

UNIVERSAL BASIC EDUCATION

A Progress-based Path to 2025

AUGUST 2011



Annababette Wils, Ph.D.
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FOREWORD

All of those who believe in Education For All should close the doors and cancel all appointments until they have read this document. It shows that universal basic education is within reach, that it is affordable, and that national governments will be well able to sustain most of the costs themselves. The progress of the past decade means that already, the 40 low-income countries studied here are approaching universal primary school intake. Only 3 countries have intake rates below 90%. The authors make the case that this progress provides the basis for achieving Education For All at lower costs than previously believed. Their conclusion that donors need to increase annual support by only \$7 billion to achieve universal primary and lower secondary enrollment will be controversial, but the scenarios presented here are strongly supported and merit close scrutiny as the effort to achieve Education For All enters the end-game phase.



Bob Prouty

Head | *Education for All - Fast Track Initiative Secretariat*

P R E F A C E

In the education arena much has been achieved. Two of the Millennium Development Goals (MDGs) challenged the education sector and, across the globe, teacher by teacher, family by family, school by school, and country by country, education has been “stepping up to the plate.”

While we have not quite reached the 2015 goals, education has made enormous progress. According to UN, between 1999 and 2008 net primary enrolment rates expanded from 82 to 89 percent in developing countries, with much greater gains in Sub-Saharan Africa and Southern Asia. Similarly in these countries, the gender gap decreased from 0.91 to 0.96 in primary and from 0.88 to 0.96 in secondary. Again, there were much greater gains in Sub-Saharan Africa and Southern Asia. Few other MDGs have demonstrated this level of success.

At FHI 360, we have recognized that these gains came with great effort, as a result of opportunity, and, unfortunately, balanced by environments and situations that hamper or even reverse advancement. We remain convinced of the critical importance of education to overall human and economic development and wanted to look beyond 2015 to what is possible with regard to the universal right to basic education.

In this policy brief Babette Wils and George Ingram realistically stretch out the achievement or near achievement of UPE for most countries an additional ten years, to 2025. Using assumptions founded on each country's current trend for children entering and completing primary and lower secondary education they demonstrate that reaching the goals is possible, and that the related costs do not have to be borne by continuously growing funds from external resources—the combination of economic growth and the boost from UPE would put countries in a position to better meet those needs. There would remain other education needs, such as improving quality, expanding early childhood development, and supporting upper secondary education.

This is a plea then for both countries that have not yet met the goals and their external partners to stay the course. In global terms, the cost to donors is reasonable and most of the need for external assistance to get all children into primary and lower secondary can be met within a 20-25 year timeframe rather than the 15 year deadline that was set in 2000. An ongoing commitment would bring the historic result of educational opportunities for all children and allow the world to celebrate a critical success that will help advance other development goals. It would be a pity to give up when we are so close to achieving the goals.



Mary Joy Pigozzi, Ph.D.

Senior Vice President | *FHI 360*

Dr. Annababette Wils served from 2003-2011 as the founding research director of the Education Policy and Data Center (EPDC) at FHI 360. She developed EPDC's original projection models, authored many of its reports, and contributed to its data visualization system. Dr. Wils holds an M.A. in economics and a Ph.D. in demography from the University of Vienna, Austria.

Dr. George Ingram served from 2005-2009 as the founding director of the Education Policy and Data Center (EPDC). He played a key role in instituting the value of free access to reliable data as an important tool in transparent policy analysis and formulation in education. Dr. Ingram holds M.A. from Johns Hopkins School of Advanced International Studies and a Ph.D. in political economy from the University of Michigan.

UNIVERSAL BASIC EDUCATION

A Progress-based Path to 2025

By Annababette Wils, Ph.D., and George Ingram, Ph.D.*

As the target year for Education For All (EFA) 2015 approaches, it is time to think about how to best utilize the remaining years and about goals beyond this date. This policy brief is about EFA projections up to 2025.

We believe that reaching universal primary and lower secondary schooling is a matter of both equity and necessity, but recognize that this goal takes time. Our findings show that even though the 2015 EFA targets may be missed in some countries, *historical trends* lead to near-universal primary completion by 2025; lower secondary will take another decade. Our analysis focuses on the 40 poorest countries,¹ where half of today's out-of-school children live.

The analysis includes resources and costing: we find domestic financing can cover most of the costs, but support from the donor community is necessary to sustain progress. The total estimated requirement for external financing is projected to rise from US\$7 billion in 2010 to a peak in 2016 of US\$13 billion for primary and lower secondary together. Then a consistent decline begins as countries are increasingly able to finance their education budgets. The projections behind these findings are discussed in this brief.

Recent progress in the 40 countries included in this study has been remarkable. Average gross primary enrolment expanded from 64% in 1985² to 99% in 2008.³ Some of the most rapid education growth observed anywhere on the globe (and possibly in history) occurred among these countries.

* This paper owes many intellectual debts, in particular to the pioneering work of Barbara Bruns, Alain Mingat and Ramahatra Rakotamalala who wrote the first major costing study. We are grateful to Nick Burnett, Kevin Watkins, and Samer Al-Samerrai for engaging the EPDC in the Global Monitoring Report projections and the costing study upon which this paper builds, and thank the EPDC team for their work on those projects. We benefitted from the careful and critical review of many colleagues including Desmond Birmingham, Nick Burnett, Luis Crouch, HyeJin Kim, Mary Joy Pigozzi, Bob Prouty, David Sprague, and Rebecca Winthrop, as well as Kaaren Christopherson's careful editing. We are immensely grateful to their generosity and the countless invaluable improvements provided to this work by their insights.

But there is another side to the story. Of the 67 million⁴ children of primary school age who are not in school, half (32 million) are in these 40 countries; 15 million are in just 2 countries — Nigeria and Pakistan.⁵ In addition, approximately 80 million children of secondary school age in these 40 countries are not in school.⁶

Primary school intake is high in almost all of the 40 countries. *What remains to be done is largely to increase school retention and quality.* Rapid intake growth appears to have corresponded with a rise in dropout rates in some countries and in many countries dropout rates are high and persistent. Many new pupils are poor and have under-educated parents with too few resources to support their schooling.⁷ The capacity of many school systems is stretched to the limit with too few teachers, classrooms, and materials for the number of pupils.⁸

In this context, this paper asks three questions:

- **WHEN CAN THESE COUNTRIES REACH UNIVERSAL BASIC EDUCATION?**
- **WHAT ARE THE CONSTRAINTS?**
- **WHAT IS THE COST TO DONORS?**

Recently, UNESCO (2010) presented a study focusing on similar questions (the model for that study was produced jointly with the Education Policy and Data Center [EPDC] and authors of this brief). As is appropriate for the UN, the study was *target based* and asked: What is necessary to reach global Education for All (EFA) goals by 2015? This EFA scenario assumes all children are enrolled in primary and all children enter lower secondary by 2015, sufficient teachers are hired, and classrooms are constructed. According to this scenario, the financial support needed from donors to achieve these EFA goals by 2015 is US\$18 billion annually.⁹ These numbers contrast starkly with approximately US\$4 billion that was available from external donors in 2007 (UNESCO, 2010). This is a useful scenario to demonstrate the magnitude of the financing gap, but, unfortunately, not a likely picture of the path ahead.

An alternative approach is to make a projection using past progress as an indicator of future progress. In this approach, the *goals* will be the same as in the UNESCO study, namely, universal primary and lower secondary,¹⁰ as well as the improved pupil-teacher ratios, more classrooms and materials, and subsidies for marginalized children assumed in that study. These inputs are all necessary but not sufficient for improvements in quality. As with the UNESCO study, qualitative improvements to curriculum and teaching methods that improve learning are not included in the projections.

However, the assumptions for education *change* are *progress-based*, an extension of historical trends. Specifically: Countries advance at the historically average rates¹¹ or their own national progress, whichever is faster. This means countries with *slower than average rates of growth are nudged upwards to the average rate of overall progress* but no more than that. The projections further assume that the funds necessary for continued growth, in particular donor financing, are forthcoming, and that a portion is targeted to out of school marginalized students. The projections are to 2025.

Some countries' progress is stymied by political and violent unrest (Somalia, Eritrea). To assume a resumption of growth in these countries implies that the countries return to stability early in the projection period.¹²

In this progress-based scenario, what are the answers to our three questions? The answers differ for primary and lower secondary.

PRIMARY EDUCATION

- By 2025, 28 of these 40 lowest income countries will have primary completion rates above 90%; 38 will be above 80%.
- To reach these high levels of completion, dropout rates must decline (school entry is already near-universal). The projected declines in dropout rates are a continuation of historical trends, but supported by more per-pupil resources and US\$200–US\$300 million annual subsidies to marginalized students to enable these children to stay in school.
- The majority of the costs for primary could be financed domestically, based on the IMF's 2010 projections for economic growth in these countries. The total *need for external* funding for primary is around US\$4 billion currently, will peak at around US\$6 billion by 2016, and then decline.

SECONDARY EDUCATION

- By 2025, the average lower secondary gross enrolment rate will be 81%, up from an average of 44% in 2009; 21 of the 40 countries will have lower secondary gross enrolment rates above 80%.
- Constraints on lower secondary enrolment growth are: providing teachers for the expanding number of students; and an increase in the proportion of adolescents from poor households who go to secondary. Subsidies to these students would need to reach about US\$500 million by 2025.
- Again, the majority of costs can be financed domestically. Even so, the *external funding requirement* will grow from US\$3 billion in 2010 to US\$7 billion annually by 2016 *before starting to decline*.

The progress assumed in these projections is only possible with increased domestic financing as well as donor support at the levels calculated. Lower levels of support will result in slower progress.

This brief uses the same model as the UNESCO study, and the same data (albeit with some updates) so the differences between the two projections arise from the differing assumptions.*

The model is a bottom-up simulation of the education system. It includes population growth, intake into primary, and progression of pupils through to the end of lower secondary contingent on grade-specific repetition, dropout, and promotion rates. Private schooling is included. Only the costs of public schooling are modeled. A portion of the pupils — the children of poorly schooled parents — is categorized as marginalized children for whom subsidies are calculated. Public school teacher, classroom, and material needs are calculated. Per-pupil resource levels are raised, but the model does not deal with in-classroom and pedagogical changes that would improve learning levels. The domestic financial resources are estimated, based on GDP (growing at the IMF post-crisis projected rate) and the proportion of GDP going to basic education.* Finally, the finance deficit between costs and domestic budget is calculated.*

Increases in school access and completion, primary and lower secondary

Primary intake rates are already high (>90%) in most of the 40 countries, a reflection of the successful drive to provide school access since 2000. In 18 of the 40 countries, gross intake rates are in excess of 100%.¹³ In 2009, only three countries had intake rates below 90% — Cote d'Ivoire, Eritrea, and Somalia. These countries also have the largest gender gap: girls have far lower entry than boys.

To project the intake rates for these three countries, as well as necessary declines for countries with excess intake rates, global trends were analyzed. A regression analysis based on *all countries with UIS data* shows intake changes as a linear function of its level and converges to a stable rate of 100%.¹⁴ For the projection of the 40 countries, the average coefficient of the linear function was used, or one that was based on the countries' own progress, whichever of the two was larger. Based on these assumptions, the projection for intake rates in all the countries would very nearly converge at the long-term stable level of 100% by 2025.

In contrast to intake rates, the primary completion rates and lower secondary enrolment rates in most of the 40 countries are low. Only one country — Kenya — had 100% primary completion and lower secondary enrolment rates in 2009.¹⁵ Partly, these generally low rates are the lagged outcome of low intake rates from earlier years, but a more important component is high primary dropout rates and low transition rates to secondary school. Too many children leave primary after just a few years of schooling.

An analysis of dropout rates shows that *globally and on average*, dropout rates over the past 10 years have declined. In countries where the dropout rates were higher, the declines were faster; dropout rate change is

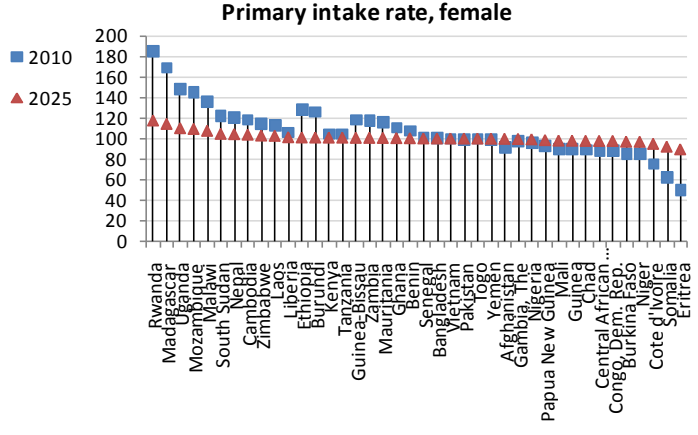
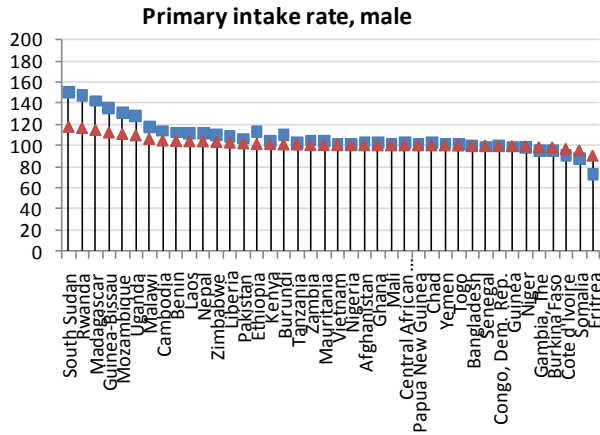
a negative linear function of the dropout rate level. To project future dropout rates, the average regression coefficient of decline is used, or the one that was based on the countries' own progress, whichever of the two produced faster dropout declines. A similar analysis and approach were applied to the repetition rates and transition rates.¹⁶

With these assumptions for progression through school, the primary completion rates would be over 90% in 28 of the 40 countries by 2025, and over 80% in 38. Lower secondary gross enrolment rates would rise to over 80% for half of the 40 countries with the projected growth rates. *Even with this less-than-ideal outcome, the absolute increases in the number of lower secondary students over the 15-year period from 2010 to 2025 is greater than three-fold in half of the 40 countries, or, higher than 7% annual growth.* Although these increases pose a "real challenge,"¹⁷ in the period 2000–2009, 27 developing countries managed over 7% annual secondary pupil growth, and of these, 19 sustained average growth rates of over 10% annually.¹⁸ This is evidence that such growth is not uncommon.

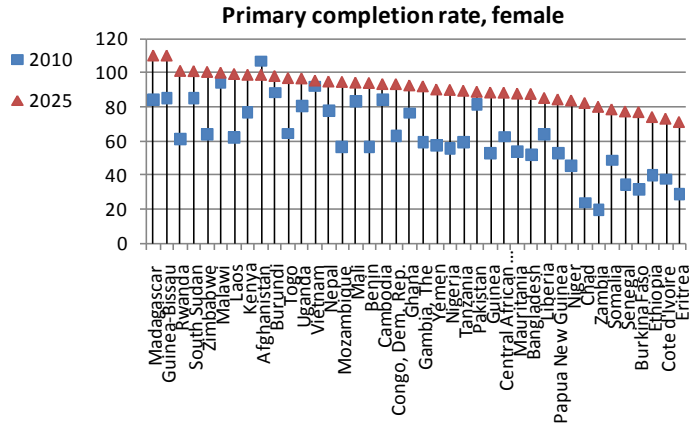
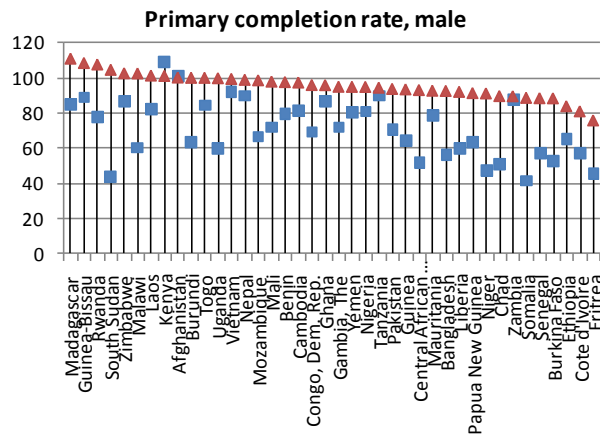
Girls are projected to have similar intake rates to boys, but are projected to continue to lag behind in primary completion and lower secondary enrolment, clearly an area where policy intervention is necessary.

It is possible that any one of these countries will, in fact, perform better than the average assumed here. Similarly, some countries could do worse. The precise distribution of countries will likely differ from this projection, but the overall picture, if growth continues *at least* at the average pace observed before 2010, would remain similar.

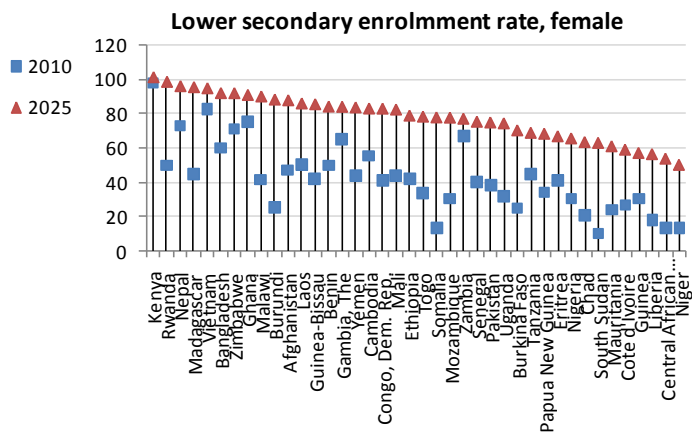
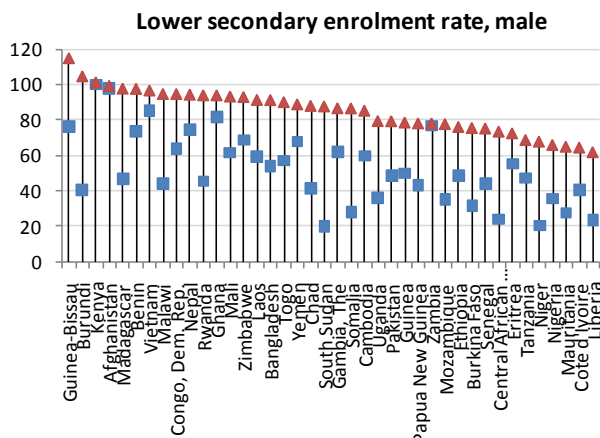
GROSS INTAKE RATE TO PRIMARY CONVERGES AT 100% BY 2025.



PRIMARY COMPLETION RATE RISES SUBSTANTIALLY AND APPROACHES UNIVERSAL COMPLETION BY 2025, RISING TO OVER 90% IN 28 OF THE 40 COUNTRIES. DIFFERENCES BETWEEN MALE AND FEMALE COMPLETION RATES REMAIN.



LOWER SECONDARY ENROLMENT RATES MORE THAN DOUBLE IN MANY COUNTRIES, BUT WITH AVERAGE GROWTH RATES, UNIVERSAL LOWER SECONDARY ENROLMENT IS NOT ACHIEVABLE BY 2025. ANOTHER DECADE OF EXPANSION WILL BE NEEDED.



Increased resources for pupils: teachers, materials, and subsidies

In many poor countries resources per pupil are low, meaning there are too few teachers, too few classrooms, and too few teaching materials for each pupil.¹⁹ In some countries the situation has worsened rather than improved. Where the number of pupils has grown rapidly, the supply of public education resources — teachers, classrooms, materials — has often fallen behind. But in places where pupil growth has been slower, the per-pupil resources have generally improved.

A statistical regression analysis of the global changes in the pupil-teacher ratios (PTR) from 2000–2010 shows a) a negative influence of high pupil growth and b) an overall tendency of improvement in the provision of teachers and classrooms.²⁰ In the projections, change in the PTR is based on the balance of these two opposing effects. The value of that balance is determined from year to year by consistent coefficients from the regression analysis and the status of the country. If the PTR changes according to this model, then by 2025, the PTR in almost all of the countries will be 40 for primary and 35 for lower secondary, meeting international benchmarks.²¹ The pupil-classroom ratio (PCR) is projected with the coefficients from PTR (due to insufficient data for a PCR model); classroom provision follows close behind that of teachers.²²

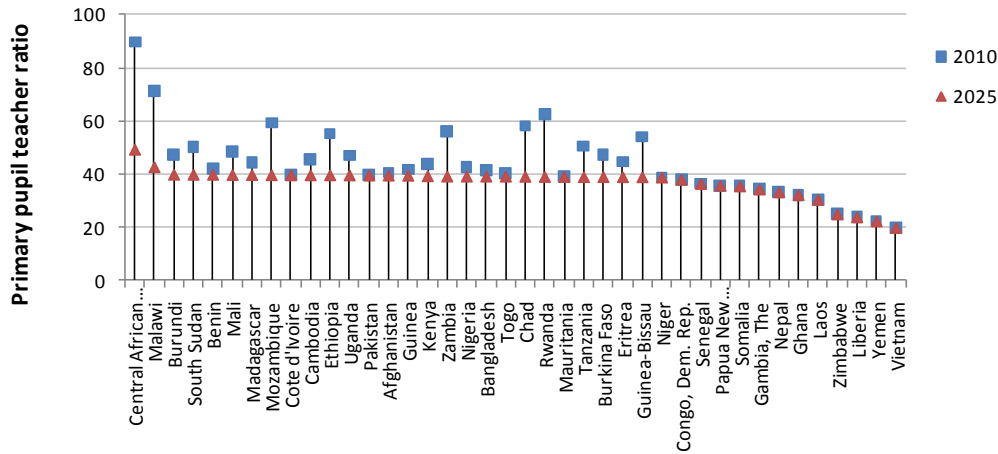
The provision of materials in most countries falls below what is needed, if the OECD average of recurrent expenditure on non-teacher-salary items (25%) is used as an indicator. Expenditure on materials can change quickly (and has in some instances), but on average, the percent of the budget for materials changes by just a little over one percentage point annually.²³ With this average increase, all budgets could include 25% non-salary recurrent expenditure by 2025.

Many of the children who are not in school or leave school early are marginalized, the UNESCO 2010 *Education for All Global Monitoring Report* tells us. They are poor, living in remote areas, from under-educated parents or a minority group or are girls. Parents often cite inability to finance school and the need for child labor as reasons their children are not in school. Programs that have addressed these costs—family subsidies and school feeding in Brazil, Kenya, Nepal, Vietnam, Mozambique, and other places have achieved remarkable results (UNESCO, 2010).

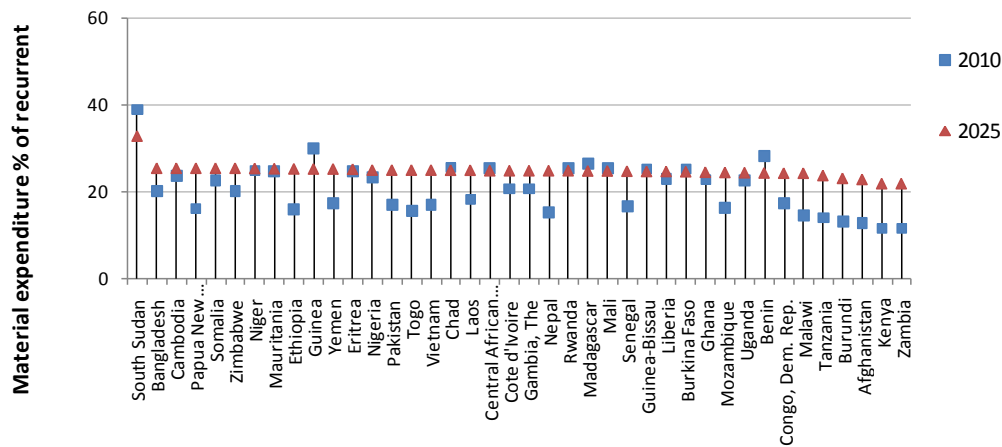
If education is to become universal, at least some of these marginalized children need extra support. This reasoning is behind a set of subsidies for marginalized children that are included in the UNESCO (2010) EFA costing study and in this EPDC study. As a group, the marginalized children are counted as those with illiterate parents (so the marginalization rate is equal to adult illiteracy).²⁴ Subsidies for marginalized pupils are two-fold: a direct subsidy to the family, and additional resources in the schools.

The UNESCO costing includes subsidies for *all* marginalized children.²⁵ However, many marginalized children are already in school today, with whatever support (or lack thereof) is provided by existing systems. In our projections, the subsidies are calculated only for marginalized children who are *added* to the school system. With our more limited assumption, in any year, as many as 30% of pupils in primary or lower secondary would receive subsidies and/or special resources, but the number of countries that would have extensive new subsidy programs would be small. In reality, the subsidy need may lie in between UNESCO's and our estimates, depending on the country.

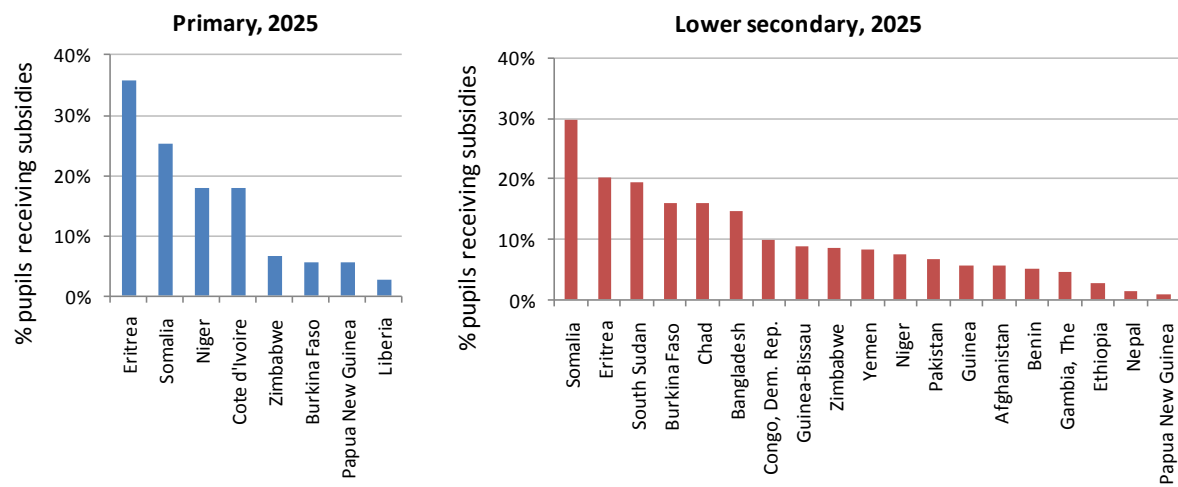
GLOBALLY, AVERAGE RATES OF CHANGE IN PTR WOULD ALLOW THE PRIMARY PTR LEVELS IN ALL THE COUNTRIES TO REACH BENCHMARK LEVELS OF 40 BY 2025, DESPITE HIGH PUPIL GROWTH. PTR FOR LOWER SECONDARY WOULD REACH THE INTERNATIONAL BENCHMARK LEVEL OF 35.



IN MOST COUNTRIES, EXPENDITURES ON MATERIALS FALL SHORT OF NEED, APPROXIMATED BY THE PROPORTION OF EXPENDITURE ON MATERIALS IN OECD COUNTRIES. GRADUAL INCREASES OF 1 PERCENTAGE POINT ANNUALLY WOULD ALLOW ALL COUNTRIES TO REACH OR NEARLY REACH THE AVERAGE OECD PROPORTIONS FOR MATERIALS EXPENDITURE LEVELS BY 2025.



SUBSIDIES ARE CALCULATED TO ENABLE OUT-OF-SCHOOL MARGINALIZED CHILDREN TO ATTEND SCHOOL. BY 2025, MOST OF THE SUBSIDIES WOULD BE CONCENTRATED IN A SUB-SET OF THE POOREST COUNTRIES.



Total costs, domestic expenditure on basic education, and the finance gap

The calculation of the costs for the projected education expansions is basically repeated multiplications: the number of pupils is multiplied by per-pupil resources — pupil teacher ratio, pupil classroom ratios, materials costs, subsidies for marginalized pupils — to get absolute numbers of teachers, classrooms, materials, and subsidies, and these are multiplied by the unit costs to obtain total costs.²⁶

Unit costs for teachers — salaries — are correlated with national GDP per capita. Data show that teacher salaries *relative to GDP/cap* are higher in poor countries — ~5x GDP/cap in countries with a GDP/cap below \$500, whereas in middle- and high-income countries, starting from approximately US\$1,500, the salaries are about double the GDP/cap. As GDP/cap increases,²⁷ the model projects teacher salaries to rise non-linearly with it, as the *relative value* shifts in line with the observed convergence to 2x GDP/cap at US\$1,500.²⁸

Other unit costs in the model are taken directly from the UNESCO (2010) study.²⁹ Classroom construction costs are set at a constant US\$13,500 for primary and US\$17,000 for lower secondary classrooms.³⁰ For marginalized pupils there are: a) direct subsidies per pupil to the family for primary students and lower secondary students, equal to 5% and 7.5% of GDP/cap, respectively;³¹ b) subsidies to schools for each marginalized pupil, equivalent to 33% of average per-pupil costs.

With these pieces in place, costs for primary and lower secondary education can be calculated for each country, year by year. The total costs for all 40 countries together increase from US\$14 billion for primary in 2010, to US\$27 billion in 2025; for lower secondary the total number rises from US\$7 billion in 2010 to US\$20 billion in 2025. In primary, about 60% of the

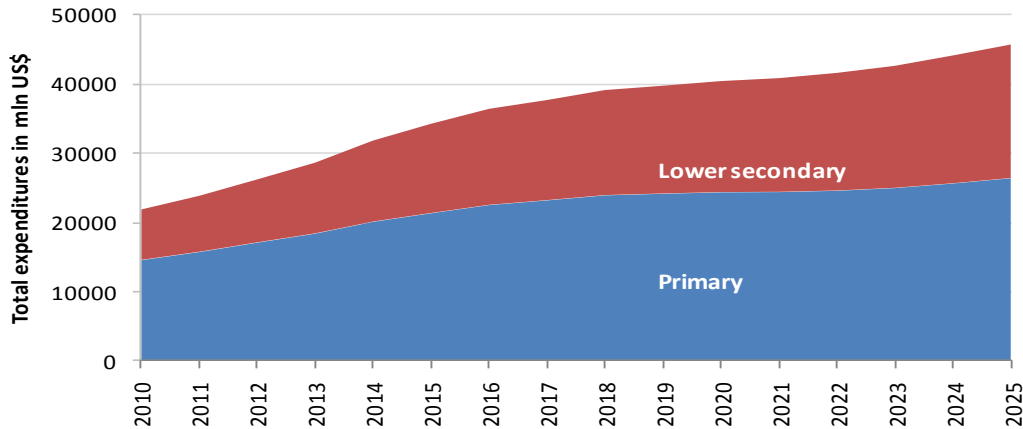
expenditure growth is due to rising enrolment and subsidies; 40% of the expenditure growth is due to more resources per pupil (teachers, classrooms, materials). In lower secondary, 85% of the rising costs are due to pupil growth.³²

Although the absolute costs of education will rise, the IMF also projects country levels of GDP to grow, despite the 2009–2010 economic crisis. On balance, the education expenditure as a *proportion* of GDP will not decline by much. Throughout the projection period, *education expenditures* as a proportion of GDP in many countries are high — above 5% in nine countries in 2010 and the highest value at 9%.

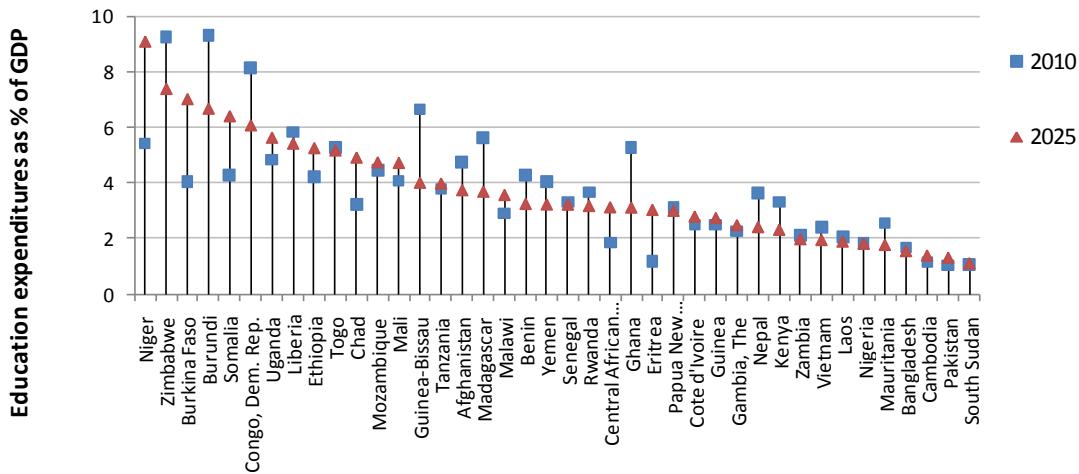
Comparatively, UNESCO (2010) suggests that 2–3% of GDP³³ is a reasonable benchmark for the public domestic fiscal contribution to basic education. The actual domestic *public education budgets* range from 1–8%,³⁴ suggesting that some countries have room for more domestic resource mobilization. For the projections, the domestic basic education budget, if under the 2-3% benchmark, is assumed to grow at the average of the historical rates of change,³⁵ which would allow all countries to reach the 2–3% of GDP budget benchmarks by 2025. Even with this change the expenditures will exceed the domestic budget levels in many countries throughout the projection period.

The remaining gap between expenditure needed and domestic budget available will need to be financed externally. For primary schooling, the projections are for the external annual finance need to rise from US\$4 billion in 2010 to US\$6 billion by 2016, and after that to decline. For lower secondary, the external financing requirement *grows* from US\$3 billion in 2010 to a peak of \$7 billion in 2016 and then starts to decline.

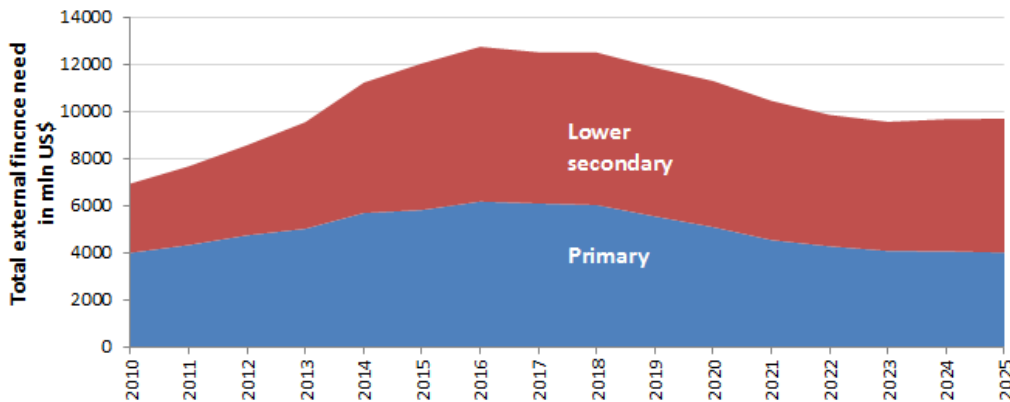
TOTAL EXPENDITURES ON PRIMARY AND LOWER SECONDARY EDUCATION FOR ALL 40 COUNTRIES TOGETHER INCREASE FROM US\$14 BILLION FOR PRIMARY IN 2010, TO US\$27 BILLION IN 2025; FOR LOWER SECONDARY, THE TOTAL NUMBER RISES FROM US\$7 BILLION IN 2010 TO US\$20 BILLION.



PRIMARY AND LOWER SECONDARY EDUCATION EXPENDITURES AS A PERCENT OF TOTAL GDP RANGE FROM 1–9% IN 2010. THOSE PERCENTAGES DECLINE ONLY SOMEWHAT BY 2025. IN MANY COUNTRIES EXPENDITURES EXCEED THE MAXIMUM SUSTAINABLE DOMESTIC BUDGET FOR PRIMARY AND LOWER SECONDARY, ESTIMATED AT 2–3%.



THE TOTAL EXTERNAL FINANCE REQUIREMENT RISES FROM A LITTLE OVER US\$7 BILLION IN 2010 TO A PEAK OF US\$13 BILLION IN 2016 AND THEN STARTS A SUSTAINED DECLINE AS DOMESTIC RESOURCES INCREASINGLY COVER MORE OF EDUCATION COSTS.



Constraints on the scenario — teacher growth, marginalized pupil support, and external financing

Although the projections are based on historical growth rates for each individual indicator (except for marginalized subsidies), some of the compounded changes appear quite large. Three factors in particular could pose constraints on the projections — absolute lower secondary teacher growth in some countries, the support subsidies for marginalized pupils, and the external financing needs.

The projected annual growth rate for lower secondary teachers is highest for South Sudan — 16% — but it is also starting from one of the lowest bases. Other countries with growth rates projected in excess of 10% annually are Niger, Somalia, Central African Republic, Liberia, Burkina Faso, and Uganda — 15% of the 40 countries. The same rates of lower secondary teacher growth were also observed in 15% of developing countries in Asia, Africa, and the Pacific from 2000–2010,³⁶ suggesting that, although high, the projected rates are feasible. The projected growth rates for primary teachers are much lower and well *within what other countries already have achieved*.³⁷ These are hopeful insights given the pessimism that prevails in some documents about teacher provision — although more acute shortages may still prevail in certain subjects, such as math and science.

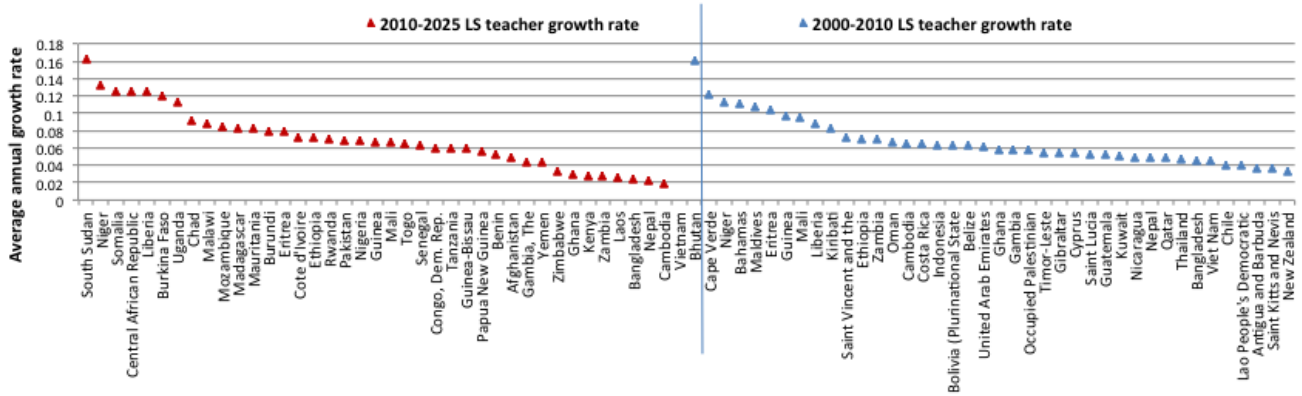
Subsidies for marginalized children have been implemented in many countries, as have various measures to recruit experienced teachers to remote areas and bring classrooms closer to under-served groups (UNESCO, 2010). Many of these initiatives have a measurable impact. There is no inventory of the total expenditures on such subsidies today, but in the scenario, the projected total costs of *new* subsidies for marginalized pupils are projected to rise to \$700 million annually by 2025 (with a growing proportion for lower secondary). This is likely a higher investment than is being made today. A failure to implement some kind of support for marginalized children would quite certainly result in slower education growth.

Finally, the external financing levels necessary are higher than what has been available historically — triple the US\$4 billion that was available for basic education in 2007. This does not include private flows to basic education, which are not tracked. A tripling of ODA would cover all of the finance gaps. The highest need for external finance will be around 2015; after that, the need declines and will continue to decline as countries' own GDP expands while basic education growth slows.

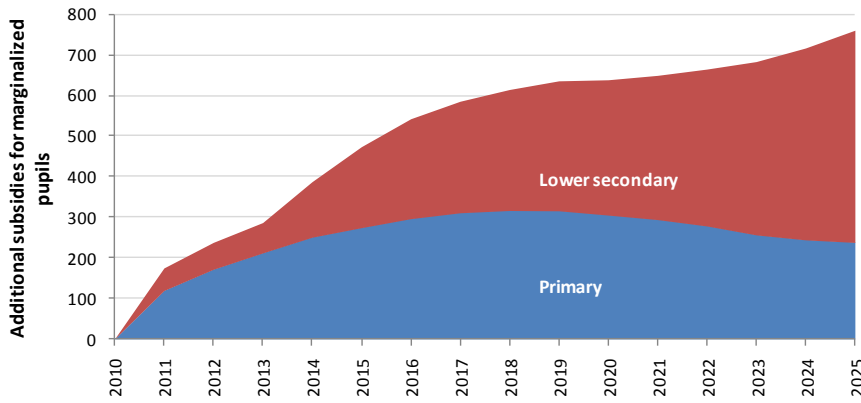
A failure to provide this external funding would seriously constrain the expansion of education. In 2015, external funding needed is 34% of the total basic education expenses in these countries. By 2020, this gap will have declined to 27%, and by 2025 to 20%. In other words, countries will increasingly be able to finance their own basic education. **The need is greatest in the coming decade.**

IN CONCLUSION, the foundation for universal primary and lower secondary access and completion has been built and is solid. Universal primary education is within sight and universal lower secondary is near. There are funding needs from donors, but they are definable and affordable and will decline within the projection period. So, a donor commitment to getting all children into and through primary and lower secondary would be a global commitment with a defined end-game. That does not speak to the further need to improve the quality of education. It is our sincere hope and anticipation that, given these clearly defined parameters, the international community will help to sustain the path these poorest countries are on and will enable their success at achieving universal basic education.

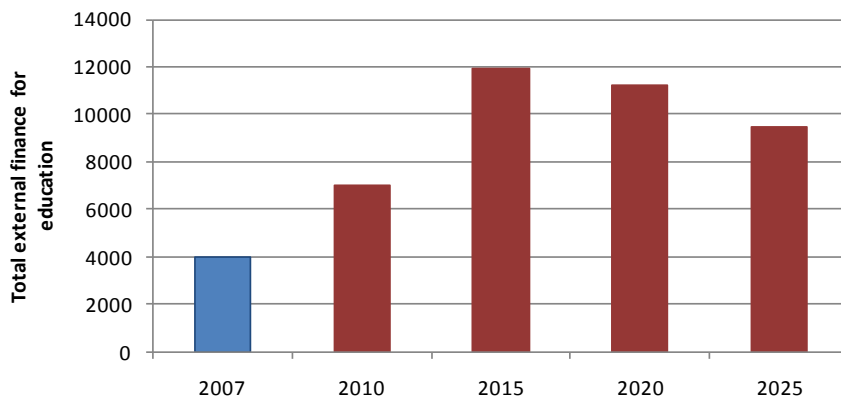
PROJECTED LOWER SECONDARY TEACHER GROWTH RATES ARE (>10%) VERY HIGH IN 7 OF THE 40 COUNTRIES. THIS KIND OF GROWTH IS AT THE LIMIT OF WHAT WAS ACHIEVED HISTORICALLY IN THE PERIOD 2000–2010.



THE MODEL PROJECTS ADDITIONAL SUBSIDIES TO ENROLL TODAY'S OUT-OF-SCHOOL MARGINALIZED CHILDREN. THESE AMOUNT TO US\$200–US\$300 MILLION ANNUALLY FOR PRIMARY. SUBSIDIES NEEDED FOR LOWER SECONDARY ARE PROJECTED TO RISE CONTINUALLY AS MORE MARGINALIZED CHILDREN ENTER THIS SCHOOL LEVEL.



THE TOTAL ODA AVAILABLE TO BASIC EDUCATION WAS US\$4.1 BILLION IN 2007. THIS DOES NOT INCLUDE PRIVATE FLOWS TO BASIC EDUCATION, WHICH ARE NOT TRACKED. A TRIPLING OF ODA WOULD COVER ALL OF THE FINANCE GAPS IN 2015. THE HIGHEST NEED FOR EXTERNAL FINANCE IS 2015–2020; AFTER THIS, THE NEED DECLINES BECAUSE COUNTRIES' OWN GDP EXPANDS WHILE ENROLMENT GROWTH SLOWS AS BASIC EDUCATION SATURATES. THE FINANCING NEED IS GREATEST IN THE NEXT DECADE.



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APPENDIX A. TABLE OF ASSUMPTIONS FOR PROGRESS-BASED SCENARIO

Indicator	Equation and assumptions	Source
Gross intake rate, GIR_t	$GIR_t = GIR_{t-1} + \max(.1, c^+) * (100 - GIR_{t-1})$	Regression of UIS data on GIR
Dropout rate primary, dr_t	$dr_t = dr_{t-1} - \max(.1, c^+) * dr_{t-1} * c$; IF $GIR > 95$, $c = 1$, else $c = .5$	Regression of EPDC/UIS data on dropout
Repetition rate primary, r_t	$r_t = r_{t-1} - \max(.058, c^+) * r_{t-1}$	Regression of EPDC/UIS data on repetition
Dropout rate lower secondary	Same as dropout for primary	Regression for primary
Repetition rate lower secondary	Same as repetition for primary	Regression for primary
Transition to lower secondary, t_t	$t_t = t_{t-1} + \max(.04, c^+) * (1 - t_{t-1})$	Regression of UIS data on transition
Pupil teacher ratio primary, PTR_t	$Max(40, PTR_{t-1} * e^{(-.64 + .44 PupilGrowth_{t-1} - .05 PTR_{t-1}/100)})$	Regression of UIS data on pupils and PTR
Pupil classroom ratio primary	Same as PTR primary	
Pupil teacher ratio lower secondary	Same as PTR primary, with limit = 35	
Pupil classroom ratio lower secondary	Same as PTR lower secondary	
% recurrent on materials, Mat_t	$Mat_{t-1} + (25 - Mat_{t=0}) / (2025 - T_0)$, where 25 is the target material expenditure and 2025 the target year	Average material expenditure in OECD as % of recurrent, UIS.
Number of marginalized pupils, MP	$M * (GER - \%NM) / \%M$, Where M is number of marginalized children, and %M is percent of marginalized children = illiteracy rate. % non-marginalized children, %NM = 1 - %M	Projections of literacy rate from model.
Teacher salary multiple, $Mult_t$	$Mult_{t-1} + \min(0, c * (GDP_t - GDP_{t-1}))$, Where $c = (Mult_{t=0} - M) / (1500 - GDP_0)$. At target GDPcap = 1500, the teacher salary multiple equals the target, M. M = 2 for primary and 3 for lower secondary.	Based on non-linear regression of teacher salary on GDP per capita, and a heuristic linear relationship approximating the regression results.
Classroom construction cost	\$13,500 for primary and \$17,000 for lower secondary	Theunynck (2009) used by UNESCO (2010)
Classroom maintenance costs	\$270/year for primary and \$340/year for lower secondary	Theunynck (2009) used by UNESCO (2010)
GDP growth rate	IMF World Economic Outlook October 2010 to 2015. From 2016-2025, 5% annually for all countries	IMF World Economic Outlook
Target GDP to education	3.4% of GDP (17% of GDP to public expenditure, and 20% of public to education)	Bruns et al. 2003:73
Distribution of education expenditure	% expenditure on primary: $34 + (DP - 4) * 8$ % expenditure on LS: $(38 - (DLS - 4) * 4) * DLS / DS$, Where, DP = duration primary; DLS = duration lower secondary; DS = duration secondary	UNESCO (2010) based on Lewin, 2008

+ c is the country-specific coefficient based on the country's historical data from 2000-08.

APPENDIX B. DATA FOR OUT-OF-SCHOOL PRIMARY AND SECONDARY CHILDREN FOR 40 COUNTRIES[†]

	OOS Primary (GMR) (1000's)	Secondary NER (GMR)	Overage primary GER (UIS)	Secondary school-age population (1000s)	OOS Secondary Est. (1000s)
Afghanistan	...	26	21	3622	1916
Bangladesh	1837	41	5	23671	12894
Benin	244	29	12	1282	759
Burkina Faso	1002	14	5	2238	1806
Burundi	244	29	29	1342	567
Cambodia	220	34	30	2168	780
Central African Rep.	310	29	18	660	353
Chad	...	29	21	1654	827
Congo, Dem. Rep.	...	29	21	8737	4370
Côte d'Ivoire	...	29	21	3097	1549
Eritrea	349	25	11	743	475
Ethiopia	3721	24	19	10701	6067
Gambia	80	40	12	199	96
Ghana	930	45	27	3077	865
Guinea	362	30	14	1452	814
Guinea-Bissau	...	29	21	159	79
Kenya	769	45	25	5279	1618
Laos	104	36	29	918	322
Liberia	447	29	53	478	89
Madagascar	20	21	41	3043	1154
Malawi	314	24	28	2069	992
Mali	763	29	10	1726	1064
Mauritania	89	17	21	418	260
Mozambique	954	3	34	2430	1534
Nepal	714	42	44	...	...
Niger	1262	9	6	2045	1737
Nigeria	8221	27	28	19905	8865
Pakistan	6821	32	19	28220	13860
Papua New Guinea	...	29	21	834	417
Rwanda	88	29	39	1338	429
Senegal	506	22	5	1888	1366
Somalia	...	29	21	1126	563
South Sudan	...	29	21	...	...
Tanzania	143	29	10	5411	3288
Togo	222	29	16	991	545
Uganda	341	19	21	4368	2631
Viet Nam	...	29	21	...	...
Yemen	906	37	12	3369	1706
Zambia	108	41	22	1385	514
Zimbabwe	281	37	12	2023	1028
TOTAL	32373				78205

[†] GMR refers to UNESCO, 2011; UIS refers to online data search, May 2011.

APPENDIX C. DATA FOR 1985 GROSS ENROLMENT RATE FOR 40 COUNTRIES (WORLD CONFERENCE ON EDUCATION FOR ALL, 1990)

	PRIMARY GER			SECONDARY GER		
	Male	Female	Both (est.)	Male	Female	Both (est.)
Afghanistan	27	14	21	10	5	8
Bangladesh	55	49	52	24	11	18
Benin	84	43	64	23	9	16
Burkina Faso	41	24	33	8	4	6
Burundi	65	50	58	6	3	5
Cambodia	-	-	...			...
Central African Republic	82	51	67	17	5	11
Chad	75	29	52	10	2	6
Congo, Dem. Rep.	84	68	76	32	14	23
Cote d'Ivoire	62	56	59	27	11	19
Eritrea			...			...
Ethiopia	46	28	37	18	12	15
Gambia, The			...			...
Ghana	78	63	71	49	32	41
Guinea	41	16	29	13	4	9
Guinea-Bissau			...			...
Kenya	98	93	96	27	19	23
Laos	121	100	111	27	19	23
Liberia	43	24	34	22	9	16
Madagascar	97	92	95	23	19	21
Malawi	73	59	66	5	3	4
Mali	29	17	23	9	4	7
Mauritania	61	42	52	23	9	16
Mozambique	75	59	67	7	4	6
Nepal	115	54	85	41	15	28
Niger	37	20	29	9	3	6
Nigeria	89	71	80	52	18	35
Pakistan	51	28	40	26	11	19
Papua New Guinea	75	64	70	19	9	14
Rwanda	69	66	68	7	5	6
Senegal	71	49	60	19	10	15
Somalia	20	10	15	12	6	9
South Sudan			...			...
Tanzania	67	66	67	5	3	4
Togo	124	78	101	36	12	24
Uganda	76	63	70	19	9	14
Viet Nam	105	99	102	43	40	42
Yemen	97	38	68	25	9	17
Zambia	102	92	97	28	13	21
Zimbabwe	139	132	136	34	35	35
AVERAGE	74	54	64	22	11	16

ENDNOTES

- ¹ The list of countries is in Appendix B and C. Seven countries categorized by the World Bank as low-income countries were excluded from the study.- Haiti, North Korea, and Sierra Leone for lack of data on school progress; Kyrgyzstan, Myanmar, Tajikistan, and Uzbekistan because UPE has already been achieved. North Sudan was included as a country in the UNESCO study upon which the model for this paper is based, but was excluded in our study because it is middle-income.
- ² Data taken from Table 4 in Appendix 1 of: World Conference on Education for All (1990).
- ³ Data from UIS. If 2008 data were not available, an estimate was made based on projections using the scenario described in this report.
- ⁴ UNESCO (2011) Statistical tables.
- ⁵ Numbers for 2008 from UNESCO (2011) Statistical tables. Does not include Afghanistan, Chad, Democratic Republic of Congo, Cote d'Ivoire, Guinea-Bissau, Papua New Guinea, Somalia, South Sudan, and Vietnam, for which no estimates were available. There were 67 million primary school age children estimated to be out of school in the world in 2008. Other countries with a million or more children out of school not included in our study are: India, China, USA, Philippines, and Brazil.
- ⁶ Approximation based on UNESCO (2011) Statistical tables. The tables provide country-specific data for 19 of the 40 countries, with a total of 22 million adolescents out of school there. Our approximation is based on the assumption that the total net enrolment rate (ANER) for secondary is the same in the missing 21 countries as in the 19 for which data are available.
- ⁷ Lewin and Sabates (2010), Kattan and Burnett (2004), Kattan (2006) on barriers to school.
- ⁸ The pupil-teacher ratio ranged from 50–100 in 10 of the 40 countries in the study.
- ⁹ The UNESCO study estimates a total annual external finance need of \$25 billion. That number includes financing for pre-school and adult literacy training, which are not considered in this paper.
- ¹⁰ The EFA goal for primary is usually interpreted as 100% primary completion by 2015. In the UNESCO study, a GER of 100% + the repetition rate was used as a proxy. There is no EFA goal for lower secondary per se; in the UNESCO study, universal transition to lower secondary by 2015 is assumed as part of the fulfillment of the EFA goal pertaining to youth opportunities. See UNESCO (2011), or the background paper (EPDC and UNESCO, 2011) for more information.
- ¹¹ The historically average rates of change for all indicators are calculated based on the period 2000-2009, using available data from UIS. A more extensive description of the estimates can be obtained from the authors and will be made available online.
- ¹² Even if the countries do not return to stability immediately, it is likely that there would be a peace dividend of high growth following the return to more stable conditions, similar to what was observed in South Sudan, Sierra Leone, Mozambique, Nicaragua and other post-conflict countries (see e.g., Kim et al. 2011). In such dividend periods, many lost years can be made up.
- ¹³ Intake rates in excess of 100% are actually only possible for a short number of years following a period of low intake rates. Underlying high recorded intake rates may be under-reported repetition, or faulty reporting. If repetition is under-reported, then dropout rates are actually lower than estimated. However, for projections of the number of students and completion rates it does not matter whether intake rates are over- and repetition is under-reported, see a discussion of this in Wils, 2011.
- ¹⁴ The function for intake rate growth $\Delta \text{GIR}_t = \max(.1, c) * (100 - \text{GIR}_{t-1})$, where ΔGIR_t is the change in GIR from the year $t-1$ to t , c is the country-specific coefficient for historical GIR change. In each year, the new level of intake rate, $\text{GIR}_t = \text{GIR}_{t-1} + \Delta \text{GIR}_t$. When GIR is greater than 100, the growth rate is negative, and GIR declines towards the sustainable level of 100. This function ignores the observation that in many countries intake rates temporarily rise above 100.
- ¹⁵ UIS most recent reported rate for completion in Kenya is 90 for 2005. The high estimate mentioned here is based on a) UIS recording of the number of pupils in the last grade and b) estimates of the % of repeaters based on historical progress. The number of pupils in the last grade of primary increased rapidly from 2005 to 2009, probably as a delayed result of the intake rate bulge in Kenya following the removal of fees.
- ¹⁶ See Appendix A for average coefficients.
- ¹⁷ Mingat et al. (2010) commenting on growth in Africa in their study for the 15-year interval up to 2020.
- ¹⁸ Based on UIS data for number of secondary pupils, accessed November 2010.
- ¹⁹ In 2009, the average number of pupils per teacher (PTR) in the pool of 40 countries was 45 and in 10 countries there were more than 50 primary pupils per teacher. For classrooms it is even worse: there were 53 primary students for each classroom (PCR). The numbers are better for lower secondary (32 pupils per teacher and 43 per classroom) but still too high in many countries. In addition, the expenditures on teaching materials can be very low. In OECD countries, with universal and relatively high quality education, the average bill for non-salary recurrent expenditure is 25% of the total recurrent expenditures. In half of the 40 countries in this study it is lower, sometimes significantly so.
- ²⁰ The function for pupil teacher ratio change $\Delta \text{PTR}_t = -.64 + .44\text{PupGrowth} - .05 \text{PTR}_{t-1}$. This function was found by regressing the average annual change in PTR from 2000–2010 for all countries with available data and using only the years available, on the average annual pupil growth in the same years, and the initial value for PTR.
- ²¹ In 2003, Bruns et al. proposed international benchmarks for per-student resources, based on detailed study of countries' enrolment growth. UNESCO's EFA study used these benchmarks, and we also use them as goals. The benchmarks are 40 pupils per teacher and classroom in primary, and 35 for lower secondary school. According to the projections here, primary PTR and PCR will meet the benchmark of 40 in 37 and 32 of the 40 countries, respectively, by 2025; for lower secondary 38 and 34 countries, respectively, will have PTR and PCR meeting the benchmark of 35 by 2025.

²² In many countries the PCR is higher than PTR, in part due to classrooms being used in double or even triple shifts.

²³ Estimate is based on average annual change of the percentage of education budget spent on non-salary recurrent expenditures from UIS, for years 2000–2009. All countries with available data included.

²⁴ The proxy of illiterate parents is taken from the UNESCO Global Monitoring Report (2010) and is explained there. Other proxies are also possible (e.g. income), but parent illiteracy captures a) a higher probability that the household is in poverty, the child is malnourished and other factors that make schooling more difficult, and b) there is less educational support in the home in the form of reading, homework help, books, and so forth.

The illiterate population is computed in the model for the age group 15+ by gender. Starting from an observed base value for literacy, literacy increases as young adults who have had at least 5 years of primary schooling enter the 15+ age-group, and as adults graduate from literacy programs (in the progress-based scenario no adult literacy programs are assumed), while mortality causes slow attrition. Over time, the literacy rates in the 40 countries rise, and the portion of target marginalized children proxied by this indicator declines.

We know that non-marginalized children have easier access to school. In the model, this observation is simplified to one where non-marginalized children (%NM) enter school first, and, once all of these children are in school, then marginalized children (%M) gain access. In equations, the enrolment rate of non-marginalized children is equal to the maximum of 100% or the ratio of overall GER/%non-marginalized.

The enrolment rate of marginalized children is equal to $(GER - \%NM) / \%M$.

The absolute number of marginalized pupils MPupils = $M * (GER - \%NM) / \%M$, where M is the number of marginalized children.

²⁵ It is not possible to measure exactly, the number of marginalized children. In the UNESCO study, the complete population of marginalized children *as estimated by the model assumptions* was included to receive subsidies.

²⁶ The exact calculations are a little more differentiated.

- Total teacher costs_t = pupils_t * PTR_t * average teacher salary_t.
- Total classroom costs = (Classrooms needed – existing classrooms) * classroom construction cost, and the existing classrooms are an inventory that depreciates by δ , or 1/life of classrooms, and appreciates by the building of new classrooms.
- Total material costs = Total teacher costs/%Mat, where %Mat is the expenditure for materials as a percentage of the total expenditure on teacher salaries.
- Marginalized pupil subsidies to families = MPupils * ms * GPD/cap, where MPupils is the absolute number of pupils who are marginalized children and ms is subsidy as % of GDP/capita.
- Marginalized pupil subsidies to schools = %MPupils * (Total teacher costs + Total classroom costs + Total material costs)

²⁷ For GDP and GDP per capita growth, the most recent IMF World Economic Outlook projections are used. The time horizon for these projections is 2015. From 2015–2025, an across the board economic growth rate of 5% is used.

²⁸ A regression of the primary teacher salary multiple of GDP/capita on GDP/capita provided a best fits with two non-linear equations:

- 1) Salary multiple, $sm = -0.689 * \ln(x) + 7.9511$ and,
- 2) $Sm = 19.033 * x^{-0.301}$, where $x = GDP/capita$.

The second of these equations provides a more plausible convergence of the teacher salary at a stable ratio to GDP/capita and is therefore chosen for the study. When the GDP/capita = \$1,500, the multiple with this equation would be 2.106. Because the equation is cumbersome to use in the model, a simplified modification is applied where the teacher salary multiple changes linearly from its starting level to a value of 2 at GDP/capita = \$1,500. Lower secondary teacher salaries were, on average, little over 33% higher than primary teacher salaries, and are set to converge at 2.7 times the GDP/capita at \$1,500.

²⁹ For further discussion, see the UNESCO (2010) study or the background paper (EPDC and UNESCO, 2010).

³⁰ A study by Theunynck (2009) was used for the classroom construction estimate. It may be possible to build schools more cheaply using local materials, volunteered local labor, or with other cost-saving measures.

³¹ Comparatively, the total expenditure per primary pupil (without additional marginalized subsidies) varied from 3–26% of GDP per capita in 2010; and from 5–23% of GDP per capita in 2025.

³² An alternative projection was made, in which PTR, PCR and the percent of budget for materials was kept constant from 2010 forward. The growth in expenditures in this alternative scenario was compared to the main projection of the paper.

³³ The benchmark varies depending on the country. UNESCO (2010) set the following levels, following Bruns et al. (2003) —public expenditure (overall) to be 20% of GDP; education expenditure as a percent of public expenditure benchmark = 17%; primary and lower secondary expenditure as a percent of education expenditure = 53–75% depending on the duration of these levels, following an adaptation from Lewin (2008).

³⁴ The domestic budget for basic education is computed as follows from UIS data, accessed 2010: Government expenditure as % of GDP * % of government expenditure on public education * percent of government public education expenditures on primary and secondary.

³⁵ Data used for analysis are from the UIS database, accessed 2010.

³⁶ UIS data for number of lower secondary teachers in Asia, Pacific countries, and Africa, 2000–2009. Only countries with at least seven years of data are included, to exclude very short-term changes in the number of teachers.

³⁷ From 2000–2009, the growth in the number of primary teachers exceeded 5% annually in 30% of the countries; compared to 18% in the projections. The highest teacher growth rate from 2000–2009 was 10% in Niger, Ethiopia, Burundi, and Mali, compared to a highest growth rate of 8% (in Eritrea) in the projections.

