POLICY RESEARCH WORKING PAPER 5320

MDG Achievements, Determinants and Resource Needs

What Has Been Learnt?

Jann Lay

The World Bank
Development Economics
Prospects Group
May 2010

Abstract

This paper reviews the effectiveness and efficiency of key policy instruments for the achievement of the Millennium Development Goals (MDG). Based on a simple cross-country regression analysis, the paper argues that average Millennium Development Goal progress is likely to be too slow to meet education and health sector targets in a number of developing countries. The paper further shows that MDG achievement can be described by a transition path with declining rates of progress. More detailed analysis reveals that the transition toward universal primary school enrollment in poor countries with low initial enrollment has accelerated considerably in the more recent past. The main part of the paper then focuses on the role of demand versus supply-side factors in social service utilization in education and health. The review arrives at the following rules of thumb that reflect some of the key determinants of achievement of the Millennium Development Goals: First, specific single policy interventions can have a considerable impact on social service utilization and specific human development outcomes. For example, improving access to basic health services, in particular to vaccination, has been a key factor in reducing child mortality rates in a number of very poor countries. Second, demand-side policies have proved extremely effective, for example in raising school enrollment and attainment levels. However, there may be more scope for targeting the demand-side in the health sector. Third, policy effectiveness and efficiency are highly dependent on initial conditions and the specificities of the respective policy. Fourth, complementarities between MDG targets, in particular social service utilization, are likely to be very important.

MDG achievements, determinants and resource needs: What has been learnt?[†]

Jann Lay[*]

[*]German Institute for Global and Area Studies, Hamburg, and University of Goettingen, Germany

Introduction

With only five years left to 2015, it is clear that most of the Millennium Development Goals (MDGs) will not be attained within the envisaged timeframe—either globally or by a majority of individual countries. This likely failure tends to overshadow the many successes of individual countries or in specific areas. The world has witnessed rapid declines in child mortality in a number of countries in the past 20 years, and millions of poor children have been brought into schools. The failures as well as successes of the MDG process provide an opportunity to learn for MDG planning, both in the short term and beyond 2015.

The MDG process has certainly helped poor countries and development policy to focus on specific development and poverty-reduction challenges. An important element in this more focused effort has been the systematic monitoring of progress on the basis of quantitative indicators. Additionally, quite some effort has been dedicated to identifying key policy instruments, assessing their effectiveness for MDG achievement, and quantifying the related resource requirements. The core objective of this paper is to review these efforts in light of actual progress made and to assess recent evidence on the effectiveness and efficiency of selected policy instruments. A particular focus of the review is the role of demand- versus supply-side factors in social service utilization in education and health. Service utilization in these sectors represents both the target of, and input into, MDG achievement.

We first provide a conceptual framework of human development outcomes and their determinants. This framework, which focuses on social service utilization and highlights the role of demand-side factors, is briefly compared to other frameworks used in MDG planning exercises. The second part of the paper is concerned with the empirics of MDG achievements. Here, we take a bird's eye view of the patterns of MDG achievement, before entering into a detailed discussion of recent microeconomic evidence with an emphasis on the role of demand versus supply-side factors in education and health service utilization. The final section concludes with the main lessons learnt for MDG planning.

Social Sector MDGs: A Conceptual Framework

The key role of social services in human development is manifest in the fact that some MDG targets are formulated in terms of social service utilization, for example, targets related to education. The starting point of our conceptual framework will therefore be a specification of

the supply and the demand sides of public services.[1] We want to express the supply of a social service i by a function s where social services $i = 1, 2, ..., N$ include the provision of primary and secondary schooling facilities, the provision of health-care services, and the provision of water and sanitation infrastructure. The supply of most public services can be meaningfully operationalized at the municipal, community, or somewhat larger regional levels. The relevant localities are denoted by c.

$$q_c^{s_i} = s(p, w, L^i, L, T^i, G_c) \tag{1}$$

p (w) denotes a vector of (factor) prices; L is a vector of inputs (labor, capital, infrastructure) with i referring to sector-specific (i) inputs; T^i captures sector specific but nationwide governance and technology factors, while G_c refers to local geographical and governance factors.

The demand for social service i can be described as a function of individual, household and community factors summarized in a vector X, and again vectors of prices p and w. These determinants typically include education (of the household or individual household members, in particular mothers), ability, wealth, income, cultural factors, and awareness. Demand will be exercised by households hh (or individuals).

$$q_{hh}^{d_i} = d(X_{hh}, w, p) \tag{2}$$

The resulting level of public service use q_{hh}^{*i} at the household level will hence be a function of all the arguments in the respective demand and supply functions. It can be thought of as a dichotomous variable of use or nonuse of social services, but it may also be a continuous variable reflecting the intensity of use and/or the quality of the respective service, for example, education.[2]

$$q_{hh}^{*i} = f(p, w, L^i, L, T^i, G_c, X_{hh}^i) \tag{3}$$

---

[1] We presume to be able to distinguish precisely between demand- and supply-side factors. For some variables that simultaneously affect demand and supply, for example, rural roads that facilitate access to health and education facilities, this distinction may be blurred.
[2] For illustrative purposes we ignore the quality of social services in the subsequent conceptual discussion and instead focus on quantity.

Equation (3) typically underlies empirical work on the "demand" for public services, although such equations are in fact reduced-form public service-use equations that incorporate both local supply and household- or individual-level demand-side factors. We now want to extend this basic framework by adding some features that are particularly relevant in the MDG context. The first such feature is the complementarity of social services, that is, the fact that utilization in different sectors tends to be mutually reinforcing. We can think of numerous examples of such complementarities: children of better-educated parents are more likely to go to school and to receive regular health checks. In turn, healthier children (and children of healthier parents) are more likely to go to school. Within our analytical framework, these complementarities can be accommodated by "endogenizing" household characteristics (Equation 4), which are a function g of some truly exogenous characteristics $\overline{X_{hh}^i}$ and social services j other than i. Note that complementarities are assumed to arise on the demand side only, although there may be supply-side complementarities as well. Schools, for example, can be places where health interventions can take place, thus lowering the cost of the respective intervention.

$$X_{hh}^i = g(q_{hh}^{*j}, \overline{X_{hh}^i}) \qquad \text{with} \quad i \neq j \qquad (4)$$

Which household characteristics can be assumed to be constant (or truly exogenous) depends on the time horizon of the analysis. While the effects of child health on school attendance will be immediate, the impact of better education of girls, that is, future mothers, on child health will take years to materialize.

The resulting level of aggregate service use Q_i^* will result from the matching of supply at the local level and demand at the household level. Let q_{hh}^{*i} be a dichotomous variable that assumes a value of one if the household uses service i. Then, the aggregate level of social service utilization will be the sum of q_{hh}^{*i} over all households hh divided by N, the total number of households.

$$Q_i^* = \sum_{hh}^{N} q_{hh}^{*i} \Big/ N \qquad (5)$$

What the above framework effectively illustrates is that the final level of social service utilization will depend on the joint distribution of community- and household-level factors

over households. This has important implications, which can be exemplified as follows. We consider the household decision to enroll its children in school, a decision that in most poor countries depends critically on household income.[3] Poor households, for example, rely on child work, and reservation wages for those children are hence relatively low. For the individual household, we therefore expect that enrollment increases with greater per capita income. More specifically, we assume that a child is enrolled when household per capita income passes a specific threshold. All other (demand and supply) factors are assumed to remain constant. We further assume that log per capita incomes are roughly normally distributed, as they often are in reality. This is illustrated in Figure 1 below, where the initial income distribution of log incomes x is denoted by h_a. In this situation, the share of children enrolled in school corresponds to the area below h_a to the right of t. If all per capita incomes in this model economy grow at the same rate, the income distribution shifts to the right (to h_b) with mean b. The share of children enrolled increases to the area to the right of t and below h_b. On the right in the figure below, we now relate mean per capita income (assuming distributionally neutral changes) and the Q^*, that is, the area under the respective distribution function. It is clear that the partial derivative of Q^* to changes in mean per capita income will be small at low levels of income, since few individuals pass the threshold. As the mode of distribution approaches the threshold, enrollment increases more quickly, before slowing again at higher levels of income. Such a pattern would indeed result over time in our stylized world with log-normally distributed income when incomes grow at a constant rate. We will pick up on this point later.

---

[3] We ignore endogeneity of income in this simple example.

Figure 1: Social Service Use as a Function of (Mean) Income with Threshold Effects
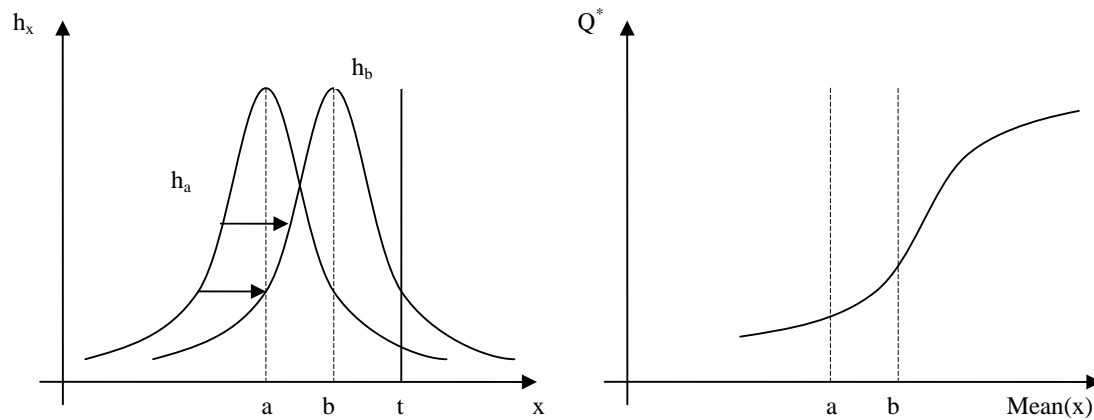
Source: Author's compilation.

This simple example illustrates two important points. First, it highlights the importance of the distribution of determinants at both the household and the local(ity) level for social service use. Second, it implies that the level of public service use follows a pattern similar to the cumulative distribution function of any bell-shaped distribution function—if the respective determinant follows such a distribution. This means that progress towards social service utilization would be slow initially, gain momentum at middle stages, and eventually slow down—an s-shaped transition path.

The example uses the case of income, which may indeed represent an important demand-side constraint in a number of social sectors. However, such factors are not limited to income. On the demand side, another important factor is education, and an argument similar to the one made for income can be made for educational levels. Another example is the distance to the next urban area, for example, with a health facility. Here, a process of urbanization that typically accompanies economic development would not only decrease the mean but would also compress the distribution of these distances. This mechanism may thus also cause an s-shaped transition.

In these examples, we have made our argument *ceteris paribus*, that is, assuming that other factors that influence service use remain constant. In reality, of course, this is not the case and all these determinants, for example, income, education, and the degree of urbanization, change simultaneously. As suggested above, intertemporal complementarities, for example, the role of future mothers' education, would also have to be considered if one examined

transition paths through time. In Figure 1 the right-hand panel would then depict t on the x-axis. Although we do not intend to develop a full analytical argument here, many of the contemporaneous relationships between different determinants tend to be mutually reinforcing and are therefore likely to render transition paths towards higher levels of service utilization steeper around the inflection point. Strong intertemporal complementarities would probably make transition paths flatter *ceteris paribus*, since they imply a lagged acceleration of progress.

So far we have focused on social service use. Ultimately, however, human development goals are not equivalent to social service utilization but rather to capabilities and functioning, to use the concepts of Sen's (Sen, 1999; Alkire, 2001) capability approach. The MDG targets include a number of quantitative indicators of these functionings and capabilities. For example, the ability to cover basic necessities, particularly freedom from hunger; the ability to read and write; and the achievement of low child mortality rates. Ultimately, social services are instruments to achieve these human development ends. The catalogue of MDG targets, however, is a list of both human development targets, in the sense of functioning and capabilities, as well as instruments, such as universal primary education and the measles vaccination target.

We also want to briefly conceptualize these relationships with a focus on nonincome goals. MDG outcomes are first formulated at the household level (Equation 6). MDG achievement should again be thought of as a dichotomous variable indicating the success or failure of the individual household to escape poverty or hunger, to send children to school, to prevent death in early childhood, etc.[4]

$$mdg_{hh}^i = g(q_{hh}^{*k}, mdg_{hh}^j, X_{hh}^i) \qquad\qquad k \in K_i \text{ and } i \neq j \qquad\qquad (6)$$

The set of social services K_i that enters into the achievement of MDG target i at the household level will differ across social targets. Child mortality, for example, will be influenced by a number of social services, such as child vaccination programs, professionally assisted deliveries, and access to water and sanitation. Equation (6) also illustrates that the human development targets may be interrelated, in addition to the relation between different social services (already incorporated in q_{hh}^{*k}). An important set of complementarities exists between health outcomes on the one hand and income-, consumption-, or food-related outcomes on the

---

[4] As mentioned above, some MDG targets are directly equivalent to service utilization, which can be easily accommodated in this framework.

other. These complementarities are known to run in both directions. In some cases there may be important time lags in these complementarity relationships. Considerable reductions in child mortality, for example, will increase the number of school-age children. Educating young girls today will probably make them and their offspring healthier. Finally, we have included a vector of other household determinants X_{hh}^{i}. Similarly to the above formulation for social service utilization, the formulation for individuals (households) can now be aggregated and divided by the total number of households N.

$$MDG_{j}^{*} = \sum_{hh}^{N} mdg_{hh}^{j*} \Big/ N \qquad\qquad (7)$$

This analytical formulation highlights the complexity of MDG achievement and its determinants. The framework stresses the importance of the interplay of demand- and supply-side factors in social service use. It also illustrates that MDG targets operate at multiple levels, here, most importantly, in terms of social service utilization and human development outcomes. Many of these targets are interrelated horizontally, that is, at the service or outcome level, as well as vertically, that is, from services to outcomes or vice versa. An obvious—and empirically well established—horizontal relationship exists, for example, between income, poverty, and maternal and child health. Vertical relationships include the impact of social services on outcomes, for example, the effect of school enrollment on literacy, as well as the indirect links in the opposite direction that often operate with time lags, for example, the effect of maternal literacy on the use of health care.

The importance of demand-side factors in social service utilization and these (often related) interdependencies would probably lead to important complementarities between different MDG targets. These factors may also imply that MDG achievements follow s-shaped transition paths, as indicated in Figure 1. Whether this is indeed the case, and which determinants and interdependencies are of particular importance for MDG achievement, are empirical questions. Obviously, addressing (some of) these questions empirically is a daunting task, and we will review relevant evidence to date in the subsequent section.

The first set of questions regards the assumption of s-shaped transition patterns in MDG achievement. More specifically, can we indeed detect an s-shaped transition pattern for social service utilization and human development outcomes? Are these transition patterns universal across MDG sectors, for example, health and education; across different MDG target levels, for example, vaccination and child mortality (or school enrollment and literacy); and across

countries? Can we identify countries that depart from such transition patterns? The second set of questions refers to the relevant determinants of MDG achievement. Can we identify the key factors and interventions of social service use and human development outcomes? What is the role of supply- vis-à-vis demand-side factors in social service utilization? In particular, what do we know about MDG complementarities? And finally, are these relationships quantifiable?

The Empirics of MDG Achievement

Addressing the first set of questions will require a bird's eye view. Using a cross-country regression framework, we attempt to identify universal transition paths and to highlight the selected peculiarities and possible deviations from such paths of specific (groups of) countries. In this exercise we will focus on education (more specifically net primary enrollment[5]) and health (here (under-five) child mortality) to illustrate our main arguments. The second set of questions will be investigated through a thorough review of the available and primarily microeconomic evidence on supply- and demand-side factors in MDG achievement with a focus on social service utilization, again in primary education and health.

Progress and Transition Paths

In order to examine progress towards MDG achievement, we model MDG targets only as a function of time.[6] The time path of $MDG_t \in {]}0,1{[}$ is assumed to follow an s-shaped function. To represent such a shape, we will use the cumulative logistic distribution function denoted by F, a cumulative distribution function often chosen because of its simple form.

$$MDG(t) = F(\mu, b, t) \tag{8}$$

μ and b are parameters that describe the underlying logistic distribution function with μ, the mean, and b, a parameter related to the variance with $\sigma^2 = \frac{1}{3}\pi^2 b^2$. Equation (8) can then be written in closed form as

$$MDG_t = \left(1 + e^{-(t-\mu)/b}\right)^{-1} = \left(1 + e^{-(\beta t + \alpha)}\right)^{-1} \tag{9}$$

---

[5] Net primary enrollment is the ratio of the number of children of official school age (as defined by the national education system) who are enrolled in primary school to the total population of children of official school age.
[6] See Clemens (2004) and Clemens et al. (2007) for similar approaches.

with $\beta = 1/b$ and $\alpha = -\mu/b$. Rearranging terms and taking logs on both sides yields the following equation:

$$-\ln(\frac{1}{MDG_t} - 1) = \alpha + \beta t \qquad (10)$$

This growth curve assumes an increasing and then decreasing adjustment speed of attainments with an inflection point at $t = \mu = -\alpha b$, the mean of the underlying (symmetric) logistic distribution function. MDG_t will be 0.5 at the inflection point: half-way achievement. We now add a country-fixed effect u_c and a random error ε, which yields estimation equation (11).
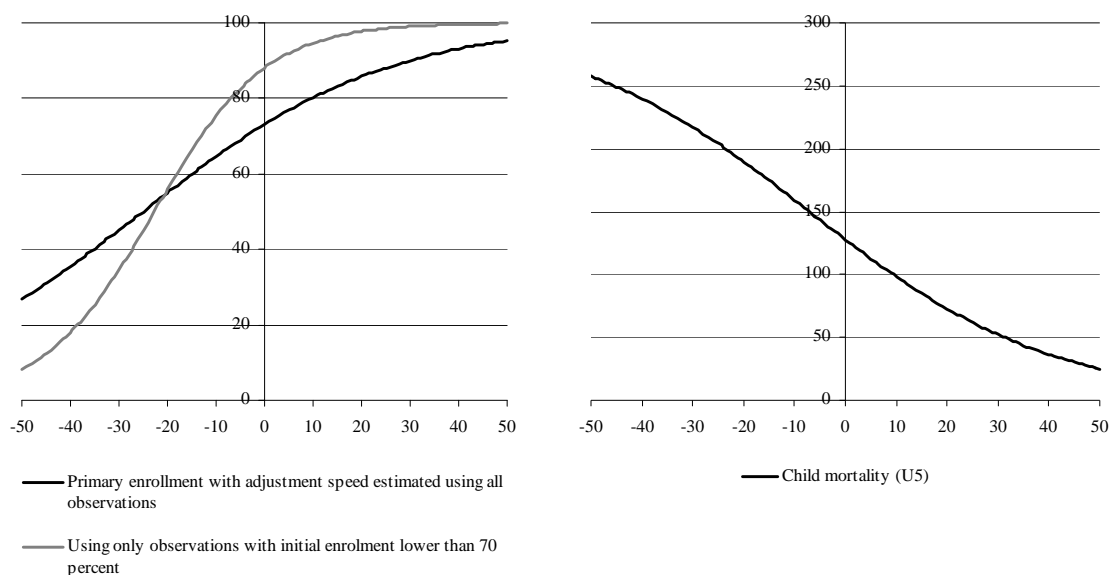
$$-\ln(\frac{1}{MDG_t} - 1) = \alpha + \beta t + u_c + \varepsilon \qquad (11)$$

We estimate this equation using Ordinary Least Squares (with country-fixed effects) on data on net primary enrollment for 1991, 1999 (or 2000), and 2006 (or 2007) from the MDG monitoring website run by the United Nations. The sample only includes developing countries, here roughly defined as low- and middle-income countries with a GDP per capita of less than US$10,000 in 1990 (in current USD). The inclusion of a country-fixed effect allows countries to start at different points in time. We then repeat this exercise for (under-five) child mortality using data from the same source, but for 1990, 1995, 2000, and 2006. Note that we need to normalize child mortality by setting a maximum initial level, which we choose to be 300. The results of estimating equation (11) for both net primary enrollment and under-five child mortality are reported in the Appendix.

The empirical results for these two social sector targets are remarkable. Overall, there is quite some similarity, across countries as well as across sectors. On an unrestricted sample, the parameter β is 0.040 for primary enrollment and 0.042 for under-five child mortality. Figure 2 illustrates the implications of these parameter values in terms of MDG progress rates. Note that the constant (plus the country-specific fixed effect) puts each country at a different (starting) point on the time axis t. The black line in the graph on the left-hand side shows that the average developing country would need, for example, approximately 25 years to increase enrollment from 40 percent (a rate common in poor Sahel countries in the early 1990s, for example) to 65 percent. Similarly, bringing child mortality from 250 to less than 100, that is, a two-thirds reduction, would take more than 50 years. These results are in line with the

findings by Clemens et al. (2007), who estimate similar specifications for a number of social development outcomes—albeit for much longer time spans (1960–2000). The authors conclude, first, that for the majority of developing countries, the attainment of most MDG targets was unrealistic to begin with. Second, they state that the expectations created by the MDG process were unreasonable, and that only under optimal circumstances and policies would poor countries be in a position to achieve the progress necessary to meet the MDGs.

Figure 2: Transition Paths of Net Primary Enrollment and (Under-Five) Child Mortality

Primary enrollment with adjustment speed estimated using all observations

Using only observations with initial enrolment lower than 70 percent

Child mortality (U5)

Source: Author's compilation based on the estimates reported in the Appendix.
Note: The horizontal axis refers to time *t*.

A less deterministic view that gives less weight to past experience as a benchmark would probably state that inputs into social services and human development outcomes (see equations 3 and 6 above), even as part of the MDG process, have not been sufficient. Furthermore, the above regressions refer not only to the past—our estimates refer to a more recent past than those by Clemens et al. (2007)—but also to average paths. The extent to which countries deviate from this average path is reflected, for example, in the R-squared of the above underlying regressions, reported in the Appendix. Despite their rudimentary specification, the regressions for child mortality rates exhibit astonishingly high explanatory power. They explain approximately 70 percent of the variation. While Clemens (2004) reports similarly high R-squared for primary enrollment based on a sample of more than 100 countries and data from 1960–2000, the R-squared for our enrollment equations including all countries is fairly low with only 0.10. This suggests considerable variation around a time path

predicted on the basis of only t and a constant. Yet, when we restrict the sample to include only countries with initial enrollment rates of less than 70 percent, R-squared increases to approximately 0.5 (see Appendix).

Yet, the unexplained and possibly random variation may not only be around the time path; parameters may also be different across different groups of countries.[7] And indeed for primary enrollment, β, which determines the shape of the adjustment curve, is heterogeneous across the sample. If we restrict the sample to the subsample just described, β turns out to be twice as high; that is, countries achieve higher levels of enrollment much more quickly. This is illustrated in Figure 2, where the grey line shows the corresponding transition pattern. Increasing enrollment from 20 to 80 percent would then only take around 30 years. For child mortality, the parameter estimates for a reduced sample of countries with initially high under-five mortality rates (higher than 50 per 1000 births) do not differ much from those in the original sample.

This may indicate that for latecomers to universal enrollment there has been a considerable acceleration of progress in recent years. This evidence can be corroborated by taking a closer look at some of the oft-cited "success" stories. These successes include Ethiopia, Malawi, Rwanda, and Uganda, all poor countries whose primary enrollment rates have strongly increased in the past 20 years, potentially enabling some to achieve universal enrollment by 2015. However, these cases may have particular circumstances: a catching-up process after conflicts in Rwanda and Uganda and relatively high rates of economic growth in Ethiopia and Uganda (and thus higher expected returns to education). Rapid progress in enrollment is also likely to be associated with a decrease in the quality of education, for example, in the case of Uganda (Kappel et al., 2006). Still, these cases indicate that progress in enrollment may be more rapid than in the past. Clemens (2004), however—referring to the same cases plus Togo, Botswana, and Indonesia—warns against such a conclusion. He suggests the careful evaluation of these experiences and points to problems of increased repetition rates masked by aggregate enrollment statistics, for example, in Togo and Malawi. Countries may also experience "enrollment bubbles," that is, temporarily higher enrollment due to public policy, combined with a temporary period of very rapid economic expansion and high expectations. This was the case in Botswana and Indonesia, for example, where enrollment levels stagnated or even fell in the early 2000s.

While the regression results for child mortality seem to show that the scope for very fast improvement is limited, quite a number of examples suggest the opposite. In fact, decreases in

---

[7] We do not discuss heterogeneity over time here.

under-five mortality have been well above historical antecedents in recent years in quite a number of developing countries. Recent success stories including countries as diverse as Nepal (142 of 1000 children to 55 between 1990 and 2007), Bangladesh (151 to 61), Eritrea (147 to 70), Lao People's Democratic Republic (163 to 70), Mongolia (98 to 43), Bolivia (125 to 57), and Malawi (209 to 111) reveal huge mortality rate declines, making the achievement of MDG 4 very likely in these cases (You et al., 2009).[8] These reductions of often more than 60 per thousand points were achieved much more quickly—in only 17 years—than would be suggested by the average progress rate above.[9]

In many of the success cases, different combinations of supply-side interventions such as immunization and nutrition programs as well as the strengthening of the health system, particularly in terms of primary care at the community/village level, seem to have been key factors behind the rapid declines. In some cases, for example, Nepal and Laos, these measures were accompanied by public awareness campaigns aimed at increasing demand for the services offered. In a cross-country comparison of eight sub-Saharan countries, Lay and Robilliard (2009) also find the expansion of vaccination coverage, a factor that is correlated with other early childhood interventions, to be among the major explanatory factors for the relative successes in their sample, for example, in Mozambique and Niger. This is in line with the earlier cross-country evidence from McGuire (2006), who shows child mortality rates to be strongly associated with maternal and infant health program efforts, while overall public health-care spending turns out to have no significant effect.[10]

Supply-side interventions thus appear to have played a major role in recent child mortality reductions. For education, in contrast, this first crude assessment of the determinants of MDG achievement suggests a more prominent role for demand-side factors, specifically income growth and growth expectations, in recent increases in enrollment. Therefore, we can conclude that there are factors that allow some countries to depart from average trajectories, although the above analysis illustrates that there are probably limits to the variation around these paths. The regression results further indicate that there may indeed be an s-shaped pattern of MDG achievement. This pattern may be taken as a sign of the important role of demand-side factors, particularly income and its many household-level correlates.

---

[8] At the same time, a number of sub-Saharan countries have made very little or no progress, so that the subcontinent now accounts for half of early childhood deaths worldwide. Progress also needs to accelerate in India, Pakistan, and China.

[9] These trends typically rest on few data points and should, for some cases, be treated with caution. Yet with the increasing frequency and higher quality of demographic and health surveys in the past 15 years, national health statistics have generally improved considerably.

[10] The latter missing effect was identified in earlier studies, for example by Filmer and Pritchett (1999).

Determinants of MDG Achievement

It is obvious that social services, without doubt an important component of MDG achievement, cannot be used if there is no supply. However, the above framework has illustrated that a given service supply only represents a hypothetical maximum amount of service utilization—because of the significance of demand-side factors. Therefore, the following review will mainly be concerned with evidence that sheds light on the relative importance of these two sets of service-utilization determinants. We then briefly discuss possible complementarities in service utilization that partly become effective through the influencing of relevant household characteristics, as described in equation (4) above. The focus of our review subsequently shifts to human development outcomes and the links between social service utilization and these outcomes.

On the supply-side, some of the elementary provisions need to be fulfilled. Social service facilities, particularly schools, health clinics, or vaccination posts, need to be accessible. Buildings, equipment, and trained personnel therefore need to be available. Recent evidence suggests that absenteeism of teachers and health staff is a substantial problem in many developing countries (Chaudhury et al., 2006). The presence and qualification of personnel is a decisive factor for the quality of the service offered, although the best doctor will not be able to help much without the necessary drugs. In the health sector, poor quality of either equipment or health staff may even pose a threat to those who seek treatment. Similarly, it is certainly not only the number of schools that matters, but also the quality of teaching.

The importance of these factors is well documented for the education sector.[11] These supply-side factors include not only the distance to a school (Glewwe and Jacoby, 1994; Bommier and Lambert, 2000; Handa, 2002; Glick and Sahn, 2006) but also a number of quality-related variables ranging from more teachers (Case and Deaton, 1999; Chin, 2005; Glick and Sahn, 2006)[12] to building conditions (Drèze and Kingdon, 2001; Bedi and Marshall, 2002; Handa, 2002; Glick and Sahn, 2006). Using a school construction program as a natural experiment, Duflo (2001) also documents the positive effect of supply-side interventions, namely, the building of more schools in areas with low enrollment rates. An evaluation of the Bolivian Social Investment Fund's school upgrading projects (Newman et al., 2002), however, finds only limited (and often insignificant) effects as a result of better building and equipment conditions in schools.

---

[11] See Glewwe and Kremer (2006) for a detailed survey.

[12] Better teachers and/or teachers who are present more often may also attract students. Direct evidence of this relationship is scarce, but there is a related literature that examines incentive schemes for teachers, for example, Glewwe at al. (2003) and Duflo and Hanna (2006).

The quantitative effects of these interventions are very difficult to compare across studies because of differences in interventions and outcome indicators, for example, enrollment versus grade attainment versus cycle completion. Additionally, quite a few of the studies do not (or are not able to) deal with possible biases in their parameter estimates, for example, due to endogenous program placement, and need to be interpreted with care. Chin's (2005) evaluation of Operation Blackboard, a program which added a second teacher in many primary schools in India, shows fairly large effects on primary completion rates, particularly for girls from poor households. Girls' (and boys') primary school completion rates increased by 1.6 (1) percentage points for each teacher added by the program per 1,000 students (the baseline completion rates for girls and boys were 46 and 64 percent, respectively). On the basis of simulations, Glick and Sahn (2006) report an increase of 6 percentage points (from 42 to 48 percent) in primary enrollment in public schools that hire an additional teacher (reducing multigrade teaching by 50 percent).

In the health sector, the evidence on supply-side factors is somewhat fragmented along disciplinary lines. Most contributions on health interventions in developing countries come from the natural sciences. The focus of this literature is clearly the impact of interventions on health outcomes, that is, specific components of what a policy maker or economist would call a program. Priority interventions that the authors consider feasible in a low-income setting are reviewed by Jones et al. (2003). Another more recent review of interventions for maternal and child undernutrition and survival by Bhutta et al. (2008) contains 209 references to studies that examine specific interventions in a developing-country context. These interventions include, for example, the promotion of breastfeeding, micronutrient interventions, and the reduction of the disease burden (promotion of hand washing and strategies to reduce the burden of malaria during pregnancy). While the cost-effectiveness of these different interventions is without doubt an important input into evidence-based health policy (and eventual health outcomes), researchers in public health increasingly seem to realize that ultimately it is the actual utilization of interventions that matters (Bryce et al., 2003; Victora et al., 2004; Kerber et al., 2007). The latter literature tries to identify effective modes of supply that are often specific to certain (types) of interventions and/or analyzes different health-service delivery systems.

Compared to these approaches, the empirical analysis of the supply side of health services in economics takes a reduced-form approach and therefore complements the above literature. Often, socioeconomic studies first examine the impact of a program (typically not one specific intervention) on effective interventions and then the impact of the program on health

outcomes. In their assessment of the Bolivian Social Investment Fund, for example, Newman et al. (2002) find that the program improves the quality of health facilities in participating communities and increases the actual use of services. These improvements have been accompanied by a considerable reduction in under-five mortality rates, from a rate of 100 per 1000 newborns to a rate of 60 in participating communities. A number of studies focus only on the first link in this chain, that is, the effect of supply-side factors on service utilization (often called, somewhat confusingly, demand). Sahn et al. (2003) examine the determinants of health facility visits in Tanzania and find that the quality of medical care has a significant effect on the probability that people will actually seek treatment in these facilities. Leonard (2007) supports these findings.

However, a recent review of the economics of health in developing countries by Mwabu (2008) for the *Handbook of Development Economics* concludes that the "developing country literature is largely silent on policies to improve health." While this statement can hardly be supported beyond the discipline of development economics, there is some truth to it. In contrast to their contributions to study of education policies, development economists have been relatively silent on health policies. This silence partly reflects the relatively poor understanding of the complex interactions between health and socioeconomic factors over the life course, as exemplified by the newly emerging body of literature on the effects of health inputs at very early life stages, which—as we have argued above— interact with socioeconomic variables and have consequences throughout the life course.[13]

The silence is even more pronounced on interventions that *improve* health, as these seem to be difficult to find—at least on the supply side. In a survey on the effects of the availability of primary-level health facilities, Filmer et al. (2000) conclude that the evidence of "any effect on health" is mixed and that "even where such evidence exists, the impact is too small to explain the variation in health status." They point to poorly functioning health facilities as a possible reason, but stress the possible role of demand-side factors. We will return to these factors below.[14] In fact, compared to Filmer et al.'s (2000) earlier review, our admittedly very selective review of more recent studies on supply-side health interventions above suggests a slightly more favorable appraisal of the socioeconomic evidence on the effects of health interventions on the supply side. This may have to do with methodological advances that allow these studies to better account for demand-side factors and/or endogenous program placement than earlier studies.

---

[13] See Strauss and Thomas (2008) for a recent review.
[14] In fact, demand-side factors that could not be sufficiently controlled for may explain a large share of the variation.

The admittedly incomplete literature review of supply-side factors in the health sector suggests that the evidence is surprisingly patchy, particularly in light of the ample evidence on the medical effects of various supply-side interventions. With some important exceptions, the debate in leading natural science journals on maternal and child health reflects the relative neglect of the socioeconomics of the supply side of effective health service utilization. This neglect is likely an important source of "randomization bias" in many medical trials of specific interventions in a developing-country context. To give an example, while a vaccine may be highly effective in reducing child mortality in a randomized experiment (typically carried out in the presence of qualified field staff), the same vaccine may prove ineffective when delivered through local health clinics that lack adequate storage capacity.

Even more important, however, seems to be the neglect of a second socioeconomic component, the demand side, in the discussion on key health interventions in low-income environments. Accordingly, Ensor and Cooper (2004) find virtually no evidence on the effectiveness and costs of policy measures designed to overcome demand-side constraints. This has changed recently, particularly because of the wave of impact evaluations that have accompanied conditional cash transfer (CCT) programs in a number of developing countries. These programs often have a maternal and child health component (Fiszbein and Schady, 2009).

The lack of demand-side intervention in the health sector may sound surprising in light of the many demand factors that are likely to affect the utilization of health care, including information on health-care choices and providers; education; household income; indirect costs, such as distance and opportunity costs; and household, cultural, and community preferences, attitudes, and norms. Indeed, the importance of demand-side constraints for health services has been demonstrated in a number of studies. Lay and Robilliard (2009), for example, show that the odds of receiving a BCG vaccination[15] in a number of Sub-Saharan African (SSA) countries are about 50 percent higher for the children of mothers with primary education than for those of mothers without schooling. This result is obtained in an estimation that includes a community-fixed effect, that is, the effect refers to mothers who are likely to face the same (or very similar) supply-side circumstances. Education is typically found to be an important idiosyncratic determinant of health service use (Lavy et al., 1996; Mwabu et al., 2003; Sahn et al., 2003).

Another well-documented constraint at the individual and household level is income and/or wealth. When other factors are controlled for, higher incomes are typically associated with

---

[15] Bacillus Calmette-Guérin (or Bacille Calmette-Guérin, BCG) is a vaccine against tuberculosis.

much higher rates of health service use (Mwabu et al., 2003; Lay and Robilliard, 2009). Evidence of the importance of income constraints also comes from the literature that has examined the effects of user fees. Mwabu et al. (2003), for example, investigate the role of user fees in Kenya. Their findings suggest that in government health facilities where relatively high fees have long been charged, the demand for medical care is income inelastic. However, they show that at government dispensaries where no fees were previously charged, even a modest increase in fees could lead to a considerable drop in service use. Similarly, Fafchamps and Minten (2007) find the suspension of user fees in Madagascar to be associated with a significant increase in visits to health centers. So do Deininger and Mpuga (2005) for Uganda. In addition to these universal factors, a number of cultural, religious, and social factors, within both the households and the larger community, are extremely important determinants of health service use. These typically interrelated factors obviously differ across countries, regions, and ethnic and religious groups, making it difficult to distinguish general patterns.[16] An important set of these factors is related to the role and status of women, both within the household and in society at large. In this regard—despite the difficulties of generalizing—an almost universal pattern is that women tend to allocate more resources to children's health and education.[17]

Both income and "cultural" constraints are addressed simultaneously by CCT programs, which provide cash transfers to poor households on the condition of a certain behavior, typically involving the use of social services. These programs often make use of the aforementioned empirical regularity that women tend to "better" allocate their resources by paying the transfer to a woman in the household. OPORTUNIDADES, for example, a pioneering Mexican program, does this and makes these payments conditional on children's school enrollment and regular visits to health facilities (Fiszbein and Schady, 2009).

As indicated above, evaluations of these programs, most of which have been implemented in Latin America and the Caribbean (LAC), have produced an extensive body of empirical evidence on the effects of providing such transfers, not only on health and education outcomes but also on the use of preventive health care. Fiszbein and Schady (2009) provide on overview of nine case studies of such programs in different LAC countries and Turkey. The results of the studies are mixed. In three of the cases, preventive-care visits rose considerably. In Honduras, for example, the share of small children who had been taken to a health center in the past month rose from 44 to 64 percent due to participation in the Programa de Asignación Familiar (Morris, Flores et al., 2004). Similar effects were reported for a

---

[16] A selective review of these studies can be found in Ensor and Cooper (2004).
[17] See, for example, Quisumbing and Maluccio (2003).

Colombian and a Jamaican program, while the remaining programs seem to have had smaller and often insignificant effects on health-care service use. An analysis of the impact of CCT programs on vaccination and immunization rates yields comparable results (Fiszbein and Schady, 2009). While some programs seem to be highly successful—in Nicaragua administrative records indicate that full vaccination coverage increased from 60 to 78 percent—others show little or no improvement. Expressed as a share of per capita consumption in participating households, the conditional transfers that trigger these effects range between 7 percent for Chile and 27 percent for Nicaragua (Red de Protección Social); Honduras and Jamaica are at the lower end with approximately 10 percent. However, these results have to be interpreted with care. While they point to the importance of demand-side factors, an assessment of their precise role would need to look more deeply into the mechanics of each specific program, especially the size of the transfer and the modalities of the conditions. In addition, a number of CCT programs have at least some supply-side components, in which case the impact evaluations show the effect of simultaneous supply- and demand-side interventions. We will return to this point later.

While health components are an important part of some CCT programs, most focus on educational achievement. The effects of the programs are clearer with regard to enrollment than for health services. Fiszbein and Schady (2009) conclude that CCT programs have had a significant positive impact on enrollment, an effect that is very large for some countries. The Red de Protección Social in Nicaragua, for example, increased enrollment by 13 percentage points from a baseline enrollment rate of 72 percent for children aged 7–13. In Ecuador, a conditional transfer of only 10 percent of per capita expenditure resulted in a 10-percentage-point increase in enrollment of children aged 6-17 from a baseline level of 75 percent. Most remarkably, the Japan Fund for Poverty Reduction increased the enrollment of girls in grades 7–9 in Cambodia from 65 percent to more than 95 percent with a transfer volume of only 2 to 3 percent of per capita consumption (Filmer and Schady, 2008). In light of the heterogeneity of these experiences, Fiszbein and Schady (2009) conclude that the effect of transfer size seems to be highly context specific and dependent on a variety of other factors.[18]

It is not the case, however, that these evaluation results come as a complete surprise. Rather, these programs were initiated based on evidence that schooling choices depend on a number of demand-side factors, particularly household income. Suggestive evidence again comes

---

[18] In light of the importance of income, it would be interesting to know whether the first C in CCT, conditionality, really matters. A recent paper by Baird et al. (2009) that evaluates a (partly) conditional cash transfer program targeted at girls and young women in Malawi provides some evidence in this regard. The authors find that the (significant) impacts of the program were, on average, similar for conditional and unconditional payments.

from some East African countries where the abolishment of school fees led to a massive influx of new students. Fafchamps and Minten (2007) also report significant effects as a result of a school fee suspension in Madagascar. The results of schooling-choice models confirm the important role of parents' income for enrollment (Gertler and Glewwe, 1990; Alderman et al., 2001, Glick and Sahn, 2006).[19] In addition, these studies demonstrate the strong effect of parental education. Another important household-level determinant of school enrollment is the opportunity cost of child time.[20] Finally, similar to the effective demand for health services, schooling choices are influenced by a whole range of other cultural and social factors.

The role of parental education in health service utilization is one important example of an "intergenerational" complementarity between different social services. The above evidence suggests that educating young girls today will relax future demand-side constraints imposed by the mothers of tomorrow. Seen from the perspective of supply-side interventions in both the education and health sectors, the importance of parental education in social service utilization implies that the effectiveness of these interventions hinges on the current level of (parental) education. This is also illustrated by Jalan and Ravallion (2003), who study the effect of the use of piped water on child health in rural India. They find that the prevalence and duration of diarrhea—an important cause of death among children under five—are significantly reduced by piped water. However, the results indicate that this effect tends to be much smaller for children in poor families, particularly when the mother is poorly educated. This is because these mothers do not have the knowledge necessary to make the best use of the service provided, that is, to translate piped-water access into safe drinking water for children. The authors conclude that their "findings point to the importance of combining water infrastructure investments with effective public action to promote health knowledge and income poverty reduction." In other words, complementarities in service utilization need to be taken into account in the design of MDG-targeted interventions. These complementarities extend beyond the role of education for service utilization, an important complementarity being the effect of child health on school attendance. For example, in a randomized experiment in Kenya, Kremer and Miguel (2004) have shown that treatment with deworming

---

[19] This is also reflected in the heterogeneity of program impact. In the Cambodian CCT program, Filmer and Schady (2008) find an effect of 50 percentage points on enrollment for the poorest 20 percent compared to "only" 15 percentage points in the richest 20 percent. Such effects have been detected in many other cases.
[20] See Orazem and King (2007) for details.

drugs and the subsequent decline in sickness reduced the school absenteeism of children aged 6–13 in schools where treatment was administered by one-quarter.[21]

This review has so far focused on the role of demand- versus supply-side factors in determining service utilization as described by the first set of equations (1-4) in the above analytical framework. However, only a subset of MDG targets refers to social services. As argued above, social service utilization is ultimately a means to achieve human development and is not an end in itself. School enrollment is thus an input into learning, just as the utilization of health services is an input into health status. What really matters in the "deworming" example is not the social service, here treatment with deworming drugs, but its effects on child health. Similarly, it is the knowledge acquired in school that matters, not school attainment or the completion of a cycle. The quality of the service and the effectiveness of specific interventions—a specific vaccination or the use of certain pedagogical tools in school—will eventually determine those links between service utilization and outcome. An exhaustive review of these issues goes beyond the scope of this paper, but we have tried to identify some key findings with regard to learning achievements as well as child and maternal health and mortality.

In general, there is more evidence that directly links such outcomes to their determinants for health than for education, since learning achievements are more difficult to measure than health outcomes. There is, for example, an abundant literature on the determinants of child mortality, an outcome that can be relatively easily measured.[22] For instance, a recent study of a number of sub-Saharan countries by Lay and Robilliard (2009) shows that young children of mothers with primary education are approximately 25 percent less likely to die than the children of uneducated mothers. The authors further demonstrate that this effect can be partly explained by higher health service–utilization rates. The study by Jalan and Ravallion (2003) indicates that similar mechanisms are at work with regard to child-health programs promoting use of improved water sources. In addition, it has been shown that better-educated mothers also tend to nourish their children better, although it is difficult to empirically disentangle all these channels (Charmarbagwala et al., 2004).

Quite a few of the abovementioned studies on the impact of CCT programs also examine outcome indicators. In fact, most impact studies first analyze a program's impact on service use and, if data is available, the program's impact on outcome measures, including child

---

[21] See Kremer and Miguel (2004) for further literature on the effects of deworming programs on educational attainment.

[22] Lay and Robilliard (2009) provide a recent survey. Anthropometric outcomes are another outcome variable that is often investigated.

growth indicators, early childhood cognitive-development indicators, and learning outcomes. With regard to health status, the studies find relatively limited and often insignificant effects. One has to be careful, however, in drawing general conclusions from these findings, as many possible transmission channels for CCT programs are at work simultaneously. These channels depend on the specificities of program design and include not only the use of health services but also changes in the diets of households. An additional and important limitation of most of these studies is their short-term character. This may also be an important limitation in terms of assessing impacts on learning. Here, the available evidence suggests that children brought to school by the transfer learn no less than other children (Fiszbein and Schady, 2009). However, they also do not seem to learn more, which may have been the policy maker's hope in light of the additional resources provided by the transfer that, in principle, could be spent on additional inputs into the child's education.

The quality of schooling determines how school visits translate into learning achievement, and particularly into literacy. Empirical evidence has shown that learning achievement in low-income countries is much lower than in high-income countries (Glewwe and Kremer, 2006). Due to deficiencies in schooling quality, a considerable portion of poor students leave school without having acquired even the most elementary language and mathematical skills. Quality concerns have also been raised in countries where enrollment has risen very fast without being accompanied by adequate measures to improve, or at least maintain, schooling quality.[23]

These quality considerations in schooling constitute yet another crucial link in the long causal chain that relates human development outcomes to its determinants. The review has so far illustrated the importance of a number of such links, both in the education and in the health sector.[24] It has also shown that a single chain may not serve as an adequate model for MDG achievement given the multiple parallel transmission channels and interdependencies between different types of social services and human development outcomes—as suggested by our analytical model. This complexity also makes it difficult to arrive at general conclusions on the basis of the empirics presented, something we will nevertheless attempt in the concluding section.

Before we do so, we want to briefly discuss practical examples of MDG planning and review some evidence on the cost-effectiveness of selected interventions. Without anticipating too

---

[23] See Kappel et al. (2006) for some evidence from Uganda's universal primary enrollment initiative.

[24] It has also ignored some links. For example, we have not explicitly addressed the role of intermediate factors, such as rural roads and/or urbanization, in social service utilization. This also has to do with the empirical difficulties involved in estimating the specific effects of such interventions. See Fay et al. (2005) for some suggestive evidence regarding the importance of infrastructure for health-related MDG outcomes.

many of the conclusions to come below, the review clearly demonstrates the importance of addressing both the demand for and the supply of social services. Furthermore, the literature suggests a relative neglect of demand-side factors in the health sector. This is also mirrored on the policy side, as an admittedly incomplete review of different MDG strategy papers in the health sector suggests.[25] It is untrue, however, that the demand side is entirely ignored. In fact, quite a few demand-side components can be found in recent country-level "MDG needs assessment and costing" reports by the UNDP. In light of the increasing number of CCT programs in low- to middle-income countries around the world, these measures are likely to gain importance in the coming years. However, most CCT programs—and this is also apparent from the evidence presented—focus on schooling, with health components figuring less prominently. This is illustrated by the following brief review of two recent UN MDG strategies and needs assessments for Bhutan and Bangladesh from 2006 and 2009, respectively (Government of the People's Republic of Bangladesh, 2009; Royal Government of Bhutan, 2007).

With regard to the education sector, both reports first list a number of supply-side interventions with regard to school infrastructure, teaching material, and teachers' pay. Both reports also target the demand side. The government of Bhutan provides a stipend of Nu. 240 (approximately US$5) per month to every primary and lower secondary school boarder in order to cover the third daily meal, which would otherwise be provided by parents. The catalogue of demand interventions for Bangladesh is more elaborate, reflecting the country's strong tradition in such programs. First, Bangladesh has a school feeding program, the coverage of which is to be extended from 2 to 20 percent of the children enrolled in primary school, targeting the poorest children in particular. Second, the government is considering a targeted cash transfer to compensate poorer households for foregone child labor earnings. Third, in addition to the aforementioned provisions, further support, equivalent to BDT 500 (approximately US$7) per year, has been allocated to each child. This includes health cards, remedial classes, and examination fees. Moreover, BDT 1,000 worth of additional support may be provided each year for purchases of teaching-learning materials, including mats, chalk, dusters, and sports materials. However, neither report proposes any major demand-side interventions in the health sector.

The neglect of demand-side policies is mirrored in the relative disregard for demand-side constraints in MDG planning and costing applications, particularly in the cost-accounting frameworks applied by the UN and the WHO (Millennium Project, 2005; WHO, 2001). When

---

[25] For example, WHO (2001), WHO (2006), and Millennium Project (2005).

interventions are scaled up and unit costs need to be extrapolated, demand-side constraints have to be taken into account—at least when the unit cost refers to social service utilization, for instance, vaccinations actually delivered or school enrollment. As an example, if the lack of education and the prevalence of traditional norms prevent mothers from having their children vaccinated against measles, the marginal unit cost of a supply intervention that effectively adds to the number of vaccinated children may be infinite in the absence of a complementary, relatively cheap information campaign aimed at the demand side. In the presence of such a demand-side intervention, on the other hand, the marginal unit cost may be very moderate. In the discussion of the costs of achieving universal primary education, Glewwe and Zhao (2006) argue that the cost estimate based on a demand-side model can be three to four times higher than cost-accounting estimates.[26] These cost-accounting exercises, which are common practice in policy reports, typically assume a linear and separable cost function. Although this may be a roughly valid procedure on the margin, for example, in cases where existing interventions are scaled up somewhat, the costs of different components of policy packages are very unlikely to be additive beyond the margin.

Not only the level but also the composition of costs is likely to change considerably when efforts focused on the demand side are included. Bangladesh's transfer programs in the education sector, for example (see the box above), imply a major shift in the cost structure of primary education. While teacher costs account for approximately 75 to 80 percent of the total cost of primary schooling in the average developing country (Bruns et al., 2003), this figure decreases to only 55 percent in Bangladesh when the demand-side interventions are taken into account.

Ultimately, cost-effectiveness studies need to constitute the basis of MDG planning and costing efforts. We therefore conclude this empirical section with three "best-practice" examples that examine not only the impact of a specific intervention, but the cost-effectiveness of different supply- and demand-side interventions. All of them at least implicitly consider demand-side constraints. Two of the three (Handa, 2002; Glick and Sahn, 2006), are *ex ante* simulations, while the third study (Coady and Parker, 2004) uses results from an *ex post* evaluation to construct (cost) counterfactuals.[27]

For the case of Mozambique, Handa (2002) compares three policies intended to increase primary enrollment: building schools, an unconditional cash transfer, and adult literacy

---

[26] Cost-accounting approaches consider supply-side inputs into social service utilization only.
[27] Another very insightful contribution on the costs and benefits of alternative policy designs for PROGRESA is Todd and Wolpin (2006). Their counterfactual analyses, which look at different subsidy schemes, are based on a structural model of schooling and fertility choices.

campaigns. His simple policy simulations suggest that building more schools not only has the largest impact but is also the most cost-effective means to raise enrollment. At a unit cost of US$70,000, building 140 schools per district would raise national net primary enrollment by 35 percentage points (from a base level of approximately 50 percent), which implies a cost of US$2.8 million per percentage-point increase. The cost-effectiveness of an adult literacy program—estimated by simulating the impact of turning all initially illiterate household heads in the bottom two quartiles into literate ones—would be even more cost-effective (US$1.9 million per percentage-point increase), but would have a smaller impact at 15 percentage points. The effects of an unconditional cash transfer would be fairly small: a 4-percentage-point increase at a very high cost of US$22.8 million per percentage-point increase.

Glick and Sahn (2006) examine the cost-effectiveness of interventions in Malagasy primary schools intended to increase enrollment. They simulate a 50 percent reduction of multigrade teaching by adding teachers and rooms to existing schools. This intervention increases enrollment from 43 to 48 percent, a 5-percentage-point increase that involves fairly heavy costs. The lower bound cost-effectiveness ratio (assuming a no-capital-costs case) is approximately US$25 per additional student enrolled, close to recurrent spending per public primary student. Although the authors do not simulate a demand-targeted intervention, they show that a cost-recovery scheme would more than eat up the positive effects of the supply-side improvement for the poor. A policy that would recover approximately 50 percent of the costs through schooling fees would reduce primary enrollment from 32 to 28 percent for the poorest quintile, compared to an increase of 38 percent without any fees. This simulation represents a supply-side-*cum*-demand-side policy.

Based on the evaluation results for PROGRESA in Mexico, Coady and Parker (2004) calculate the costs of generating an extra year of secondary schooling for a representative cohort of students for two policy alternatives. They compare the cost-effectiveness of building schools, that is, reducing the distance to school, with that of schooling subsidies. They find schooling subsidies to be far more cost-effective in keeping children in school. At a cost of approximately $10,000 Mexican pesos[28] (US$1000) per extra year of schooling, the education grant—as actually implemented as part of PROGRESA—generates 393 additional years of schooling for 1000 children in a representative cohort. This compares to a cost of more than

---

[28] More precisely $12,500 for boys and only $6,900 for girls.

$100,000 pesos per extra year of schooling under the most favorable supply-side scenario with zero discounting and assuming that the school building can be used for 40 years.[29]

Conclusions

This paper has reviewed the evidence on MDG progress, its determinants, specific related policies, and resource requirements. We have introduced an analytical framework that has highlighted the key determinants of, and relationships between, social service utilization and MDG achievement. This framework has motivated our empirical review, which in turn focused on the effectiveness and efficiency of selected policies on the demand and supply sides of social service utilization in the health and education sectors.

The analytical framework has also suggested that MDG achievement may follow an s-shaped transition pattern in social service utilization and human development outcomes. Based on a simple regression analysis, we have illustrated that average MDG progress is likely to be too slow to meet most social sector targets in most developing countries. In addition, we show that MDG achievement, specifically primary enrollment rates and child mortality reductions, can be described according to an s-shaped transition path. These findings are generally in line with earlier evidence from Clemens et al. (2007), who have analyzed data for 1960 to 2000, although we only consider the past 20 years. More detailed analysis, however, reveals that the transition towards universal primary enrollment in poor countries with low initial enrollment appears to have accelerated considerably in the past 20 years. Furthermore, while average progress in child mortality reduction remains relatively slow, quite a number of countries have managed to achieve dramatic decreases in child mortality rates since 1990. These successes of the MDG process are typically rooted in specific policies and/or circumstances, which we have tried to identify in our review of the recent and rich empirical literature.

More specifically, our analytical framework led us to ask whether we can identify key factors and interventions for MDG achievement, and what can be said about supply- vis-à-vis demand-side factors in social service utilization. Furthermore, the framework raised the question of whether complementarities between different MDGs can be revealed empirically. We have indicated that providing definitive answers to these questions is impossible in light of the very diverse determinants, policies, and outcomes in the experiences reviewed. Nevertheless, we think some rules of thumb regarding the effectiveness and efficiency of specific types of policies can be discerned. These rules implicitly reflect what we regard as

---

[29] The cost-benefit calculations presented are based on the assumption that the parameters of the estimated model, for example, a school-participation equation, are constant. There are good reasons to believe that this assumption is violated, at least for nonmarginal policy changes.

the key determinants of MDG achievement, and thus represent a key ingredient for MDG planning efforts.

First, specific policy interventions can have a considerable impact on social service utilization and human development outcomes. For example, improving access to basic health services, in particular to vaccination, has been a key factor in reducing child mortality rates in a number of very poor countries. This message incorporates the second rule of thumb: don't ignore the demand side! In the education sector, demand-side measures have proven extremely effective in increasing enrollment and attainment levels, particularly for girls in very low-income environments. Hence we add the following: don't ignore the demand side in the health sector! While the socioeconomic empirical evidence on the use of health services clearly indicates that these barriers are of utmost importance, both the scientific debate and the policy sphere are dominated by a supply –side–focused technical and medical point of view.

These rules should not, however, be understood as a call for the general reallocation of resources into demand –side–oriented policies. Here the third rule applies: policies have to be highly context specific. Policy effectiveness and efficiency depends on initial conditions and the specificities of the respective policy (package). A case in point is the above example of policy options to increase primary enrollment in Mozambique. In contrast to the experiences of many other countries, building schools seems to be much more efficient than transfer policies in bringing more children into primary schools. This is likely due to the fact that distances to rural schools may be prohibitively high in sparsely populated Mozambique, particularly compared to low-income countries in South East Asia.

Fourth, complementarities between MDG targets, in particular social service utilization, are likely to very important. This rule is of course closely related to the importance of demand-side constraints. Reducing poverty will lift a key constraint to the use of social services. An interesting additional aspect in this regard is the role of growth expectations in enrollment decisions. The lagged impact of educating future mothers on health outcomes represents another important complementarity.

These rules can serve as basic guidelines in MDG planning. The variety of well-documented and evaluated policy experiences around the globe represent a menu of options that should be tailored to country- and sector-specific circumstances. In addition, MDG planning should allow for contingencies, that is, for learning from experience and changing policies accordingly. This implies that a planning approach specifying a catalogue of priority actions, as advocated by the UN Millennium Project, may prove less effective and efficient. Priority actions, for instance, run the risk of becoming outdated in light of new evidence or new policy

tools, as exemplified by the emergence of CCT programs as an effective instrument for increasing school enrollment in some contexts.

Finally, two general observations stand out from this review. First, we have stressed that MDG targets are comprised of inputs into human development achievement, in particular social service utilization in education and health, as well as outcomes, for example, literacy and mortality. Defining inputs and outcomes as targets may prove counterproductive, since an optimal policy, which should be aimed at achieving human development, is unlikely to weigh all the targets equally, as the MDGs implicitly do. Policy makers may be tempted to focus on the target that can be most easily fulfilled, as illustrated by the focus of many countries on enrollment rates. Introducing weights or sequencing of targets may be one improvement to a development agenda beyond 2015. Second, too much of the work reviewed here focuses on impact alone without considering the cost side. This may partly explain why this work does not figure as prominently in practical strategy papers as it should. Furthermore, most of the impact evaluations reviewed are silent on the mechanisms of an intervention; these need to be understood in order to trigger learning processes beyond a particular context.

References

Alderman, H., Orazem, P.F., Paterno, E.M. (2001). School quality, school cost, and the public/private school choices of low-income households in Pakistan. *Journal of Human Resources*, 36, pp. 304-326.

Alkire, S (2001). Valuing freedoms: Sen's capability approach and poverty reduction, Oxford University Press, Oxford.

Baird, S., McIntosh, C., Ozler, B (2009). Designing cost-effective cash transfer programs to boost schooling among young women in Sub-Saharan Africa. Policy Research Working Paper 5090, World Bank.

Bedi, A. S., Marshall, J. H. (2002). Primary school attendance in Honduras. *Journal of Development Economics*, 69 (1), pp. 129-153.

Bhutta, Z. A., Ahmed, T., Black, R. E., Cousens, S., Dewey, K., Giugliani, E., Haider, B. A., Kirkwood, B., Morris, S. S., Sachdev, H. P. S., Shekar, M., Maternal and Child Undernutrition Study Group (2008). What works? Interventions for maternal and child undernutrition and survival. *The Lancet*, 371 (9610).

Bommier, A., Lambert, S. (2000) Education Demand and Age at School Enrollment in Tanzania. *Journal of Human Resources*, 35 (1), pp. 177-203.

Bruns, B., Mingat, A., Rakotomalala, R. (2003). Achieving Universal Primary Education by 2015: A Chance for Every Child. Washington, DC: The World Bank.

Bryce, J., el Arifeen, S., Pariyo, G., Lanata, C. F. Gwatkin, D., Habicht, J.-P., Multi-Country Evaluation of IMCI Study Group (2003). Reducing child mortality: can public health deliver? *The Lancet*, 362 (9378), pp. 159-164.

Case, A., Deaton, A. (1999). School Inputs and Educational Outcomes in South Africa. *Quarterly Journal of Economics*, 114 (3), pp. 1047-1085.

Charmarbagwala, R., Ranger, M., Waddington, H., White, H. (2004). The determinants of child health and nutrition: A meta analysis. OED Working Paper Series. Operations Evaluation Department, Washington, D.C.: World Bank.

Chaudhury, N., Hammer, J., Kremer, M., Muralidharan, K. and Rogers, F. H. (2006). Missing in Action: Teacher and Health Worker Absence in Developing Countries. *Journal of Economic Perspectives*, 20 (1), pp. 91-116.

Chin, A. (2005). Can redistributing teachers across schools raise educational attainment? Evidence from Operation Blackboard in India. *Journal of Development Economics*, 78 (2), pp. 384-405.

Clemens, M. A. (2004). The Long Walk to School: International education goals in historical perspective. Development and Comp Systems 0403007, EconWPA.

Clemens, M. A., Kenny, C. J. and Moss, T. J. (2007). The Trouble with the MDGs: Confronting Expectations of Aid and Development Success. *World Development*, 35 (5), pp. 735-751.

Coady, D. P., Parker, S.W. (2004). Cost-effectiveness Analysis of Demand- and Supply-side Education Interventions: the Case of PROGRESA in Mexico. *Review of Development Economics*, 8 (3), pp. 440-451.

Deininger, K., Mpuga, P. (2005). Economic and Welfare Impact of the Abolition of Health User Fees: Evidence from Uganda. *Journal of African Economies*, 14(1), pp. 55-91.

Drèze, J., Kingdon, G. G. (2001). School Participation in Rural India. *Review of Development Economics*, 5 (1), pp. 1-24.

Duflo, E. (2001). Schooling and Labor Market Consequences of School Construction in Indonesia: Evidence from an Unusual Policy Experiment. *American Economic Review*, 91 (4), pp. 795-814.

Duflo, E., Rema, H. (2005). Monitoring Works: Getting Teachers to Come to School. NBER Working Paper, 11880, National Bureau of Economic Research, Cambridge.

Ensor, T. and Cooper, S. (2004). Overcoming Barriers to Health service access: Influencing the Demand side. *Health Policy and Planning*, 19 (2), pp. 69-79.

Fafchamps, M., Minten, B. (2007). Public Service Provision, User Fees and Political Turmoil. *Journal of African Economies*, 16 (3), pp. 485-518.

Fay, M., Leipziger, D., Wodon, Q., Yepes, T. (2005). Achieving child-health-related Millennium Development Goals: The role of infrastructure. *World Development*, 33 (8), pp. 1267-1284.

Filmer, D. (2003). Determinants of Health and Education Outcomes. Background Note for the WDR 2004. The World Bank. Mimeo.

Filmer, D., Hammer, J. S., Pritchett, L. H., (2000). Weak Links in the Chain: A Diagnosis of Health Policy in Poor Countries. *World Bank Research Observer*, 15 (2), pp. 199-224.

Filmer, D., Pritchett, L. (1999). The impact of public spending on health: Does money matter? *Social Science and Medicine*, 49 (10), pp. 1309–1323.

Filmer, D., Schady, N. (2008). Getting Girls into School: Evidence from a Scholarship Program in Cambodia. *Economic Development and Cultural Change*, 56, pp. 581-617.

Fiszbein, A., Schady, N. (2009). Conditional Cash Transfers. World Bank Policy Research Report, Washington D.C.

Gertler, P., Glewwe, P. (1990). The Willingness to Pay for Education in Developing Countries: Evidence from Rural Peru. *Journal of Public Economics*, 42, pp. 251-275.

Glewwe, P., Jacoby, H. (1994). Student Achievement and Schooling Choice in Low-Income Countries: Evidence from Ghana. *Journal of Human Resources*, 29 (3), pp. 843-864.

Glewwe, P., Ilias, N. and Kremer, M. (2003). Teacher Incentives." NBER Working Paper, 9671, National Bureau of Economic Research, Cambridge.

Glewwe, P., Kremer, M. (2006). Schools, Teachers, and Education Outcomes in Developing Countries. Handbook of the Economics of Education, Elsevier.

Glewwe, P., Zhao, M. (2006). Attaining Universal Primary Schooling by 2015: An Evaluation of Cost Estimates. In: Glewwe, P., Zhao, M. and Binder, M. (2006). Achieving Universal Basic and Secondary Education: How Much Will It Cost? American Academy of Arts and Sciences.

Glick, P. and Sahn, D. (2006). The demand for primary schooling in Madagascar: Price, quality, and the choice between public and private providers. *Journal of Development Economics*, 79, pp. 118-145.

Government of the People's Republic of Bangladesh (2009). Millennium Development Goals needs assessment & costing 2009-2015. General Economics Division Planning Commission Government of the People's Republic of Bangladesh.

Handa, S. (2002). Raising primary school enrollment in developing countries: The relative importance of supply and demand. *Journal of Development Economics*, 69 (1), pp. 103-128.

Jalan, J., Ravallion, M. (2003). Does piped water reduce diarrhea for children in rural India? *Journal of Econometrics* 112, pp. 153-173

Jones, G., Steketee, R., Black, R., Bhutta, Z., Morris, S. (2003). How many child deaths can we prevent this year? *The Lancet*, 362 (9377), pp. 65-71.

Kappel, R., J. Lay, S. Steiner (2005). Uganda: No More Pro-Poor Growth? *Development Policy Review*, 23 (1).

Kerber, K. J., de Graft-Johnson, J. E., Bhutta, Z. A., Okong, P., Starrs, A. and Lawn, J. E. (2007). Continuum of care for maternal, newborn, and child health: from slogan to service delivery. *The Lancet*, 370 (9595), pp. 1358-1369.

Lavy, V., Strauss, J., Thomas, D. and Vreyer, P. de (1996). Quality of health care, survival and health outcomes in Ghana. *Journal of Health Economics*, 15, pp. 333-357.

Lay, J., Robilliard, A.-S. (2009). The complementarity of MDG achievements: the case of child mortality in Sub-Saharan Africa. Policy Research Working Paper Series 5062, The World Bank.

Leonard, K. L. (2007). Learning in Health Care: Evidence of Learning about Clinician Quality in Tanzania. *Economic Development and Cultural Change*, 55 (3), pp. 531-55.

McGuire, J. W. (2006). Basic Health Care Provision and Under-5 Mortality: A Cross-National Study of Developing Countries. *World Development*, 34 (3), pp. 405-425.

Miguel, E., Kremer, M. (2004). Worms: Identifying Impacts on Education and Health in the Presence of Treatment Externalities. *Econometrica*, 72 (1), pp. 159-217.

Millennium Project (2005). Child Health and Maternal Health. Task Force on Child Health and Maternal Health. Earthscan, London.

Morris, S., Flores, R., Olinto, P., Medina, J. (2004). Monetary incentives in primary health care and effects on use and coverage of preventive health care interventions in rural Honduras: cluster randomised trial. *The Lancet*, 364 (9450), pp. 2030-2037.

Mwabu, G. (2008). Health Economics for Low-Income Countries. In: Schultz, T.P., Strauss, J., (eds.). *Handbook of Development Economics*, 4 (5).

Mwabu, G., Wang'ombe, J., Nganda, B. (2003). The Demand for Medical Care in Kenya. *African Development Review*, 15 (2-3), pp. 439 – 453.

Newman, J., Pradhan, M., Rawlings, L. B., Ridder, G., Coa, R. Evia, J.L. (2002). An Impact Evaluation of Education, Health, and Water Supply Investments by the Bolivian Social Investment Fund. *World Bank Economic Review*, 16 (2), pp. 241-274.

Orazem, P. F., King, E. M. (2008). Schooling in Developing Countries: The Roles of Supply, Demand and Government Policy. In: Schultz, T.P., Strauss, J., (eds.). *Handbook of Development Economics*, 4 (5).

Quisumbing, A.R. and Maluccio, J.A. (2003) Resources at Marriage and Intrahousehold Allocation: Evidence from Bangladesh, Ethiopia, Indonesia, and South Africa. *Oxford Bulletin of Economics and Statistics*, 65(3), pp. 283-328.

Royal Government of Bhutan (2007). Bhutan Millennium Development Goals needs assessment and costing report (2006-2015), Planning Commission Royal Government of Bhutan.

Sahn, D., Younger, S. D. and Genicot, G. (2003). The Demand for Health Care Services in Rural Tanzania. *Oxford Bulletin of Economics and Statistics*, 65 (2), pp. 241-260.

Sen, A.K. (1999). Development as freedom. Knopf Press, New York.

Spinaci, S., Currat, L., Shetty, P., Crowell, V., Kehler, J. (2006). Tough Choices: Investing in health for development. World Health Organization.

Strauss, J., Thomas, D. (2008). Health over the Life Course. In: Schultz, T. P., Strauss, J. (eds.) *Handbook of Development Economics*, 4 (5).

United Nations (2009). Strengthening the Global Partnership for Development in a Time of Crisis. MDG Gap Task Force Report.

Victora, C. G., Hanson, K., Bryce, J., Vaughan, P. (2004). Achieving universal coverage with health interventions. The Lancet, 364 (9444), pp. 1541-1548.

World Health Organization (2001). Macroeconomics and health: Investing in health for economic development. Report of the Commission on Macroeconomics and Health. Geneva.

You, D., Wardlaw, T., Salama, P. Jones, G. (2009). Levels and trends in under-5 mortality, 1990-2008, The Lancet, In Press, Corrected Proof, Available online 10 September 2009, DOI: 10.1016/S0140-6736(09)61601-9.

Appendix: Regression Results

	Primary Enrollment		Child Mortality (under 5)	
	All countries	Initial enrollment lower than 70 percent	All countries	Initially higher than 50 per 1000 births
t	0.040***	0.088***	0.042***	0.044***
	(0.008)	(0.010)	(0.001)	(0.002)
Constant	1.838***	-0.123	1.123***	0.291***
	(0.079)	(0.098)	(0.013)	(0.019)
Country-fixed effects	Yes***	Yes***	Yes***	Yes***
R-squared within	0.10	0.49	0.70	0.67
Number of observations	367	125	723	434
Number of countries	116	38	145	87

Source: Author's calculations.
Notes: Standard errors in parentheses. * $p<0.05$, ** $p<0.01$, *** $p<0.001$.