water productivity in food production	1
	9	Government	Lowering the cost of starting new businesses	1?
Fair	10	Migration	Lowering barriers to migration for skilled workers	1
	11	Malnutrition	Improving infant and child nutrition	4
	12	Malnutrition	Reducing the prevalence of low birth weight	4, 5
	13	Diseases	Scaled-up basic health services	6
Bad	14	Migration	Guest worker programs for the unskilled	1
	15	Climate	Optimal carbon tax	7
	16	Climate	Kyoto Protocol	7
	17	Climate	Value-at-risk carbon tax	7

A related but slightly different example is provided by MDGs 4 to 6 on reducing child mortality, improving maternal health, and combating HIV/AIDS, malaria and other diseases. While MDG 6 includes all diseases, the explicitly-mentioned diseases and the ones that are emphasized in the analysis of success-to-date in attaining this MDG (e.g., United Nations 2006) are the traditional health problems of developing countries – communicable, maternal, perinatal, and nutritional conditions (CMPNC). However despite the rapid growth of some diseases in this category (particularly HIV/AIDS), these traditional illnesses no longer dominate health problems in developing countries and are projected to be a declining share of such problems over the next decades. Non-communicable diseases (NCD) currently have a larger and predicted growing share of health problems in developing countries – see Figure 1 and Table 4. By highlighting CMPNC, MDGs 4 to 6 may divert attention from the already more important and more

rapidly growing NCD. (The Copenhagen Consensus effort summarized above and in Table 3 is more subject to the risk of inducing resource allocations away from the larger and more rapidly expanding health conditions because it limited consideration of diseases to infectious diseases, and thus to CMPNC.)

Figure 1. % Composition of DALYs projected for three major GBD/WHO categories for all developing countries by World Health Organization/Global Burden of Disease Project (Behrman, Behrman and Perez, Table 7A)

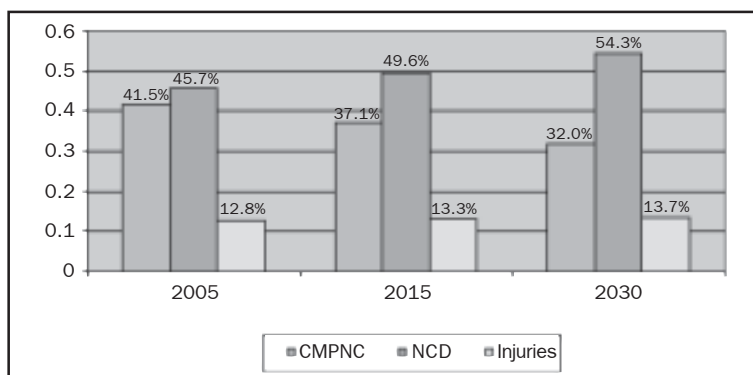


Table 4. Ranking of top causes among WHO/GBD projected DALYs for all developing countries and for low-income developing countries in 2005 and 2030

Causes Ranked for All Developing Countries in 2005	Aggregate Tripartite Category of Causes*	Ranking of Top Conditions			
		All Developing Countries		Low-Income Developing Countries	
		2005	2030	2005	230
Neuropsychiatric conditions	NCD	1	1	1	2
Cardiovascular diseases	NCD	2	3	3	4
Unintentional injuries	Injuries	3	4	2	1
Perinatal conditions	CMPNC	4	9	4	9
HIV/AIDS	CMPNC	5	2	6	3
Respiratory infections	CMPNC	6	10	5	10
Sense organ diseases	NCD	7	5	9	6
Malignant neoplasms	NCD	8	7	8	8
Respiratory diseases	NCD	9	6	11	5
Diarrheal diseases	CMPNC	10	13	10	12
Intentional injuries	Injuries	11	8	7	7
*NCD=Non-communicable diseases; CMPNC = Communicable, maternal, perinatal and nutrition conditions					

The effectiveness of policies depends on the social, economic, and policy environment, so policies that are effective in one environment might not be effective in another and should not be blindly emulated.

While this point seems so obvious that it hardly needs mentioning, there seems to be a tendency to believe (even to hope) that what works well in one context can just be transplanted to work well in another context. But if individuals or families are trying to do their best to pursue whatever they want subject to constraints imposed by markets, the environment, policies, culture, and their initial resources (as is suggested by economic models as well as casual observation), it is hardly surprising that how they respond to some policy change depends largely on what that context is.

Increasing the nutritional intakes of malnourished children in pursuit of MDGs 1 and 4 in an environment with low prevalence of infectious diseases, for example, is likely to have much greater impact than doing the same in a highly infectious disease environment (Martorell 1997, 1999). Increasing schooling of women in pursuit of MDGs 1 to 6 in a context in which there is not much in the way of rewards for more-schooled women outside of the household is likely to have much greater impact on the health and education of women and children than increasing schooling for women in contexts where there are high returns to such schooling outside of the household in labor markets (e.g., Behrman, et al. 1999 for rural India versus Behrman and Rosenzweig 2002 for the United States). Providing textbooks to schools that do not have them is much more likely to be effective if dedicated and skilled teachers are present than if they are not. The importance of the context is one important factor in precluding effective direct simple transfers of specific policies from one setting to another. If such transfers are made, there are likely to be gains from serious systematic evaluation in the new context (point 6).

The gains from collecting good information and undertaking good systematic analysis of policies are likely to be considerable.

To assess policy effectiveness, one must ask a challenging counterfactual question: What would be the impact on a person who is exposed to a policy change in comparison with the same person who at the same time is not exposed to the policy change? Because there are many possibly important variables that determine any outcome of interest such as maternal health for MDG 5 or the quality of water for MDG 7, some of which are not likely to be observable (e.g., innate ability, health, and motivation for individuals; aspects of soil quality and water systems for environmental concerns), simple associations between some indicator of a particular policy and some outcome of interest are not likely to reveal the policy impact precisely because the individuals (or other entities) exposed to the policy are not likely to be the same as those who are not, with regard to unobserved characteristics. To be concrete, with regard to MDGs 2 and 3, those who attend school are likely to differ from those who do not in regard to factors such as ability, motivation, and family background. Likewise, those students who attend better schools are not likely to be the same with regard to such characteristics as those who do not.

The ‘gold standard’ for assessing policy impact is therefore considered to be a good policy experiment in which individuals (or schools or whatever) are randomly selected to be exposed to the policy change so that in terms of the unobservables, those with the policy ‘treatment’ are on average the same as the controls without the policy treatment. Therefore, the difference between the outcomes for the two groups reveals the average policy impact. Programs often have to be rolled out over time, so rolling them out with random assignment is not only relatively fair as compared with alternatives such as political decisions regarding what sequence people are exposed to a new policy, but also permits better policy evaluation. The ideal

experiment is a powerful means of assessing the effectiveness of actual policies. Though policy experiments in practice only approximate this ideal to differing degrees,¹ it would appear that policy experiments should be undertaken much more frequently than they are. In an uncertain and changing world, actually learning what the dynamics of policy effectiveness are could substantially improve decisions regarding what policies to maintain, what policies to modify, and what policies to abandon in order to pursue the MDGs or other goals. If policy experiments cannot be undertaken for every policy option being considered, then statistical methods to try to compare the policy impacts on treatment versus control groups are likely to be desirable (e.g., so-called 'natural experiments,' matching methods to establish controls as comparable as possible to those treated, structural models that permit exploring counterfactual policies as in Todd and Wolpin, 2006).

Advocates of particular policy changes often just 'know' that what they advocate will be effective, but given their vested interests, information problems, and unintended consequences of policy changes, there is considerable value in ongoing systematic evaluation. Probably the best known, large-scale, and recent policy experiment in developing countries is the Mexican *PROGRESA/Oportunidades* anti-poverty human resource investment conditional cash transfer program mentioned above that addresses MDGs 1 to 6 fairly directly (Behrman and Skoufias, 2006; Levy, 2006). For this program there was an initial evaluation sample in 1998 with random assignment of 506 rural communities to treatment and to control status (it turned out, for two years). The experimental evaluation led to fairly confident conclusions that in some respects the program worked well and in

¹ The ideal experiment would have random assignment between treatment and control groups of some treatment or of a placebo that neither those who distributed the treatment nor those who received the treatment could identify from the treatment, with no attrition or spillovers between the two groups and following both groups sufficiently long enough to observe the dynamics of the effects over time and the long-run effects.

other respects it could be improved through modifications. This sampling was a critical factor in the maintenance of the program that required support from Congress and that persisted with a historical change in the government after over six decades of rule by the same political party (Levy 2006, Behrman 2007).

There are a number of other cases related to the MDGs that demonstrate how the power of experiments can be informative in identifying causal effects from associations. One interesting example is the examination of the impact of flip charts in Kenya (Glewwe et al., 2003) on education (MDG 2, MDG 3). In the study area there are significant associations between having flip charts and school performance that might plausibly reflect causality in that context in which school supplies were very limited, so having a flip chart might make teachers much more effective. But the associations between school performance and having flip charts also might reflect other factors in part or in whole, such as the quality of the teachers or of the administration or the support of parents for education. Indeed, when flip charts were allocated randomly across schools following an experimental design, no significant impact was found between having them and school performance. The observed positive associations between having flip charts and school performance therefore apparently reflected not that in this context flip charts positively improved school performance, but that schools that had flip charts also tended to have other characteristics that caused better school performance.

Of course, experiments and other systematic evaluations have costs. But for many programs advocated to improve attainment of the MDGs, substantial resources are involved. In many more cases than for which systematic policy evaluations are currently undertaken, it would appear that the expected gains from improved policies would exceed the costs of such evaluations.

Conclusion

Recent research has some important insights for selecting policies that are likely to improve attainment of the MDGs. Though there are no magic bullets in the sense of policy innovations that will have high benefit-to-cost ratios everywhere, there are examples in particular contexts that suggest consideration for other contexts. The returns to human resource investments (importantly including health and nutrition in addition to education) appear to be high in many contexts: for example, with synergies among different types of investments and with early life particularly important, often suggesting some 'win-win' possibilities of increasing longer-run productivities and efficiencies in addition to attaining MDG-like goals and reducing poverty.

Conditional cash transfers and very specific incentives to improve specific problems (such as teacher and health-care worker absence) seem very promising for helping to attain several of the MDGs at least in the contexts in which they have been explored. But contexts differ and the incentives for many participants in the policy chain – from policy makers, to implementers, to clients – also differ, with many unintended and indirect effects resulting from policies. Information problems also are severe. In particular contexts, there is likely to be a multiplicity of policies that might help attain any particular MDG with different benefit-to-cost ratios in economic terms, as well as great variance in the benefit-to-cost ratios across MDGs and between pursuing MDGs and other policies that should be addressed if governments are to help enhance the welfare of citizens as much as possible.

Therefore more serious efforts at collecting information and systematically analyzing such information to understand and evaluate specific policies in particular contexts is likely to lead to enhanced knowledge about the type of desirable policy choices needed to attain specific MDG goals and other goals of developing countries across the varying contexts in different countries in Africa, Asia, and Latin America.

References

- Afridi, F. 2007. "Child Welfare Programs and Child Nutrition: Evidence from a Mandated School Meal Program in India," Syracuse, NY: Syracuse University.
- Alderman, H. and J. R. Behrman. 2006. "Reducing the Incidence of Low Birth Weight In Low-Income Countries has Substantial Economic Benefits," *World Bank Research Observer* 21:1, pp.25-48.
- Banerjee, A. V. 2006. "Making Aid Work: How to Fight Global Poverty—Effectively," originally published in the July/August 2006 issue of *Boston Review*, forthcoming in *Making Aid Work*, Boston Review/MIT Press 2007).
- Behrman, J. R. 2007. "Policy-oriented Research Impact Assessment (PORIA) Case Study on the International Food Policy Research Institute (IFPRI) and the Mexican *Progresa* Anti-poverty and Human Resource Investment Conditional Cash Transfer Program," Washington, DC: International Food Policy Research Institute Impact Assessment Discussion Paper No. 27.
- Behrman, J. R., H. Alderman and J. Hoddinott. 2004. "Hunger and Malnutrition" in ed. Bjørn Lomborg, *Global Crises, Global Solutions*, Cambridge, UK: Cambridge University Press, pp. 363-420.
- Behrman, J. R., J. A. Behrman and N. Perez. 2006. "Out of Sync? Social Science Research on Health and Development and Health Conditions in Developing Countries," Philadelphia: University of Pennsylvania, mimeo.
- Behrman, J. R., A. Foster, M. R. Rosenzweig and P. Vashishtha. 1999. "Women's Schooling, Home Teaching, and Economic Growth," *Journal of Political Economy* 107:4 (August), pp. 682-714.
- Behrman, J. R. and M. R. Rosenzweig. 2002. "Does Increasing Women's Schooling Raise the Schooling of the Next Generation?" *American Economic Review* 92:1 (March), pp. 323-334.

- Behrman, J. R., P. Sengupta and P. Todd. 2005. "Progressing through PROGRESA: An Impact Assessment of Mexico's School Subsidy Experiment," *Economic Development and Cultural Change* 54:1 (October), pp. 237-275.
- Behrman, J. R. and E. Skoufias. 2006. "Mitigating Myths about Policy Effectiveness: Evaluation of Mexico's Anti-Poverty and Human Resource Investment Program," *Annals of the American Academy of Political and Social Science* 606 (July) special issue entitled *Chronicle of a Myth Foretold: The Washington Consensus in Latin America* edited by D. S. Massey, M. Sanchez R. and J. R. Behrman, pp.244-275.
- Duflo, E. and R. Hanna. 2006. "Monitoring Works: Getting Teachers to Come to School," Cambridge, MA: Department of Economics and Poverty Action Lab, Massachusetts Institute of Technology.
- Foster, A. and M. R. Rosenzweig. 1995. "Learning by Doing and Learning from Others: Human Capital and Technical Change in Agriculture," *Journal of Political Economy* 103:6 (December), pp. 1176-1209.
- Glewwe, P., M. Kremer, S. Moulin and E. Zitzewitz. 2003. "Retrospective vs. Prospective Analyses of School Inputs: The Case of Flip Charts in Kenya." *Journal of Development Economics* 74, pp. 251-268.
- Grant, M. J. 2007. "Children's School Participation and HIV/AIDS in Rural Malawi: The Role of Parental Knowledge and Perceptions," Philadelphia, PA: University of Pennsylvania, memo.
- Grant, M. J. and J. R. Behrman. 2008. "Gender Gaps in Educational Attainment in Less Developed Countries," Philadelphia, PA: University of Pennsylvania, memo.
- Islam, M. and J. Hoddinott. 2008. "Evidence of Intra-Household Flypaper Effects from a Nutrition Intervention in rural Guatemala," *Economic Development and Cultural Change* (forthcoming).

- Jacoby, H. G. 2002. "Is There an Intrahousehold 'Flypaper Effect'? Evidence from a School Feeding Programme," *The Economic Journal*, 112, pp. 196-221.
- Jacoby, H. G. 1994. "Borrowing Constraints and Progress Through School: Evidence from Peru," *Review of Economics and Statistics* 76:1 (February), pp.151-160.
- Jacoby, H. G. and E. Skoufias. 1997. "Risk, Financial Markets and Human Capital in a Developing Country," *Review of Economic Studies* 64:3 (July), pp. 311-335.
- Knowles, J.C. and J. R. Behrman. 2005. "Economic Returns to Investing in Youth. In J. R. Behrman, B. Cohen, C. Lloyd and N. Stromquist, eds. *The Transition to Adulthood in Developing Countries: Selected Studies*, Washington, DC: National Academy of Science-National Research Council, pp. 424-490.
- Levy, S. 2006. *Progress Against Poverty: Sustaining Mexico's PROGRESA-Oportunidades Program*, Washington, DC: Brookings Institution.
- Lomborg, B. ed. 2004, *Global Crises, Global Solutions*, Cambridge, UK: Cambridge University Press.
- Martorell, R. 1997. "Undernutrition During Pregnancy and Early Childhood and Its Consequences for Cognitive and Behavioural Development." in M.E. Young (ed.) *Early Childhood Development: Investing In Our Children's Future*. Amsterdam: Elsevier.
- Martorell, R. 1999. "The Nature of Child Malnutrition and Its Long-Term Implications." *Food and Nutrition Bulletin* 19, pp. 288-292.
- Todd, P. and K. I. Wolpin. 2006. "Using a Social Experiment to Validate a Dynamic Behavioral Model of Child Schooling and Fertility: Assessing the Impact of a School Subsidy Program in Mexico," *American Economics Review* 96(5), pp. 1384-1417.
- United Nations. 2006. *The Millennium Development Goals Report 2006*, New York: United Nations.

The MDGs as a Policy Tool: the Challenges Ahead¹

Nora Lustig

Abstract

The Millennium Development Goals are a very useful advocacy tool but, as a policy tool, they pose significant challenges in three particular areas: 1) monitoring and reporting; 2) designing, costing and implementing policy interventions; and 3) mobilizing resources. Data to monitor progress in achieving the MDGs is limited and suffers from inconsistencies. Available methods to guide policy interventions in achieving the MDGs and estimating their costs are quite imperfect. Capacity to budget and implement the selected policy interventions in poor countries is not easily available. Resources – in particular, Overseas Development Assistance — required to achieve the MDGs in the poorest countries are insufficient and unpredictable. The paper suggests some courses of action to address these challenges.

Keywords: Millennium Development Goals; costing policy interventions; monitoring poverty reduction; overseas development assistance; domestic resource mobilization.

¹ An earlier version of this paper (and under a different title) was presented at the conference “Reaching the MDG’s: an International Perspective Forum” organized by Grupo de Análisis para el Desarrollo (GRADE), the Network on Inequality and Poverty (LACEA-NIP), the Poverty and Economic Policy Research Network (PEP) and the Universidad del Pacifico (UP), Lima, June 12, 2007. The analysis presented here is based on work under my coordination while I was Director of the Poverty Group at UNDP and results of my work as a consultant for the UNDP project on data quality for MDG monitoring and reporting. I am grateful to Wendy Sanchez for her valuable assistance and participants of the conference “Reaching the MDG’s: an International Perspective Forum” (Lima, June 12, 2007) for their helpful comments.

Originally known as the International Development Goals, the Millennium Development Goals were generated in a series of international conferences organized under the auspices of the United Nations in the 1990s. In September 2000, the goals were officially adopted by the 189 member states who signed the United Nations Millennium Declaration. At the time, these goals also changed their name to Millennium Development Goals (MDGs).

The MDGs have undoubtedly mobilized unprecedented attention, both at the national and international levels, to the needs of the world's poorest. They are a great advocacy tool. As a policy tool, however, the MDGs pose significant challenges. In this note, I will briefly review some of these challenges in three particular areas: 1) monitoring and reporting; 2) designing, costing, and implementing policy interventions; and 3) mobilizing resources. This exercise is by no means meant to be comprehensive. Its purpose is to highlight some of the difficulties of translating 'words into deeds' and, hopefully, inspire further analysis and actions to address some of the challenges outlined here.

The MDGs since 2000

The MDGs are eight goals that member states of the UN have agreed to achieve by the year 2015. In particular, the member states have committed to:

MDG 1: Eradicate Poverty & Hunger

Target 1: Halve, between 1990 and 2015, the proportion of people whose income is less than one dollar a day

Target 2: Halve, between 1990 and 2015, the proportion of people who suffer from hunger

MDG 2: Achieve Universal Primary Education

Target 3: Ensure that, by 2015, children everywhere, boys and girls alike, will be able to complete a full course of primary schooling

MDG 3: Promote Gender Equality

Target 4: Eliminate gender disparity in primary and secondary education, preferably by 2005, and in all levels of education no later than 2015

MDG 4: Reduce Child Mortality

Target 5: Reduce by two-thirds, between 1990 and 2015, the under-five mortality rate

MDG 5: Improve Maternal Health

Target 6: Reduce by three-quarters, between 1990 and 2015, the maternal mortality ratio

MDG 6: Combat HIV AIDS, Malaria and Other Diseases

Target 7: Have halted by 2015 and begun to reverse the spread of HIV/AIDS

Target 8: Have halted by 2015 and begun to reverse the incidence of malaria and other major diseases

MDG 7: Ensure Environmental Sustainability

Target 9: Integrate the principles of sustainable development into country policies and programmes and reverse the loss of environmental resources

Target 10: Halve, by 2015, the proportion of people without sustainable access to safe drinking water

Target 11: By 2020, to have achieved a significant improvement in the lives of at least 100 million slum dwellers

MDG 8: Develop a Global Partnership for Development

Target 12: Develop further an open, rule-based, predictable, non-discriminatory trading and financial system. (Includes a commitment to good governance, development, and poverty reduction – both nationally and internationally)

Target 13: Address the Special Needs of the Least Developed Countries (LDC) (Includes: tariff and quota

free access for LDC exports; enhanced programme of debt relief for HIPC and cancellation of official bilateral debt; and more generous ODA (Overseas Development Assistance) for countries committed to poverty reduction)

Target 14: Address the special needs of landlocked developing countries and small island developing states

Target 15: Deal comprehensively with the debt problems of developing countries through national and international measures in order to make debt sustainable in the long term

Target 16: In cooperation with developing countries, develop and implement strategies for decent and productive work for youth

Target 17: In cooperation with pharmaceutical companies, provide access to affordable essential drugs in developing countries

Target 18: In cooperation with the private sector, make available the benefits of new technologies, especially information and communications

Since 2000, practically all governments, UN organizations, the International Financial Institutions (IFIs), and major civil society groups have signed on to the Goals. Moreover, at the 2005 World Summit world leaders resolved to prepare and implement comprehensive MDG-based national development strategies as a shared framework for implementation.

According to a recent assessment, “a number of countries are on track to achieving the MDGs, but no region is on track to meeting all the Goals. The lack of satisfactory progress is most severe in sub-Saharan Africa, where several countries are not on track to achieve a single Goal. Many non-African LDCs and other poor countries face similar challenges. Even the regions that have made substantial progress, including much of Asia, continue to face challenges in areas

such as health and environmental sustainability. Rapid deforestation, increasing water scarcity, deep-rooted gender inequalities, rising HIV prevalence, youth unemployment, and other obstacles to long-term development are pervasive across many regions. In many middle-income countries, particularly in those with high economic inequality, entire regions and ethnic groups are not making enough progress to meet the Goals.”² As we shall see in the next section, this assessment is based on very limited data.

Monitoring and Reporting

Conceptually, the MDGs are not ideal. They are a mix of qualitative and quantitative, specific and general, and input and outcome objectives, some of which are not defined with precision and therefore difficult to track. For example, let us consider target 2: “Halve, between 1990 and 2015, the proportion of people who suffer from hunger.” How is ‘hunger’ defined? Or, consider target 9: “Integrate the principles of sustainable development into country policies and programmes and reverse the loss of environmental resources.” What are the so-called ‘principles of sustainable development?’ Or, target 11: “By 2020, to have achieved a significant improvement in the lives of at least 100 million slum dwellers.” How does one determine if improvement is ‘significant?’

Indicators can help to address some of these weaknesses by outlining the concepts to be monitored. In 2001, the Inter-Agency and Expert Group on the MDG Indicators (IAEG) was convened in order to assist with the definition and preparation of a set of indicators to monitor comparative country and regional progress in achieving the MDGs. The group comprises representatives from 25 international organizations and bodies who either collect data on one or more of the MDG statistical indicator series or oversee activities related to

² Briefing presented by UNDP’s Administrator to the Secretary General, March 2007, mimeo.

monitoring and reporting.³ The UN Statistics Division (UNSD) serves as the convener of the meetings and secretary of the group. The IAEG began formal meetings in 2002.⁴

In 2003, the group expanded the MDG targets from 13 to 18. In addition, the targets were further disaggregated into 48 indicators. Until recently the indicators had grown to 67.⁵ At present, the current list is set to expand to accommodate the additional indicator series that have been proposed by IAEG to track the four additional MDG targets that have been called for by the General Assembly.⁶

Such a large number of indicators raises the following questions:

1. Are developing countries able to collect the necessary data to estimate these indicators? More precisely, for how many countries do at least two data points exist in order to compare progress by indicator? Even if they do exist, are the data reliable?

³ The group includes the United Nations Secretariat, a number of UN agencies, IMF, OECD and the World Bank, national experts from statistical offices, and representatives from other organizations concerned with the development of data for the MDGs at national and international levels, such as Paris 21 and IDB. In addition to the standing members, external statisticians and expert advisers also offer assistance when needed. For more information on the IAEG, please see: <http://millenniumindicators.un.org/unsd/mdg/Host.aspx?Content=IAEG.htm>.

⁴ For the General Assembly's authorization of monitoring functions, see: Resolution 55/162: Follow-up to the Outcome of the Millennium Summit. http://millenniumindicators.un.org/unsd/mdg/Resources/Static/Products/GAResolutions/55_162/a_res55_162e.pdf. For the Secretary General's plan of action, see: "Road Map towards the implementation of the United Nations Millennium Declaration." Report of the Secretary General. A/56/326. 6 September 2001. http://millenniumindicators.un.org/unsd/mdg/Resources/Static/Products/SGReports/56_326/a_56_326e.pdf.

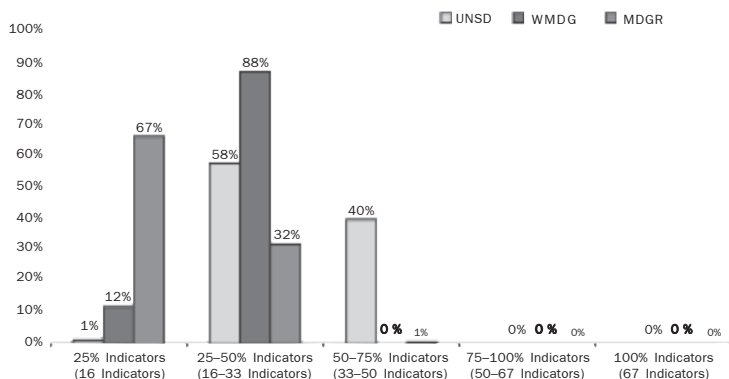
⁵ For the purpose of the study, we are considering 67 indicators, which were agreed upon with UNSD as being the most relevant and serving as proxies for overall data availability and consistency.

⁶ The IAEG has been authorized by member states through the General Assembly to propose a set of new targets and indicators related to productive employment and decent work for all, reproductive health, universal access to treatment for HIV/AIDS, and the reduction in the rate of loss of biodiversity. For more details see: "Report of the Secretary-General on the work of the Organization." A/61/1.2006.par.24. http://millenniumindicators.un.org/unsd/mdg/Resources/Static/Products/SGReports/61_1/a_61_1_e.pdf.

2. Given that to each goal correspond several indicators, how are they being aggregated in order to pass judgment on whether a country, a region or, for that matter, the world are on track to meeting the MDGs?

As we can see in Figure 1, based on the information assessed from the three sources – World Bank, UNSD and MDG reports (MDGRs) – not a single country has two data points between 1990 and 2006 for the whole set of 67 indicators. At best, 40 percent of the countries have trend data on half or more of the indicators found in the UNSD database. Neither the World Bank database nor the data reported in MDGRs have similar levels of information available when compared to UNSD. For the World Bank, none of the countries have trend data available for fifty percent or more of this universe of indicators. In fact, roughly 18 countries have less than one quarter of the indicators covered.⁷ For the MDG reports, the number of countries spikes 100 when considering a similar range of low indicator availability.⁸

Figure 1: Shares of countries with 2 observations per indicator



Source: UNSD, WBMDG, Poverty Group/BDP/UNDP, February 2007

⁷ The difference in coverage between the UNSD and World Bank data as reflected in figure 1 is puzzling since in principle both have access to each other's information and both are part of the Inter-Agency Group. This is an issue worth exploring in the future.

⁸ A more detailed assessment for data availability by indicator/series can be found in Lustig, Nora "Data Availability for MDG Monitoring and Reporting: an Assessment", Poverty Group, UNDP, June 2007, mimeo.

The above shows that the data to monitor progress in achieving the MDGs is very limited. Even in the case of a basic indicator such as the proportion of people whose income is less than one dollar a day, about a third of the 149 countries do not have adequate information to monitor progress in the UNSD database.

Since 2000, a number of efforts have been made to measure progress to achieve the MDGs by the UN Secretariat, UNDP, UN Regional Commissions, and the World Bank. In the report prepared by the UN Secretariat, the qualitative assessment presented in Table 1 reflects the opinion of the experts that participate in the IAEG and is not based on a rigorous taxonomy (including an agreed upon aggregation method). Given the mentioned data gaps and the difficulties posed by aggregation, such a task would be virtually impossible and the opinion of experts is probably the next best thing.

However, in addition to the ambiguity that underlies this exercise, the difficulties to track progress are compounded by the fact that different agencies use their own typology to assess progress. A recent review of the MDG reporting exercises undertaken by UNSD, ESCAP and ECLAC, and the UNDP-supported country-based MDG Reports concluded that “there is limited consistency in presentation, assessment methods and typologies used to report on the status and *progress* of the MDGs across different agencies and publications.”⁹ This leads to the uncomfortable situation that, beyond very broad and general statements such as those mentioned at the beginning of this note, the available analysis for specific countries and/or specific goals and indicators have to be taken with great caution.

⁹ Letouze, Emmanuel “Tracking the Millennium Development Goals: A Selective Review of Data Collection Modalities, Reporting Sources and Assessment Methods”, Poverty Group, UNDP, 2006, mimeo.

Table 1: Progress towards the MDGs 2005

Goals and Targets	Africa			Asia			Commonwealth of Independent States		
	Northern	Sub-Saharan	Eastern	South Eastern	Southern	Western	Oceania	Latin America & Caribbean	Europe Asia

Goals 1 : Eradicate extreme poverty and hunger

Reduce extreme poverty by half	low poverty	very high poverty	moderate poverty	moderate poverty	high poverty	low poverty	—	moderate poverty	low poverty
Reduce hunger by half	very low hunger	very high hunger	moderate hunger	moderate hunger	high hunger	moderate hunger	moderate hunger	moderate hunger	high hunger

Goals 2 : Achieve universal primary education

Universal primary schooling	high enrolment	low enrolment	high enrolment	high enrolment	moderate enrolment	moderate enrolment	moderate enrolment	high enrolment	moderate enrolment
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Goals 4 : Reduce child mortality

Reduce mortality of under-five-years-old by two thirds	moderate mortality	very high mortality	moderate mortality	moderate mortality	high mortality	moderate mortality	high mortality	moderate mortality	low mortality	high poverty
Measles immunization	high coverage	very high coverage	moderate coverage	moderate coverage	low coverage	moderate coverage	very low coverage	high coverage	high coverage	high coverage

Goals 5 : Improved of maternal health

Reduce maternal mortality by the quarters	moderate mortality	very high mortality	low mortality	high mortality	very high mortality	moderate mortality	high mortality	moderate mortality	low mortality	low mortality
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Goals 6 : Combat HIV/AIDS, malaria and other diseases

Halt and reverse spread of HIV/AIDS	—	very high prevalence	low prevalence	moderate prevalence	moderate prevalence	—		moderate prevalence	high prevalence	low prevalence
Halt and reverse spread of malaria*	low risk	high risk	moderate risk	moderate risk	moderate risk	low risk	low risk	moderate risk	low risk	low risk
Halt and reverse spread of tuberculosis	low mortality	high mortality	moderate mortality	high mortality	high mortality	low mortality	high mortality	low mortality	moderate mortality	moderate mortality

Goals 7 : Ensure environmental sustainability

Reverse loss of forests	small area	medium area	medium area	large area	small area	large area	large area	large area	small area
Halve proportion without improved drinking water	high coverage	low coverage	moderate coverage	moderate coverage	high coverage	high coverage	low coverage	high coverage	moderate coverage
Halve proportion without sanitation	high coverage	very low coverage	low coverage	moderate coverage	very low coverage	high coverage	moderate coverage	high coverage	moderate coverage
Improve the lives of slum-dwellers	moderate proportion of slum-dwellers	very high proportion of slum-dwellers	high proportion of slum-dwellers	moderate proportion of slum-dwellers	very high proportion of slum-dwellers	high proportion of slum-dwellers	—	high proportion of slum-dwellers	moderate proportion of slum-dwellers

Country experiences in each region may differ significantly from the regional average. For the regional groupings and country data, see <http://millenniumindicators.un.org>.

Sources: *United Nations, based on data and estimates provided by: Food and Agriculture Organization; Intern-Parliamentary Union; International Labour Organization; UNESCO; UNICEF; World Health Organization; UNAIDS; UN-Habitat; World Bank—based on statistics available June 2005.*
Compiled by: *Statistics Division, UN DESA.*

The progress chart operates on two levels. The words in each box tell what the current rate of compliance with each targets is. The colours show the trend, toward meeting the target by 2015 or not. See legend below:

- Target already met or very close to being met.
- Target is expected to be met by 2015 if prevailing trends persist, or the problem that this target is designed to address is not a serious concern in the region
- Target is not expected to be met by 2015, if prevailing trends persist
- No progress, or a deterioration or reversal
- Insufficient data

*The available data for maternal mortality and malaria do not allow a trend analysis. Progress in the change has been assessed by the responsible agencies on the basis of proxy indicators.

Designing, Costing and Implementing Policy Interventions

The selection of policy interventions must be preceded by a fairly accurate diagnostic of the ‘binding constraints’ that lie in the way of achieving a particular goal. The binding constraints can come from a variety of sources: fiscal constraints, lack of adequate institutions or coordination failures, insufficient human resources and infrastructure, geography and vulnerability to natural disasters, political instability and conflict, social norms, macroeconomic volatility, international policy constraints, policy-induced distortions, and so on. In some cases, additional financial resources will be needed to eliminate the constraint. In others, the required policy intervention will come in the form of changes to the legal and regulatory frameworks. Still, in other cases the international community will have to intervene, for example, to help bring an end to conflict.

It is more than likely that the binding constraints will come from different sources and if they are not addressed concomitantly, the desired result will not be observed. Let us take the example of low levels of education. It is clear that supply-side shortcomings such as the lack of schools or teachers are at the root of the problem. However, if children are not sent to school because parents cannot afford to give up their labor, do not value the benefits that education will bring to their children, or are biased against educating girls, building more schools and hiring more and better teachers is not going to result in a dramatic change in school attendance. This is a typical case in which resources have to be channeled not only to increase the supply of education but also to raise its demand with, for example, conditional cash transfers and active campaigns to change parents’ perceptions and behavior.

Designing and Costing Policy Interventions

The process of selecting the best policy interventions and estimating their costs is particularly difficult because there are

likely to be trade-offs and synergies among MDGs as well as general equilibrium and macroeconomic effects that should be taken into account. Given a fixed resource envelope, investing in health and education infrastructure will be at the expense of investing in physical infrastructure. The result may be an improvement in education and health outcomes (Goals 2, 4, 5 and 6) at the cost of lower output growth and income poverty reduction (Goal 1). This is a typical example of a difficult trade-off. Investing in children's health and malnutrition (Goals 1 and 4) will result in a rise in school attendance (Goal 2). This is an example of synergy. If achieving the education and health goals implies hiring teachers, doctors and nurses in large amounts, their wages and with it the cost of the policy intervention are likely to go up. If wages go up in the local economies, the price of food might go up as well, affecting the poor whose incomes or wages did not change. These are examples of undesirable general equilibrium effects. If foreign aid inflows increase sharply to fund the necessary spending to achieve the goals, the real exchange rate might appreciate, hurting output and employment in the export and import-substituting sectors. This is an example of a negative macroeconomic effect of scaling-up aid to achieve the MDGs.

An ideal tool for MDG analysis and policy planning would try to cover all sectors and inputs; would capture all synergies, trade-offs, input-output linkages, and economy-wide effects; and, would be transparent, easy to understand, and adaptable; modular to match expenditure planning processes in line ministries; capable of dealing with non-linearities; implementable with minimal data needs; capable of simulating impact of policies, and, applicable to all country settings.

In real life no such a tool exists. In practice, policymakers and international organizations have used three approaches to estimate the effects and costs of policy interventions to achieve the MDGs: needs assessment, poverty-growth elasticity estimates, and multi-

sector general equilibrium models. In Table 2 there is a summary of each method and in Table 3 we present an assessment of their respective strengths and weaknesses.¹⁰

Table 2: Alternative methodologies to costing the MDGs

	Poverty Elasticity with ICOR (Kakwani et. Al, 2006; Devarajan et al., 2002)	MAMS Maquette for MDG Simulation (Bourguignon et al., 2004)	Needs Assessment (Millennium Project, Sachs et. al, 2004)
Goals	Goal 1 income only target	Includes Goals 1-6 and part of 7	All Goals except 1, poverty part of 7 and 8
Identify binding constant	Mechanical application of simple ICOR link between growth, investment and Aid needs	Model focuses on trade-off between human development vs. infrastructure	Unconstrained optimization—assumes poverty trap so optimization is not relevant
Choose policy interventions	Single intervention: public investment only	Can simulate trade-offs & spill-over of a set of policy interventions	Engineering approach: consultation with experts
Estimate cost of interventions	Uniform ICOR and range of country-specific poverty elasticity	MDG module uses WB best practice intervention costs and impacts.	Detailed bottom-up models using unit costs for individual interventions
Assess financing requirements/ macro trade-offs	Macro trade-offs are assumed to be dealt outside model	Macro-module simulates trade-offs	Macro trade-offs are assumed to be dealt with outside the model

¹⁰ For a more detailed discussion, see, for example, Logfren, Hans and Diaz-Bonilla, Carolina “Economywide Simulations of Ethiopian MDG Strategies,” DECPG, World Bank, Washington, DC, July 22, 2005; Millennium Project Investing in Development: A Practical Plan to Achieve the Millennium Development Goals; Svensson, Maude “Basic Primer for Costing PRS Interventions. Zero Draft,” World Bank mimeo, March 2, 2007; “Appraising Practical Approaches to Methodologies and Macroeconomic Modeling for the MDGs. A Summary Report”, Poverty Group, BDP, UNDP, August 15, 2006; “Costing the Millennium Development Goals: Methods, Challenges and Implications. A Summary Report,” Poverty Group, BDP, UNDP, March 15, 2007.

Table 3: Strengths and weaknesses of alternative approaches to costing the MDGs

	Poverty Elasticities Approach (Kakwani and Son, 2006; Devarajan et al., 2002)	Maquette for MDG Simulation (MAMS) (Bourguignon et al., 2004)	Needs Assessment Approach (Former Millennium Project)
Main strengths	<ul style="list-style-type: none"> – Gives ballpark estimates of aid required to achieve Goal 1 – Easy to apply 	<ul style="list-style-type: none"> – Comprehensive – Incorporates spill over and micro and macro trade-offs 	<ul style="list-style-type: none"> – Straightforward cost estimates – Easy to link to budget programming
Main weaknesses	<ul style="list-style-type: none"> – Mechanical – No specific policies – No validation – Ignores micro-macro trade-offs and spill over – Difficult to incorporate in budget programming 	<ul style="list-style-type: none"> – Difficult to validate parameters → How robust are the results? – Very data-intensive and complex to put in place – Incorporation of spill over effects and trade-offs is limited 	<ul style="list-style-type: none"> – Mechanical – May miss binding constraints – Ignores micro and macro trade-offs and spill over effects

The ‘Needs Assessment’ method or bottom-up costing builds on thorough sector and sub-sector knowledge and involves sectoral experts. It necessitates field trips, detailed analysis and projections of baseline statistics, as well as country-specific, disaggregated unit costs. It establishes feasible strategies and estimates costs in a fixed-coefficient fixed-price framework with no synergies, trade-offs, or second-round effects.

The ‘Poverty-Growth Elasticity’ or top-down method builds on extensions of the Harrod-Domar growth model. It is used for calculating the required investments that will be needed in order to reach a target growth rate.¹¹ When costing the MDG goal on halving poverty, for example, assumptions of poverty elasticities, etc., are added to the standard assumptions of countries’ incremental capital

¹¹ See Burnside, Craig and David Dollar, “Aid, Policies, and Growth,” World Bank mimeo, November 1996; Devarajan et al., 2002 and Kakwani et al., 2006.

output ratio (ICOR), which is a broad measure of the productivity of investments in each country. This approach would be used for calculating how much investment would be necessary in order for a country to halve poverty by 2015, for example. The resulting financing gap between required investment and available resources is often assumed to be filled with foreign aid. As mentioned in Table 3, this approach gives very rough ballpark aggregate estimates, however, which should not be used without comparing them with those resulting from more disaggregated models.

An application of the 'General Equilibrium' top-down method to MDG planning has been developed by the World Bank. The MAMS (Maquette for MDG Simulation) is a computable general equilibrium model designed for MDG analysis. MAMS is complementary to and draws extensively on sector and econometric research on MDGs. It typically covers MDG 1 (income poverty), MDG 2 (primary school completion), MDG 4 (under-five mortality rate), MDG 5 (maternal mortality rate), and MDG 7 (water access and sanitation access). The MAMS is an economywide, inter-temporal, flexible-price model which can capture synergies, trade-offs and second-round effects.

In practice, no single method is likely to be robust enough by itself and a more sensible approach should rely on a combination of the three.

Implementation

However, even if governments were able to identify the right policy interventions and cost them accurately to reach the MDGs, significant challenges remain in the implementation phase such as shortcomings of the budgeting process, weaknesses in the public administration and service delivery systems, and counterproductive political economy dynamics.¹²

¹² Levy, Santiago "Policy Notes on MDGs", Poverty Group, BDP, UNDP, New York, December 2006.

Existing budgeting and public financial management processes are often unable to set clear medium-term priorities that are effectively implemented through annual budgets. The broad objectives set out in national plans and poverty reduction strategies are often not linked effectively to medium-term expenditure allocations that set clear, politically endorsed priorities to guide the annual budgetary process.

This occurs in part because there is no coordination and agreement between the line ministries and executing agencies, on the one hand, and budgetary authorities (Ministers of Finance, for example), on the other. Unless this validation and revision of delivery methods, financial costs and expenditure commitments is carried out, it is not reasonable to assume that goals will be fulfilled. Line ministries cannot be forced to execute tasks for which they are not convinced and budgetary authorities will not include spending lines if the cost estimates are not credible or if the financial commitments are considered not viable or pose a threat to macroeconomic stability.

Another factor which affects the incorporation of the MDG-related priorities in the annual budgets is the often negligible role of parliaments in debating and influencing priorities. This drastically reduces the ability to build an enduring consensus and the predictability around policy and spending priorities.

In addition, spending in the social sectors has often been the victim of large shortfalls in budgetary implementation with the burden typically falling on non-personnel spending. At a technical level, these shortfalls reflect weaknesses in the budgetary process in the context of unrealistic initial budgets. Frequently however, these problems are no accident and probably reflect deeper political economy influences. For example, significant in-year budget adjustments might be decided without the knowledge or involvement of the line ministries and agencies concerned.

In poor countries, the public administration and social sector staff may be insufficient in numbers or ill-equipped to implement

and manage the policies and programs to achieve the MDGs. In particular, a large expansion of health and educational coverage needs to be accompanied by a discussion of alternative methods for delivering these services as well as the incentive system for public and private providers of the service, as well as sub-national governments.

Delivering health and educational services requires the participation of workers and suppliers who, if they are able to exercise monopoly power (through unions or barriers to entry), could extract large rents when they know that the demand for their products — labor, medicines, school supplies—will be increased steadily and rapidly over the next years. Such political economy dynamics would be counterproductive because they could substantially increase the cost of achieving the MDGs.

Resource Mobilization

Achieving the MDGs will require, in most cases, substantial additional fiscal resources. Domestically, these can be generated through increased revenue (primarily taxes), reallocations within the budget, through enhanced efficiency of budget expenditure, and through borrowing in the domestic financial market. Middle-income countries can and should finance their policy interventions and programs to achieve the MDGs from these sources.

However, as we can see in Table 4, revenue collection in the poorest countries is relatively small (less than 20 percent of GDP) and also much more difficult to change at least in the short-run. Even if government revenues could be increased significantly in low income countries, the resources will be insufficient to achieve the Goals by 2015. Every available analysis shows that external resources, particularly in the form of grants, are absolutely essential.

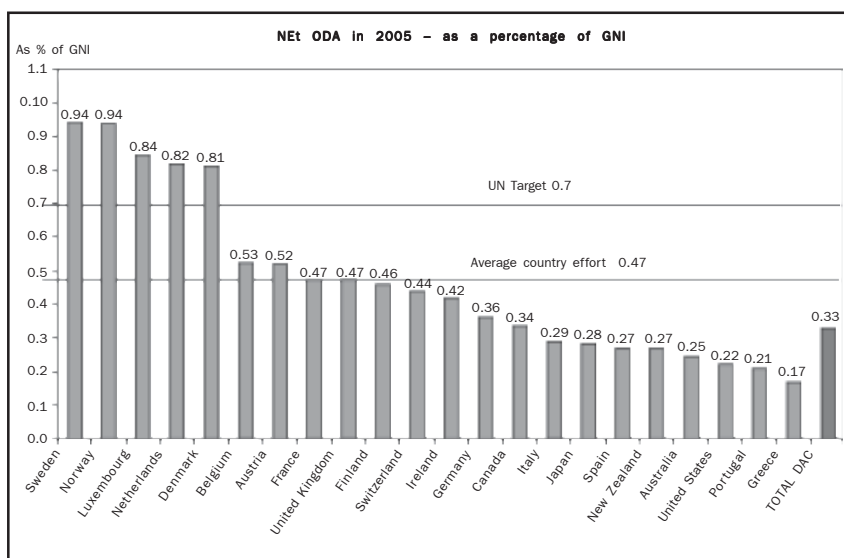
In spite of successive and visible commitments, the donor community has fallen way short of its promises to increase official

Table 4: Tax to GDP ratio in relation to income

GDP per capita	Tax to GDP ratio (1997-2001)
<US\$1,000	14.5%
US\$1,000-5000	21.3%
US\$5,000-10.000	22.8%
>US\$10,000	32.4%

Source: World Development Indicators

development assistance (ODA) to 0.7 percent of GNI by 2015. According to the latest OECD DAC figures ODA fell in 2006, and donors are not on track to meeting their commitments on aid (Figure 2). Total official aid from DAC members rose by 32 percent in 2005 to USD 106.8 billion – a record high. However, most of this increase was accounted for by two countries (Afghanistan and Iraq). Apart from these two countries, tsunami aid, unusually high debt relief,

Figure 2: Net Overseas Development Assistance: 2005

and an increase in humanitarian aid drove the overall increase in aid. The core development assistance for sub-Saharan Africa has been stagnating. If one excludes Nigeria, which received exceptional debt relief, then net ODA to the rest of Africa *fell* by 1.2 percent in real terms despite the pledges by the Group of Eight and the European Union to substantially increase development assistance.

Moreover, the bulk of ODA remains project-driven, undermining national priorities and domestic accountability, and most development partners have not made available country-by-country timetables for how they will increase ODA to meet the Gleneagles and EU commitments. The lack of predictable commitments to scale up aid makes it impossible for recipient countries to plan for the necessary increase in public investments so that additional resources cannot be used effectively once they become available.

Concluding remarks

Country-level data to monitor progress in achieving the MDGs is quite limited. In part this is due to the fact that the international community has selected too many indicators to track progress. As a result, not a single country has two data points between 1990 and 2006 for the whole set of 67 indicators. At best, 40 percent of the countries have trend data on half or more of the indicators. What is worse, a third of the 149 developing countries do not even have adequate information to monitor progress in Goal 1 (poverty reduction). The difficulties to track progress are compounded by the fact that different UN agencies use their own typology to assess progress and that information from different sources is not consistent. Given this panorama, it would be advisable that the UN agencies, World Bank and the regional banks, and in conjunction with the national governments, concentrated their efforts in identifying, collecting, and analyzing a much smaller set of core indicators to track progress in the MDGs. In particular, the international community should aim to have reliable and consistent country-level information at least on

poverty indicators, infant and maternal mortality, and gender-disaggregated data on access to education.

To identify adequate policy interventions to achieve the MDGs, estimate their costs, and put them into practice is quite a complex process. Policymakers and international organizations have used three approaches to estimate the effects and costs of policy interventions to achieve the MDGs: needs assessment, poverty-growth elasticity estimates, and multi-sector general equilibrium models. Each one has advantages and shortcomings. For example, the needs assessment method does not take into account synergies and trade-offs, the poverty-growth elasticity is too aggregated, and the general equilibrium models are too data-intensive and difficult to calibrate.

Because of the scale involved in terms of financial and human resources particularly in poor countries, a partial-equilibrium, sectoral approach may be misleading. In order to achieve the goals with the most cost-effective interventions and minimize mistakes and negative unintended effects, policymakers will have to combine rigorous methods with heuristic approaches to identify key obstacles, trade-offs, and synergies. They will have to rely on evidence-based results, economy-wide and sectoral models, and experts' recommendations. Since none is likely to be infallible, the strategies to achieve the MDGs should have in-built mechanisms for on-the-fly evaluations and timely adjustments and corrections.

Achieving the MDGs will require substantial additional financial resources. Middle-income countries can and should do it via higher taxes or changes in the allocation of public spending. In the poorest countries however, even if government revenues could be increased significantly, the resources will be insufficient to achieve the Goals by 2015. Every available analysis shows that external resources, particularly in the form of grants, are absolutely essential.

In spite of successive and visible commitments, development assistance for sub-Saharan Africa has been stagnating. Moreover, the bulk of ODA remains project-driven, undermining national priorities and domestic accountability, and most development partners have

not made available country-by-country timetables for how they will increase development assistance to meet their commitments. In particular, multi-year predictability of aid flows is absolutely necessary for recipient countries to plan for the necessary increase in public investments to achieve the MDGs.

References

- Bourguignon, François; Maurizio Bussolo; Luiz Pereira da Silva; Hans Timmer and Dominique van der Mensbrugghe. "MAMS: Maquette for MDG simulations." Washington, DC: The World Bank, March 2004, mimeo.
- Burnside, Craig and David Dollar. "Aid, Policies, and Growth." Washington, DC: The World Bank, November 1996, mimeo.
- Devarajan, S.; M. J. Miller and E. V. Swanson. "Goals for Development: History, Prospects and Costs." World Bank Policy Research Working Paper 2819. Washington, DC: The World Bank, 2002.
- Kakwani, Nanak and Hyun H. Son. "How Costly is it to Achieve the Millennium Development Goal of Halving Poverty Between 1990 and 2015?" Working Paper No 19. International Poverty Centre. New York: UNDP, 2006.
- Letouze, Emmanuel. "Tracking the Millennium Development Goals: A Selective Review of Data Collection Modalities, Reporting Sources and Assessment Methods." New York: Poverty Group, UNDP, 2006, mimeo.
- Levy, Santiago. "Policy Notes on MDGs." New York: Poverty Group, BDP, UNDP, December 2006.
- Logfren, Hans and Diaz-Bonilla, Carolina. "Economywide Simulations of Ethiopian MDG Strategies." DECPG, World Bank, Washington, DC, July 22, 2005.
- Lustig, Nora. "Data Availability for MDG Monitoring and Reporting: an Assessment." New York: Poverty Group, UNDP, June 2007, mimeo.
- Svensson, Maude. "Basic Primer for Costing PRS Interventions. Zero Draft." Washington, DC: The World Bank, March 2007, mimeo.
- UN Millennium Project. "Investing in Development: A Practical Plan to Achieve the Millennium Development Goals." New York: Millennium Project, 2005.

UN Millennium Project. "Millennium Development Goals Needs Assessments for Ghana, Tanzania and Uganda." New York: Millennium Project, Background Paper, 2004.

United Nations Development Programme. "Appraising Practical Approaches to Methodologies and Macroeconomic Modeling for the MDGs. A Summary Report." New York: Poverty Group, BDP, UNDP, August 15, 2006.

_____. "Costing the Millennium Development Goals: Methods, Challenges and Implications. A Summary Report." New York: Poverty Group, BDP, UNDP, March 15, 2007.

_____. Briefing presented by UNDP's Administrator to the Secretary General, March 2007, mimeo.

United Nations. General Assembly, 56th session. "Road map toward the implementation of the United Nations millennium declaration: report of the Secretary General". UN document A/56/326. New York: United Nations, September 2001.

_____. General Assembly, 55th session. "Follow-up to the Outcome of the Millennium Summit". Resolution 55/162. New York: United Nations, December 2000.

_____. General Assembly, 61st session. "Report of the Secretary-General on the work of the Organization." UN Supplement No. 1 (A/61/1), par. 24, August 2006.

_____. Millennium Development Goals Indicators.

United Nations Development Group. National MDG Reports.

World Bank, World Development Indicators. Washington DC: The World Bank.

Costing MDG Achievement in Peru and Policy Implications: A Play in Three Acts¹

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Abstract

This note takes stock of three research efforts undertaken recently regarding the feasibility to achieve MDGs in Peru by 2015, the budgetary costs involved, and the additional policies potentially required. A first work showed that with a 5 percent annual economic growth rate, Peru would need to invest around 0.7 percent of GDP annually in additional policies to improve the country's chance to meet its human development goals. Likewise, poverty reduction goals would need additional transfer programs costing at least 0.7 percent of GDP per year. A second paper indicated that only a growth rate of 7 percent would halve national poverty, diminishing needed additional investment to 0.5 percent of GDP. A third effort included the potential feedback from educational attainment to economic growth, raising potential annual growth to 6 percent. Nevertheless, only when including ambitious targets for secondary and higher education, the economy would grow by 7 percent and poverty reduction could get close to its target by 2015.

Keywords: Millennium Development Goals, Peru, GDP growth, poverty, human capital education, health, water and sanitation.

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Introduction

In September 2000, all country members of the United Nations (UN) signed the Millennium Declaration where they recognized the need to promote a multidimensional vision of development centered on the fulfillment of basic needs with an environmentally sustainable basis. Specifically, they committed to achieve, by the year 2015, a set of goals and targets related to the reduction of poverty, hunger, disease, mortality, illiteracy, environmental degradation, and discrimination against women. These are known as the Millennium Development Goals (MDGs).

For the first time in history, this declaration did not remain like another fanciful political declaration rife with best wishes for poor countries but devoid of any practical content or operational implication. On the contrary, all donors and multilateral organizations have increasingly used this MDG framework to organize their aid programs with developing countries. All projects and policies are now screened against this background and should answer questions such as which MDGs are being addressed, in what manner, and whether these projects and policies are the most cost effective interventions to attack the problem.

Most importantly, developing countries themselves should believe in the MDG framework and appropriate it (with possible adaptations to specific country circumstances) for the short- and long-term planning and design of economic and social policies aimed at addressing the most basic development problems.

Peru has shown its commitment to the achievement of the MDGs along several fronts. The “National Accord” with 31 state policies was signed by all political parties and civil society institutions in 2002. Policies regarding the Accord’s chapter on Equity and Social Justice match closely with MDG1 (poverty and hunger reduction). MDG2 (education access), MDG3 (gender equality), MDG4 (infant mortality), MDG5 (maternal mortality) and MDG6 (access to water and sanitation). The plan of the current Garcia Administration explicitly

recognized MDGs as goals for Peru's social sectors and, recently, has quantified specific targets for its 5-year government period such as a 15 percentage point reduction in national poverty (from the current 45%) and a 9 percentage point reduction in chronic child malnutrition (from the current 25%).

However, Peru lacks an institutional framework to undertake long-term policy planning specially in the social sectors. The archaic National Planning Institute, which played a significant role in guiding public and private investment in the 1970s, during a time of heavy direct state intervention in the Peruvian economy, was closed down in the early 90s and has not been replaced by a modern Strategic Planning Institute which could be useful and consistent with a market economy (a law creating the Strategic Planning Center was approved in 2003 but has not been implemented so far). International aid agencies and the Peruvian academia have helped to fill this gap from time to time. The authors' projects regarding MDGs in Peru have been sponsored by the local office of UNDP, in the context of producing the national progress report for MDGs in 2004; the Latin America office of UNDP and IDB headquarters, in the context of a regional project on costing MDGs; and by the international Poverty and Economic Policy (PEP) research network.

The Analytical Contribution of the MDG Framework

The wide range of aspects involved in the MDGs, from education to environment and gender equality, reflects the shift towards a broadened concept of poverty (which includes short-run poverty symptoms and long-run poverty determinants). The fact that all these issues must be taken care of simultaneously, emphasizes the relevance of promoting a comprehensive approach and a coordinated strategy for reducing poverty.

The MDG framework can be viewed as an important step towards achieving a consensus regarding the minimum set of

arguments that a social planner's loss function must include, especially when considering difficult inter-temporal choices between short-term poverty alleviation and long-term poverty reduction. The framework has contributed to the debate regarding the multidimensional aspects of poverty and, in terms of policy analysis and design, made explicit the need for a systemic approach to poverty reduction.

Despite this, MDG assessment has been usually conducted on a sectoral basis, estimating the future path of each indicator as a function of its past evolution, or via structural models that account for a limited set of determinants, typically taking other MDG indicators as givens. Thus, MDG prediction and costing could be biased because of the failure to consider the interactions among policy interventions and indicators.

It is thus crucial to consider synergies among MDGs in order to have a more precise estimation of costs involved and to identify better policy interventions. We have stressed this feature along the three research projects undertaken so far.

Act I - Connecting MDGs and Costing Their Potential

Achievement in a Partial Equilibrium Context

Up to 2003, attempts to simulate and cost MDG achievement in Latin America have been focused on MDG1. The work by ECLAC, IPEA and UNDP (2002) was the product of a regional project that included a cross-country comparison of the different combinations of economic growth paths and income redistribution schemes which can be consistent with achieving MDG1 in Latin America, explicitly using the one-dollar-a-day poverty benchmark as well as the nationally-established extreme poverty basket.

Beltran et. al. (2004) was a first attempt to build on the work of ECLAC, IPEA and UNDP (2002) to incorporate the other MDGs in the case of Peru and simulate their future trajectories simultaneously. We used microeconomic estimations based on household survey data and administrative records on program costs

to capture the potential impact of policy interventions in education, nutrition, and infant and maternal health developments, in addition to other socioeconomic variables including household income, which is the main link between the macroeconomic environment and the private demand for social sectors. We considered these empirical coefficients and assembled a simulation model which linked all social sectors to capture potential synergies across indicators. For instance, education improvements predicted in the education MDG module influenced (albeit with some time lag) the nutrition and health indicators through the parents' educational levels.

This simulation model was capable of estimating the future value of MDG indicators, with or without further policy interventions. All the simulations showed the need for further policy interventions to increase the chance to meet the MDGs on time. In other words, none of the passive scenarios (i.e.: merely allowing the economy to grow at different average rates and, through increases in household income produce improvements in social indicators via higher private demands) revealed a path that guaranteed MDG achievement, even with rather high economic growth rates. A limitation of this first model was the assumption of exogenous macroeconomic scenarios of economic growth.

Under a moderate scenario with an average growth rate of 5 percent per year for total GDP up to 2015, the Peruvian government would need to invest a total of 1.4 percent of GDP per year in order to increase the chance of achieving the first five MDGs. Specifically, resources that amount to 0.7 percent of GDP each year should be devoted to additional social investments such as water and sanitation infrastructure, prenatal controls (specifically conducted by skilled personnel), literacy programs, school feeding programs, and enhancement of health clinics. The remaining 0.7 percent of GDP per year would go to short-term income transfers aimed at directly improving income distribution through programs such as

conditional cash transfers, which also monitor human capital accumulation for long-term poverty reduction.²

The model also showed that an optimistic scenario for the Peruvian economy with a 7 percent average rate of growth continuously until 2015 would likely achieve the poverty goal (MDG1) without requiring any significant program of direct cash transfers. However, all other additional policy interventions previously identified in the social sectors would still be needed to meet the other social MDGs, demanding 0.5 percent of GDP in additional resources every year.

Besides the aggregate cost estimates (based on an integral model with synergies among sectors), one critical finding of this first work was the extremely important role played by the increased access to water and sanitation facilities for health, nutrition, and education improvements. Other identified policy interventions with relatively low costs were: prenatal controls, literacy programs, school feeding programs, and the enhancement of basic health clinics.

Our work did not want to replace proper impact evaluation at the micro level when assessing specific interventions, but tried to shed light on the potential interventions to look at for policy guidance from an MDG perspective and the aggregate cost of embarking on an active campaign for MDG achievement.

Act II: Connecting MDGs and Costing MDG Achievement in a General Equilibrium Context

Thanks to the opportunity provided by a UNDP-WB-IDB regional project to assess MDG costing in a general equilibrium context, we were able to confirm some of our initial findings and explore further issues in a second piece of work. Castro and Yamada (2006) used a

² In a more pessimistic scenario of 3 percent annual growth, the total cost involved increased to close to 4 percent of GDP per year: 0.9 percent of GDP would be invested in additional social policies whereas more than 3 percent of GDP would be needed for cash transfers to secure the national poverty goal.

computable general equilibrium model developed by Löfgren and Bonilla (2006) and adapted for microsimulations by Vos (2005), in order to assess whether the MDG achievement in the Peruvian case would cause any macroeconomic disruptions which would in turn make it unfeasible to pursue.

The model began requiring a specially constructed Social Accounting Matrix (SAM) and standard technical coefficients with Peruvian data, in order to calibrate a general equilibrium model for the economy. Löfgren and Bonilla added to this CGE environment an MDG block so that the model was capable of finding future trajectories for social MDGs in a general equilibrium context. However, this model produced average outcomes, and for the poverty MDG a representation of the income distribution of the country was needed. Microsimulations with actual Peruvian income distribution data pictured in a recent household survey (ENAH0 2004) were thus done to estimate the potential evolution of poverty up to 2015.

This CGE model showed that in a base scenario with economic growth of 4.8 percent per year (this time, fully consistent in a general equilibrium context), the additional government spending needed to increase the chance of meeting the social MDGs would be 0.95 percent of GDP on average every year. This cost would be 40 percent higher if goals were pursued individually without taking advantage of inter-sector synergies as explained before. However, this economically feasible scenario did not allow the potential fulfillment of the national poverty goal.

This model also worked out in much greater detail the economics and mechanisms behind enrolment and graduation through the education cycles, concluding that an expansion of educational services would help guarantee a 96 percent completion of the primary cycle with only one year of delay by 2015. Given a commitment to fiscal discipline in Peru, as enshrined in the Prudence and Fiscal Responsibility Law, the main financing mechanism of these additional social investments would have to be higher tax revenues, increasing the tax burden ratio accordingly.

This CGE model also indicated that an alternative scenario of a 7 percent economic growth would make the achievement of the national poverty goal more likely. Moreover, the additional private investment undertaken by households in social development, induced by the rise in private income, would reduce the fiscal effort required for pursuing the social MDGs. The average additional investments would amount to 0.49 percent of GDP per year, a figure almost identical to the one estimated in Beltran et. al. (2004) in a partial equilibrium context.

Act III: Accounting for the feedback among education, economic growth and poverty reduction

In the last twenty years the positive role played by improvements in education attainment (human capital accumulation) in contributing to economic growth has been revisited both at the theoretical (Lucas, Romer and others) and empirical (Barro, Xala-i-Martin and others) levels. Given that these two issues are neatly connected in the MDG framework through MDG2 (education) and MDG1 (monetary poverty), it was a natural step to further link them analytically and empirically within the MDG structure. Yamada et al. (2007) have focused on this issue in detail (discussing different levels of educational attainment beyond the primary level), leaving the other MDGs aside.

For this, we built a model that accounts for the potential feedback between schooling performance, the accumulation of human capital, and long run GDP growth, and link these results with poverty incidence. The model proposed comprises four different blocks: (i) a macro block (which connects educational attainment with aggregate GDP growth via the accumulation of human capital using an extended version of Lucas's (1988) model); (ii) an education block (which involves specific functional forms relating education indicators with a set of determinants based on results that stem from micro-econometric estimations using Peruvian household data); (iii) a poverty block (which links GDP growth and changes in the Gini coefficient with the incidence of monetary poverty in line with the accounting model

proposed in ECLAC, IPEA and UNDP (2002)); and iv) a costing and resource constraint block (which specifies cost functions—based on administrative records—for specific policy interventions identified in (ii), and links these to a planner's budget constraint).

With this, we pursued a dual objective: (i) estimate the gains, in terms of potential increased GDP growth and poverty reduction, that could stem from intervention leading to improvements in enrolment and graduation rates within the education sector; and (ii) discuss which type of educational services are to be considered if we seek improvements in enrolment rates *per se*, vs. improvements in households' income generation potential, the latter being a critical element to be taken into account when designing intervention in the educational sector.

Our simulations revealed that with additional funds which amount, on average, to 1 percent of GDP each year, expansions in the provision of educational services in all three levels could add, by year 2015, an extra 0.89 and 1.80 percentage points in terms of long-run GDP growth and permanent reduction in poverty incidence, respectively. Regarding the second objective, our results showed that in order to engineer intervention in the educational sector so as to transfer to households the necessary assets to attain a larger income generation potential in the long run, we need to extend the original set of MDG indicators to account for access to higher educational levels besides the primary level. In fact, the gains (in terms of added GDP growth and poverty reduction) would only be marginal if we limit ourselves to the provision of education services related to the primary cycle.

Conclusions, main policy implications, and avenues for further research

The three research efforts discussed above provide some important policy implications regarding MDG achievement in Peru and the potential costs involved.

Under a moderate GDP growth scenario of 5 percent per year up to 2015, partial and general equilibrium analyses reveal that additional resources required to foster MDG achievement (in terms of primary education, nutrition, infant and maternal health, and access to improved water and sanitation services) would be between 0.7 percent and 0.95 percent of GDP each year. Such a growth rate, however, would not suffice to reach MDG1 when measuring poverty using the national poverty line.

In fact, a 7 percent sustained GDP growth rate proves to be an important pre-condition to cut national poverty by half by year 2015. This result repeats itself in all three “acts” and even in the one act that relies on a microsimulation methodology to account for the full distribution of income. In addition, and as confirmed by the results provided in the first two “acts,” growth itself would not allow for the achievement of the rest of the MDGs: even under this most optimistic growth scenario, additional policy interventions (providing education, health and water and sanitation services) are required, and these imply additional resources that amount to 0.5 percent of GDP each year.

Finally, the third “act” suggests an answer to the question of whether the MDG framework can provide, by itself, an engine to foster the 7 percent growth rate so desired. The answer is yes: we believe MDG2 (education access) plays a crucial role in this sense by providing social planners with a target aimed at enhancing households’ permanent income generation potential. In addition, this analysis has revealed that for a middle income country like Peru, education matters and not only at the primary level. Secondary and tertiary levels deserve equal policy priority because of their potential role in enhancing economic growth. Therefore, Peru’s prospects of reducing poverty would be greatly improved if access to these additional levels of education is secured in a progressive (more equitable) way.

Given the above, further research should be devoted to the implementation of our last model within a general equilibrium framework that can also account for the evolution and interrelations across MDG indicators related to nutrition, health, and access to

improved water and sanitation. In this way, we would be able to account for the synergies between MDG indicators in a more comprehensive manner and be in a better position to understand how policy actions taken today will impact on tomorrow's poverty.

Finally, it is also worth stressing that MDG achievement and macro policies are not only interconnected via funding needs in the way the three models surveyed here suggest. Actually, reducing GDP volatility and the procyclicality of social expenditure constitute important preconditions to mitigate the occurrence of adverse shocks (that tend to affect the poor more aggressively) and to provide adequate protection for the most vulnerable when these adverse shocks occur.

Regarding the former, evidence for Peru (see Loayza and Polastri (2004)) suggests an asymmetric elasticity between poverty incidence and per capita GDP growth: this elasticity is larger than 1 percent (in absolute value) during recessions and smaller than 1 percent during expansions. Regarding the procyclicality of social expenditure, estimations presented in Castro (2006) for the period 1994-2004 show that the ratio of social spending to GDP exhibits a positive elasticity (with respect to growth) of around 2.3 percent. This, together with the empirical regularity of an elasticity of poverty incidence with respect to growth larger than 1 percent during recessions, means that the procyclical behaviour of social spending implies that its coverage (social spending per poor) falls around 4 percent for each 1 percent reduction in per capita GDP.

Since policy recommendations that stem from quantitative models like the ones considered in this paper assume, for simplicity's sake, that both GDP and social expenditure grow at a steady rate, policymakers must thus be aware that specific interventions in the social arena should be accompanied by an overall fiscal policy aimed at mitigating adverse shocks and avoiding drastic spending cuts. This will greatly enhance the possibility of attaining medium and long run social targets like the ones proposed in the MDGs.

References

- Beltrán, A., J. F. Castro, E. Vásquez and G. Yamada. 2004. "Objetivos de desarrollo del milenio en el Perú: alcanzando las metas," United Nations Development Program (UNDP) and Centro de Investigación de la Universidad del Pacífico (CIUP), Lima, December 2004.
- Castro, J. F. and G. Yamada. 2006, "Evaluación de Estrategias de Desarrollo para Alcanzar los Objetivos del Milenio en América Latina: El Caso de Perú," mimeo, CIUP.
- Castro, J. F. 2006. "Política fiscal y gasto social en el Perú: ¿Cuánto se ha avanzado y qué más se puede hacer para reducir la vulnerabilidad de los hogares?." CIUP.
- Castro, J. F., Beltrán, A., E. Vásquez and G. Yamada. 2005. "A Systemic Assessment of MDG Achievement: The Case of Guatemala," Centro de Investigación de la Universidad del Pacífico, Lima, September 2005.
- Economic Commission for Latin America and the Caribbean (ECLAC), Instituto de Pesquisas Economicas Aplicadas (IPEA) and UNDP. 2002, "Meeting the Millennium Poverty Reduction Targets in Latin America and the Caribbean," New York.
- Loayza, N. and R. Polastri. 2004. "Poverty and Growth in Peru," Background Report for Peru's Poverty Assessment. The World Bank. (WB)
- Löfgren, H. y C. Díaz-Bonilla. 2006, "MAMS: An economy-wide model for analysis of MDG country strategies. Technical documentation," DECPG World Bank. (mimeo)
- Lucas, R. 1988. "On the Mechanics of Economic Development," *Journal of Monetary Economics*, No. 22, pgs. 3-42.
- Vos, R. (2005), "Microsimulation Methodology: A Technical Note" (processed), New York, October.

- Yamada, G., J.F. Castro, A. Beltrán and M. Cárdenas. 2007.
“Education Attainment, Growth and Poverty Reduction within
the MDG Framework: Simulations and Costing for the Peruvian
Case,” Research project financed by PEP.

Challenges to MDG Achievement in Low Income Countries: Lessons from Ghana and Honduras

*Maurizio Bussolo and Denis Medvedev**

Abstract

This paper summarizes policy lessons from applications of the Maquette for MDG Simulations (MAMS) model to two low income countries: Ghana and Honduras. Costs of achieving MDGs could reach 10-13 percent of GDP by 2015; although, significant savings may be realized by improving the low productivity observed in social services provision. Sources of financing matter: foreign aid inflows can reduce international competitiveness through real exchange appreciation, while domestic financing can crowd out the private sector and slow poverty reduction. Spending a large share of a fixed budget on growth-enhancing infrastructure may mean sacrificing some human development, even if higher growth is usually associated with lower costs of social services. The pursuit of MDGs may also have distributional effects by increasing skill premiums.

Keywords: Millennium Development Goals (MDG), Ghana, Honduras, Simulation Model JEL codes: D58, O57, O15, E61

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Introduction

The adoption of the UN Millennium Declaration in September 2000 has committed the international community to a broad vision of development that includes not only higher incomes but also enhanced education and health levels, better access to water and sanitation, and improvements in other human development (HD) objectives. Achieving the ambitious set of Millennium Development Goals (MDGs) by 15 has required efforts on multiple fronts.¹ First of all, new data collection and more systematic monitoring are necessary to assess the current situation and recent progress. Although poverty statistics exist for most developing countries, other social indicators such as mortality, education completion rates, or access to basic services are not always readily available. Secondly, once the ‘distance’ between the current situation and the various goals can be determined, the costs to cover that distance need to be calculated. Since different combinations of inputs can be utilized to reach the targets and costs depend on which combination is chosen, estimating these costs can be complicated.

In order to assess alternative MDG strategies, the World Bank has developed a framework for the empirical assessment of the costs and benefits of various MDG strategies: the Maquette for MDG Simulations (MAMS). To date, MAMS has been applied in about 30 countries in Latin America, Middle East, and Africa. It is a flexible

¹ At the UN Millennium Summit of 2000, the world’s leaders agreed on the following targets for 2015:

- a. Halving poverty and hunger rates (relative to the 1990 rates);
- b. Achieving universal primary education;
- c. Eliminating gender disparity in education;
- d. Reducing by two thirds the under-five child mortality rate (relative to the 1990 rate);
- e. Reducing by three quarters the maternal mortality rate (relative to the 1990 rates);
- f. Reversing the spread of HIV/AIDS, malaria and other major diseases;
- g. Halving the population shares without sustainable access to safe water and improved sanitation (relative to the 1990 rates);
- h. Developing a global partnership for development.

analytical tool that can accommodate a wide variety of datasets and country-specific circumstances. The main advantages of MAMS include: explicit “production” of various MDG indicators, numerous links from HD service provision to the rest of the economy through labor market and government budget constraints, and the recognition of potential positive spillovers when multiple MDGs are targeted at the same time.

The objective of this paper is to illustrate these features of the MAMS model and to delineate some general policy lessons by drawing on two recent applications of MAMS to Ghana and Honduras.² Five main messages emerge from this analysis. The first is that full MDG achievement is unlikely without a large scale-up of resources, and progress is likely to be uneven across the different goals. The second is that the choice of financing mechanisms—foreign grants, borrowing, taxation—has significant implications for macroeconomic performance and poverty reduction. The third message is that the overall growth environment is key to both poverty reduction and achievement of the non-poverty MDGs, as faster growth increases demand for HD services and creates incentives for attaining higher educational levels. Fourth, scaling up aid (or mobilizing domestic resources) is not the only way of reaching the MDGs, as significant cost savings can be realized from improving efficiency in public sector service delivery. Finally, efforts to reach the MDGs can have important distributional effects by increasing skill premiums and raising inequality.

The structure of this paper is as follows. Section 2 provides a summary of MAMS and discusses the main policy-relevant features of the model. Section 3 gives a detailed assessment of the main lessons learned from MAMS applications in Ghana and Honduras. Section 4 offers concluding remarks.

² These applications are available as stand-alone studies—Bussolo and Medvedev (2007) for Ghana and Bussolo and Medvedev (2006) for Honduras—and address broader sets of issues than what are covered in this paper.

The MAMS modelling framework

Devarajan et al (2002) appropriately warn that: “any attempt to determine the aggregate costs of achieving the development goals is a highly speculative exercise.” Among others, two major obstacles need to be overcome: most MDGs tend to be jointly produced and future income growth rates and progress on the MDGs are both endogenous. In other words, interventions that further a given MDG are often likely to promote other MDGs and ‘double counting’ of costs can be an issue. For example, expenditures specifically aimed at improving the health of the young will help reduce child mortality but they may also improve the ability of kids to learn at school and thus promote the achievement of the education MDG.³ The second obstacle consists of the simultaneous determination of economic growth and progress on social MDGs. Future growth rates are not only difficult to forecast but are also important determinants of the cost of achieving the MDGs. Future input prices, wages, and exchange rates may be quite different in a fast growing economy vis-à-vis those in a slow growing one. On the other hand, improved health and educational outcomes can increase productivity and support higher growth rates.

No existing approach completely resolves these issues and policy makers should be aware of these limitations when using current cost estimates. The costing methodologies for MDGs can be classified in two main groups: bottom-up costing and economy-wide modeling. The stylized analytical steps of bottom-up costing consist of: a) determining needed “physical” inputs e.g. investments, labor (at different skill levels) and intermediate inputs for each MDG; b) computing costs of providing inputs using projected or current prices, wages, and exchange rates; and c) assigning costs to different agents (government, private sector, NGOs, others).⁴ This method

³ See, for example, Paxson and Schady (2005), who show that children with lower hemoglobin levels perform worse on tests with a sample of 3,000 predominantly poor pre-school age children in Ecuador.

⁴ See, for example, UN Millennium Project (2005), and the task force reports referenced therein.

has some clear advantages: it is quite transparent, not very technically intensive, and is based on micro evidence. However it has some problems as well. Physical input needs by MDG are not well-defined – different combinations of the determinants can achieve the objective; MDG-specific inputs cannot be identified since some inputs contribute, directly or indirectly, to more than one MDG; and finally, marginal returns to inputs may vary depending on the value for the MDG indicator. In addition, the bottom-up costing does not consider that the scaling up effort to expand social service provision may crowd out private activity and in certain cases, reduce overall economic growth. This in turn can negatively influence the achievement of the goals and increase costs.

Economy-wide modeling (normally in the form of Computable General Equilibrium or CGE models) avoids these problems by explicitly accounting for the direct and indirect effects generated by the pursuit of MDGs. For most poor countries, the increased current and capital spending of government on education, health, and other basic services – and its connected financing via foreign grants, taxation or borrowing – represents major economic shocks with uneven repercussions across sectors of the economy, its labor markets, its trade performance, and so on. Even with these advantages, two major limitations of current CGE models are that they normally aggregate public expenditures into a single category and do not explicitly account for the output side of government spending. As numerous theoretical and empirical literature has pointed out, public spending on infrastructure, health, and education can stimulate growth by improving the marginal productivity of the private sector's physical capital and labor.⁵ Therefore, detailed accounting of these types of

⁵ See, for example, Calderon and Servén (2004) and Romp and de Haan (2005) for evidence on links between infrastructure and growth, Baldacci et al (2004) for empirical support of links between education and health spending and growth, and Agenor and Moreno-Dodson (2006), as well as studies cited therein, for evidence on interaction and mutual reinforcement of public infrastructure, health, and education.

spending is a desirable feature of a model aimed at assessing alternative policies for attaining MDGs.

The *Maquette for MDG Simulations* or MAMS is a dynamic general equilibrium model which explicitly links public expenditures on individual social services and infrastructure to social outcomes in terms of MDG attainments and aggregate growth.⁶ A key objective of MAMS is to capture the main interactions between the pursuit of the MDGs and the evolution of the economy. The model explicitly incorporates the following HD targets: universal primary school completion (MDG 2), reduced under-five and maternal mortality rates (MDGs 4 and 5), and increased access to improved water sources and sanitation (part of MDG 7). To the extent that a package of interventions that curtails child and maternal mortality helps to reduce the incidence of major diseases including HIV/AIDS, the model also implicitly tracks MDG 6. In addition, achievements in terms of poverty reduction (MDG 1) are monitored, although the model does not contain mechanisms for specific MDG 1-related interventions.⁷

Production of a typical MDG is modeled as a nested system of two functions.⁸ At the bottom level of the MDG production

⁶ See Bourguignon et al (2007) for a detailed description of the model and Lofgren and Diaz-Bonilla (2006) for technical documentation.

⁷ Of the 8 MDGs in the 2000 Millennium Declaration, only two are completely left out of the current version of the model: MDG 3 – promote gender equality and empower women and MDG 8 – develop a global partnership for development. The choice of MDGs to be included in the model is driven not by any prior regarding of which goals are likely to be more costly and have a more pronounced impact on the real economy, but rather by the availability of data and the existence of quantitative MDG indicators. Thus, the “reverse loss of environmental resources” and “significantly improve the lives of slum dwellers” objectives are left out of our analysis of MDG 7 because no numerical criteria have been established for reaching these targets. The same is true for all aspects of MDG 8. On the other hand, the current version of MAMS does not consider MDG 3 and the hunger aspect of MDG 1 due to difficulties in obtaining the needed data.

⁸ The modeling of the education MDG is more complex because student achievement is tracked year by year, and the length of the primary education cycle is taken into account when calculating completion rates.

nest, the model computes an aggregate measure of MDG service delivery by taking into account public and private expenditure on MDG services, availability of infrastructure services, positive spillovers from progress on other MDGs, and demand-side effects (see Table 1). Expansion of per capita service delivery requires increased commitments of three broad categories of inputs: labor (which is disaggregated according to skill/education levels), capital, and intermediate goods. In addition to these inputs, which account for spending on specific MDG interventions, the aggregate measure of MDG service delivery is also determined by complementary policies. For example, reaching the education MDG requires additional schooling services, but is also facilitated by improvements in health conditions (proxied by MDGs 4 and 5), by better infrastructure (e.g., better roads to schools), by higher income levels (better-off parents may not need their children to work), and by good returns to education (proxied by the wage premium paid to skilled workers).

The aggregate measure is strictly increasing in all of its components, and does not capture potential bottlenecks and/or the decreasing returns to scale as the target approaches (due to the difficulty of reaching the most remote parts of the population or, for example, necessity of high-level medical care to reduce maternal mortality beyond a certain threshold). In order to account for these effects, the top level of the MDG production nest links this aggregate measure of MDG service delivery to actual MDG outcomes by

Table 1. Determinant of MDG achievement in MAMS

MDG	Per-capita Service Delivery	Other Determinants			
		Per-capita consumption	Wage incentives	Public infrastructure	Other MDGs
1 Poverty		X			
2 Education	X	X	X	X	4
4 Infant Mortality	X	X		X	7a,7b
5 Maternal Mortality	X	X		X	7a,7b
7a Access to Water	X	X		X	
7b Access to Sanitation	X	X		X	

requiring greater and greater improvements in the former for the same rate of improvement in the latter.⁹

In addition to being a key input in the production of MDGs, improvements in public infrastructure also contribute to overall growth by adding to the productivity of private activities. This means that real GDP growth—and, indirectly, poverty reduction—is partly influenced by government policies and in particular by its investment in infrastructure services (roads, ports, energy, etc). However, given the lack of consensus on the strength of this relationship and the non-linear relationship between growth and poverty reduction, the MAMS model does not include explicit policy instruments for targeting the achievement of MDG 1. Instead, the model is capable of tracking the progress on poverty reduction by means of several alternative methods.

A simple option is to use an estimated elasticity of poverty reduction with respect to growth in households' per capita consumption. A more sophisticated approach (and one that is utilized in the case studies considered in this paper) is to rely on a macro-micro framework where a set of aggregate results from MAMS are passed on to household survey data by means of a micro-simulation module.¹⁰ The simulations involve applying changes in employment, skill levels, relative wages, and consumption per capita from MAMS to each individual (or household) in the survey, which produces a new distribution of income and translates the evolution of macro variables into poverty and inequality outcomes. Although significantly more data-intensive than the simpler poverty elasticity-based method, the micro-simulation approach allows for a wider range of mechanisms for escaping poverty, including moving from agricultural employment to non-farm activities where the wages tend to be higher, upgrading individual skills (through schooling), changes in relative wages, and an economy-wide growth component that equally benefits all households.

⁹ This is accomplished by using a logistic function with the MDG outcome as a dependent variable and the aggregate measure of MDG service delivery as an independent variable.

¹⁰ This approach follows the methodologies developed in Bourguignon and Pereira da Silva (2003), Chen and Ravallion (2003), and Bussolo et al (2005).

Policy lessons from MAMS work

Millennium Development Goals for Honduras and Ghana: current achievements and forthcoming challenges

The first important message that emerges from a quantitative assessment of the MDG situation in the two countries under study is that performance on individual goals varies substantially. Given the initial situation and the likely public expenditure trends over the next decade, progress towards MDGs is likely to be uneven across the two countries. Thus, even if the overall total financing requirements are broadly similar in Ghana and Honduras, the challenges facing Ghanaian and Honduran policy makers – as well as the strategies to overcome these challenges – reflect the specificity of each country's circumstances (see Table 2 and Table 3).

Table 2. Current MDG Situation and Baseline Performance: Ghana and Honduras

	Ghana				Honduras			
	1990	2004	2015 Target	Distance covered in base	1990	2004	2015 Target	Distance covered in base
MDG 1: People living below the national poverty line (% of pop.)	84	64	42	28%	52	31	26	384%
MDG 2: Primary completion rate (% of relevant age group)	65	76	100	63%		47	100	76%
MDG 4: Under-five mortality rate (per 1,000 births)	59	31	20	16%	122	112	40	20%
MDG 5: Maternal mortality rate (per 100,000 live births)	180	108	70	17%	740	503	185	20%
MDG 7a: Access to an improved water source (% of population)	73	82	95	14%	54	56	85	21%
MDG 7b: Access to improved sanitation facilities (% of pop.)	66	77	95	15%	21	35	85	23%

Source: www.developmentgoals.org, www.sierp.hn, millenniumindicators.un.org, G-JAS (2007), AMCOW (2006).

Note: The table lists individual goals (2015 levels) as defined by national authorities, which may be more or less ambitious than the percentage improvements from 1990 levels which are used as the official definition by the UN.

In 2004, the base year for MAMS, Honduras seems in a better position than Ghana for all the MDGs. The Latin American country has recorded better achievements in terms of education, mortality rates, and population coverage for basic water and sanitation services.¹¹ However, this better initial situation does not necessarily mean that the 2015 targets are more easily reachable. In fact, since the targets are expressed as relative improvements from the 1990 situation (apart from education where universal primary completion is a common threshold), the ‘distance’ that the two countries have to cover is comparable. The country-specific challenges are thus determined by the progress that each country has made during the 1990-2004 period and, more importantly, by the sector costs needed to achieve the individual targets. These two elements – recent past progress and sector costs – are connected because, as mentioned above, getting closer to achieving a given goal often means rising costs. Providing social services to the poorest, most remote population groups, even if these are a small fraction of the total population, is usually complex and expensive.

In terms of the non-monetary poverty MDGs and starting with education, in Honduras, the rate of alphabetization of the young has increased from 79.7 percent in 1990 to 85.5 percent in 2001 and the enrollment rates for primary education have reached 89.3 percent in 2004. Moreover, there is no apparent gender gap, as the data for primary education shows boys and girls having almost identical access and completion rates. In Ghana, significant progress is taking place in basic education, aided by the recent (2005) abolition of basic school fees and enhanced expenditure allocation towards the lagging regions (G-JAS, 2007).

¹¹ Notice that the poverty performance is difficult to compare because the national poverty lines differ across countries.

Table 3. Government spending required for reaching MDGs: Ghana and Honduras

Government Spending categories	Ghana		Honduras	
	Required average growth rates (2004-2015)	Gov. spending as share of GDP in 2004	Required average growth rates (2004-2015)	Gov. spending as share of GDP in 2004
Primary education	15.6	3.7	3.4	2.9
Health	11.7	2.8	18.6	2.9
Water and Sanitation	14.1	0.5	15.1	0.7
Total Government Expenditures		17.7		24.5

Note: Spending is valued in constant local currency. Growth rates in primary education are for the 2004-2010 period.

Source: Government of Honduras (2005), AMCOW (2006), Government of Ghana (2003), World Bank staff estimates.

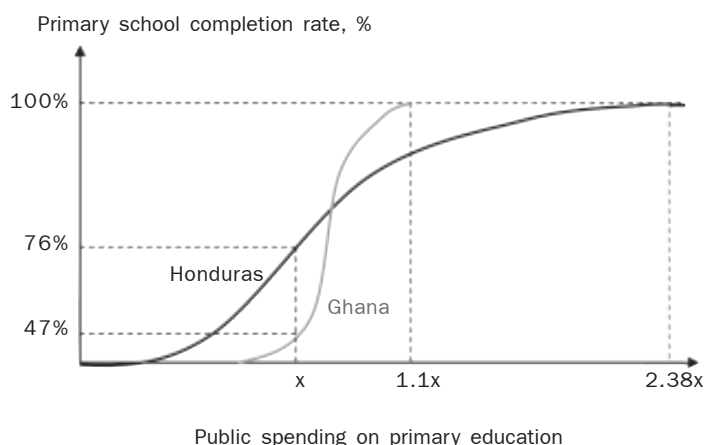
Although these developments in the education indicators exhibit clear positive trends, a number of studies have raised concerns about the quality of education received by Honduran and Ghanaian pupils and the efficiency of public education spending.¹² These common concerns are however reflected in quite different estimates of the cost of reaching universal primary completion by 2015. As shown in Table 3, although Honduras is already allocating close to 4 percent of GDP of its public expenditures to primary education, experts estimate that resource needs in this sector will grow at the average rate of 15.6 percent for the period 2004-2015. This contrasts markedly with Ghana that is spending about 3 percent of GDP on primary education and needs to expand its educational services by just 3.4 percent per year.

Various factors may explain these stark differences: Honduras' distribution of primary education attainments may be more unequal

¹² For example, World Bank (2001) notes that Honduras ranked last in language and next-to-last in math in a study assessing language and math skills in the third and fourth grades for twelve Latin American countries. Also, World Bank (2004) found that the recent expansion in public spending on primary education was accompanied by declining efficiency.

than that of Ghana, meaning that reaching uncovered groups may be harder; inefficiencies in the primary school system may be more widespread and serious in the Latin American country; or, it may use more intensively expensive resources such as highly qualified teachers.¹³ To incorporate the key feature of decreasing returns to spending as the goal approaches, MAMS uses logistic, S-shaped functions as shown in Figure 1. The ‘flatter’ logistic curve for the case of Honduras indicates that decreasing returns to spending in education are more severe and begin at lower completion rates than in the case of Ghana. This helps explain the counterintuitive situation where Honduras is closer to achieve its education goal but needs more resources than Ghana.

Figure 1. Honduras is closer to its primary education goal but reaching it may be costlier than in Ghana



Note: the point ‘ x ’ on the horizontal axis represents the current (2004) public spending on primary education, see values in terms of shares of GDP in Table 3. The points $1.11x$ and $2.38x$ represent the spending in 2010 (when every school aged child, in a 6 year primary cycle, has to enter and graduate from grade 1 in order to reach MDG2 by 2015) and are calculated as the compounded growth rates of Table 3; so for the case of Honduras: $2.38 = (1+0.156)^6$.

¹³ It is important to underline that MAMS relies on sector studies to assess the empirical strength of these factors and embeds them in its general equilibrium framework.

Similar arguments can be used to compare the health MDGs with the important difference that in this comparison Honduras is in a better position than Ghana. In Honduras, the under-five mortality rate decreased from 59 to 31 per thousand births and the infant mortality rate was reduced from 47 to 23 per thousand between 1990 and 2005/6. While data inadequacies do not permit a precise assessment of the evolution of maternal mortality, the available survey results suggest that considerable progress has been achieved: the maternal mortality rate was reduced from about 180 (per 100 thousand) in 1990 to around 108 in 2000.¹⁴ The rapid pace of reductions in infant and child mortality rates between 2001 and 2005/6 bodes well for the achievement of MDG 4, but continued progress is conditional on maintaining the recent growth of public health expenditures, which grew nearly four times as fast as real GDP between 1999 and 2005.

If this growth is not sustained, additional inroads in improving health outcomes are likely to be minor (see, for example, chapter 7 of World Bank, 2007). In Ghana, efforts to reduce child and maternal mortality have practically stalled since 2003, which is even more worrisome since health sector expenditures have risen over the same period (G-JAS, 2007). The required additional resources to reach the health MDGs differ markedly across the two countries, reflecting these recent uneven performances and their associated expenditure patterns. Partial equilibrium estimates shown in table 3 suggest that Honduras will need to increase its health services provision by 12 percent per year, while the comparable rate of increase in Ghana is close to 19 percent.

With regard to water and sanitation, Honduras' national coverage for potable water increased from 73 percent to 82 percent over 1990-2004, while sanitation coverage increased from 66 percent to 77 percent. However, large disparities in coverage rates

¹⁴ Surveys aimed at measuring maternal mortality rates were administered in 1990 and 1997, and the national statistical institute (INE) estimated the rate for the year 2000.

are observed across rural and urban areas, and even across large and smaller cities. In addition, Honduras faces severe challenges in reaching its ambitious coverage rates on account of the high growth rate of its population and the low efficiency of sector institutions. According to official forecasts, reaching a 95 percent coverage rate for water and sanitation in 2015 (a goal which is above that set by the Millennium declaration) means providing access to water for an additional population of 2.6 million in total – 1.2 million in rural areas and 1.4 million in urban areas – and supplying sanitation services to an additional population of 3.5 million in total, distributed between 1.3 and 2.2 million in rural and urban areas, respectively. In Ghana, although access to water and sanitation services has been improving, inequalities in access (particularly between rural and urban areas) and issues of quality in this sector remain a major bottleneck for development. Recent estimates suggest that the costs of inadequate water and sanitation facilities may be as high as 2.1 percent of GDP, indicating the need for policy attention (G-JAS, 2007).

The above constraints determine the path of the MDGs in the baseline scenario for each country. These scenarios are based on the following assumptions. In Honduras, real GDP per capita grows at 1.8 percent per year; this coincides with growth projections of the IMF (2006) and Government of Honduras, but is much faster than the 0.5 percent average annual growth recorded over the 1990-2004 period. The level of government service provision in public infrastructure, water and sanitation, health, and education sectors is assumed to grow at the same rate as real GDP (3.9 percent per year). Spending in the general government sector is also set to grow exogenously at this rate, so that total public consumption grows at the rate of real GDP expansion in the projected period. In Ghana, per capita growth is expected to be much higher at 4.2 percent per year. Health and general government spending are assumed to grow at the same rate as real GDP (6.8 percent per year), while spending on education, water-sanitation, and infrastructure is set to grow at

the expenditure rates planned by the government (4, 5.4, and 5.4 percent per year, respectively).

Even with these optimistic growth performances, none of the non-poverty MDGs is likely to be reached in Ghana or Honduras in the baseline case. In Ghana, the high and sustained pace of growth bodes well for reaching the poverty MDG, which is likely to be surpassed in the baseline scenario. Our estimates show that solid progress is likely to take place in education, where 87 percent of children will complete the primary cycle in 6 years. Although this falls short of the MDG of universal primary completion, more than 75 percent of distance to target is covered in the baseline scenario (see the last column of Table 2). In contrast, relatively little progress is likely to take place in water and sanitation, where only 21 and 23 percent of total distance to target will be covered in the baseline. Finally, reductions in child and maternal mortality are even slower, with one-fifth of the required improvement likely to take place by 2015.

In Honduras, given the high rates of growth of service provision required to reach the MDGs and the slow growth assumed in the baseline for these same services, it is not surprising that the distance toward the goals covered in the baseline scenario is less than in the case of Ghana. The largest improvement, 63 percent of the distance to target, is observed for the education goal¹⁵, while progress towards health, water-sanitation, and poverty goals is much slower. Only 16 and 17 percent of the distance to target is covered for the child and maternal mortality goals, respectively, while water and sanitation fare slightly worse at 14 and 15 percent of total distance covered. Finally, the baseline improvement in the poverty headcount is 28 percent of the total distance to target. That is, the 1.8 percent per capita income growth generated in the

¹⁵ In the case of education even if Honduras has to spend much more than Ghana (see Table 3), the distance to the common 100 percent completion target is much shorter for Honduras than for Ghana.

baseline scenario is not sufficient to make major progress in poverty reduction.¹⁶

The modest achievements of the baseline scenario signal the need to increase the efforts to expand public provision of MDG-related services. Table 3 shows estimates of how much is needed to reach each individual MDG under the restrictions that synergies and general equilibrium effects are not accounted. The next subsection addresses the question of the costs to reach all the MDGs when these restrictions are removed.

How much will it cost to reach the MDGs?

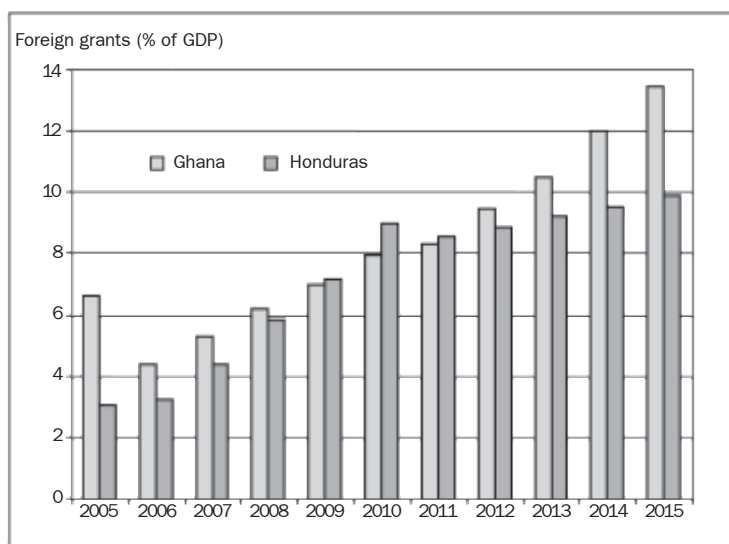
The second important message emerging from the analysis of the MDGs challenge is that, notwithstanding the differences across Ghana and Honduras with respect to individual goals, the overall costs to achieve all the non-poverty MDGs are quite large for both countries, reaching 10 to 13 percent of GDP in 2015. Generally, there are two broad strategies for scaling up resources for MDG achievement: a) increasing spending with the current unchanged ‘production structure’ or b) combining lower increase in additional spending with a more efficient production structure. Although this second strategy of mixed additional spending and improved efficiency is more realistic, it is useful to determine the total cost in a situation with no productivity improvements. This approach helps establish the size of the challenge, and also highlights the potential magnitude of structural impacts on the host economy, including implications for labor markets and government fiscal space.

In order to reach the full set of non-poverty MDGs, the growth in HD service delivery per capita (excluding the provision of public

¹⁶ The baseline poverty reduction is modest due to increasing inequality between 2004 and 2015. The Gini coefficient rises by 0.7 percentage points, while the Theil index increases from 0.69 to 0.72. The trend towards rising inequality is explained by higher demand for skilled and tertiary-skilled workers, which drives up their labor earnings and increases wage inequality. Additionally, the wages of unskilled workers grow slower than the economy-wide average because of the demographic structure of Honduras, where large cohorts of young people enter the labor market at low skill levels.

infrastructure) in Ghana would have to nearly triple from 2.0 percent per year in the baseline to 5.7 percent per year. The growth in per capita MDG service delivery in Honduras would need to accelerate in a similar fashion, rising from 1.8 percent per year to 7.1 percent per year. Assuming for simplicity that the financing gap is filled by foreign grants, the total cost of providing these services in Ghana is likely to reach US\$16.2 billion over the 2004-2015 period, while the comparable figure for Honduras is US\$9.2 billion.¹⁷ These results imply that by 2015, MDG-related foreign grants would need to rise by US\$101 per capita in Ghana and US\$139 per capita in Honduras. Reflecting the increasing unit costs of service provision (as coverage of MDG services extends to parts of the population that are more difficult to reach, socially or geographically) as well as overall population growth, the required amounts of aid are likely to rise over time, reaching 13 percent of GDP in Ghana and 10 percent of GDP in Honduras (Figure 2).

Figure 2. Financing requirements to reach the MDGs are large, and rising over time



¹⁷ The implications of alternative financing scenarios will be considered in the following section.

What are the implications of alternative financing mechanisms?

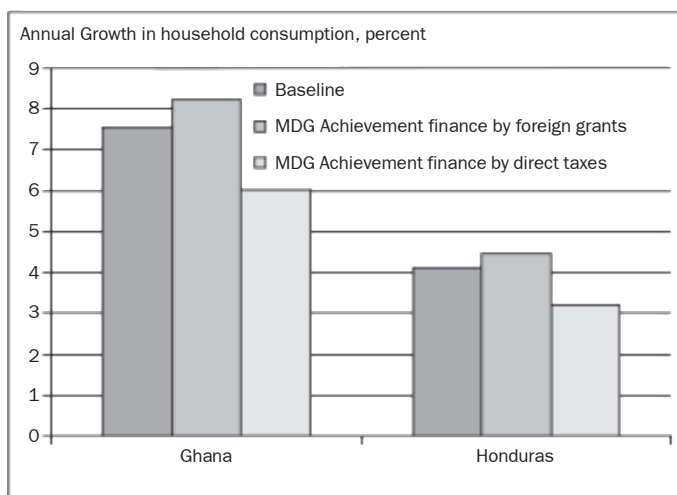
Although the required expansion in HD service provision does not depend on the choice of financing mechanism, the total costs (in local currency units or US\$) of providing these services can vary significantly across different financing scenarios. Besides foreign grants, the MDG financing gap can also be filled by raising taxes, or through foreign or domestic borrowing. It is also possible, and even likely, that an MDG achievement strategy would rely on a combination of these approaches but, for simplicity, we consider each of them separately.

If the MDGs are financed through foreign aid, absorption of large inflows of foreign currency may be associated with real exchange rate appreciation and the ‘Dutch disease’ problems that stem from it. In our simulations, both Honduras and Ghana experience a substantial appreciation of real exchange rate, by 12 and 14 percent over the 2004-2015 period, respectively. While the appreciation benefits the consumers of imported goods, it has two important drawbacks: first, the purchasing power of each dollar of foreign aid declines in step with the falling real exchange rate; and second, the growth rate of exports falls significantly below baseline levels. This potential loss of competitiveness in international markets is an important signal to policymakers that financing MDG activities through large amounts of foreign aid *and* focusing on export-led growth may not be compatible strategies.

The impact of MDG financing through foreign borrowing is similar to foreign grants, with the exception that the government fiscal space is further constrained by the necessity of making interest payments. Furthermore, accumulation of external debt may not be a welcome strategy in countries that only recently received reprieve from crippling external debt burdens through the HIPC initiative. As an alternative, governments may consider raising the required revenues domestically, either through domestic bond issues or increased taxation. However, doing so is likely to have adverse effects on private consumption (tax financing) or crowd out private

investment (bond financing). For example, financing MDG expenditures through direct taxes in Honduras requires a near tripling of the 2015 tax rate from 5.5 percent to 14.8 percent. As a result, private consumption growth slows from 4.1 percent per year in the baseline to 3.2 percent in the tax scenario, and the 2015 poverty headcount in the tax simulation is 4 percentage points higher than in the baseline (Figure 3). If public expenditure on MDGs were to be financed exclusively through direct taxes, Honduras would only cover 12 percent of total distance to its poverty target between 2004 and 2015, compared with 28 percent in the baseline and 30 percent if the MDG financing were provided through foreign grants.

Figure 3: Financing HD expenditure through direct taxes penalizes consumption



The impact of tax financing in Ghana is similar, with consumption growth declining to 6.0 percent per year relative to 7.5 percent per year in the baseline and 8.2 percent per year if the MDGs were financed through foreign grants. Therefore, the progress on poverty reduction is also significantly reduced, although Ghana is still likely to be on track for meeting MDG 1 due to the robust pace of growth

anticipated over the next decade. Thus, the main message is not whether a given country is more or less likely to achieve the poverty targets—the progress on poverty reduction is largely determined by the baseline growth performance—but that the choice of financing mechanisms for MDG strategies has explicit costs: losing international competitiveness, penalizing private consumption, or reducing private sector growth. Policymakers should be aware of these costs and weigh them carefully against the HD benefits of reaching the MDGs.

Income growth and MDG achievement: complements or substitutes?

A key feature of the MAMS model is that the costs of attaining the MDGs depend not only on the estimates by sector experts, but also on the availability of necessary resources (labor, capital, and intermediate inputs), complementary policies (e.g., provision of public infrastructure), and the overall growth environment of the country. Costs of reaching the MDGs are likely to be lower when demand for services is higher, the contribution of the private sector is larger, and the requisite infrastructure is in place and of sufficient quality.¹⁸ At the same time, faster growth in the private sector is likely to drive up wages throughout the economy, therefore raising the costs of providing both HD and other public services for the government. The causality also runs the other way, as good MDG performance has important positive spillover effects on growth. For example, improvements in schooling increase the share of skilled and tertiary-skilled workers in total employment, which in turn leads to higher average labor productivity.¹⁹

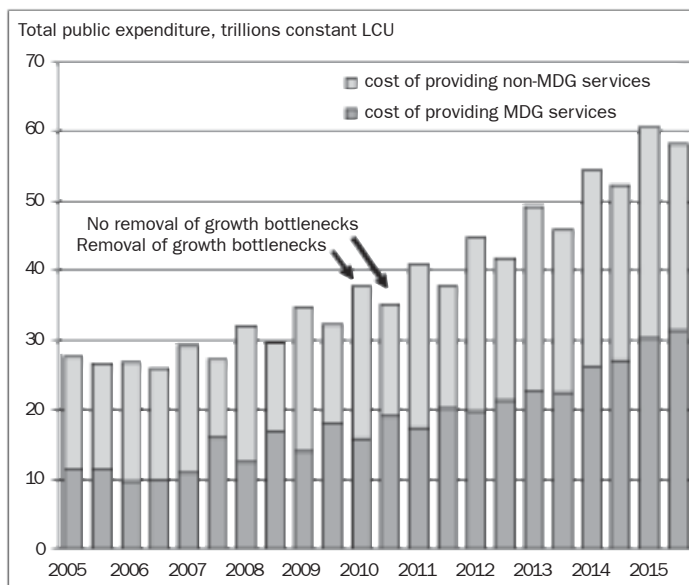
¹⁸ Note that both Ghana and Honduras applications do not include private provision of HD services.

¹⁹ There exist other potential spillovers, such as higher labor productivity due to improved health of workers and higher survival rates of children who then go on to join the labor force. However, this possibility is not considered in the simulations presented in this paper due to the time scope of the analysis: improvements in child health are likely to translate into a larger and healthier workforce with a time lag greater than the endpoint of our simulations (2015).

In order to illustrate the relationship between growth and achievement of the non-poverty MDGs, we consider a scenario where the government is able to accelerate growth by increasing investment in public infrastructure (including water and sanitation). In Ghana, this accelerated growth scenario—which addresses the infrastructure gaps that have constrained Ghana’s growth performance in the past by doubling the growth rate of public investment in infrastructure from 5.4 to 10.8 percent per year and implementing a similar increase in the growth rate of current spending in water and sanitation—quickens the growth rate of real GDP per capita to 4.6 percent per year, from 4.2 percent per year in the baseline. The accelerated growth simulation then serves as an alternative starting point for the effort to reach the MDGs; figure 4 contrasts the total (current and capital) spending by the government under an MDG scenario that starts from the baseline (i.e., no removal of growth bottlenecks) and an MDG scenario that incorporates accelerated growth (i.e., removal of growth bottlenecks).

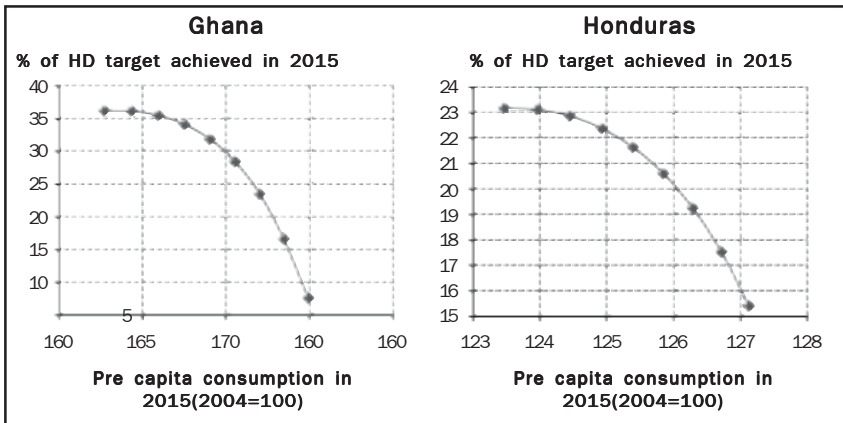
Figure 4 shows that while total public spending in the accelerated growth MDG scenario is always higher (due to additional investment in infrastructure), the HD expenditure is consistently lower. HD costs depend on the interaction of two factors. On the one hand, faster productivity growth in the private sector leads to higher wages, which then drive up the costs of reaching the MDGs. On the other hand, growth-enhancing investments in infrastructure reduce the costs of attaining the MDGs through positive spillovers and demand-side effects. Overall, the second set of factors outweighs the first and, in the accelerated growth scenario, the costs of reaching the MDGs are lower.

Figure 4. Accelerated growth results in substantial MDG cost savings in Ghana



While the previous discussion highlighted the many complementarities between MDG achievement strategies and growth, there also exist important trade-offs between HD- and growth-targeted activities. Faced with a fixed budget envelope, policymakers may not be able to raise sufficient resources to finance a full set of MDG activities and maintain adequate investments in infrastructure. In this case, one may broadly distinguish between investing in activities that are beneficial to growth (such as infrastructure) and activities that improve human development but that do not have immediate feedbacks on growth. In order to quantify this HD-growth trade-off, we undertake a series of simulations where the overall public budget is fixed at baseline levels, but the allocation of government resources varies from infrastructure-intensive to HD-intensive. The results of each simulation in terms of consumption growth and the average level of achievement of the non-poverty MDGs are then represented as points of a trade-off curve in Figure 5.

Figure 5. Investing more in growth may require sacrifices in HD progress



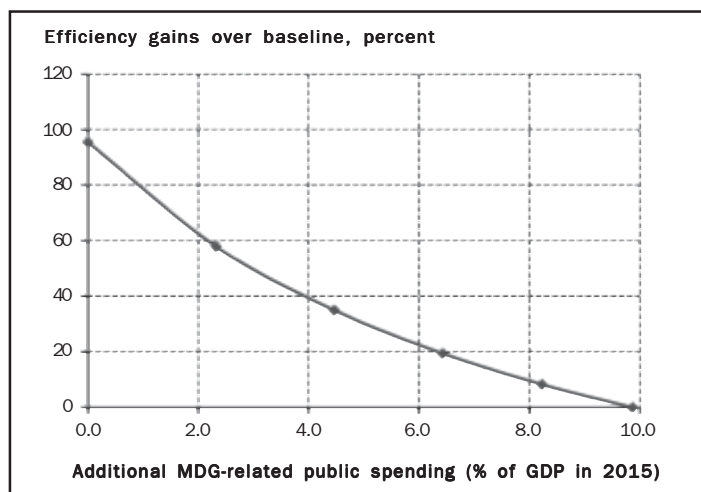
The trade-off curve is concave, implying that additional investment in either HD or infrastructure services results in progressively smaller improvements in the relevant indicators. Additionally, Bourguignon and Sundberg (2006) suggest that the trade-off between human development and growth becomes flatter as a country comes closer to achieving its HD targets. In other words, because the unit costs of reaching the most remote parts of the population (both economically and socially) are likely to rise as a country comes closer to the MDG targets, making the final steps towards the MDGs is much more costly in terms of foregone growth than when the MDG strategies were initially implemented.

What if the available MDG financing falls short of the required amounts?

If the total amount of MDG financing is constrained at some amount below the total requirements, improvements in the efficiency of service delivery may be required in order to assure that the targets are reached. Accordingly, higher levels of productivity in the HD sectors are likely to reduce the need for additional spending. A scenario of limited financing and increased efficiency in services provision is policy-relevant in view of the large size of the additional public spending

(required to achieve the MDGs in the absence of efficiency gains) and in light of earlier observations on the apparently low efficiency performance in Honduras and Ghana.

Figure 6: MDGs in Honduras can be achieved by a combination of aid and efficiency gains



Assuming that the objective is to reach all the MDGs, the policy alternatives can thus be grouped into two categories: increasing the efficiency of public spending or increasing the amount of spending. For the same level of full MDG achievement, these two alternatives are shown as a policy trade-off curve in figure 6 for the case of Honduras.²⁰ At one extreme of this tradeoff, the MDGs (excluding the poverty target) are attained exclusively by scaling up MDG-related expenditures, while keeping efficiency constant at the baseline levels. As discussed earlier, this would require an increase in MDG-related spending by 10 percent of GDP by 2015. At the other extreme, the non-poverty MDGs are attained exclusively by improving efficiency,

²⁰ Note that figure 6 assumes that financing is provided by foreign grants. This figure over-simplifies the problem suggesting that the policy mix is two-dimensional. As discussed earlier, MDG attainment also depends on spending on infrastructure as well as the growth in household per capita income.

while keeping expenditures at the same levels as in the baseline scenario. In the MAMS model, the efficiency of public spending is entirely determined by labor productivity, and improvements in efficiency can be measured by the ratio of the productivity level in 2015 versus their level in the base year (2004). If the MDGs in Honduras are to be reached with no additional (grant-funded) spending, the overall productivity level would have to increase by 96 percent. This implies, for example, that the primary education MDG may be achieved with 52 percent fewer skilled workers and 40 percent fewer tertiary-skilled workers, while the comparable savings in health are 54 and 42 percent.

Finally, one can envision different combinations of efficiency and additional public spending amounts between the two extreme cases, each of which is sufficient to attain the MDGs. For example, if the level of foreign grants in Ghana is constrained to 40 percent of the amount needed, the overall level of public sector efficiency would need to rise by 45 percent relative to the 2004 levels. This means that in primary education, the same outcome could be achieved with 16 percent fewer teachers (relative to the foreign grant scenario), while in health, the MDGs could be reached with 19 percent fewer doctors. Overall, cost savings from increased efficiency in Ghana could amount to 9.7 billion USD between 2004 and 2015.

What are the effects of the pursuit of MDGs on the labor markets?

There are a number of links between MDG achievement strategies and labor market dynamics. On the one hand, in order to reach the MDGs, the public sector must hire more doctors, teachers, and engineers. This raises demand for skilled workers (increasing their wages and/or stimulating additional employment) at the economy-wide level and also limits the availability of skilled workers in the private sector. On the other hand, by virtue of encouraging children and young adults to remain in school, the pursuit of MDGs boosts the supply of skilled workers relative to the baseline. Finally, there

are important inter-temporal effects due to the length of the education cycle. During the transition phase when unskilled individuals choose to go to school rather than enter the labor market, the economy experiences a growth penalty of a smaller total labor force.²¹ During this phase, additional public spending in education is needed to offset the lower growth in consumption per capita. Obviously, a better educated labor force would contribute to stronger growth rates in the future. However, before reaching this new higher growth path, a country is faced with an important trade-off similar to that experienced by poor households who have to decide whether to send their young members to school and forego their incomes, or get them to work but deprive them of potentially higher earnings in the future.

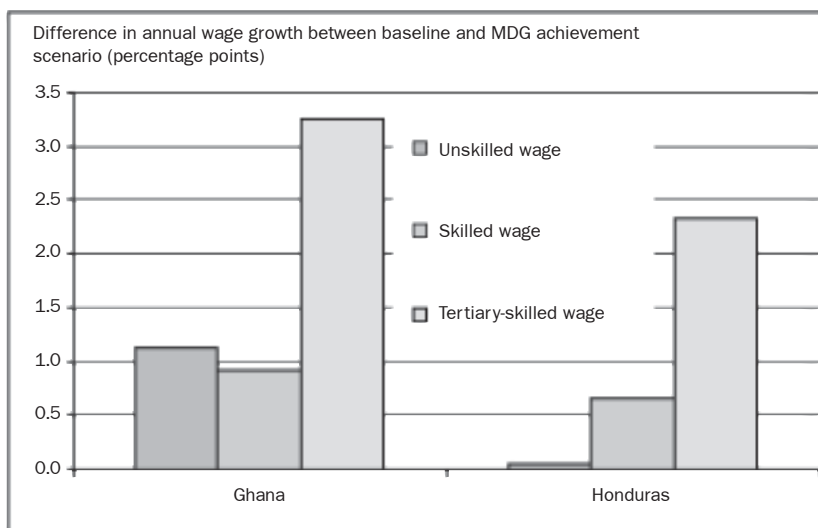
The effects described in the previous paragraph combine to produce the wage dynamics depicted in Figure 7. This figure plots the absolute differences in annual wage growth (expressed in percentage terms) for the three skill categories in Ghana and Honduras. The acceleration in growth of tertiary-skilled wages is directly attributable to the increased demand for high-level skills workers in the public sector, which more than compensates for the increased supply of these workers due to improvements in the education system. The reason is that the public sector in general, and MDG-related public services in particular, are much more skill-intensive than the rest of the economy. However, these wages increase economy-wide—meaning, higher production costs for the whole economy—and can affect, together with other variables, macroeconomic performance.

The evolution of unskilled and skilled wages highlights important differences in the ability of the education sector to scale up for MDG achievement across the two countries. In Honduras, where the demographic distribution is heavily skewed towards younger age groups—almost 45 percent of the total population is 16 years old or younger—the secondary school system is unlikely to be able to absorb the large quantities of primary graduates without a significant scale up in financing. Since our simulations keep the growth in secondary

and tertiary education financing the same as in the baseline, the quality of education in secondary schools deteriorates, discouraging primary graduates to continue their education. As a result, the growth rate of unskilled labor supply falls only slightly relative to baseline, and the increase in unskilled wage growth is negligible.

In Ghana, the secondary school system is relatively well-positioned to absorb the higher quantities of primary school graduates (the result of reaching the MDG 2) without a significant deterioration in the quality of education. Therefore, large amounts of unskilled workers exit the labor force (the annual growth rate of unskilled labor declines from 2.1 percent per year in the baseline to 1.3 percent in the MDG scenario) and gradually return as skilled workers. As a result, unskilled labor becomes relatively scarcer and unskilled wage rise relative to baseline. On the other hand, although growth in skilled wages accelerates relative to baseline, the acceleration is muted by the increasing supply of these workers.

Figure 7. The pursue of MDGs raises demand for skilled workers



The rising demand for skills and faster growth of skilled wages has important consequences for the distribution of income and poverty reduction. Growing wage differentials increase income inequality, which means that the bulk of the economy-wide gains are likely to accrue to individuals already earning incomes above the poverty lines (e.g., individuals with a tertiary education). This is one of the reasons why the MDG achievement scenarios fail to deliver more impressive poverty reduction. In Honduras, the headcount index in 2015 declines by less than one percentage point relative to the baseline, despite the 0.4 percent per year acceleration in consumption growth. This occurs because inequality also rises over the course of the same period, with the Gini coefficient increasing by 1.2 percentage points to 61, and the Theil index rising from 0.72 to 0.76. It is important to acknowledge that these results do not imply a ‘worsening’ of income inequality because they are underpinned by rising premiums for education, which in the long term will encourage more children to attend school and potentially raise economy-wide productivity levels. At the same time, the results highlight the potential need for public safety nets to assist poor workers who are likely to gain the least under these policies.

Conclusions

The MAMS model is the first framework to explicitly take into account the general equilibrium consequences of scaling up for the achievement of MDGs. The MAMS approach consolidates the partial equilibrium assessments of the experts on education, health, infrastructure, and water; links the pursuit of MDGs to the labor markets, fiscal sustainability, and international competitiveness; and provides a consistent set of prices and volumes that can be used in a micro-simulation analysis of poverty and income distribution effects of MDG strategies. In this paper, we have illustrated the main features of MAMS and the policy lessons that could be learned from the model using two recent MAMS applications to Ghana and Honduras.

Our discussion draws attention to a number of potential areas for attention by policymakers. Our results show that the costs of reaching the MDGs in low-income countries such as Ghana and Honduras are likely to be large, reaching 10 and 12 percent of GDP by 2015, respectively. The choice of financing mechanisms for the MDG strategies has important consequences for the macroeconomic variables: foreign aid financing is likely to result in losses in international competitiveness and reduced export growth, while domestic financing is likely to crowd out private investment and slow the progress on poverty reduction. We show that while the overall growth environment is a key determinant of the total cost of reaching the MDGs, there are important public policy trade-offs between investing in growth-enhancing infrastructure or human development-intensive activities. Taking account of the low reported efficiency of public service provision in Ghana and Honduras, our simulations point to significant cost savings that could be achieved by improvements in productivity in the public provision of social services. Finally, the pursuit of MDGs is likely to increase demand for skilled workers faster than the education system is able to produce new graduates; although in the long term this will encourage more people to attend and remain in school through higher skill premiums, in the short term this policy could lead to increased income inequality and a lower poverty elasticity of growth.

References

- Agenor, Pierre-Richard and Moreno-Dodson, Blanca. 2006. "Public Infrastructure and Growth: New Channels and Policy Implications," World Bank Policy Research Working Paper No. 4064.
- African Ministers' Council on Water, AMCOW. 2006. *Getting Africa on Track to Meet the MDGs on Water and Sanitation: A Status Review of Sixteen African Countries*.
- Baldacci, Emanuele, Clements, Benedict, Gupta, Sanjeev and Cui, Qiang. 2004. "Social Spending, Human Capital, and Growth in Developing Countries: Implications for Achieving the MDGs," IMF Working Paper No. 04/217.
- Bourguignon, Francois, Carolina Diaz-Bonilla, and Hans Lofgren. 2007. "Aid, Service Delivery and the MDGs in an Economy-Wide Framework." World Bank Policy Research Working Paper forthcoming.
- Bourguignon, François, and Luiz Pereira da Silva. 2003. *The Impact of Economic Policies on Poverty and Income Distribution: Evaluation Techniques and Tools*. Washington, DC: World Bank and Oxford University Press.
- Bourguignon, François, and Mark Sundberg. 2006. "Constraints to Achieving the MDGs with Scaled-Up Aid," UN Department of Economic and Social Affairs Working Paper No. 15.
- Bussolo, Maurizio, Jann Lay, and Dominique van der Mensbrugghe. 2006. "Structural Change and Poverty Reduction in Brazil: The Impact of the Doha Round." In *Poverty and the WTO: Impacts of the Doha Development Agenda*, ed. Thomas Hertel and Alan Winters. Washington, DC: World Bank.
- Bussolo, Maurizio and Denis Medvedev. 2007. "Accelerated Growth and MDG Achievement in Ghana: A General Equilibrium Analysis of Fiscal Policy Alternatives." Presented at PEGNet conference, Berlin, Germany, September 6-7.
- Bussolo, Maurizio and Denis Medvedev. 2006. "Millennium Development Goals for Honduras: Current Achievements and

- Forthcoming Challenges.” Presented at GTAP conference, Addis Ababa, Ethiopia, June 15-17.
- Calderon, Cesar A. and Servén, Luis. 2004. “The Effects of Infrastructure Development on Growth and Income Distribution,” World Bank Policy Research Working Paper No. 3400.
- Chen, Shaohua, and Martin Ravallion. 2003. “Household Welfare Impacts of China’s Accession to the World Trade Organization.” World Bank Policy Research Working Paper No. 3040.
- Devarajan, Shantayanan, Miller, Margaret and Swanson, Eric V. 2002. “Goals for Development: History, Prospects, and Costs,” World Bank Policy Research Working Paper No. 2819.
- Ghana Joint Assistance Strategy, G-JAS. 2007. *Commitments by Partners to Work Toward GPRSII Goals and Harmonization Principles*.
- Government of Ghana, Ministry of Education. 2003. *Education Strategic Plan 2003 to 2015*, Accra, Ghana.
- Government of Honduras, Grupo Consultativo. 2005. *Avanzando en la Planificación Sectorial de Mediano Plazo: Plan Pluriennial de Ejecución de la ERP*, Tegucigalpa, Honduras.
- International Monetary Fund, IMF. 2006. *Ghana: Debt Sustainability Analysis*, Washington, DC.
- Lofgren, Hans and Carolina Diaz-Bonilla. 2006. “MAMS: An Economywide Model for Analysis of MDG Country Strategies – Technical Documentation.” Mimeo. World Bank.
- Paxson, Christina H. and Schady, Norbert. 2005. “Cognitive Development Among Young Children in Ecuador: The Roles of Wealth, Health, and Parenting,” World Bank Policy Research Working Paper No. 3605.
- Romp, Ward, and Jakob de Haan. 2005. “Public Capital and Economic Growth: A Critical Survey,” in *Infrastructure, Economic Growth, and the Economics of PPPs*, EIB Papers, European Investment Bank, Vol. 10.
- UN Millennium Project. 2005. *Investing in Development: A Practical Plan to Achieve the Millennium Development Goals*. New York.

- World Bank. 2001. *Honduras Public Expenditure Management for Poverty Reduction and Fiscal Sustainability*, Washington, DC.
- World Bank. 2004. *Honduras Development Policy Review: Accelerating Broad-Based Growth*, Washington, DC.
- World Bank. 2007. *Honduras Public Expenditure Review*, Washington, DC.

Multidimensional Poverty in Senegal: A Non-Monetary Basic Needs Approach

Jean-Bosco Ki, Salimata Faye and Bocar Faye

Abstract

An appreciation of poverty that is as complete as possible constitutes an essential step in the analysis of the causes of poverty and in the formulation of policies to combat it. The monetary approach is not sufficient to capture the multiple aspects of poverty; a multidimensional analysis is also needed. The main objective of this research is therefore to construct a composite indicator of poverty using a basic needs approach. The analysis shows that the most widespread forms of poverty in Senegal are related to the vulnerability of human existence and to the lack of infrastructure, elements of comfort, and equipment. We estimate the incidence of multidimensional poverty to reach 60 percent, compared to 48.5 percent for monetary poverty. Rural areas are particularly affected by non-monetary poverty whereas urban areas are affected more by monetary poverty in spite of the existence of human capital and basic infrastructure. The two types of poverty are quite strongly and positively correlated.

Keywords: Multidimensional poverty, Composite poverty indicator, Composite index, Basic needs approach, Non-monetary poverty, Multiple Correspondence Analysis, Capability Approach.

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Pauvreté Multidimensionnelle au Sénégal : Une approche non monétaire par les besoins de base*

Résumé

L'approche monétaire n'est pas suffisante pour cerner les aspects multiples de la pauvreté. Une analyse multidimensionnelle est nécessaire pour établir une mesure exhaustive de ce phénomène, tant du point de vue de ses causes que des politiques de lutte contre la pauvreté. C'est l'objectif principal de cette recherche qui a permis de construire un indicateur composite de la pauvreté à partir des besoins de base. L'analyse de cet indicateur montre que les formes de pauvreté les plus répandues au Sénégal sont liées à la vulnérabilité de l'existence humaine, au manque d'infrastructures, et au manque d'éléments de confort et d'équipement. L'incidence de la pauvreté multidimensionnelle vaut 60 % contre 48,5 % pour la pauvreté monétaire. La zone rurale est particulièrement touchée par la pauvreté non monétaire tandis que la zone urbaine est plus beaucoup plus affectée par la pauvreté monétaire malgré l'existence du capital humain et d'infrastructures de base. Cependant il faut noter que les deux types de pauvreté demeurent positivement corrélés.

Mots-clefs : Pauvreté multidimensionnelle, Indicateur composite, Indice composite, Besoins de base, Pauvreté non monétaire, Analyse des Correspondances Multiples, approche par les capacités.

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Introduction

Given that poverty is a multidimensional phenomenon, the monetary approach is not always sufficient to capture the multiple aspects that poverty involves, and its consequences compromise the ability of populations affected by this phenomenon to lead decent and happy lives. For, even though an individual may have the wherewithal necessary to satisfy his needs, some other goods and infrastructure must also be available and accessible in the locality where he lives. Otherwise he may have no choice but to consume undrinkable water, for instance, even though he has the means to pay for the services of the water company located near his area of residence. Or, he may have the financial means to acquire an education, but end up being unable to attend school for lack of educational facilities in the proximity. Or again, he may die through a minor illness before arriving at the hospital, simply because the latter is far from his area of residence.

These situations actually constitute other forms through which poverty manifests itself. They illustrate the fact that poverty is not solely monetary, but presents itself as a multidimensional phenomenon. It is therefore important for researchers to take this fact into account in their effort to achieve a better understanding and measurement of poverty. Hence the research interest in a multidimensional approach to poverty analysis, so as to be able to identify the poor and their concerns better, for the efficient design and implementation of appropriate strategies likely to help fight against poverty.

Very few studies have addressed the multidimensional aspect of poverty by using composite indicators in the case of Senegal. On the other hand, several non-monetary poverty studies have been realized in that country based on a one-dimensional approach, which consists of analyzing each dimension of poverty separately. The present study mainly aims to construct a Composite Poverty Indicator (CPI) that may help provide an aggregate welfare measure embodying several dimensions. The construction of such a composite indicator will also permit the study of the links between monetary and non-monetary

poverty, and to work out a multidimensional poverty index in order to evaluate its incidence.

In addition to the above introduction, the remainder of this study is organized into five sections. A brief presentation on Senegal will be followed by a review of the literature on poverty in the country, a discussion of the methodology used, a presentation of the results, and finally, the conclusion and recommendations of the study.

Senegal: A country affected by poverty, yet with significant initiatives in progress

Senegal is located in the far western region of the African continent bordering the Atlantic Ocean, and spreads over an area of 196 000 km². Its population was estimated at 10 500 000 inhabitants in 2004, with a growth rate of 2.7 percent. The Gross Enrollment Ratio (GER) in primary school is 80 percent.¹ The country is endowed with very few natural resources, and it has a long coastline whose strong potentialities for fishing are already overexploited. Fishing remains one of the most important export sectors, followed by phosphates and groundnuts.

On the macroeconomic level, the country witnessed an average growth rate of 4.3 percent over the 1996-2001 period, which reached 6.5 percent in 2003. Inflation is controlled and contained below a 3 percent ceiling (the inflation rate was 2.3 % in 2003) in accordance with the convergence criteria prescribed by the currency area of the Economic and Monetary Union of West Africa (UEMOA), of which Senegal is a member. However, Senegal is still a heavily indebted country (its debt service/exports ratio being 74.3%).

Senegal's first household survey (ESAM I)² was carried out over the 1994-1995 period, and the incidence of monetary poverty was estimated to be around 57.9 percent.³ This incidence dropped to

¹ The GER was 79.9 percent in 2004/Ministry of Education.

² Direction de la Prévision et de la Statistique (DPS), 1994/1995.

³ Poverty thresholds estimates by the DFS amount to 787 CFA francs per day for the city of Dakar, 429 CFA francs for other cities, and, 281 CFA francs for the rural area.

48.5 percent⁴ in 2000-2001, according to ESAM II results. Among the national government's future economic policy orientations, the fight against poverty takes up center stage. Poverty reduction is also very much in the fore of the Millenium Development Objectives (MDO). To fight efficiently against poverty, the government has drawn up a Poverty Reduction Strategy Paper (PRSP) in order to determine the Policies, Programmes and Projects (PPP) to be implemented. The PRSP has identified and centered on three main priority areas: (i) wealth creation; (ii) capacity building and the promotion of basic social services; and (iii) improvement in the living conditions of vulnerable groups. These priorities constitute the major challenges that the Poverty Reduction Strategy (PRS) must take up. Consequently, research in the area of poverty analysis has positioned itself as the foundation on which the success of this extensive program has to be based in order to increase the likelihood of achieving its objectives. The following section presents a brief review of the existing literature on the measurement of poverty.

Review of the Literature

The literature on poverty measures distinguishes between two approaches: the monetary approach supported by Welfarists or utilitarians, and the non-monetary approach supported by the non-Welfarists.

The Monetary approach

This utilitarian approach places the conceptualization of welfare in the utility space (Ravallion, 1994) whose satisfaction determines the level of welfare. But since utility is not directly observable, resources (i.e. income – expenditures) have been used to measure welfare.

The utilitarian approach thus arises out of an essentially unidimensional welfare concept which is reduced to a simple lack of

⁴The poverty incidence of 53.9 percent given in the PRSP in 2001 comes from estimates of expenditure vectors that were available in the first ESAM II results.

financial resources necessary for attaining a minimum quality of life. In terms of economic policy, it recommends the reduction of poverty by increasing labor productivity, through interventions of a general nature.

The Non-monetary Approach

The non-monetary approach corresponds to the non-utilitarian view. It places welfare in the space of freedoms and accomplishments. A distinction is made between the approach by way of capacities,⁵ and the approach through basic needs. The former emphasizes the concept of 'functionings' and maintains that the individual must be adequately fed, have an education, be in good health, participate in community life, be free, appear in public without shame, etc. The approach through basic needs generally integrates the fundamental variables considered by the capacities approach, but adds to it other variables such as access to basic social services, including water, energy, education, health, food, housing, infrastructures, etc.

The empirical application of this approach has been hindered for a long time by the problems involved in aggregating all the above deprivations. From the economic policy standpoint, the non-monetary approach usually proposes targeted interventions which have the advantage of reducing the selection bias in favor of the poor relative to general kinds of interventions. In the case of Senegal, very few studies have tackled multidimensional poverty using composite indicators. Studies carried out by the United Nations Development Program (UNDP) may only be considered as preliminary attempts to apply this concept.

The present study proposes an evaluation of non-monetary poverty using the multidimensional approach, which permits the construction of a composite indicator aggregating welfare deficits through variables affecting human existence. The study uses the following methodology.

⁵ Mostly developed by Amartya Sen

Methodology

Methodological Choices

In the context of this study, we adopt a non-monetary approach based on basic needs, where the latter place the welfare concept in the accomplishments space, unlike the monetary approach that gives priority to the space of resources. The main variables taken into account by this approach are education, nutrition, health, hygiene, sanitation, drinking water, the environment, housing, infrastructures, longevity, communications, access to energy, possession of consumer durables and goods of comfort etc. We also resort to a technique that aggregates different non-monetary poverty dimensions in order to have an overall view of the latter and therefore, to facilitate the monitoring of their overall evolution. Several approaches such as the entropy approach⁶ and the inertia approach,⁷ in particular, may help take up this challenge.

The entropy approach is derived from dynamic mechanics. It is often used in statistical information theory, from which Massoumi (1986) has developed an Optimal Composite Indicator (OCI) that minimizes a weighted sum of divergences taken two by two at a time. The main limits of this approach reside in the choice of parameters and weights used in the composite indicator functional form.⁸

On the other hand, the inertia approach stems from the field of static mechanics. It is mainly based on multidimensional analytical techniques, often known as factorial analyses. One may find in the works of Meulman (1992),⁹ Bry (1996),¹⁰ Volle (1993),¹¹ Escofier and Pagès (1990) a complete methodology of these techniques among

⁶ Details are available in the working paper version available on PEP website at www.pep-net.org.

⁷ Details are available in the working paper version available on PEP website at www.pep-net.org. See also Louis Marie Asselin (2002), « Pauvreté multidimensionnelle, théorie ».

⁸ Details are available in the working paper version available on PEP website at www.pep-net.org.

⁹ Louis Marie Asselin (2002), *Pauvreté multidimensionnelle*, IMG.

¹⁰ Xavier Bry (1996), *Analyses factorielles simples*.

¹¹ Michelle Volle (1993), *Analyse des données*, Paris 1993.

which we will only mention the main ones such as Principal Component Analysis (PCA), Generalized Canonical Analysis (GCA), and Multiple Correspondence Analysis (MCA).¹² The other multidimensional analytical techniques originate in the development of the latter. The inertia approach is based on these various techniques, and it proposes a methodology that may help construct a composite indicator with the least possible arbitrariness in defining its functional form. It also makes an optimal choice of the pertinent dimensions of poverty while brushing aside redundant information. A complete development of this approach may be found in the work entitled *Pauvreté multidimensionnelle*, by Louis-Marie Asselin (2002).

In this study, the methodology we use for constructing the Composite Poverty Indicator (CPI) will be based on the inertia approach with the help of multidimensional analyses. These techniques were selected because they help eliminate arbitrariness as much as possible in the calculation of a composite indicator. The factorial analysis technique most suitable to the present study is Multiple Correspondence Analysis,¹³ since the study uses qualitative variables that can be codified in binary form by means of (0, or 1).

Functional Form of the Composite Poverty Indicator (CPI)

The construction of the CPI is based on the inertia approach which aims to define a composite indicator for each given population unit, using multidimensional analytical techniques. Among these tools, the most adapted to our case study is Multiple Correspondence Analysis (MCA) (see Appendices for more details).

The CPI functional form is defined as follows:¹⁴ Let us consider i the index of a given household, and C_i its CPI value. According to Louis-Marie Asselin, the CPI functional form is:

¹² Details are available in the working paper version available on PEP website at www.pep-net.org.

¹³ Additional information about MCA are available in the working paper at www.pep-net.org

¹⁴ Details are available in the working paper version available on PEP website at www.pep-net.org.

$$Ci = \frac{\sum_{k=1}^K \sum_{j_k=1}^{J_k} W_{j_k}^k I_{j_k}^k}{K}$$
, where K = number of indicator categories ; J_k = number of indicator k categories; $W_{j_k}^k$ = the weight (standardized score on the first axis, $\frac{\text{score}}{\sqrt{1_1}}$ ¹⁵) of category J_k , being the first eigen value. $I_{j_k}^k$ = the binary variable 0/1, which takes on the value of 1 when the unit has category j_k .

The weights given by MCA correspond to the standardized scores on the first factorial axis. The CPI value for any household m simply corresponds to the mean of standardized scores of categorical variables. The weight of a category is the mean of standardized scores of population units belonging to that category.

Data Sources

The main data sources used in the study are drawn from the QUID (Questionnaire Unifié sur les Indicateurs de Développement) survey and ESAM II. The QUID survey constitutes the first phase of ESAM II during which only non-monetary indicators were measured. Data on monetary indicators were gathered during the second phase. The additional data used in this study originate in national accounts and other reports related to poverty.

Measuring, monitoring and analyzing MDGs using multidimensional measurements

Generally, the multidimensional poverty measurements constitute a way to gauge, follow, and analyze MDGs. This study includes several dimensions of MDGs such poverty reduction, education, health, energy, environment, and communication. The resulting Composite Poverty Indicator, constructed using the MCA approach can also be used to follow global progress toward attaining the MDGs.

¹⁵SPAD uses this formula, whereas SPSS divides the score by the eigen value 1_1 for the variance of the factor to be equal to 1

Presentation of the Results

Multiple Correspondence Analysis of Non-monetary Poverty Dimensions

In the context of this study, we carried out a preliminary MCA to visualize the multidimensional aspects of poverty which take into account all of its non-monetary dimensions (See Table 1). This first MCA also constitutes the basis for constructing the CPI.

Table 1: Preliminary list of 37 variables for the Composite Poverty Indicator¹⁶

VARIABLES	VARIABLES
Education Primary schooling rate Secondary schooling rate Literacy rate Access to primary school Access to secondary school	Energy Type of lighting Electricity Fuel
Health Access to health services Consultation of health services Rate of assistance to childbirth Morbidity Prenatal care	Communications Television Radio/radio-cassette player Access to public transport
Drinking water Source of drinking water Access to water in less than 30 minutes	Goods of comfort, equipment and other assets Car or truck Motorcycle Bicycle Réfrigérateur/Freezer Stove Iron Sewing machine Mattress/bed Watch or alarm clock Plots of land, building Other land Cattle Sheep/goats
Nutrition Food problems Access to the food market	
Housing and sanitation Nature of roof Nature walls Housing occupancy status Type of toilet	

¹⁶ The malnutrition indicator of children less than 5 has not been taken into account owing to the fact that the QUID survey collected data on this indicator only on a quarter of all the households surveyed, given the problems encountered in measuring and weighing children less than 5 years old.

The histogram of MCA eigen values¹⁷ highlights the unhooking of the first factorial axis. The latter explains 10.29 percent of the total inertia of the variable cluster, whereas the other axes show a low explanatory power (each with less than 3 % of the inertia explained). This distinction of the first axis underscores the particular phenomenon of poverty. MCA analysis will mainly center on this axis which describes poverty.

This first factorial axis generally opposes two households' categories: poor households and non-poor households. Meanwhile, the second axis introduces a differentiation within each class. In the case of the well-to-do, it makes a distinction between very rich households and rich households. Similarly, it generally distinguishes poor households from very poor households within the class of the poor.

Overall, the poor have very limited access to education, health, sanitation, drinking water, housing, energy, means of communication, transport, food, goods of comfort, and durables.

Construction of the Composite Poverty Indicator (CPI)

Selection of Variables for the Construction of the CPI

Multiple Correspondence Analysis has provided the basic elements for selecting the variables used in the construction of the CPI. The main criterion to consider here is the First Axis Ordinal Consistency (FAOC) on the Factorial Axis which generally expresses a welfare state. This property is a necessary condition for the CPI to effect an ordering of households in accordance with their level of welfare. For a given primary indicator, it ensures that the latter's ordinal welfare structure is respected by the ordinal structure of the coordinates (scores) of its modalities on the first axis. Other second order criteria deal with discrimination measures, the spreading over on the first

¹⁷Details information are available in the working paper, see www.pep-net.org

axis, the high frequency of non-responses or the very low frequencies of some of the modalities. The variables finally selected are presented in Table 2 below.

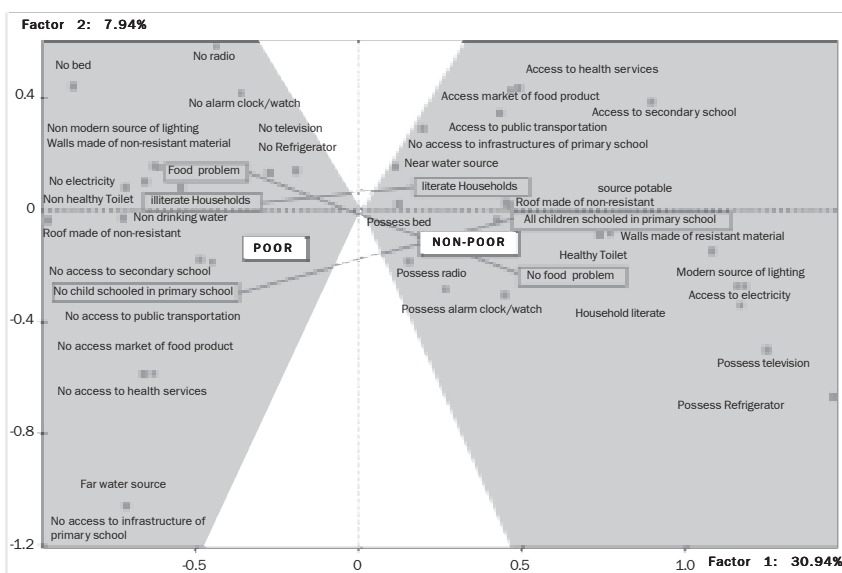
Table 2: Final list of 21 variables and 44 modalities for the CPI

VARIABLES	MODALITIES
Education Primary schooling rate Literacy rate Access to a primary school in less than 30 minutes Access to a secondary school in less than 30 minutes	Households providing no education to any child Households providing education to some children Households providing education to all children Illiterate Households Households in which some members are literate Households in which all members are literate Less than 30 minutes, More than 30 minutes Less than 30 minutes, More than 30 minutes
Health Access to health services in less than 30 minutes	Less than 30 minutes, More than 30 minutes
Drinking water Source of water used for drinking Access to drinking water in less than 15 minutes	Drinking water, Undrinkable water Less than 15 minutes, More than 15 minutes
Nutrition Access to food market Food problems	Less than 30 minutes, More than 30 minutes Never had a food problem, Experience food problems
Housing and sanitation Nature of the roof Nature of walls Type of toilets	Roof solid (concrete, cement, slate, zinc), thatched roof, and others Cement bricks, banco bricks and wood Toilets hygienic, Toilets unhygienic
Energy Electricity in the household Fuel Type of lighting	Yes, No Modern fuel, Non-modern fuel Modern lighting source, Non-modern lighting source
Communications Television Radio/radio-cassette player Access to public transport in less than 15 minutes	Yes, No Yes, No Less than 15 minutes, more than 15 minutes
Goods of comfort Possession of refrigerator/freezer Possession of mattress/bed Possession of watch/alarm clock	Yes, No Yes, No Yes, No

A Final MCA on the CPI Variables

A final MCA run on the 21 variables retained for the construction of the CPI resulted in a considerable increase in the explanatory power of the first axis, which rose from 10.29 percent to 30.94 percent. The explanatory power of the second axis also increased from 2.89 percent to 7.94 percent. In the new factorial plane, welfare moves from left to right. In this plane, all variables have the ordinal consistency on the first axis (OCFA) property where a net separation of the poor from the rich takes place, as they are opposed on the first factorial axis which describes real welfare states.

Figure 1: First plane of the final MCA

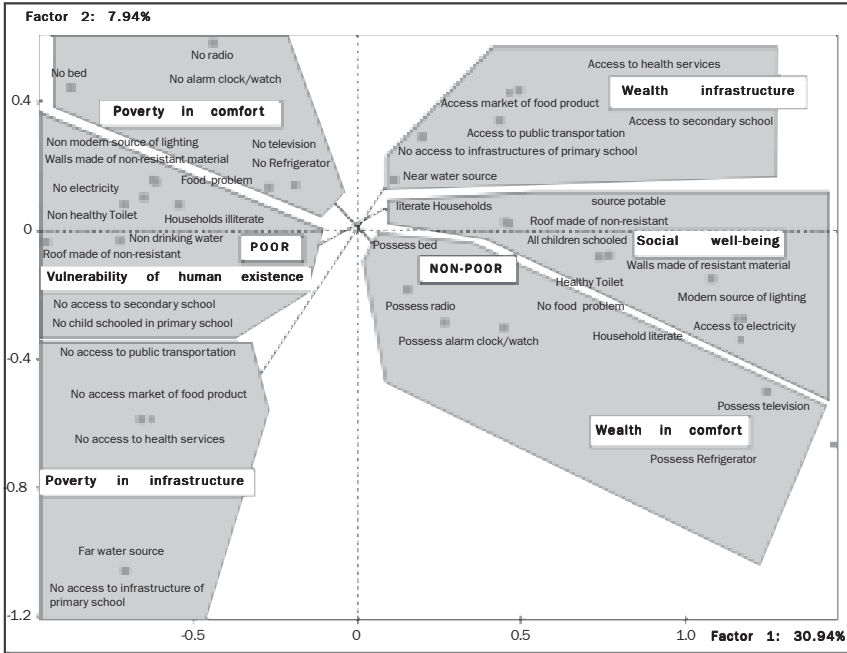


Source : Calculated with SPAD using the QUID 2001/DPS survey data.

Detailed information about the scores of the different indicators (corresponding to the weights used in the construction of the Composite Poverty Indicator) are available in the working paper version on the PEP website (www.pep-net.org).

The CPI is a welfare indicator which ranks households according to their non-monetary welfare levels. Since all households are not affected by the same type of multidimensional poverty, the following paragraph summarizes non-monetary poverty typology.

Figure 2: Typology of multidimensional poverty



Source : Calculations with SPAD using QUID 2001/DPS data.

Typology of Non-monetary Poverty

The figure below distinguishes three types of non-monetary poverty: a poverty indicative of the vulnerabilty of human existence (inadequacy of human capital, and unpleasant living conditions), poverty from the standpoint of infrastructures, and poverty in terms of household comfort.

The vulnerabilty of human existence is the most perceptible form of poverty. It is the form of poverty that characterizes a poor person

at first glance. It is attributable to the housing conditions of the poor: banco (mud) walls, thatched roof, absence of drinking water, toilets, electricity, television, the use of wood as fuel, and of a storm oil lamp for lighting.

In addition to these difficult conditions, parents and children alike are not educated, do not visit health services, and do not eat their fill. These vulnerable households do not have at their disposal the minimum capacities which could help improve their living conditions, and their possibilities of choice are very limited.

Beyond the vulnerability of human existence, one will find poverty in terms of infrastructures, and poverty in terms of household equipment and comfort. The first manifests itself through poor access to infrastructures such as schools and health services, sources of drinking water, food markets etc. This form of poverty exceeds the possibilities of a household. It is rather directly linked to the policies and capacity of the State to equitably provide the basic infrastructures necessary for improving the living conditions of their population. The third and last form of poverty manifests itself through households that are under-equipped in terms of durable and comfort goods such as refrigerators, televisions, radios, alarm clocks, and beds.

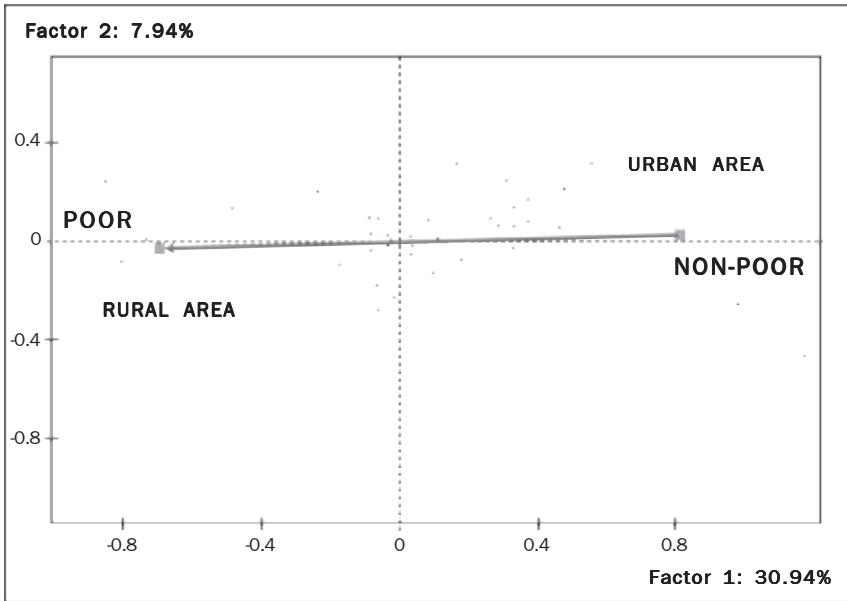
Since we have just covered the different types of multi-dimensional poverty, the following paragraphs will help appreciate the ranking of urban and rural areas, regions, and socio-economic groups relative to the CPI.

CPIs Characteristic of the Household Head

CPI and Residence Area

For a given category, the CPI corresponds to the mean of standardized scores on the first axis for individuals found in this category. The following graph gives the position of urban and rural areas relative to the CPI. Welfare moves from left to right. The farther left the category is located, the more it is linked to poverty, and the farther right it is, the more it indicates a position of wealth.

Figure 3: CPI and residence area

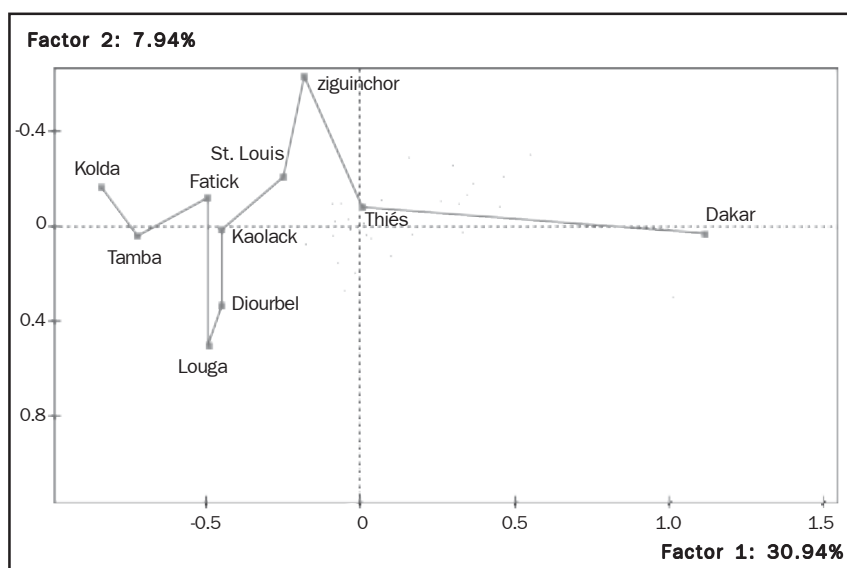


Source : Calculations using the QUID 2001/DPS survey data.

The welfare axis (the horizontal axis) directly associates the rural area with poverty, and the urban area with wealth. Overall, it shows that household living standards are distinctly better in the urban area than in the rural area. The CPI is equal to -0.69 for the rural area and 0.81 for the urban area. Of the three forms of non-monetary poverty identified above, the rural area is the most affected by all of them.

CPI and Regions

The following graph presents the regions in the first factorial plane:

Figure 4: CPI and regions

Source: Calculations using the QUID 2001/DPS survey data.

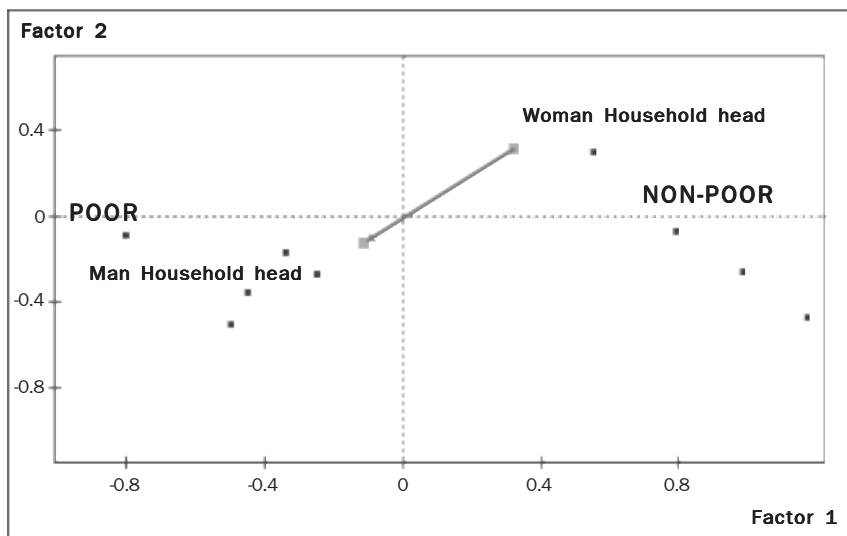
The poverty axis isolates the most urbanized regions, namely, Dakar and Thiès, and shows that in general, households residing in these localities enjoy a higher well-being than those in other regions. Regions with low living standards are those of Kolda and Tambacounda. As to other regions, their living standards range between these two extremes. The regions of Ziguinchor, Louga et Diourbel are positioned significantly further apart from the first axis. The Ziguinchor region is not only affected by the vulnerability of human existence, but it seems particularly affected by the lack of comfort and household equipment. Concerning the regions of Louga and Diourbel, the lack of infrastructures set them apart from the other regions. The regional CPI values are presented in the Appendices.

CPI and Household Head Gender

The following factorial graph shows that the CPI is higher for women household heads (0.37) than for men household heads (-0.10). This

means that overall, households managed by a woman have a higher level of welfare than those managed by a man.

Figure 5: CPI and household head sex

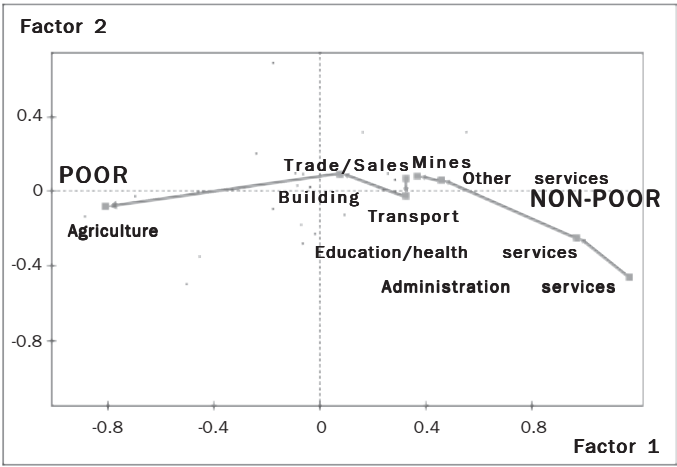


Source : Calculations using the QUID 2001/DPS survey data.

CPI and the Household Head Activities

The CPI very clearly distinguishes two categories of activities: agriculture broadly defined, and non-agricultural activities (administration, industry, commerce, construction, services, and others). In the factorial graph, the welfare axis associates agriculture with poverty and other activities with wealth., implying that the welfare level of households whose head carries out an agricultural activity is lower than that of households managed by a head engaged in other activities.

Figure 6: CPI and household head activities

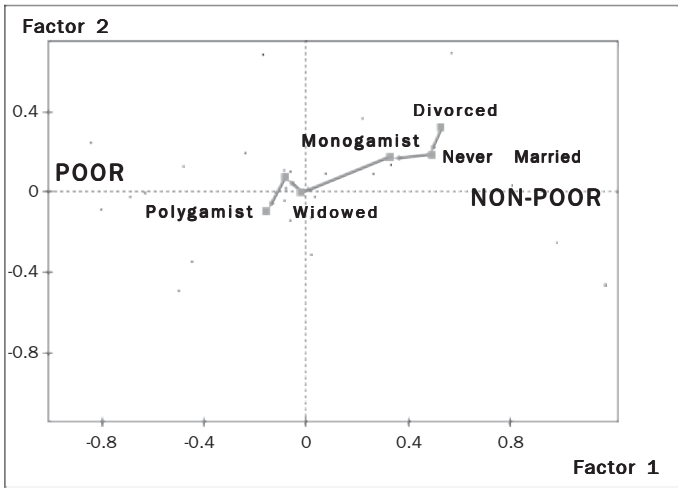


Source : Calculs using the QUID 2001/DPS survey data.

CPI and Household Head Matrimonial Status

The following graph shows that polygamy is associated with poverty, whereas monogamists, divorcees, widowers, and singles are positioned on the wealth side.

Figure 7: CPI and household head matrimonial status

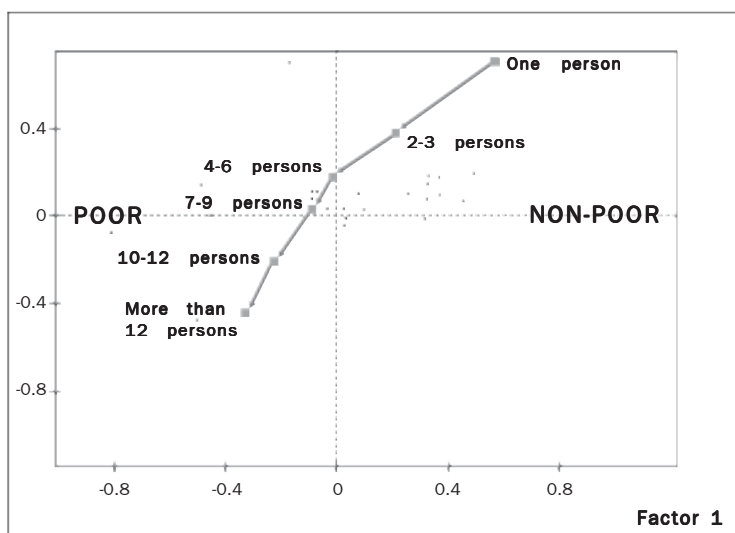


Source : Calculations using the QUID 2001/DPS survey data.

CPI and Household Size

On the following graph, the welfare axis shows that the living standard of households falls with their size, meaning that the higher the household size, the higher the household level of poverty is also.

Figure 8: CPI and household size



Source : calculations using the QUID 2001/DPS survey data.

Incidence of Multidimensional Poverty

Classification of Households

By ranking households in increasing order of CPI values (see Appendices), the histogram of index nodes (see Appendices) shows a disconnection between the first and second node, thus indicating the pertinence of grouping households into two classes. Classification results are given in the Table 3.

Table 3: Proportion of classes

	Minimum	Maximum	%
Poor	-1,03	0,1172	61
Non-poor	0,1178	1,11	39
Total	-1,03	1,11	100

Source : Calculations using the QUID 2001/DPS survey data.

Class Characteristics

As the table below indicates, poor households are the ones that actually do not have access to basic needs. This class of poor persons brings together mostly households with no access to modern energy, health, education, secure housing, the media, drinking water, nutrition, basic infrastructures, and elements of comfort. These households for the most part reside in the rural area (82 %), and agriculture is their main activity. This class is also characteristic of large and polygamous families. Households managed by men in this class predominate those managed by women. It should be noted that no household in this class owns a refrigerator, and all the households of this class live under a roof built with non-solid material.

The rich class gathers together households that have a satisfactory access to basic needs. The characteristics of this class are summarized in the following table.

Table 4: Characteristics of the poor class

Active variables	Modalities	% of the class in the modality	% of the modality within the class	Total frequency of the modality
Access to electricity	No access to electricity	92	98	65
Type of lighting	Non-modern source of lighting	92	97	64
Fuel	Non-modern	87	94	66
Nature of walls	Banco (mud) bricks	96	76	48
Type of toilets	Unhygienic	94	78	51
Television	No television	80	97	74
Nature of roof	Non-solid roof	100	53	32
Refrigerator/freezer	No refrigerator/freezer	72	100	84
Access to secondary school	More than 30 minutes	80	87	66
Drinking water	Non-potable source	92	57	38
Access to health services	More than 30 minutes	86	59	42
Access to food markets	More than 30 minutes	85	58	42
Access to public transport	More than 15 minutes	82	59	44
Literacy	Illiterate households	88	45	31
Schooling at the primary level	Household with no child attending school	82	39	29
Access to primary school	More than 30 minutes	87	27	19
Possession of alarm clock/watch	No alarm clock/watch	75	51	42
Food problems	Experience food problems	68	77	69
Access to source of drinking water	More than 15 minutes	86	18	12
Possession of radio	No radio	78	31	25
Possession of bed/mattress	No bed/mattress	93	8	6

Illustrative variables	Modalities	% of the class in the modality	% of the modality within the class	Total frequency of the modality
Residence area	Rural	93	82	54
Main activity	Agriculture	95	50	32
Region	Kolda	94	11	7
Region	Tamba	89	8	6
Region	Kaolack	82	13	10
Region	Fatick	87	9	6
Sex	Male	64	86	81
Region	Diourbel	80	14	11
Matrimonial status	Polygamous	67	32	29
Household size	More than 9 persons	64	40	38
Matrimonial status	Monogamous	62	56	56
Household size	Between 6 and 9 persons	61	39	39
Main activity	Construction	60	3	3
Main activity	Transport	48	2	3

Source: Calculations using the QUID 2001/DPS survey data.

Table 5: Characteristics of the non-poor class

Active variables	Modalities	% of the class in the modality	% of the modality within the class	Total frequency in the modality
Electricity in the household	Electricity	97	86	35
Type of lighting	Modern source of lighting	96	87	36
Fuel	Modern fuel	90	78	34
Nature of walls	Cement bricks	72	95	52
Type of toilets	Hygienic toilets	74	91	48
Television	Television	94	61	25
Nature of the roof	Solid roof	57	100	68
Refrigerator/freezer	Refrigerator/freezer	99	41	16
Access to secondary school	Less than 30 minutes	77	66	34
Access to drinking water	Potable source	58	92	62
Access to health services	Less than 30 minutes	57	85	58
Access to food markets	Less than 30 minutes	56	83	58
Access to public transport	Less than 15 minutes	56	79	56
Literacy	All households literate	88	27	12
Access to primary school	Less than 30 minutes	45	93	80
Possession of alarm clock/watch	Watch	49	73	58
Food problems	No food problems ever	56	44	31
Schooling at the primary level	Households schooling all the children	56	40	28
Possession of radio	Radio	45	86	75
Access to source of drinking water	Less than 15 minutes	43	95	87
Possession of bed/ mattress	Bed/mattress	41	99	94
Literacy	Households with some literate members	43	63	57

Illustrative variables	Modalities	% of the class in the modality	% of the modality within the class	Total frequency in the modality
Residence area	Urban	76	90	46
Region	Dakar	92	60	26
Main activity	Administration	92	7	3
Main activity	Education/health	83	6	3
Sex	Female	54	26	19
Main activity	Services and others	59	15	10
Main activity	Commerce/sale	53	18	13
Matrimonial status	Divorced	64	4	2
Matrimonial status	Single	60	5	3
Household size	Between 1 and 5 persons	45	28	24
Matrimonial status	Monogamous	38	54	56
Region	Thiès	36	12	13
Region	Ziguinchor	24	3	5
Region	St Louis	26	7	11

This non-poor class is characterized by access to electricity, secure housing, drinking water, health, education, nutrition, the media, household appliances, and goods of comfort. The majority of these households live in urban areas (90%), and they are engaged in administrative, trade, and service activities. They are not very numerous, and the household manager in this class is often monogamous, single or divorced.

Multidimensional Poverty Thresholds

Firstly, and as an illustration, we may consider the intermediate value separating the poor class and the non-poor class as a threshold below which a household may be considered as being poor. This value may be approximated by:

$$[\text{Maximum CPI value* in the poor class}][\text{Poor class weight}] + \text{minimum CPI value* in the rich class}][\text{Rich class weight}].$$

With a maximum of 0.1172 for the poor class, and a minimum value of 0.1178 for the non-poor class, we obtain an intermediate value of 0.1174.

From this value, we can calculate the FGT¹⁸ indices for corresponding to the incidence of poverty. A poverty threshold can also be defined from the partial thresholds determined for each basic indicator used in the construction of the CPI. By considering a reference household with access to basic needs, its CPI — which will define a multidimensional poverty threshold — can be calculated.

In the case of this study, we have 19 binary variables and 2 variables (primary education, and literacy) with 3 modalities. If we assume that our household of reference is not poor in all dimensions, the result would be almost the same, as if we had chosen an intersection from partial poverty thresholds.

Let us assume that a household is not poor in all the 19 (binary) dimensions, that all its children attend school, and all household members are literate; this household will have the greatest CPI value,

¹⁸ Foster, Greer, and Thorbecke (1984).

which is equal to 1.11. For another household that is destitute in all dimensions, the minimum CPI value will be -1.03. To determine our threshold, we have considered a household of reference with access to a sub-group of basic goods and services. Most of the partial thresholds considered come from the PRSP drawn up for Senegal.. This household has the following characteristics:

Table 6: Characteristics of the household of reference

Goods to which it has access	Goods to which it has no access
1 – All its children attend school 2 – It has access to primary school in less than 30 minutes 3 – It has access to health services in less than 30 minutes 4 – It consumes drinking water 5 – Its source of water is less than 15 minutes away 6 – It does not have food problems 7 – Some of its members are literate away 8 – It uses modern energy (electricity, sun, gas) 9 – It has a radio 10 – A roof built with resistant material 11 – Walls built with resistant material 12 – It has a mattress/bed 13 – Hygienic toilets	14 – No television 15 – No watch/alarm clock 16 – Non-modern cooking fuel 17 – Food market more than 30 minutes away 18 – No refrigerator/freezer 19 – May not have access to electricity produced by SENELEC, but uses modern energy 20 – Public transport more than 15 minutes 21 – Secondary school more than 30 minutes away CPI value of household of reference (threshold) = 0,088

With these characteristics, the household of reference has a CPI score of 0.088.¹⁹ This threshold is close to the one obtained by ranking households in increasing order (0,1174). The incidences obtained are presented in the following paragraph.

¹⁹The factorial coordinates of modalities are divided by the square root the of first eigen value (1₁) corresponding to the computational method using SPAD as in A. Morineau, Lebart and Marie P. "Statistique exploratoire multidimensionnelle."

Monetary and multidimensional poverty according to household head characteristics

The incidence of poverty with households classified in increasing order corresponds to the weight of the poor class, which is equal to 61 percent. With a household of reference, we have an incidence close to 60 percent against an incidence of 48.5 for monetary poverty.

On the monetary as well as the non-monetary level, the rural area remains the most affected as compared to the urban area, though multidimensional poverty is more pronounced in the rural area however. The least poor regions are the most urbanized, such as the cities of Dakar, Thiès, and Saint-Louis. The poorest cities are those of Kolda, Tambacounda, and Fatick. The status of regional poverty on the multidimensional level is similar to the one observed on the monetary level. In effect, the rank correlation of regions according to both types of poverty is equal to 0.73.

For both concepts of poverty, households managed by a woman are less poor than those managed by a man. Both monetary and non-monetary poverty increase with household size. It should be noted that multidimensional poverty does not increase indefinitely with household size. Relative to the matrimonial status of the household head, polygamists are poorer than monogamists, singles, widowers, and divorcees. Relative to activity, on the monetary as well as on the non-monetary level, farmers remain the poorest.

Divergence and convergence of multidimensional and monetary poverty by region

With a rank correlation of 0.5 between regions according to the two measures, overall convergence is average. As indicated in the map below, convergence is perfect in the areas of Dakar and Saint-Louis which keep the same ranks relative to the two measures. It is also

²⁰ The monetary results are drawn from the ESAM II Report on poverty produced by the DPS, and entitled « La pauvreté au Sénégal : de la dévaluation de 1994 à 2001-2002 »²¹ Significant at the 1 percent level, Weight=weight*size.

Table 7: Multidimensional and monetary poverty according to household head characteristics

Variables	Modalities	Incidence of multidimensional poverty/ Classification (1)	Incidence of multidimensional poverty/household of reference (2)	Incidence/ monetary poverty (3)20	Deviations (1)-(3)	Deviations (2)-(3)
Area	Urban	23,9	22,3	37,6	-14	-15
Total	Rural	93,1 61,2	92,3 60	64,9 48,5	28,2 12,7	27,4 11,5
Region	Dakar	8,6	7,4	33,6	-25	-26,2
	Ziguinchor	75,8	74,3	67,1	8,7	7,2
	Diourbel	80,9	80,2	61,5	19,4	18,7
	St Louis	74,3	72,9	41,2	33,1	31,7
	Tamba	89,5	88,6	56,2	33,3	32,4
	Kaolack	81,7	80,4	65,3	16,4	15,1
	Thiès	64,6	62,5	48,6	16	13,9
	Louga	80,4	79,4	36,2	44,2	43,2
	Fatick	87,7	86,9	46,3	41,4	40,6
Total	Kolda	94 61,2	93,8 60	66,5 48,5	27,5 12,7	27,3 11,5
Sex	Male	64,7	63,6	51,2	13,5	12,4
Total	Female	46,4 61,2	45,1 60	37,1 48,5	9,3 12,7	8 11,5
Size	1 person	34,9	34,6	3,3	31,6	31,3
	2 to 3	51,5	50,2	8,7	42,8	41,5
	4 to 6	62,7	61,8	32,7	30	29,1
	7 to 9	64,7	63,1	53,5	11,2	9,6
	10 to 12	63,5	61,9	60,4	3,1	1,5
Total	More than 12	59,8 61,2	59 60	69,4 48,5	-9,6 12,7	-10,4 11,5

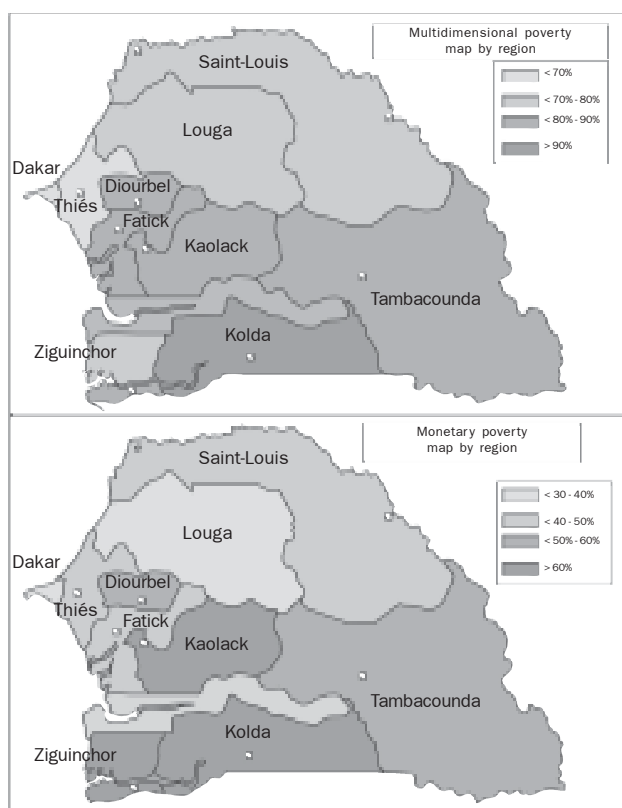
Table 7. (cont'd)

Variables	Modalities	Incidence of multidimensional poverty/Classification (1)	Incidence of multidimensional poverty/household of reference (2)	Incidence/monetary poverty (3)20	Deviations (1)-(3)	Deviations (2)-(3)
Matrimonial	Monogamous	62,3	61,2	47	15,3	14,2
	Polygamous	66,8	65,4	56	10,8	9,4
	Single	39,4	39,4	28,2	11,2	11,2
	Widower	48,9	47	41,9	7	5,1
	Divorced	35,7	35	38,2	-2,5	-3,2
	Other	55,5	55,5	-	-	-
Total		61,2	60	48,5	12,7	11,5
Main Activity	Agriculture	95,2	95	72,2	23	22,8
	Mines, quarries	45,3	43,1	36,6	8,7	6,5
	Construction	59,3	58,1	52,9	6,4	5,2
	Transport	48	46,1	37,3	10,7	8,8
	Commerce/sales	47,6	46	33,7	13,9	12,3
	Services	41	39,7	34,2	6,8	5,5
	Education/health	16,9	16,9	15,3	1,6	1,6
	Administration	8,7	7,8	8,6	0,1	-0,8
	Others	50,7	48,7	44,1	6,6	4,6
	Total	61,2	60	48,5	12,7	11,5

Source : I4ESAM II/DPS Report on Monetary and Calculations using the QUID 2001/DPS survey data.

very strong in the regions of Kolda, Tambacounda, and Diourbel. It is average for the regions of Thiès, Louga, and Fatick. There exists a strong divergence for the region of Ziguinchor which is less poor on the multidimensional level, but very poor on the monetary level. This is probably due to the good position it holds on the educational level, since it registers the highest rates of access to education among the regions in Senegal each year. But this situation is not accompanied by an unlimited access to monetary resources owing to market imperfections, notably, in the labor market.

Map 1: Mapping of multidimensional and monetary poverty

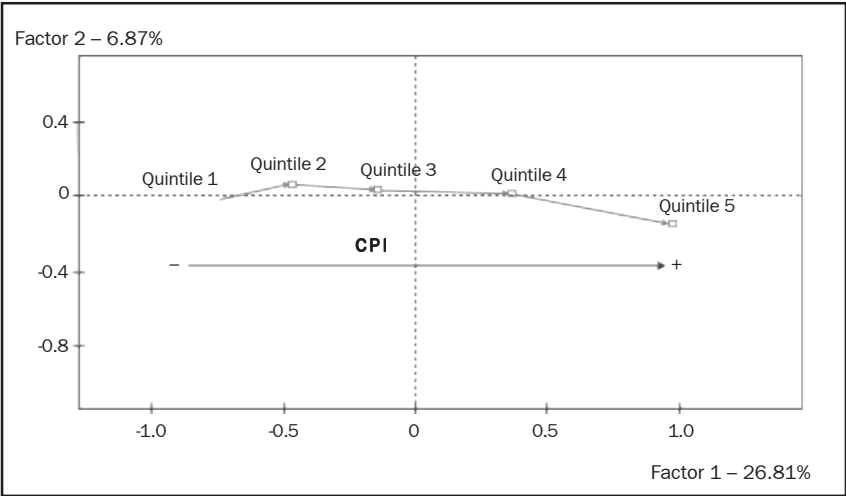


Source : ESAM II/DPS Report on monetary poverty, and calculations by the authors for multidimensional poverty.

Link between Monetary and Non-monetary Poverty

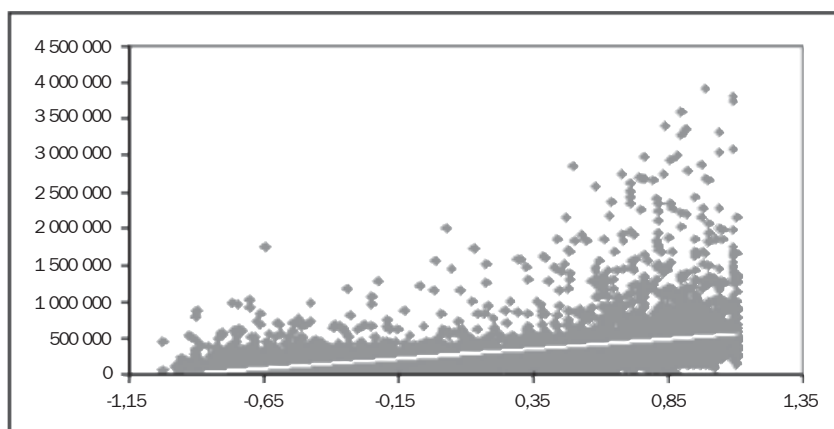
In general, this amounts to looking for the correlations between monetary and non-monetary poverty and in particular, to finding out whether those who are poor at the non-monetary level are also poor on the monetary level. The following graph, which positions the quintiles of expenditure per head and per adult equivalent relative to the composite poverty index, detects a positive relationship between the two indicators of welfare measurement. The first quintiles position themselves towards the lowest CPI values, and the last quintiles towards the highest CPI values.

Table 8:CPI and quintiles of expenditure per adult equivalent



Source : Calculations using the QUID and ESAM II 2001/DPS survey data.

The graph below, which presents expenditure per head as a function of the CPI, shows a cluster of points revealing a positive correlation between the two indicators. These results confirm the link established in the preceding factorial graph.

Table 9: Expenditure per adult equivalent as a function of the CPI

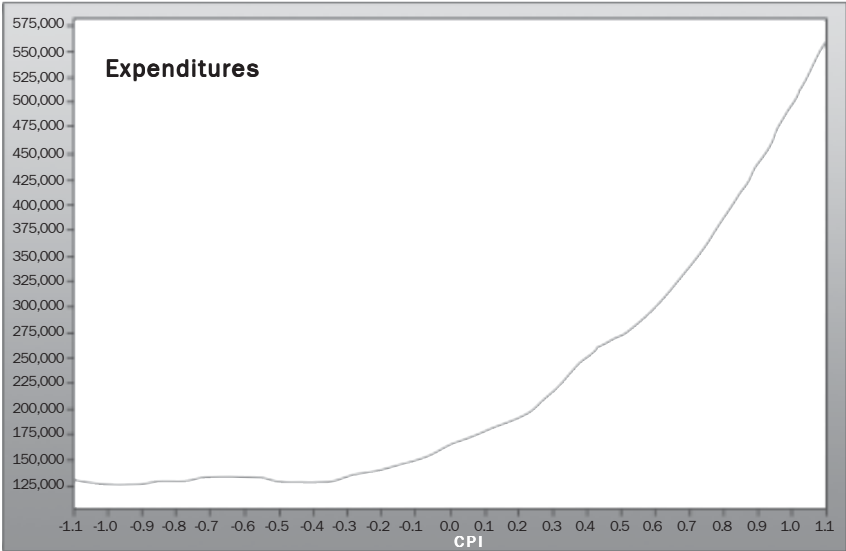
Source: Calculations using the QUID and ESAM II 2001/DPS survey data.

The correlation coefficient between the CPI and expenditure per head and per adult equivalent is equal to 0.4721. The non parametric correlation coefficient between households ranks according to the CPI and expenditure per head is 0.60. These results show that there exists a positive link between monetary and non-monetary poverty. This means that when a poor person is destitute on the non-monetary level, he is also more likely to be poor on the monetary level. The results of a non- parametric regression establishing the link between the CPI and expenditure per head corroborate the results arrived at earlier.

The preceding graph shows that the higher the CPI value, the higher the expenditure is per head as well as per adult equivalent, which implies that households with high human capital, access to infrastructures, and goods of comfort tend to be less poor from the monetary standpoint.

²¹ Significant at the 1 percent level, Weight=weight*size.

Figure 9: Non-parametric regression between the CPI and expenditures per adult equivalent



Source: Calculations using the QUID and ESAM II 2001/DPS survey data.

The following table supports the preceding conclusions, and shows a decline in the incidence of monetary poverty when going from the first to the last CPI quintile. Similarly, the incidence of multidimensional poverty decreases from the first to the last quintile of expenditure per head and per adult equivalent.

To the question “ How many monetary poor can we identify on the level of the non-monetary poor, and vice-versa?”, the following table provides some answers.

Table 10: Non-monetary poverty and expenditure per head

Quintile of expenditure per head and per adult equivalent	Incidence of multidimensional poverty/ Classification	Incidence of multidimensional poverty/ household of reference	CPI quintiles	Incidence of monetary poverty
1	93,7	92,6	1	73,3
2	83,4	82,3	2	72,5
3	69,0	67,6	3	59,1
4	42,6	40,8	4	30,5
5	17,4	16,9	5	7,2
Total	61,2	60	Total	48,5

Source : Calculations using the QUID and ESAM II 2001/DPS survey data.

Table 11: Overlapping of non-monetary poverty and monetary poverty

	Incidence of non-monetary poverty – classification	Incidence of non-monetary – household of reference	Incidence of monetary poverty
Group of the non-monetary poor (classification method)	100%	98%	68%
Group of the non-monetary poor (household of reference method)	100%	100%	68%
Group of the monetary poor	85%	84%	100%

Source : Calculations using the QUID and ESAM II 2001/DPS survey data.

Nearly 68 percent of the multidimensional poor are equally affected by monetary poverty. As to the monetary poor, more than 84 percent of them are also affected by multidimensional poverty. These results show that there actually exists some overlapping between these two concepts of poverty, although we may find that some non-monetary poor completely escape monetary poverty, and vice-versa. The following paragraph highlights this situation.

Extent of Double Poverty

The question here is to determine the proportion of households affected both by monetary and non-monetary poverty, the proportion of those who are poor on the non-monetary level and non-poor on the monetary level and vice versa, and those who escape from these two forms of poverty (or double poverty). These different proportions are presented in the following table.

More than 40 percent of Senegalese households are affected by double poverty, and about a third escape from it. The incidence of double poverty is particularly high in the rural area compared to the urban area. It remains widespread among rural households whose members not only lack financial means, but also infrastructures and a pleasant environment to live in, in addition to being unable to satisfy their basic needs (nutrition, education, health, drinking water, etc.). The proportion of those who escape from monetary poverty but who are under the yoke of non-monetary poverty is particularly high. Thus, despite the fact that a number of rural households may have financial means at their disposal, they are still condemned to lead an indecent life for lack of infrastructures, a pleasant environment, and functional capacities.

In the urban area, the proportion of non-poor households on the non-monetary level, but poor on the monetary level, is particularly high as compared to the rural area. This corroborates the daily financial problems faced by city dwellers in spite of the existence of infrastructures, a more decent environment, and functional capacities. This state of affairs raises several questions linked, notably, to income redistribution policies, and to the inefficiency with which markets function, especially the market for labor.

Generally speaking, double poverty affects the poorest groups. Thus the regions of Kolda, Tambacounda, and Diourbel are the most affected, as well as large families, polygamous families, and farmers. Households managed by a woman are less affected by double poverty than those headed by a man.

Table 12 : Extent of double poverty

	The multi-dimensional and monetary poor	The multi-dimensional poor and monetary non-poor	The multi-dimensional non-poor and monetary poor	The multi-dimensional non-poor and monetary non-poor	Total	The multi-dimensional and monetary poor	The multi-dimensional poor and monetary non-poor	The multi-dimensional non-poor and monetary poor	The multi-dimensional non-poor and monetary non-poor	Total
Area										
	Urban	16,8	7,1	20,8	55,3	100	15,7	6,6	21,9	55,8
	Rural	60,1	32,9	4,8	2,1	100	59,6	32,7	5,3	2,4
Total		41,6	19,6	6,9	31,8	100	40,8	19,2	7,7	32,3
Region										
	Dakar	4,7	3,9	28,9	62,9	100	4,0	3,4	29,6	63,0
	Ziguinchor	58,2	17,6	8,9	15,3	100	57,1	17,2	10,0	15,7
	Diourbel	57,5	23,3	4,0	15,1	100	57,0	23,2	4,5	15,3
	St Louis	37,7	36,5	3,5	22,2	100	37,0	35,9	4,2	22,9
	Tamba	53,1	36,3	3,1	7,6	100	52,6	36,0	3,6	7,8
	Kaolack	61,1	20,6	4,2	14,1	100	60,2	20,2	5,1	14,5
	Thiès	40,1	24,5	8,5	27,0	100	38,8	23,7	9,8	27,7
	Louga	33,7	46,7	2,5	17,2	100	33,3	46,1	2,9	17,7
	Fatick	43,7	44,0	2,6	9,7	100	43,3	43,6	3,0	10,1
	Kolda	65,1	28,9	1,4	4,2	100	65,0	28,8	1,5	4,7
Total		41,6	19,6	6,9	31,8	100	40,8	19,2	7,7	32,3
Sex										
	Male	44,9	19,8	6,3	29,0	100	44,1	19,5	7,1	29,3
	Female	27,5	18,9	9,6	44,0	100	26,7	18,4	10,4	44,5
Total		41,6	19,6	6,9	31,8	100	40,8	19,2	7,7	32,3
Size										
	1 person	2,9	32,1	0,4	64,6	100	2,9	31,7	0,4	65,0
	2 to 3	7,1	44,4	1,6	47,0	100	6,9	43,3	1,8	48,0
	4 to 6	29,2	33,5	3,5	33,9	100	28,8	33,0	3,9	34,3
	7 to 9	48,3	16,3	5,2	30,1	100	47,1	16,0	6,4	30,5
	10 to 12	52,8	10,7	7,6	28,8	100	51,4	10,5	9,0	29,1
	More than 12	54,0	5,8	15,4	24,8	100	53,3	5,7	16,1	24,9
Total		41,6	19,6	6,9	31,8	100	40,8	19,2	7,7	32,3

Table 12. (cont'd)

		The multi-dimensional and monetary poor	The multi-dimensional poor and non-poor	The multi-dimensional non-poor and monetary poor	The multi-dimensional non-poor and monetary poor	The multi-dimensional non-poor and monetary poor	The multi-dimensional non-poor and monetary poor	Total	The multi-dimensional non-poor and monetary poor	The multi-dimensional non-poor and monetary poor	Total
Matrimonial status	Monogamous	41,6	20,7	5,4	32,3	100	40,9	20,3	6,1	32,7	100
	Polygamous	47,9	18,8	8,1	25,1	100	46,9	18,5	9,1	25,5	100
	Single	22,2	17,2	6,0	54,5	100	22,2	17,2	6,0	54,6	100
	Widower	29,7	19,2	12,2	38,9	100	28,5	18,5	13,4	39,6	100
	Divorcee	25,7	10,0	12,5	51,9	100	25,2	9,8	13,0	52,0	100
Total		41,6	19,6	6,9	31,8	100	40,8	19,2	7,7	32,3	100
Activities	Agriculture	70,2	25,1	2,0	2,8	100	70,1	24,9	2,1	2,9	100
	Mines, quarries										
	Construction	27,4	17,9	9,2	45,5	100	26,1	17,0	10,5	46,4	100
	Transport	40,7	18,6	12,2	28,5	100	39,9	18,2	13,0	28,9	100
	Commerce/Sales	28,7	19,4	8,6	43,3	100	27,6	18,5	9,7	44,2	100
	Services	25,7	21,8	8,0	44,5	100	24,8	21,2	8,9	45,1	100
	Education/health	24,0	17,0	10,2	48,8	100	23,2	16,5	11,0	49,3	100
	Administration	8,4	8,5	6,9	76,2	100	8,4	8,5	6,9	76,2	100
	Others	2,7	6,0	5,9	85,4	100	2,4	5,4	6,2	86,0	100
		34,3	16,4	9,8	39,5	100	32,9	15,8	11,2	40,1	100
	Total	41,6	19,6	6,9	31,8	100	40,8	19,2	7,7	32,3	100

Conclusion and Recommendations

Because of the multidimensional nature of poverty, the monetary approach alone is not always sufficient to account for the multiple phenomena which compromise the ability of some populations to lead decent and happy lives. A multidimensional analysis therefore becomes necessary if we truly want to identify the poor, as well as the strategies more likely to combat this phenomenon more efficiently.

The multidimensional approach to poverty is based on the calculation of a composite indicator of poverty derived from Multiple Correspondence Analysis by taking into account other dimensions of poverty such as education, health, drinking water, nutrition, housing, sanitation energy, communications, household durables, goods of comfort and other assets. Its application to the case of Senegal has drawn important conclusions on poverty.

On the multidimensional level, all households are not affected by the same type of poverty. The most widespread forms of poverty are those linked to the vulnerability of human existence (inadequate human capital and indecent living conditions), the shortage or absence of basic infrastructures, and the lack of goods of comfort and household equipment.

The incidence of multidimensional poverty was estimated to be in the neighborhood of 60 percent relative to a household of reference able to satisfy a minimum of basic needs. Moreover, monetary poverty affects 48.5 percent of households. Whether on the monetary or non-monetary level, the rural area is more affected by poverty than the urban area. In the latter area, monetary problems are predominant as compared to non-monetary difficulties, whereas it is the reverse in the rural area. Despite the presence of human capital and infrastructures, urban households always find it very difficult to overcome monetary problems, which leads us to question the efficiency of markets, notably that of labor markets.

It should be noted that there exists a positive link between monetary and non-monetary poverty, with a positive and significant

correlation between the CPI and expenditure per adult equivalent. The majority of the monetary poor are also poor on the multidimensional level and vice versa.

From the economic policy standpoint, general interventions to increase labor productivity, in accordance with utilitarian theory, should be given priority in the urban area where poverty is more of a monetary nature, while for the rural area, which faces both forms of poverty (though multidimensional poverty is relatively more pronounced there) an efficient combination of targetted interventions in accordance with the non-utilitarian approach, in addition to general interventions, would rather be advisable.

References

- Benzécri, J.P.. 1980. L'Analyse des données, Analyse des correspondances, Exposé élémentaire, Dunod.
- Bibi Sami. 2002. *Measuring Poverty in a Multidimensional Perspective: A Review of Littérature*, Faculté des Siences Economiques et de Gestion de Tunis, CIRPEE, Université Laval, Québec, Canada.
- Bry,X. 1995. *Analyses factorielles simples*, Economica, Paris.
- Bry, X. 1995. *Analyses factorielles multiples*, Economica, Paris.
- Chakravarty, S. R., Mukherjee, D., Ranade, R. R. 1997. *On the Family of sub-groups and factor decomposable measures of multi-dimensional poverty* in D. J. Slottje (ed.), *Research on Economic Inequality*, Vol. 8, JAI Press, London.
- Daffé, G. & Badji, M. S. 2003. *Le profil de pauvreté féminine au Sénégal*, Programme de recherche MIMAP/Sénégal-CREA.
- Direction de la statistique et de la prévision (DPS). 2001. *Plan d'échantillonnage de l'enquête QUID 2001/ESAM II*.
- DPS. 1995. Enquêtes Sénégalaises Auprès des ménages. *Rapport préliminaire*, Dakar.
- DPS. 1997. Enquêtes Démographiques et de Santé III. *Rapport*, Dakar.
- DPS. 1988. Population du Sénégal: structure par âge et par sexe en 1988 et projection de 1998 à 2015. Dakar.
- DPS.1998. Situation économique du Sénégal. Dakar.
- DPS. 2003. Comptes révisés du Sénégal 1996.2001 Dakar.
- Duclos J. Y., D. Sahn. S. Younger, 2002, *Comparaison robuste de la pauvreté multidimensionnelle*, CIRPEE & Cornell University.
- Duclos, J.Y. Araar, A. 2004. Poverty and Equity: Measurement, Policy and Estimation with DAD.
- Escofier, B. et Pagès, J. 1990. Analyses factorielles simples et multiples, objectifs méthodes et interprétation, DUNOD, 284 P.
- Fatou, C. et Kane, R. 2002. *Profil de la pauvreté au Sénégal : approche monétaire*, Programme de recherche MIMAP/ Sénégal-CREA.

- Gendreau, F. 1998. Crises, pauvreté et changement démographiques dans les pays du sud.
- Foster Greer J. J. and Thorbecke, E. 1984. *A class of decomposable poverty Measures*, *Econometrica*.
- Greenacre, M. and J. Blasius, 1994, *Correspondance analysis in the social sciences, Recent developments and applications*, Academic Press, Harcourt Brace & Company Publishers
- Ki, J. B. & K. Akakpo. 2001. *Dimensions spatiales de la pauvreté humaine au Sénégal*, Mémoire de fin d'étude, ENEA-STADE.
- Krugman, P., Obstfeld, M. 1995. *Economie internationale*, 2^e éditions, Nouveaux horizons les Prémisses, ECONOMICA
- Lachaud J. P., 2000., *Dépenses des ménages, développement humain et pauvreté au Burkina Faso : Substitution ou complémentarité?* Document de travail n°49, Université Montesquieu-Bordeaux IV, Centre d'économie de développement.
- Lebart, L., Morineau, A., Piron, M. 1995. *Statistique exploratoire multidimensionnelle*, DUNOD, PARIS.
- Asselin, L. M. 2002. *Pauvreté multidimensionnelle*, CRDI, IMG.
- Maasoumi, E. 1999. *Multidimensional approaches to Welfare Analysis*, chap 15 in J. Silber ed., *Handbook of Income Inequality, Measurement*, Kluwer Academic Publishers.
- Meulman, J. J. 1992. The integration of multidimensional scaling and multivariate analysis with opimal transformations, *Psychometrika*, Vol. 57, n°4 539-565.
- Ministère de l'Economie et des Finances du Sénégal. 2002. *Document de Stratégie de Réduction de la Pauvreté (DSRP)*. Dakar
- PNUD. 1990. Rapport mondial sur le développement humain. PNUD.
- Ravallion, M. 1994. *Poverty Comparisons*, Chur, Switzerland : Harwood Academic Publishers.
- Sen, A. 1985. *Commodities and capabilities*. Amsterdam North Holland.
- Volle, M. 1993. *Analyse des données*, Paris 1993.



"Papers presented in this book were prepared as contributions to a researcher-stakeholder forum on 'Reaching the MDGs: An International Perspective' (Lima, Peru, June 12, 2007) co-organized by the Poverty and Economic Policy (PEP) Research Network, the Grupo de Análisis para el Desarrollo (GRADE), Universidad del Pacífico and the Network on Inequality and Poverty (NIP)."

The MDG movement has been intensifying since the UN Millennium Summit of 2001 when 147 heads of state endorsed this international effort and committed to foster progress in all eight MDGs. Multilateral organizations have supported this movement in various ways, especially in the development of indicators and the refining of commitments from key international stakeholders. However, seven years from the deadline of 2015, there is consensus that progress has been limited, notably in the case of the poorer countries with the worst initial conditions. Thus, much of the recent discussion focuses on the search for a proper assessment of the challenges ahead and the identification of clear action paths to overcome political, institutional and economic constraints that have limited progress so far, especially in poorer countries.

The papers selected for this volume were selected among those presented at an international researcher-stakeholder forum organized by the Grupo de Análisis para el Desarrollo (GRADE) in collaboration with PEP, the Universidad del Pacífico and the Network on Inequality and Poverty (NIP). Situated at the midpoint of the MDG process, the meeting was a good opportunity to assess the progress in the MDGs and the challenges ahead. Nearly 200 researchers, policy makers, representatives of

multilateral institutions and other stakeholders from Peru, Latin America and other parts of the developing world gathered to listen to and debate the issues raised by prestigious international experts from around the world.

Five papers that cover a wide variety of challenges to reaching the MDGs were selected for inclusion in these conference proceedings offer insightful comments about the way to realign efforts toward reaching the MDGs, how to capture the interactions between the various MDGs so as to obtain as precise an estimate as possible of the actual cost of attaining the MDGs in a variety of countries and, in line with the MDG perspective of going beyond a strictly income-based definition of poverty, how to measure poverty in a multidimensional framework.

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