

## **Three Proposals to Improve Education in Latin American and the Caribbean: Estimates of the Costs and Benefits of Each Strategy**

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### **Introduction**

Many economists claim that better education leads to greater economic growth, as well as higher incomes for individuals, better health and lower fertility rates. The development community also subscribes to this view, and so has provided large increases in funding for education projects. Two of the eight Millennium Development Goals also focus on education (all children to complete primary school, and gender equality at all educational levels, both to be achieved by 2015).

And yet these claims are not necessarily correct, either in general or for Latin American and Caribbean (LAC) countries in particular, so it is important to evaluate the impact of particular education policies on outcomes of interest. This paper proposes and evaluates three such policies: nutrition programs for younger children, conditional cash transfers to families whose children attend school regularly, and vouchers for private education.

### **Progress and Problems with Education in Latin America and the Caribbean**

Large strides have been made since 1960 in the education sector in LAC countries. In 1960, most children enrolled in primary schools, but less than one third started secondary education. By 2004, two thirds of children were enrolled at pre-primary level, almost all completed primary education and a large majority started secondary education (although no figures are available for secondary completion rates). Finally, almost one third of the population enrolls in post-secondary education.

These overall figures of course mask significant variation. Haiti, for which little data are available, has a very poor record, with only 40% completing primary education. Paraguay, Guatemala, Honduras and Nicaragua also show weak performance. Regrettably, the major increases in *participation* in many countries – now approaching those in high income countries – are not reflected in educational *achievement* as measured by internationally standardized scores for reading and math.

Even relatively prosperous LAC countries with above average schooling statistics (such as Argentina and Chile) fall far short of the learning achieved by students in rich countries (France, Japan, the UK and USA) and even by students in developing countries in other regions (Indonesia, South Korea, Malaysia, Thailand and Turkey).

On the issue of gender equality, Latin American and Caribbean countries have made great progress. Indeed, on average, women born between 1979 and 1981 received 9.6 years of education compared to 9.3 for their male peers, which reflects primarily changes in higher education. However, there are still significant gender gaps in favor of boys in Bolivia, Guatemala, Mexico and Peru. This is only for the lowest income groups and mainly among the indigenous population, which reflects a broader issue in the region. Indigenous populations lag far behind the non-indigenous groups in terms of educational participation and achievement.

**Economic analysis of the causes and consequences of different educational outcomes**

Policy recommendations should, of course, be based on a proper analysis of sound data. However, there are many problems in doing this, and we now look at these on the basis of economic theory.

The first issue is to establish appropriate causal relationships. For parents, sending their children to school is to some extent a trade-off between allowing their children to acquire academic skills (to improve their lot later in life) and increasing current family income. Schooling not only involves direct costs, but also a loss of productive work done by children. Moreover, the benefits of schooling vary, and the factors that contribute to this variation include the contributions from parents (books, school supplies, teaching at home etc), level of parental education, the innate intelligence of the children, and school and teacher characteristics. Parents have to balance limited resources against the expected gains for their children (and possibly for themselves).

Doing a rigorous economic assessment of the impacts of the various factors is extremely difficult. Errors in the data collected can lead to misleading results. Communities targeted for educational initiatives are not uniform, so the introduction of an initiative in an area where parents are particularly receptive or resistant will skew the results in one direction or the other. For effective policies to be introduced, it is important to know how direct changes in schools and teachers affect student learning, and also how receptive parents are to the changes. Not only should education be effective, it must also be attractive to induce families to send their children to school.

Some education policies only indirectly affect the basic variables of economic analysis: the characteristics of schools and the costs of education and academic outputs. Examples of such indirect policies are decentralization, encouraging competition between schools, and linking performance to pay. However, the effect of such policies is again hard to estimate accurately, unless the policies can be implemented in a truly random sample of schools.

While discussions often focus on how to raise years of schooling and how to increase student learning, the true economic test of an education policy is its effect on income and non-income benefits (such as health). From the various studies on income, it is possible to estimate the impact of schooling on wages, but in many developing countries many people are self-employed, particularly in rural areas. In this case, the direct income benefits of education are generally lower.

It also seems clear that better educated people have a higher quality of life. In particular, they are generally healthier and have healthier children. However, there are few reliable estimates of the extent of this, and the benefit-cost ratios (BCR's) we calculate only include direct income increases. All BCRs are therefore inevitably underestimated.

Benefit-cost ratios will also, of course, depend on the chosen discount rate. For the purposes of this paper (and, indeed, the whole Copenhagen Consensus exercise) two rates are used: 3% and 6%. Use of these two gives an indication of the sensitivity of particular policies to external factors. Overall, it should be appreciated that the figures

themselves are influenced by the many errors intrinsic to the collection of both cost and income data on a large scale, and should not be taken as definitive. Nevertheless, ratios which are significantly greater than one for both discount rates should be seen as attractive options in principle, particularly as they do not take account of the various indirect benefits such as improved health.

### **Estimates of Benefit-Cost Ratios for Three Types of Education Intervention**

Three specific interventions have been evaluated, all of which seek to increase the demand for education and are seen as particularly appropriate for the Latin American and Caribbean region. Many others may be equally promising, but could not be analyzed rigorously because of lack of data, particularly data relating to benefits.

**A. Nutrition Programs for Pre-School Age Children.** There are a number of studies which show that children who have been better nourished in their first years of life stay in school longer and learn more per year of schooling. In particular, we examine two studies from the region – in Bolivia and Guatemala – and one from the Philippines.

The INCAP study, started in Guatemala in 1969, provided pre-school children in two villages a nutritious porridge (*atole*) for up to three years, while children in two other villages received a much less nutritious cool drink (*fresco*). All children also received basic medical care, at a cost of \$5 per child. The total cost of the *atole* intervention (with medical care) was \$23.25 per child per year.

Assessing the benefits, it was found that consuming *atole* for three years increased grade attainment by 1.2 years for girls, although there was no impact for boys. Taking an average increase of 0.6 years of education for all children, and assuming (based on other studies) that an additional year of schooling increases wages by 10%, the discounted present value of the intervention is \$622 (using a 3% discount rate) or \$261 (using a 6% rate). The associated benefit-cost ratios are 9.2 and 4.0 respectively. Even assuming that the wage increase is only 5% per each additional year of schooling in such rural areas, the BCRs are still 4.6 and 2.0.

A more extensive program implemented in Bolivia in the 1990s, PIDI, has recently been evaluated. This had both nutritional and educational components and was implemented in low-income urban areas, with children from 6 months to 6 years being eligible to enroll. Costs were much higher than in the Guatemalan program, at \$516 per child per year. However, BCRs were still 3.3 and 2.2 for the two discount rates.

The third study combines estimates of the impact of nutritional status on educational achievement and their benefit in terms of wages in the Philippines with data on the cost of a nutritional intervention in India. The Narangwal Project, carried out in the Punjab in the late 1960s and early '70s, increased child height by about 2 centimeters, at a cost of about \$100 per child. For an average child, the improved nutritional status was equivalent to an extra 6 months of schooling, which translates to an increase of \$57 in annual wages. The overall BCRs are 9.3 and 3.9 for the two discount rates.

**B. Conditional Cash Transfer Programs.** A number of countries in the LAC region have implemented programs where poor families receive monthly payments if

their children attend school regularly. Many of these have been done in a randomized way, with control communities receiving no payments, so benefits can be estimated fairly reliably. Although conditional cash transfer (CCT) programs can undoubtedly increase rates of school enrolment and attendance, they do nothing directly to improve the often poor quality of teaching. Arguably, a combination of CCT and school improvement initiatives could be a more cost-effective intervention, but there is little evidence available to test this. Here, we look at examples of CCT programs from Honduras, Mexico and Nicaragua.

Mexico implemented the Progresa program – the earliest, largest and best known CCT initiative – in 314 rural communities in 1998, with a further 181 communities serving as controls for the first two years. Although originally intended to last for three years, the program (now renamed Oportunidades) has been expanded and continues to operate. Payments were made to poor families (about two thirds of the communities) if their primary- and lower secondary-school aged children attended for at least 85% of the time. Discounted average costs per child over the planned three years have been estimated to be \$391 (3% discount rate) and \$380 (6% rate). For the full seven years of schooling covered by the current program, these costs rise to \$839 and \$754 respectively. All these costs are averaged across the total eligible population, although in practice a proportion of children dropped out.

The average increase in years of schooling (across the entire eligible population) has been estimated to be 0.66 years; actual increases for children participating fully would be higher. The benefits have been estimated using two different assumptions of the effect of an extra year of education: that it increases wages by 10% (assuming that many of the better educated will migrate to urban areas) or 5% (assuming they remain in rural areas). Taking average wages of just over \$1,000 per year, the net effect of the additional 0.66 year of schooling would be either \$66 or \$33 per year. Over a working life, the discounted value of the extra schooling (averaged over all eligible children) would be \$1,081 (3% discount rate) or \$453 (6% rate) if we assume a wage increase of 10% (the urban migration scenario). If, on the other hand, the population remains in the countryside and so wage increases are only 5%, these figures are reduced to \$541 and \$227 respectively.

From these figures, we can derive a range of cost-benefit ratios. The most favorable case is for a three year program, with an extra year of schooling raising wages by 10%. The BCRs are then 2.8 (3% discount rate) and 1.2 (6%). For a program running for the full seven years, these ratios are reduced to 1.3 and 0.6 respectively. If the more conservative assumption of a 5% wage increase is used, then a 10% wage increase yields BCRs of 1.4 (3% discount rate) and 0.6 (6% rate) for a three year program, further reduced to 0.6 and 0.3 for a full seven year term.

Similar programs have been implemented in Honduras and Nicaragua. The first phase of Nicaragua's *Red de Protection Social* was carried out from 2000 to 2003, with families receiving cash transfers if their children in the 7-13 age range were enrolled in grades 1-4 and had an attendance rate of at least 85%. Given an average annual payment per participating child of \$136, the present discounted cost of the program (over three years) is \$396 or \$385 (3% and 6% discount rates).

The estimated increase in enrollment corresponds to a 0.59 increase in years of schooling, which in turn would be expected to increase wages by \$145 per year (assuming a 10% increase in wages per additional year of education). The discounted present value of this is \$2,377 (3% discount rate) or \$997 (6% rate). Using the conservative estimate of a 5% annual wage increase per year of schooling, the \$73 increase in wages has a discounted present value of \$1189 or \$498, depending on the discount rate. The benefit-cost ratios are then 9.9 (3% discount rate) and 3.8 (6% rate) for the more optimistic wage scenario, or 4.4 and 1.9 for the less optimistic wage increase.

Cost effectiveness may be even higher than these figures, if we take into account not just the extra enrollment but also the 20% increase in attendance generated by the program. This translates into a total increase in schooling of 1.5 years, with corresponding additional wage increases. In this case, benefit-cost ratios are very high, at 22.7 for a 3% discount rate and 9.7 for a 6% rate, assuming a 10% wage increase per year of schooling. Even for a 5% wage increase, the ratios are 11.3 and 4.8 respectively.

The third CCT program is *Programa de Asignacio Familiar* (PRAF) in Honduras. This covered children in the first four years of primary school. Although the attendance target of 85% was part of the program, this was never enforced. Cash payments were smaller than in the other examples, and the discounted present cost over the three year period of the pilot program was \$131 and \$128 per child at the two standard discount rates.

Increases in years of schooling were modest, at 0.14. However, a more optimistic analysis takes account of the 4.6% increase in daily attendance, giving an estimated 0.38 years increase in total schooling. Taking the same base assumptions as in the other cases, annual wages would increase by between \$29 (0.38 years extra schooling, 10% wage increase per additional year) and \$5.34 (0.14 additional years, 5% wage increase).

Using the most optimistic interpretation of the results, benefit-cost ratios are 3.6 and 1.6 for the two discount rates. If we assume schooling is increased by only 0.14 years, these figures fall to 1.3 (3% discount rate) and 0.6 (6% rate). Benefit-cost ratios are, of course, lower in all cases for an assumed 5% increase in wages per additional year of schooling.

Overall, these CCT programs have benefits exceeding costs at a 3% discount rate, but at a 6% rate benefits exceed costs in only about half of the cases.

**C. Voucher Programs.** Chile and Colombia have both introduced voucher schemes to pay for private education, with the goal of improving school quality through competition.

In Colombia, the *Programa de Ampliacion de Cobertura de la Education Secundaria* (PACES) awarded over 125,000 scholarships to poor urban children between 1992 and 1997. In most areas, demand exceeded supply and allocation was by lottery, making the program partially randomized. The cost to the government was \$24 more per student per year than simply enrolling them in the public system. For parents,

although they reduced expenditure on education by \$22, there was an opportunity cost of \$41 because their children were able to work less. The total annual cost to society was thus \$43 per winner per year. However, these figures were collected when only 49% of vouchers were used by winners. Allowing for the later 88% take-up rate, the present discounted cost per student over the period of a scholarship is \$193 (3% discount rate) or \$188 (6% rate).

The poor urban students receiving scholarships completed on average 0.12 years additional schooling, which is estimated to raise wages by 1.2%, or \$36. Over the child's lifetime, the present discounted value of additional earnings would be \$1215 (3% discount rate) or \$872 (6% rate), giving benefit-cost ratios of 6.3 and 4.6 respectively. In fact, this probably understates the benefits, because standardized test scores showed an improvement equivalent to an additional year's schooling. This alone would raise annual income by \$300, giving CBRs of 25.5 and 10.9 at the two discount rates.

Although the Colombian program seems very cost effective, a similar intervention in Chile showed no effect on test scores or years of schooling, so overall evidence for the region is mixed.

**D. Programs that could not be evaluated.** Specific programs which we did not include were:

- Decentralized management (no reliable estimates on which to base an evaluation)
- Deworming (shown to be effective in sub-Saharan Africa, but infestation rates are much lower in LAC)
- Bilingual education (difficult to evaluate and apparently with a relatively small impact)
- Teacher incentives and professional training (no significant impacts reported)

### **Recommendations to Strengthen the Knowledge Base**

One of the most frustrating conclusions of this study is that we know very little about the impact of specific policies on educational outcomes. The best way to correct this is to undertake more randomized experiments. Governments may be reluctant to do such studies in case they point to failures. NGOs are in a better position to undertake the work, but it is unreasonable to expect them to finance it. This suggests that large international aid organizations, such as the World Bank and Inter-American Development Bank should provide funding for more program evaluations. Although doing this will not be easy, it is important to identify those programs that are ineffective in order to focus more funds on those that actually work.

### **Conclusions**

We have shown that there are a number of educational interventions that have benefits (measured by lifelong earning potential) that greatly exceed the costs. There may also be additional health benefits, which are difficult to quantify. However, there are still many unknowns, and it is important that governments, aid agencies and large international organizations develop effective ways to evaluate programs and publicize the results. Not doing so will be of little help in closing the educational gap between Latin American and Caribbean countries and the more developed countries.