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Children without Borders

An alternative way for thinking external assistance to education

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1. Introduction

Development challenges in most social domains, like education and health, are generally examined and analysed in countries, and in light of information produced at the country level. In this paradigm, if one wishes to go beyond single-country analysis, one can usefully and interestingly i) contrast country cases through a comparative, international perspective, or ii) use national data for a sample of countries, in order to describe and understand the variability that may exist across them. Both these approaches may generate evidence on the variable impacts of delivering or financing services on their expected social outcomes. Albeit useful, these methods remain "hic and nunc", strongly pegged to data collected at country level and attached to individual countries. Furthermore, this country-specific focus is all the more strengthened because external assistance and funding directed to social issues is, in reality, channelled to address social issues within countries.

Looking more specifically at the education sector, the country is the place where educational policies are designed and implemented, as well as where national discussions take place with development partners. The country is currently **the** pivotal administrative unit to which international assistance is directed **and** the entity where external resources are released and spent. Obviously, because of the nature of national government decision-making and international relations, both practical and institutional reasons make a strong case for this kind of arrangement. However, paradoxically, it can be observed that on one hand, the international community is communicating its aid/development priorities with a focus on children (to provide them with a school-based education, with nutritive food, with appropriate vaccination…), whereas on the other all their actions are directed to specific countries – regardless of the distribution of children.

Understandably, donors want to maximize the returns on their investments; this can be achieved whether by helping countries to tackle economic and social issues for their development or by ensuring their own political agenda. More likely donor countries try to do both, meaning that, beyond developmental issues, donors may be influenced by their political agenda to provide assistance to the recipient countries. Besides these bilateral dimension, the global perspective need also be considered since the consolidation of individual donor behaviours could result in cases of recipient countries that may *in fine* be considered either as "donor darlings" or "donor orphans", creating a feeling for a distant observer that equity of treatment of countries by the international community may not be appropriately achieved.

From a more fundamental point of view, it can be argued that the prevalence of country level data and analyses tends to blur an appropriate description of the social challenges at stake, while also not providing the most appropriate basis to

identify assistance to countries. It also introduces a pervasive bias by violating the fundamental principle of giving each child an equal weight in shaping the quantitative and qualitative vision; hence the global agenda in education. And this agenda is obviously wider than that identified at country level.

This argument for distancing analysis from the country-level is relevant at the analytical and agenda-setting level, as well as at the policy level. It may then be of interest both to enlarge the vision by considering territories wider than countries, and to put the focus on individuals and their personal education status (possibly also their health or nutrition status) irrespective of their country of residence within these territories. This would help bring universality and equality upfront in the education debate.

2. The global ambition of the research

2.1 General perspective

The broader idea of this research is aligned with important work conducted a bit over 10 years ago at the World Bank, on global inequality of income and conditions of living in the world[1]. Its objective was to generate an overall picture of inequality for 100 countries, blending inequality both **within** countries ("rich Americans versus poor Americans, for instance") and **across** countries (such as "being poor in the US and in Bangladesh", for example). The objective of that work was complementarily to provide a description from a new analytic angle with the idea that this new way of looking at things could help better discuss the relevant policies of richest countries and non-governmental organizations vis-à-vis the poorer countries.

In general terms, the objective of the research presented thereafter is related to that of Branko Milanovic; but while Branko Milanovic was targeting *income* inequality, this work targets *education* inequality. In both cases, the perspective is on the one hand to analyse specific issues over territories much wider than countries and, on the other, to put the focus on individuals and their personal circumstances, irrespective of their country of residence within these territories. As a consequence, this perspective allows in principle to bring universality and equality upfront in the education debate.

This alternative framework in studying inequality in education has a strong methodological and a knowledge-oriented agenda, while presenting an intellectual challenge to examine how this new approach could be designed and conducted. But if the concepts are obviously important, the empirical dimension

[1]. Research conducted by Branko Milanovic: Worlds Apart; the World Bank, 2005

is also at the heart of the exercise at hand. The translation of concepts into a factual analysis using existing data is not an objective but rather a constraint. There is nevertheless a possibility that data may not be fully available and that additional efforts are needed to operationalize the work in a reasonable manner.

But the sound empirical dimension of the exercise is also a necessity since its ambition is that the analyses conducted generate concrete results that may i) help envision new ways of providing more effective assistance in education to individuals and countries and ii) contribute to the discussion on how the international community could operate so as to address educational issues and challenges, in harmony with international agendas.

Experience of the attempts made between the years 2000 to 2015 to help countries reach the MDG (EFA, FTI and beyond), albeit very positive, suggests however that the international community can be more effective helping a better reach of the SDG by 2030 -- in spite of their big ambitions; in this context, there is a possibility that the mechanisms focusing first on the children (as intended to be demonstrated in this paper) may prove to be more effective that the current mechanisms that focus first on countries[2].

2.2 Identifying the Concept of the research

This research aims at gauging the extent to which the current pattern by which the donor community as a whole allocates its funds to individual countries in view of helping them to improve coverage and quality of education services is appropriate. This assessment will confront the actual practices and the actual distribution of donor funding for education to individual countries with the modelled outcome of the proposed alternative, i.e. when the distribution of donors' interventions derive from targeting individuals according their educational status (and possibly their wealth).

The first part of this report is instrumental, or methodological, and will be devoted to operationalize its approach, and provide concrete estimates. This part aims at preparing the information to be used, as well as documenting the methodological thought on which the research is building on. Given the novel nature of the project, this step is to require a substantial amount of technical work since concepts have to be operationalized and new indicators to be discussed and created. The second part of the report corresponds to **the conduct of the analysis itself**, and will present the actual comparison between current funding profiles and what these patterns would be under the modelled fund allocations. The paper will conclude by presenting possible policy implications.

[2]. Many experts have stressed that some proportion of the funds provided by international assistance has not been geared to address the MDG related issues (notwithstanding the fact that, when the funds had a MDG label they may not have been used always in an efficient manner).

* For greater specificity, the research is to consist first in i) characterizing the social characteristics (gender. area of residency. conditions of living and income group..) of all the individuals of the appropriate age group over the territory identified to conduct the empirical work; ii) attaching to them their geo-location coordinates, and iii) assessing their "educational status"[3]. On the basis of the latter, a ranking of the individuals of the targeted age-group will be made from those who have had the least favourable schooling careers (no education at all) to those who are faring the best in the system.

On the basis of this ranking, it is possible to identify the population of the 20, 40 or 50 percent lowest in the list; then i) to identify their social characteristics using comparable indicators (in particular income group, defined over the whole "territory" considered in the research and not within individual countries), and ii) to locate them (in general over that territory as well as in terms of country). It would also be possible, using appropriate cost data, to get an estimate of the amount of the resources needed to address the schooling difficulties of this population.

Finally it would also be possible to compare the amount and the distribution of the resources "needed" on the one hand, and the amount and the distribution of the resources mobilized by the international community to do so. The possibilities can either be that 1) the amount of resources mobilized by the donors are globally enough and well distributed across countries to help them address their education problems; 2) the amount is insufficient but well distributed across the recipient countries; or 3) the resources are both not enough and wrongly distributed across the various countries that compose the territorial area used in this research.

The research under way, and the report thereafter, is organized in two sequential steps: the first step is **instrumental** and aims at preparing the information to be used; given the new nature of the project under consideration, this step is to require a substantial amount of practical work since new concepts have to be operationalized and new indicators to be discussed and created. The second step is more operational and corresponds to **the conduct of the analysis itself**.

[3]. The construction of the "educational status" as well as that of the "poverty index" used will be discussed with more details further below.

3. Measuring the relevant indicators

3.1 Underlining geographic and demographic characteristics under study

In this section, two aspects are considered to identify the reference population selected for this research. First, the different countries that will compose the territory over which the analyses will be conducted, and second, the most optimal age-group to target regarding the individuals living in that same territory.

3.1.1 Identifying the "territory"

The overall design of the study implies expanding the traditional country-based approach, and to consider territories that are broader than countries. Therefore, it is convenient to define the cluster of countries upon which the analysis will be conducted.

Although studying all countries of the World would obviously be of interest, focusing on those from Sub-Saharan Africa would be more manageable. But here again, this has appeared a too ambitious challenge. Given the explanatory nature of the study, it has been estimated that it was in fact preferable to restrict the analysis to a sample of countries of that region; using a restricted sample could help understand how to proceed for this kind of analysis and create a kind of prototype for a future work covering a larger number of countries.

But a choice of countries to be targeted by the study remains to be made. The possibility to mobilize the relevant data is obviously a strong argument; a second argument has also been to focus on countries that are different but share a reasonably similar social and cultural context[4]. A specific set of French-speaking countries in Sub-Saharan Africa has been chosen. The current intensity of international funds directed to education in these countries is recorded and there is the availability of data drawn from a student assessment survey (PASEC) conducted in 2014 in ten countries, using the same instrument to test the students and similar procedures for both administration of tests and coding of responses. Moreover, out of these ten countries, the availability of the same type of household survey (Demographic and Health Surveys), conducted within a reasonable time span (2010-2014) has been identified for nine of them.

These countries, mostly located in the Western and Central part of the continent

[4]. Even though this argument has some value, it is in reality weaker that it spontaneously appears. At first sight one could consider preferable to consider countries that are geographically contiguous since they are likely to share some commonality; a cluster up made of Benin, Bangladesh, Armenia, Guatemala and Chad may not be a good idea. But in fact these disparate countries are in fact also very similar in that i) all their children must go to school, ii) get educational services that must be conducive to effective learning while iii) in any event the production of educational services implies that resources be mobilized to this end.

are: Benin, Burkina Faso, Burundi, Cameroun, Congo Republic, Côte-d'Ivoire, Niger, Senegal and Togo[5].

3.1.2 Selecting the age group of reference individuals

The usual education statistics can be calculated for these nine countries, using household survey data. But in this research, we do not use household surveys to calculate statistics at any geographic level; but rather to identify the educational status of **individuals**. For that, we will create a status index that will cover various aspects of individual education trajectories. But first, individuals are characterized by their age, and we need to define what would be the optimal age in our sample in order to take into account exposure to preschool, primary, and secondary education.

Given all the usual methodological caveats that recording age can bear, there are some other strategic considerations to take into account when selecting our sample. Concerning age, a favourable characteristics is the communality of all nine countries; official age at entry in primary education is 6, while the duration of the primary cycle is of 6 years and that of lower secondary education of 4 years.

But a reference age needs be identified to focus on so as to construct the schooling career status at the individual level. With knowledge of the DHS questionnaires regarding education, here are the various options:

a) If we chose children of 6 years of age, we would be able to determine whether they have attended preschool but we would be not in a position to determine whether they have had access to primary education: in fact, age-specific enrolment rates show that an important proportion of children in these countries enter primary education only at 7 or 8. Besides, we will not know much about their schooling history because the latter would be very short.

b) If we chose children of 9 or 10 years of age, we would be in a good position to document whether children have effectively had exposure to primary education—in terms of access, but also in terms of some progression within that level. But we would not know whether they have attended preschool because we know only the education status at the time of survey; besides we would still have a very truncated view of his/her schooling career in primary education, and even more if we consider basic education (compounding primary and lower secondary education)

[5]. Incidentally, all these countries belong to the "Bottom Billion Countries" of Paul Collier; Oxford University Press. 2007.

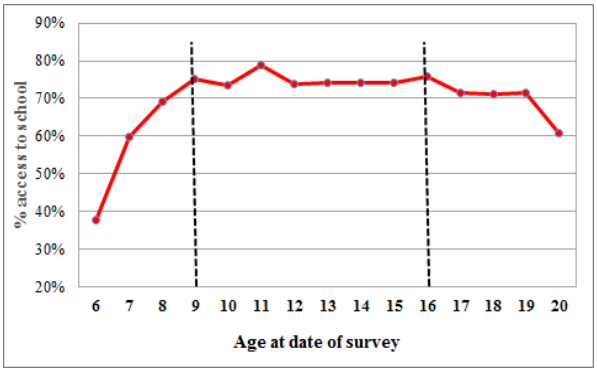
c) If we chose children 13 or 14 years of age, we would still know whether the child has ever had access to primary education but intake might refer to an event that happened 6 or 7 years before the date of the survey. Nonetheless, we would have a reasonably good understanding of the schooling trajectory of the child within primary education (because we will know whether they have dropped out or repeated, and the highest grade attained if they are still in school). Conversely, access and participation to lower secondary education will be somehow truncated.

d) If we chose individuals 18 and 19 years of age, access and participation to primary education would be even more remote (perhaps at times where access to education was lower) while access and career in lower secondary education could then be relatively well documented. We would therefore gain an almost full picture of the schooling profile of the individuals, from preschool to secondary schooling.

At the end, a choice needs be made so as to optimize the balance between the wealth of information recorded in the survey, and the length over which time spans (difference between the occurrence of recorded events and the time of the survey). In order to make the most appropriate choice, it has been useful to examine the pattern of attendance by looking at the occurrence of having gotten to enrol in primary education (or of not) according to the age of the respondent at the time of survey.

Graph 1 below helps first to determine that it would not be relevant to target children below 9 years old, for the same reasons noted in point (a) above. Interestingly, above 9 years old, the pattern can be considered as reasonably flat up to 16 years of age (beyond this threshold, access to education declines). In other words, it means that the different cohorts of students (from age 9 to age 16 at the time of the survey in the countries sampled in that research) have had on average similar exposure to education.

Graph 1: Chances of access to primary education according to age at time of survey



But for the purpose of that research, It would therefore be relevant to move the cursor "to the right" since overall, i) we would not lose much by identifying those who never got to school whether the analysis is based on the group of those of 9 rather than on the group of those of 16, and ii) we would gain substantially by doing so in terms of the capacity to get a good description of the schooling career of the individuals. At the end, it seems appropriate to retain the population of the 16 years old as the reference for the research; we preferred in fact to use the group 15-16 years of age to have a larger sample). The raw number of the observations is 21,261 individuals in the global data set, making 5.34 million individuals after the relevant weighting. Annex 1 provides useful complements on that count including the distribution of the highest grade attained in that population.

3.2 Mobilizing the variables that can be associated to the individuals in the target group

It is possible to extract from the DHS surveys both information on access to school and on schooling trajectories in primary and some lower secondary education for all the individuals in our target group. For these individuals we also know their gender, area type (urban or rural) and a set of assets and living conditions[6]. We also know the country, region/province in which they reside in, but the country will be considered only at the end of the work.

Further to this initial set of data, some additional data are needed, and some indicators need to be built. Missing elements at this point are related to preschool (access) and on elements allowing us to measure to some extend the quality of education services and the level of student learning.

[6]. We also know whether the individual is an orphan but this information has not been used in the research; the reason and a short analysis around this aspect is provided in Annex.

Further, we need additional specific work such as making poverty data consistent for individuals residing in the targeted territory but in different countries; and creating the "Education Status Index" (ESI), a central pillar for the analysis to be conducted later on.

3.2.1 The case of preschool

In the DHS (as in all HS), information does not exist to indicate whether an individual 16 years of age has had preschool before getting to primary education. When information on preschool is available in the DHS (in 6 of the 9 countries of our sample), it concerns only the individuals in preschool at the time of survey. However, a bulk of empirical research converge to stress that early childhood is a crucial period for the development of the individual and that building socio-emotional and cognitive competences of the child are key for formal learning in primary education. In other words, providing documentation on preschool should not be discarded.

Generally speaking, two elements on this theme are well known: i) Gross Enrolment Rate of preschool is generally on the low side in the 9 countries of our sample, but there are nevertheless wide disparities on that count between them; for example, this statistics is around 34 percent of in Cameroun, while it stands at around 14 percent in Congo and Senegal but only 7 Percent in Burundi Côte-d'Ivoire or Niger and 4 percent in Burkina Faso; ii) access to preschool is also strongly unequal between population groups within countries, with percentage disproportionally much larger for children from wealthier families and for urban dwellers than for children living in poverty and in rural areas.

In the context of that research, since we do not know whether a targeted individual has had preschool, it has appeared interesting to attach to each child an estimate of the likelihood that he/she effectively received any early childhood education. This has been done i) using the DHS in the six countries where the information is available (Cameroon, Congo, Côte-d'Ivoire, Niger, Senegal and Togo), and ii) using PASEC data (see point 3.2.2 below) in the three remaining countries where the information in not available through the DHS (Benin, Burkina Faso and Burundi). In both cases a function of attendance to preschool has been estimated[7]. This function can be of this type:

Prob (Prescho)[8] = f (Gender, Urban/Rural, Region, Wealth Quintile)

[7]Note that the regional dimension has not been used in PASEC because this dimension was not available in that survey. It is also to be noted that, for these countries, adjustments has been made to match the average figures on coverage of preschool from ISU.

[8]. It may be useful to note that the probability of a child entering primary education of having preschool is currently higher than the pupil teacher ratio currently estimated for preschool since enrolments at this level is referred to the 3-5 age group while all students having preschool do have necessarily three years of pre-schooling.

Such type of function can be estimated in each of the nine countries of our sample. It can then be used to simulate the likelihood of having preschool for an individual holding a given set of the socioeconomic and geographical characteristics considered in the function above. The figures obtained vary quite substantially, for example a figure of 2 percent for a rural boy belonging to the poorest quintile of wealth the population living in Burkina Faso, 21 percent for an urban girl from the highest quintile of wealth living in the same country, or 44 percent for a girl holding the same characteristics of the latter but living in Senegal.

This pattern can also be can be applied to the 16 year-olds; this helps to get a sense of their chances of having preschool in the conditions prevailing at the time of survey. This statistics is used to enrich the set of the schooling related elements attached to each individual considered in this research. More detailed documentation on this aspect is provided in the Annex A.1.

3.2.2 The case of student learning

Quality of service and student learning are obviously very important aspects to consider when documenting the schooling career of individuals. The objective of education is not merely that children register in school and remain a certain amount of time in school, it is also that they effectively learn what is intended by the curricula; and essentially that students be able to get reading/writing and problem solving skills.

Empirical evidence stresses that the level of learning of students in primary education varies from one country to another and that it varies also within countries according to students' characteristics.

A procedure similar to that used for preschool has been used to appraise student learning. Individual PASEC data, collected in 2014 in the countries of interest, is a good opportunity to estimate, for each country, the relationship between individual learning scores (consolidating French and math) and individual student characteristics. On this basis, simulation of that relationship for the individuals targeted in the main data set will allow bringing the student learning dimension in the overall analysis.

Concerning the impact of the various variables, here is what can be observed. In all countries, students from rich families have significantly better scores than their counterparts from poor families. Similarly students living in urban areas do in general much better than those living in the rural (with the exception of Burundi in which the urban/rural distinction per se, makes no statistically significant

difference. Boys who are enrolled at grade 6 have in general better scores than girls (in particular in Côte-d'Ivoire, Niger and Togo); but the contrary is observed in Burundi and Benin. Globally, the social variables considered here generate substantial disparities in learning.

But, notwithstanding the impact of the social variables, it is important to note that the average level of that score (M = 500; σ = 100) differs quite substantially across the 9 countries of our sample. With an average close to 600, Burundi has by far the highest average score, followed by Burkina Faso, Senegal and Togo that stand around 540. Benin, Cameroun and Congo come after with average scores around 510. Slightly Below (around 490) is Côte-d'Ivoire. Niger, comes last with an average score of 430 that can be considered quite low.

Blending the socioeconomic and geographical dimensions with the differences across countries leads to a very wide range of cases. For example, the figure for an urban male from the highest quintile of wealth living in Burundi is 647 while it is only 378 for a rural male from the lowest quintile of wealth living in Niger. A more detailed documentation on this aspect is provided in the Annex A.2.

3.2.3 Estimating an overall poverty index at the "territory" level

Since the DHS does not include aspects of budget and consumption of the household, it is necessary to rely upon its assets and conditions of living (physical characteristics of the house, electricity, safe water, toilets, house appliances, means of transportation, possession of land and cattle). A set of about 30 of the same indicators is available in all the nine DHS surveys used in this paper. From these, a factor analysis helps ranking the households from that which circumstances are the worse to that for which they are the most favourable: this initial ranking helps identify deciles or quintiles of that distribution.

This procedure is generally used in the analysis of poverty within a given country. This is done in first place separately for each of the 9 countries considered, helping to identify "**country-specific deciles and quintiles**" of the conditions of living. A similar procedure has been used for the global sample (9 countries). This has helped to identify "**overall deciles and quintiles**" that are valid for the "territory as a whole. The two types of quintiles are on the one hand somehow linked (the poorest/richest household in the poorest/richest country being the poorest/richest overall); but on the other, there is also some degree of discrepancy since some individuals may be in quintile 1 according to their country-specific indicator but in the third or the fourth quintile when the indicator is calculated for the territory as a whole[9].

[9] Contrasting the two distributions illustrates both the statistical link existing between them and the magnitude of their difference. Besides the correlation (R^2) between the two statistics is only 0.509 (half of the variance in the global decile is accounted by the variance in the national decile).

Data proposed in Table 1 below (based on the whole population, not on that restricted to the 15-16 age group) confirm that statement. The diagonal (shaded cells) corresponds to the cases in which there is congruence between the numerical values of the two statistics. Altogether, the figures in the grey cells account for 26 percent of the 134.1 million population of the sample. The cells above the diagonal correspond to the cases of individuals whose global decile is higher than there national decile. The contrary applies to the cells below the diagonal.

The further is a cell away from the diagonal, the larger is the discrepancy between the distributions of the two statistics (figures in bold); but the further a cell stands away from the diagonal the smaller are also the numbers of individuals concerned. It is estimated that 26 percent are exactly on the diagonal, from a cumulative total 57 percent whom are on or close to the diagonal (cells in italics). For 11 percent of overall population, the discrepancy between the distributions may be said to be strong[10].

Tableau 1: Cross tabulation of the "country specific" and the "overall territory" deciles of the conditions of living (individual level, full sample)

		Decile global										Total
		1, poorest	2	3	4	5	6	7	8	9	10, richest	
Decile national	1, poorest	5,370,886	*3,757,874*	2,239,180	1,233,130	698,816	344,320	**172,435**	**67,334**	**10,572**	**705**	13,895,252
	2	*2,530,618*	2,556,572	*2,881,985*	2,368,998	1,651,780	882,954	387,049	**97,903**	**17,784**	**3,483**	13,379,126
	3	1,413,667	*1,854,276*	2,087,760	*2,475,680*	2,429,458	1,782,093	1,150,874	367,256	**101,413**	**4,750**	13,667,227
	4	1,006,897	1,335,154	*1,634,106*	1,839,616	*1,997,104*	1,983,666	1,990,815	1,175,056	627,804	**108,335**	13,698,553
	5	702,545	1,084,963	1,360,678	*1,828,027*	2,008,405	*2,077,046*	1,679,372	1,697,661	1,102,044	305,218	13,845,959
	6	434,016	695,999	846,690	1,215,912	*1,801,753*	2,295,430	*2,246,506*	2,047,455	1,391,995	445,024	13,420,780
	7	**260,536**	473,927	651,580	919,187	1,121,394	*1,772,365*	2,257,848	*2,842,283*	2,065,300	897,139	13,261,559
	8	**256,052**	**318,451**	432,873	623,826	791,925	1,221,021	*1,923,206*	2,812,831	*3,050,232*	1,598,507	13,028,924
	9	**53,889**	**201,096**	**337,023**	405,895	532,394	826,506	1,186,243	*2,031,318*	4,110,621	*3,056,908*	12,741,893
	10, richest	**2,927**	**15,932**	**39,114**	**57,463**	98,971	230,814	429,203	718,729	*2,017,879*	9,552,607	13,163,639
Total		12,032,033	12,294,244	12,510,989	12,967,734	13,132,000	13,416,215	13,423,551	13,857,826	14,495,644	15,972,676	134,102,912

The table provides the proportion of the country-sampled population (15-16 years of age) in the various deciles of the overall wealth index. Should the distribution of living conditions be the same in all countries of the sample, being in a specific decile in his country of residency would imply that a given household would also

[10]. For example, individuals in deciles 3 or 4 (9 or 10) in their country who turn out to be in decile 9 or 10 (3 or 4) in the global distribution.

be in the same decile when transposed in the overall territory perspective. A basic conjecture is that it is unlikely for an individual from the sample to be part of the same decile in both national and overall contexts, given the known differences across different countries, in particular in GDP per capita.

The discrepancy of wealth between national and global standpoints (confined here to the nine countries) are apparent in Table 1 above, when crossing the distribution of the wealth index (deciles) in the two definitions. Introducing the country of residence of the individuals depicts indeed quite a striking picture. Table 2, below, provides interesting elements on that count.

The table provides the proportion of the country-sampled population (15-16 years of age) in the various deciles of the overall wealth index. Should the distribution of living conditions be the same in all countries of the sample, being in a specific decile in his country of residency would imply that a given household would also be in the same decile when transposed in the overall territory perspective. A basic conjecture is that it is unlikely for an individual from the sample to be part of the same decile in both national and overall contexts, given the known differences across different countries, in particular in GDP per capita.

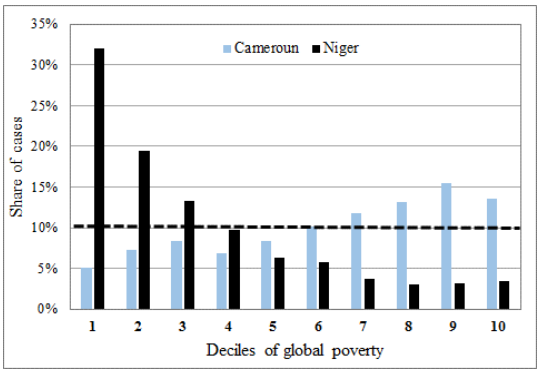
Table 2: Distribution of the **overall**[11] deciles of wealth in the various countries of our sample

Overall decile	Countries									Total
	Benin	Burundi	Cameroun	Congo	Côte-d'Ivoire	Niger	Senegal	Togo	Burkina Faso	
1	7.3 %	7.1 %	5.1 %	4.8 %	2.3 %	32.0 %	6.6 %	6.8 %	12.1 %	10.0 %
2	7.2 %	13.9 %	7.3 %	7.4 %	5.1 %	19.5 %	7.1 %	9.9 %	12.7 %	10.0 %
3	8.7 %	18.5 %	8.3 %	10.3 %	5.0 %	13.3 %	7.4 %	9.6 %	13.1 %	10.0 %
4	9.6 %	19.0 %	6.9 %	10.4 %	9.2 %	9.7 %	8.6 %	11.5 %	10.7 %	10.0 %
5	11.2 %	15.5 %	8.4 %	10.2 %	9.2 %	6.3 %	9.4 %	9.7 %	13.5 %	10.0 %
6	12.4 %	11.6 %	10.2 %	9.2 %	11.6 %	5.7 %	9.6 %	10.7 %	10.0 %	10.0 %
7	11.5 %	4.5 %	11.8 %	12.7 %	14.2 %	3.7 %	13.2 %	10.5 %	7.8 %	10.0 %
8	11.8 %	3.9 %	13.1 %	14.0 %	13.8 %	3.1 %	14.7 %	8.9 %	6.2 %	10.0 %
9	11.1 %	3.0 %	15.5 %	13.1 %	12.2 %	3.2 %	13.8 %	10.5 %	6.3 %	10.0 %
10	9.0 %	2.9 %	13.5 %	8.0 %	17.5 %	3.5 %	9.6 %	11.8 %	7.7 %	10.0 %
	100.0 %	100.0 %	100.0 %	100.0 %	100.0 %	100.0 %	100.0 %	100.0 %	100.0 %	100.0 %

To illustrate that point, Graph 2 hereafter, shows the proportion of population 15-16 years old in Niger and Cameroun by overall deciles of wealth.

[11]. It is to be noted that the items (32) to identify the scale of the wealth index, the numerical value of that index for all the individuals in the sample and their ranking, are the same for all the individuals; these items are physical in nature (physical characteristics of the house and of its equipment, conditions of living, various types of assets…).

Graph 2: Proportion of population 15-16 in Niger and Cameroun by overall deciles of wealth



Instead of having all the points around 10 percent in each decile (as would suggest an equal distribution of wealth), Niger has a much larger share of its population in the lowest overall deciles (in particular in decile 1 that counts for 32 percent of total population, and to a lesser extent decile 2 that accounts for another 19.5 percent of population). A much smaller share in the highest deciles (only around 3 percent in deciles 9 and 10). An opposite scenario is found for Cameroun: only 5 and 7 percent of the population belong respectively to the deciles 1 and 2 in the overall distribution of wealth, whereas 16 and 13 percent of the Cameroonian population are in deciles 9 and 10.

More generally, Cameroon, Congo and Côte-d'Ivoire are characterized by a small proportion of their population in lowest two overall deciles and by a high proportion in deciles 9 and 10. By contrast, Niger and to a lower extent Burkina Faso are characterized by an inverse pattern with a relatively large proportion of their population in global deciles 1 and 2 and a small proportion of their population in deciles 9 and 10.

It is true that the pattern uncovered here is linked to the fact that the different countries in the sample do not stand at similar levels of economic development; but this argument is however not that strong. For example Congo is not very different from Senegal, Benin and Togo in terms of the distribution of individual wealth, although the four countries stand at quite different levels of GDP per capita (both in US$ and PPP). Similarly, Burundi is characterized by the lowest level of GDP per capita within our sample; however, the proportion of its population in the lowest global decile (7.1 percent) is similar to that of Senegal (6.6 percent) or Togo (6.8 percent). Finally, the pattern of distribution of overall wealth is only mildly correlated with country-level economic development in our sample.

A dual result of these patterns is that if we focus on the lowest deciles of global wealth, one the one hand we do find individuals in all of the nine countries of our

sample; but, on the other, a country like Niger counts for as much as 45 percent of all individuals belonging to the first (lowest) decile of global wealth[12], and 27 percent of those belonging to the second decile. These figures are very high since the population 15-16 of Niger accounts for only 14 percent of total population of the nine countries under consideration.

3.2.4 Identifying the individual Education Status Index (ESI)

The Education Status Index (ESI), meant to synthetize the different aspects of the schooling career of the targeted individuals, is to play a pivotal role in the research underway. Because it is an index, the different elements composing the ESI need to be weighted according to the emphasis we want to give to the different aspects of the schooling career, with the perspective of ranking the individuals from those who are in the worst conditions, education-wise (possibly social conditions wise as well) to those whose education performance (and possibly their social conditions) put them in the most favourable circumstances.

But there is no definite manner by which this "new" indicator could be calculated; there is potentially a number of "formulas" to do so. Furthermore, there is some likelihood that the results obtained with its use differ, possibly by some significant margin, according to the specification chosen. The potential variables that can be mobilized to enter in the formula of ESI are summarized in the table below:

Coverage	Ever had Access to School (A)	Highest Grade Attained (B)	Estimated Probability of Having Had Preschool (C)	
Quality			Estimated Probability of Having Had Preschool (C)	Estimated Learning Score in Primary Education (D)
Social characteristics	Male/Female (E)	Urban/Rural (F)	Global Decile of Wealth (G)	Child is an orphan (H)

* In terms of the content of ESI, on could focus only on the dimension of coverage and consider any combination of A, B and C. But one could be willing to take also into account the quality dimension, which can be approached by C and D. However, and even though the incidence of the social characteristics of the individual is already somehow implicitly incorporated in the school related outcomes, one may introduce also the social dimension per se (E, F, G and H).

* Concerning how these variables can be assembled, two approaches can be thought of: i) the first consists in using a standard additive pattern of the figures attached to the different components chosen to contribute to the ESI. Then this can be done with no weighting factor, giving implicitly an equal weight to the

[12]. Niger and Burkina Faso together account for about two-thirds of the individuals belong to the first global decile.

various components. But one can also use explicit weight so as to give a greater to some component over the others; ii) the second starts from the fact that significant amounts of correlation do exist between the different potential components of ESI[13]. In such circumstances, the additive approach above may lead to blur the picture by incorporating "implicit" weights in the calculation of ESI. Factor analysis takes care of these "parasitical" correlations. This amounts to consider ESI as a non-observable variable that takes into account in a fair manner the components chosen to contribute to it.

Different components to be incorporated in the ESI and different manners to assemble them together result in a relatively large set of possible ESI estimates. In a sense, this is potentially disturbing given i) the normative dimension of its nature in the analysis and ii) the possible impact of the specification that would be chosen upon the results to be obtained later on. In such circumstance it is probably wise to start by browsing over the array of possibilities to estimate ESI, and to conduct a comparisons between them, as a means to progress toward a choice. Analyses presented in Annex 4 are useful in that perspective.

Practical conclusions of the work presented in Annex 4 are first i) that, given the fair amount of similarity between the factor analysis and the "additive" approaches, and second ii) that variations on the weighting in the additive approach carries also little incidence, it has appeared preferable to start conducting the analysis on the basis of the three following specifications:

* FACT2, which takes into account only the schooling careers variables (probability of having attended preschool, access to primary education and highest grade attained);

* FACT4, which takes additionally into consideration the estimated learning score of the individual in his/her country of residence given his/her social characteristics;

* FACT6, which incorporates, additionally to FACT4, the social characteristics of the individual, gender, urban/rural place of living and overall poverty index.

4. Conduct of the analysis: descriptive and analytical aspects; results obtained

4.1 Reference framework

Let us recall that a central objective of the work underway is to determine the extent to which, within our sample, the current country-specific distribution of

[13]. for example, those who have benefitted from preschool are more likely to get to primary school, or those who live in rural more likely to be poor and less likely to get to school and be retained in school till the age of 16…).

external aid is in line with the educational needs of the children, irrespective of the particular country they live in. In relation to the distribution of ESI, the more children are located on its low-end, the more intense are their needs in relative terms.

One issue with official development assistance directed to education, is that it is based on the notion that it has to reach “marginalized children” those “left behind”, and so forth, but this is done without clearly defining who are these children, what are the key characteristics they share, and how to identify them. Further, every government or non-governmental organization has its own perspective.

However if the actions are to be targeted to the children that are “left behind”, it is important to identify what that means concretely, since this normative and generic statement is too vague to be operational—further, it could even mean that children marginalized for some donors, might not be for others. For the purpose of this research, a decision needs to be made on the percentage of children with the lowest ESI to be taken into account, besides the decision on the particular specification of ESI to consider. However, given the speculative nature of the research, we better not make these choices and treat these “decisions” as parameters for the analysis, helping therefore to test at a later stage the degree of variability (or consistency) of the results obtained with variations on these parameters.

Assuming we consider a given specification of the ESI statistics, we have therefore in hand its overall distribution. It is then straightforward i) to rank the overall population 15-16 years of age in our sample of nine countries, from the lowest value of ESI to its highest value, and ii) to identify the groups of those who are in the first (lowest numerical values of ESI) decile of the distribution of ESI or in the lowest two (three, four…ten) deciles of that distribution.

After such groups have been constructed, it is again straightforward to identify their characteristics, and noticeably in terms of country of residence, gender, geographical area (urban/rural) and global quintile of wealth. It will then obviously be of interest to observe how this pattern is affected by i) the specification of the ESI statistics used and ii) the deciles considered in its distribution.

On this basis, and for each of the couples [type of ESI and deciles of its distribution considered), we will get the information on the number of individuals targeted by country. We will then in a position to make an inference to the dimension of spending, and its corresponding distribution across the nine countries of our sample.

4.2 Descriptive perspective: to which population groups belong the targeted individuals according to the specification of ESI and their position in its distribution?

Recall that it has previously been decided to keep only the three specifications (FACT2, FACT4 and FACT6) for ESI at this stage of the work.

Table 3, below, is a reduced form of the results obtained. Along with the three specifications of ESI, three cases are considered for the deciles (lowest 20 %, 40 % and 60 %); plus the reference for the whole population (15-16 years of age in the nine countries).

There is a law in the sociology of education (and in sociology in general, possibly the single real law of the discipline according to R. Boudon) that says that the smaller the global availability of a good (something desirable), the wider are the social disparities.

Table 3: Distribution of the individuals in the lowest 2, 4 and 6 global deciles of wealth by Country and social variables

	Lowest 2 deciles of ESI			Lowest 4 deciles of ESI			Lowest 6 deciles of ESI			Total population
	FACT2	FACT4	FACT 6	FACT2	FACT4	FACT 6	FACT2	FACT4	FACT 6	
PAYS	%	%	%	%	%	%	%	%	%	%
Benin	0.0	5.9	5.5	5.9	6.3	6.3	5.4	7.3	7.9	8.4
Burundi	2.6	0.0	1.5	9.3	2.0	3.8	11.5	6.4	9.6	7.9
Cameroon	5.1	5.8	6.8	7.8	10.0	10.6	9.1	10.4	11.5	18.3
Congo	0.1	0.2	0.2	0.8	0.9	1.5	1.7	2.0	1.8	3.4
Côte d'Ivoire	20.0	16.9	11.9	20.0	20.1	15.6	18.5	18.4	15.7	16.9
Niger	30.2	34.0	36.4	20.4	28.2	27.9	19.2	21.5	20.1	14.1
Senegal	10.2	8.6	9.4	11.7	10.5	10.0	11.8	10.8	10.3	11.4
Togo	0.5	1.4	1.4	2.2	2.3	3.9	3.6	4.7	5.2	5.4
Burkina Faso	31.2	27.3	26.9	21.9	19.7	20.4	19.3	18.4	17.9	14.1
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Gender	%	%	%	%	%	%	%	%	%	%
Female	53.6	51.9	49.9	49.7	48.5	45.1	48.0	46.2	45.1	47.8
Male	46.4	48.1	50.1	50.3	51.5	54.9	52.0	53.8	54.9	52.2
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Residency	%	%	%	%	%	%	%	%	%	%
Rural	90.5	95.6	99.4	82.9	86.0	95.1	79.9	83.7	91.4	60.9
Urban	9.5	4.4	0.6	17.1	14.0	4.9	20.1	16.3	8.6	39.1
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

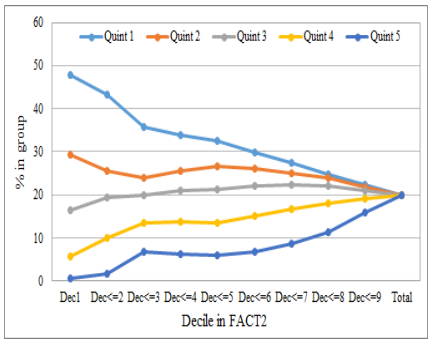
Quintile Wealth	%	%	%	%	%	%	%	%	%	%
1 (Poorer)	43.3	45.3	51.0	33.8	36.8	45.1	29.9	31.1	32.4	20.0
2	25.4	26.4	27.4	25.4	25.3	29.7	26.1	26.4	29.1	20.0
3	19.5	19.0	18.6	20.9	19.6	17.4	22.1	21.8	22.6	20.0
4	10.1	7.7	3.1	13.6	12.8	6.4	15.1	14.7	13.0	20.0
5 (Richer)	1.6	1.5	0.0	6.2	5.5	1.5	6.8	5.9	3.0	20.0
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Numbers	1,067,846			2,137,253			3,202,335			5,337,735

A practical application of this generic law for our work would be that the social disparities would be maximum when considering the first decile in the distribution of ESI, to diminish progressively thereafter as we consider the first two, the first three, etc., deciles, up to the point where there remains (mechanically) no social disparity when the full population (10 deciles) is considered[14]. This is largely what is observed, irrespective of specification chosen for ESI. Graphs 3, below, illustrate the pattern.

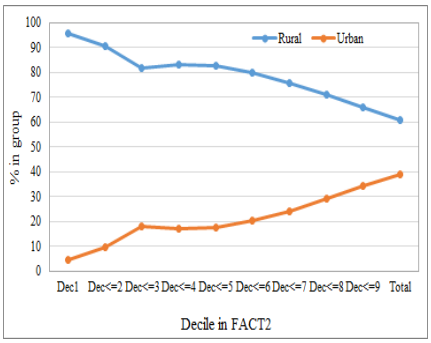
[14]. There is a dual "equity" move is at work when the coverage of a system (a cycle) of study increases, with on the one hand, a significant tendency for social disparities globally to shrink, while on the other, those who are still left out (as long as coverage is not universal) are all the more disadvantaged. This pattern is analyzed as deriving from a principle based on "easiness" on the supply side (easier to implement a school in urban than in rural area, in particular in remote locations) and response to the stronger demand for education services expressed by the most influential strata of the population (sometimes also low demand from some populations).

Graphs 3: <u>The pattern of reduction of social disparities as larger coverage is considered</u>

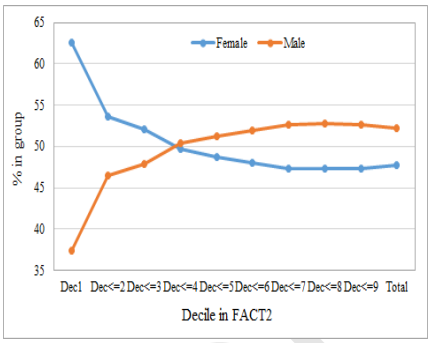
Quintile of wealth in FACT2



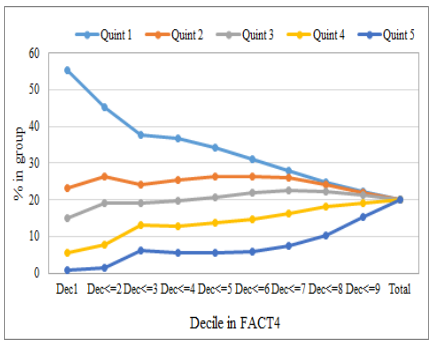
Area of residence in FACT2



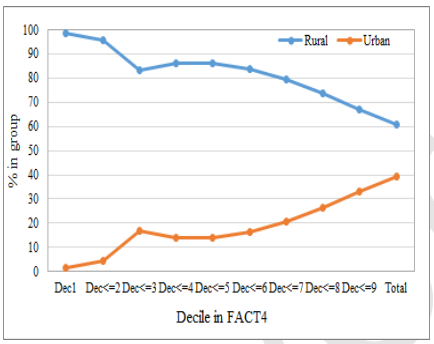
Gender in FACT2



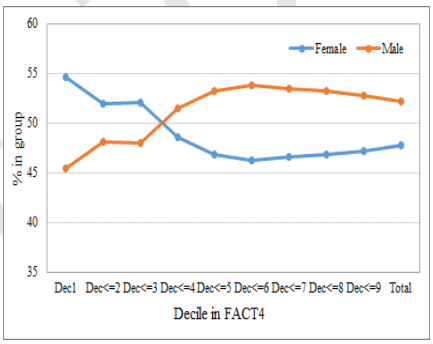
Quintile of wealth in FACT4



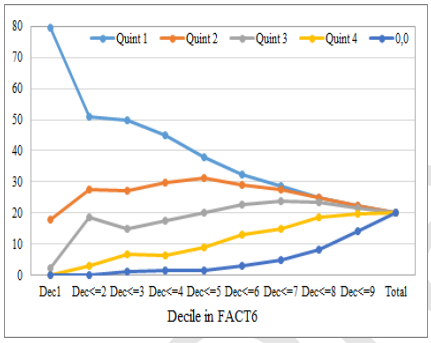
Area of residence in FACT4



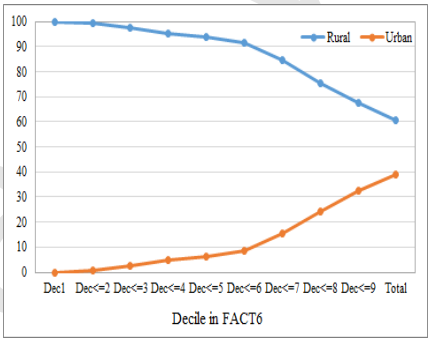
Gender in FACT4



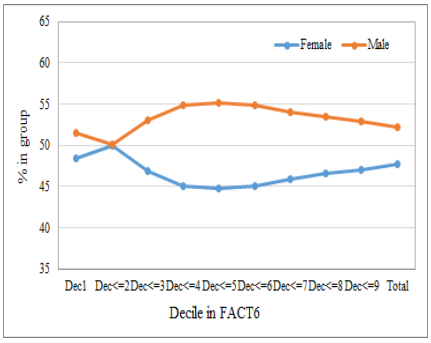
Quintile of wealth in FACT6



Area of residence in FACT6



Gender in FACT6



Visually, the graphs are similar in that all of them start from a case (decile 1) in which the social disparities are generally wide to a point (total population) where the social disparities are mechanically totally absent. However, if the three social factors (wealth, gender and area of residence) play a role, it is also clear that, for a given type of ESI (FACT2, FACT4 or FACT6) the quintile of wealth (in particular disparity between the poorest and the richest quintiles) as well as the type geographical location (urban versus rural) do generate much wider disparities than gender does.

Then, focusing now on the three specifications taken into account for ESI (FACT2-FACT6), it appears that the intensity of the social disparities is lesser in the FACT2 specification and largest in the FACT6 specification (FACT4 being in between) as shown with the figures proposed in Table 4, below.

Table 4: Logarithm of the odds ratio concerning wealth and residence area according to the specification of ESI and the degree of specificity of the reference population

Type of ESI – social factor	Dec1	Dec<=2	Dec<=3	Dec<=4	Dec<=5	Dec<=6	Dec<=7	Dec<=8	Dec<=9	Total
FACT2 (Geo Area - r/u)	2.6	1.8	1.1	1.1	1.1	0.9	0.7	0.5	0.2	0.0
FACT4 (Geo Area - r/u)	3.8	2.6	1.2	1.4	1.4	1.2	0.9	0.6	0.3	0.0
FACT6 (Geo Area - r/u)		4.7	3.2	2.5	2.3	1.9	1.3	0.7	0.3	0.0
FACT2 (Wealth - Q1/Q5)	4.5	3.3	1.7	1.7	1.7	1.5	1.1	0.8	0.3	0.0
FACT4 (Wealth - Q1/Q5)	4.2	3.4	1.8	1.9	1.8	1.7	1.3	0.9	0.4	0.0
FACT6 (Wealth - Q1/Q5)			3.7	3.4	3.3	2.4	1.7	1.1	0.5	0.0

The reason for social selectivity to exist in FACT2 is quite obvious since FACT2 is made of i) the access to education, ii) the highest grade attained for individual aged 16 should they still be in school or not, and 3) the estimated chances they have of having benefited from preschool; all of these aspects are more or less affected by the social variables. As a consequence, if it is true that FACT4 does take into account the learning dimension of educational services in the various countries of the sample, it contributes also to further “load” the social component already incorporated in FACT2. And finally, since FACT6, beyond the school-related components of FACT4, takes into account in an explicit manner gender, wealth and area of residence, it is no surprise that FACT6 be quite more “socially loaded” than FACT4.

These results may help to suggest that it would probably be **relevant to use FACT4 as the reference specification of ESI**. It focuses formally only on school-related variables, consolidating its quantity and quality dimension (FACT2 ignoring the quality dimension which should obviously be given a significant

importance), while rightly incorporating the social aspects with their effective influences on schooling. It is probably not relevant to overloading FACT4 by further adding in an explicit manner the social factors as in FACT6.

4.3 The country dimension is also of first importance to consider

In section 4.2, the analysis put the focus on the social variables, without considering the country dimension. In a sense this could appear to be "natural in a context where the reference of that work is precisely to ignore frontiers. But the borders are nevertheless to be considered, at least at some point, to compare the actual case where international assistance to education is provided to countries with an alternative reference that would be centred on the children.

Two perspectives can be taken when looking at the country dimension of ESI: one consists in examining the extent to which social country conditions accounts for the intensity of their problems in the education sector[15]; another is more global and suggests that from an international perspective, social conditions are contextual; what really matters is to address the deficiencies identified here on the outcome side via the ESI statistics. In our work we focus on the second perspective using the FACT4 specification of ESI.

Table 5, below, presents the country distribution by deciles of ESI and that under different forms: i) the first provides the numbers of individuals 15-16 by country in each decile of ESI; ii) the second does the same in a cumulative manner starting, from the lowest decile; this help to generate the distributions of individuals by country in the first x (2, 3, …10) deciles of ESI; iii) the third specification is similar to the previous one, but provides the figures in percentage by country within each decile of ESI group (in its cumulative form).

An **initial observation** is that if we focus on the lowest decile of ESI, some countries are absent or almost absent; in fact only three countries have sizeable numbers in that group, Cameroon, Côte-d'Ivoire and Niger.

This is probably no surprise for Niger, but finding Cameroon and Côte-d'Ivoire in that group may be somehow unexpected. The reasons behind the latter in these two countries are partly similar and partly different: for Cameroon, the reason is that quite strong disparities exist between regions, schooling in the northern

[15]. The point is that we have seen that there was a noticeable incidence of the social variables on ESI, while the average values of the social parameters are also quite different across the various countries considered in this research. For example, the share of the population 15-16 living in rural ranges 35 percent in Congo to 88 percent in Burundi; similarly, the proportion of the population belonging to two lowest deciles of global wealth varies from a low 7 percent to a high 51 percent. These figures stress that different social context exist across the countries of the sample, and that this is likely to account for some of the difference between them in terms of their ESI.

regions of the country lagging on all counts significantly behind the rest of the country; for Côte-d'Ivoire, disparities (less pronounced than in Cameroon) do also exist between South and North, but it has to be added that education has been significantly shaken by the social/political instability between 2000 and 2012, contributing to its low performance of the system as a whole[16].

But it may have been expected to find Burkina Faso in the lowest decile of ESI. In fact, if the figure is zero in the first decile, it is relatively substantial (291,183) in the second decile (accounting for 38 percent of total population 15-16 in the country). This suggests that the system of education of the country on the one hand has effectively a relatively low performance, while on the other it succeeds to achieving some basic outcomes.

Table 5: Distributions of ESI by deciles in different specifications country wise

	Number of individuals 15-16 by deciles of ESI (FACT4)									
Country / Decile	1	2	3	4	5	6	7	8	9	10
Benin	0	62,584	36,966	35,494	40,783	58,197	54,392	47,144	49,265	66,065
Burkina Faso	0	291,183	77,861	51,291	95,632	74,612	45,291	52,346	64,677	1,329
Burundi	0	0	33,104	8,623	77,724	84,932	100,365	68,183	40,893	8,909
Cameroon	58,692	3,297	60,834	91,617	56,202	63,733	70,76	87,932	119,282	363,933
Congo	989	1,085	3,399	14,494	24,925	19,119	25,934	47,355	42,394	3,057
Côte d'Ivoire	124,962	55,017	111,126	137,369	88,82	71,083	102,123	121,405	87,795	122
Niger	348,149	14,374	102,18	136,696	48,057	40,662	45,28	13,756	1,111	191
Senegal	0	91,515	99,601	32,081	55,858	67,33	59,689	68,573	86,088	49,663
Togo	1,247	13,721	10,052	24,511	53,047	47,623	31,734	25,752	41,278	41,213
Total	534,039	532,776	535,123	532,176	541,048	527,291	535,568	532,446	532,783	534,482

	Cumulated number of individuals 15-16 in the lowest x deciles de ESI (FACT4)									
Country / Decile	1st decile	2 deciles	3 deciles	4 deciles	5 deciles	6 deciles	7 deciles	8 deciles	9 deciles	Total
Benin	0	62,584	99,55	135,044	175,827	234,024	288,416	335,56	384,825	450,89
Burkina Faso	0	291,183	369,044	420,335	515,967	590,579	635,87	688,216	752,893	754,222
Burundi	0	0	33,104	41,727	119,451	204,383	304,748	372,931	413,824	422,733
Cameroon	58,692	61,989	122,823	214,44	270,642	334,375	405,135	493,067	612,349	976,282
Congo	989	2,074	5,473	19,967	44,892	64,011	89,945	137,3	179,694	182,751
Côte d'Ivoire	124,962	179,979	291,105	428,474	517,294	588,377	690,5	811,905	899,7	899,822
Niger	348,149	362,523	464,703	601,399	649,456	690,118	735,398	749,154	750,265	750,456
Senegal	0	91,515	191,116	223,197	279,055	346,385	406,074	474,647	560,735	610,398
Togo	1,247	14,968	25,02	49,531	102,578	150,201	181,935	207,687	248,965	290,178
Total	534,039	1,066,815	1,601,938	2,134,114	2,675,162	3,202,453	3,738,021	4,270,467	4,803,250	5,337,732

	Proportion of individuals 15-16 in the lowest x deciles de ESI (FACT4

[16]. Even though it may be added that the performance of the system was already not very satisfactory before this "cloudy" period.

Country / Decile	1st decile	2 deciles	3 deciles	4 deciles	5 deciles	6 deciles	7 deciles	8 deciles	9 deciles	Total
Benin	0.0 %	5.9 %	6.2 %	6.3 %	6.6 %	7.3 %	7.7 %	7.9 %	8.0 %	8.4 %
Burkina Faso	0.0 %	27.3 %	23.0 %	19.7 %	19.3 %	18.4 %	17.0 %	16.1 %	15.7 %	14.1 %
Burundi	0.0 %	0.0 %	2.1 %	2.0 %	4.5 %	6.4 %	8.2 %	8.7 %	8.6 %	7.9 %
Cameroon	11.0 %	5.8 %	7.7 %	10.0 %	10.1 %	10.4 %	10.8 %	11.5 %	12.7 %	18.3 %
Congo	0.2 %	0.2 %	0.3 %	0.9 %	1.7 %	2.0 %	2.4 %	3.2 %	3.7 %	3.4 %
Côte d'Ivoire	23.4 %	16.9 %	18.2 %	20.1 %	19.3 %	18.4 %	18.5 %	19.0 %	18.7 %	16.9 %
Niger	65.2 %	34.0 %	29.0 %	28.2 %	24.3 %	21.5 %	19.7 %	17.5 %	15.6 %	14.1 %
Senegal	0.0 %	8.6 %	11.9 %	10.5 %	10.4 %	10.8 %	10.9 %	11.1 %	11.7 %	11.4 %
Togo	0.2 %	1.4 %	1.6 %	2.3 %	3.8 %	4.7 %	4.9 %	4.9 %	5.2 %	5.4 %
Total	100 %	100 %	100 %	100 %	100 %	100 %	100 %	100 %	100 %	100 %

Based on these observations, it appears reasonable to focus on the lowest two deciles together than to consider specifically the lowest decile of ESI.

Besides these initial observations, we find again the **pattern of gradual convergence** for each country in the move from the lowest decile towards the full population. However beyond the generic pattern which is similar for all the countries, the reality is quite different from one country to the other. Table 6, below, provides the relevant figures.

Table 6: Proportion of population taken into account by country in the lowest x deciles of ESI

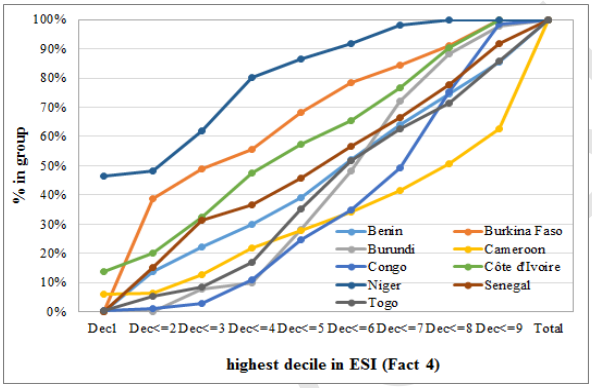
	Proportion of individuals 15-16 in the lowest x deciles de ESI (FACT4									
	1 decile	2 deciles	3 deciles	4 deciles	5 deciles	6 deciles	7 deciles	8 deciles	9 deciles	Total population
Benin	0 %	14 %	22 %	30 %	39 %	*52 %*	64 %	74 %	**85 %**	100 %
Burkina Faso	0 %	39 %	*49 %*	56 %	68 %	**78 %**	84 %	91 %	100 %	100 %
Burundi	0 %	0 %	8 %	10 %	28 %	*48 %*	72 %	**88 %**	98 %	100 %
Cameroon	6 %	6 %	13 %	22 %	28 %	34 %	41 %	*51 %*	63 %	100 %
Congo	1 %	1 %	3 %	11 %	25 %	35 %	*49 %*	**75 %**	98 %	100 %
Côte d'Ivoire	14 %	20 %	32 %	*48 %*	57 %	65 %	**77 %**	90 %	100 %	100 %
Niger	46 %	*48 %*	62 %	**80 %**	87 %	92 %	98 %	100 %	100 %	100 %
Senegal	0 %	15 %	31 %	37 %	*46 %*	57 %	67 %	**78 %**	92 %	100 %
Togo	0 %	5 %	9 %	17 %	35 %	*52 %*	63 %	72 %	**86 %**	100 %
Total	10 %	20 %	30 %	40 %	50 %	60 %	70 %	80 %	90 %	100 %

In Table 6, the point where about 50 percent of the total population 15-16 is taken into account is identified in italics and yellow (the “yellow point”), while that where this is the case for about 80 percent is identified in bold and grey (the “grey point”). Countries stand in very different position in this respect. While Niger reaches its yellow point with only 2 deciles of ESI (Burkina Faso reaches it with about 3 deciles), Cameroon with 8 deciles of ESI (Congo Republic with 7). Concerning the grey point, Niger reaches it with 4 deciles, a point where most of the other

countries have not yet reached the yellow point. Burkina Faso comes second with its grey point reached with decile 6. Countries such as Benin or Togo has to wait till decile 9 to reach the grey point, while Cameroun does not reach it at all (it is reached only with the whole country population).

Graph 4, below, illustrates the global pattern of convergence, the discussion on the yellow and grey points being now illustrated by the fact that the curves attached to the different countries can be easily stood out. The different curves are flanked up by that of Niger and down by those of Congo and Cameroon.

Graph 4: Proportion of population taken into account by country as global cumulated deciles of ESI are considered



These numerical results has potentially a significant bearing in an action-oriented perspective, since they concern the priority that could be given by the donor community to the different countries. In that context, because the lines do not intersect much with each other, this suggests that the hierarchy of the global priority across countries may not be strongly affected by the size of the population to which international community is interested in providing assistance.

4.4 Bridging the distribution of numbers with that of the resources

In this report it is considered that a general objective is to provide assistance to those children who are currently lagging behind in terms of their educational status, irrespective of their country of residence. On this basis, It is straightforward to suggest that the global amount of resources provided by the donors to support education (588 million US$ on average between 2010 and 2014) be distributed to the countries according to the distribution of the individuals in the first deciles of ESI. This raises however two questions:

. The first is to determine the concrete meaning of “the first deciles”. This concept needs be operationalized; it could for example be the lowest 2, 4 or 6 deciles.

The second is to determine whether it is relevant to consider that *a child is a child*, so that the same amount of support should be provided, regardless of the cost of education in the country of residence (as for example in the new funding model of GPE). But the cost of education may be considered so that a child does not command the same amount of assistance whether he/she lives in a country where the unit cost in basic education is US$ 80 or US$ 140. Besides, when talking about the cost of education, is it the actual figure (which may embody inefficient provision and low quality of service) or a more normative figure based on some elements of benchmarking (as FTI did in 2001, using the indicative framework), using therefore a more normative approach.

At this point, providing answers to these two questions appears crucial in view of operationalizing the analysis. But these questions are normative in nature and it may not a priori be appropriate for a technical work to suggest choices on these matters. It is probably better science no to pre-empt specific answers and to test an array of parameters on these two counts. This approach may on the one hand be heuristic if the results obtained are different while, on the other, provide more robust conclusions if the results are reasonably similar.

4.4.1 Variation on the targeting of deciles of ESI without considering the cost of education

Table 7, below, provides the average amounts (over the period 2010-2014) of the external assistance for education provided by all the donors to each of the countries of our sample, the distribution of the population 15-16 in the lowest 2, 4 and 6 deciles of ESI (in its FACT4 specification) by country, as well as the ratio between that distribution based on the concept of this report ("children without borders") and the actual distribution of the ODA by country (Further detail on the actual ODA allocation for education in the nine countries of the sample are provided in Annex 6).

Before considering ODA allocations, a first observation is, with no surprise, that the specificity of countries is all the more pronounced as size of populations is smaller and concentration of individuals with a low educational status higher. In the lowest two deciles, the share of some countries is much larger than that in the total population (respectively 34 and 14 percent in Niger for example), while it is much less for others (for example Togo with corresponding figures of 1.4 and 5.4 percent). These specificities fade progressively away as the populations of the four, then six, lowest deciles of ESI are considered.

Table 7: Distribution of external assistance to education to the countries sampled: comparing the use of CWB concept without weight for the cost of education with actual ODA

Pays	ODA/year (Av 2010-14)		% Population				ODA/			
	Million US$	%	First 2 deciles	First 4 deciles	First 6 deciles	Total	First 2 deciles	First 4 deciles	First 6 deciles	Total
Benin	56.2	10.0 %	5.9 %	6.3 %	7.3 %	8.4 %	1.71	1.59	1.38	1.19
Burkina Faso	83.1	14.9 %	27.3 %	19.7 %	18.4 %	14.1 %	0.54	0.75	0.81	1.05
Burundi	29.6	5.3 %	0.0 %	2.0 %	6.4 %	7.9 %	-	2.71	0.83	0.67
Cameroon	107.3	19.2 %	5.8 %	10.0 %	10.4 %	18.3 %	3.30	1.91	1.84	1.05
Congo Rep.	22.0	3.9 %	0.2 %	0.9 %	2.0 %	3.4 %	20.23	4.20	1.97	1.15
Côte-d'Ivoire	42.9	7.7 %	16.9 %	20.1 %	18.4 %	16.9 %	0.46	0.38	0.42	0.46
Niger	38.9	7.0 %	34.0 %	28.2 %	21.5 %	14.1 %	0.20	0.25	0.32	0.49
Senegal	158.4	28.3 %	8.6 %	10.5 %	10.8 %	11.4 %	3.30	2.71	2.62	2.48
Togo	20.6	3.7 %	1.4 %	2.3 %	4.7 %	5.4 %	2.63	1.59	0.79	0.68
Total	558.9	100.0 %	100.0 %	100.0 %	100.0 %	100.0 %	1.00	1.00	1.00	1.00
R^2 With ODA							0.01	0.03	0.04	0.22

Since no weighting is considered at this point for the cost of education, it means that the same amount of external assistance is granted to all the children belonging to a given group of ESI (lowest 2, 4 or 6 deciles or total population). In this context, donors' assistance to a country is in equally proportionate to the number of targeted children in a given country.

As mentioned above, we do not know the group of ESI to be taken into consideration. This group might indeed be restricted only the children in the lowest two deciles of ESI; it might be larger and consider the forty percent of children, or even embrace the wider group made of the 6 lowest deciles. Results provided in Table 7, above, consider these different possible cases.

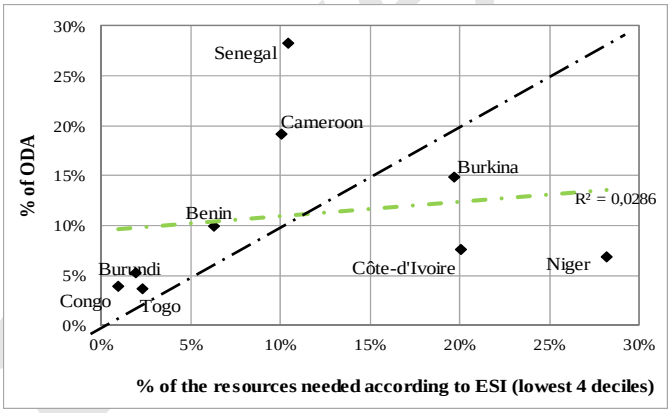
The comparison between the distribution country-population in the various groups of ESI with that of ODA for education (2010-2014 average allocations), shows that the two distributions differ by a very large margin. In fact, while the correlation between the various distributions of ESI across countries (variations on the number of the lowest deciles of ESI) are always very high (R^2 above 0.9), the correlations between the distribution of ODA and that of spending in the context of CWB are always very low; the R^2 is for example only 0.01 if ESI focuses on the lowest two deciles, 0.02 if the lowest four deciles are considered; it is only when the full population is considered ("lowest 10 deciles") that the R^2 becomes statistically significant, even though its numerical value remains relatively low (22 %).

These results suggest that the current practices of the donor community (assuming it can be thought as a global group) in allocating funds for education to the countries of the sample (probably to countries in general) are absolutely not at all aligned with what it would be if children lagging in education (should in the lowest 2, 4, or 6 deciles) were really targeted, irrespective of their country of residence.

Given the strong discrepancy between the actual distribution of ODA across the different recipient countries and the distribution resulting from "children without borders" concept, there are clearly winners and losers, as illustrated in Graph 5, below.

Let's first remember that Graph 5 has been prepared for the specification FACT4 of ESI and for the case corresponding the lowest four deciles of its distribution. In this graph, the diagonal line provides the reference where there would be perfect symmetry in the proportion of children, country wise, according to both the CWB concept and actual ODA allocations.

Graph 5: Contrasting the "needed" resources, estimated from the distribution of ESI (Lowest 4 deciles), unweighted for the cost of education with that of ODA,



Visually from graph 5, two countries appear to be real outliers: on the one hand Senegal is clearly a winner in that it gets 28 percent of the amount of ODA for education provided to the group of the nine countries of interest, although the country hosts only 10.5 percent of the 15-16 population is the lowest four deciles of ESI; on the other hand, Niger is a significant loser since it counts 28 percent of the children in the lowest four deciles of ESI but gets only 7 percent of the ODA provided for the sector to the nine countries as a whole. The discrepancy between these two cases is far from anecdotic as it would be necessary to increase the recorded ODA of Niger by a factor 11 so as to match the ODA granted to Senegal given the number of individuals in the lowest four deciles of ESI respectively in these two countries.

Côte-d'Ivoire, and to a lesser extent Burkina Faso, are in the same category than Niger but with a lesser magnitude; conversely, the case Cameroon is also somehow comparable to that of Senegal but also with less intensity. Given their size and the size of their challenges in education, a direct reading on the graph is not the most appropriate approach to assess the case of Benin, Burundi, Congo and Togo. In fact, the figures on the right hand side of Table 7 (column for the lowest 4 deciles) show that the coefficient for Burundi (2.71) is similar to that of Senegal, while that for Congo (4.22) is even larger. Togo and Benin are comparable cases in which the coefficient of ODA/needs (1.59) is favourable, but only by a more moderate margin.

It is to be reminded that Graph 5 (as well as comments made on it) are related to the population of the lowest 4 deciles of ESI. And it is obviously of interest to assess the degree of robustness of the results when the lowest 2 or 6 deciles of ESI are considered. The pattern is in fact very similar (as the high values of the R^2 across the three distributions suggest), the relative position of the different countries in the graph being very similar should the target be the lowest 2, 4 or 6 deciles of ESI.

However, in a sense mechanically as well as in line with the point made above, the dot representing a country tends to be less distant from the diagonal as the population of a larger number of deciles is considered. For example Niger represents respectively 34, 28 and 22 percent of the total population (nine countries) in the lowest 2, 4 and 6 deciles of ESI, while the number of individuals 15-16 account for 14 percent of that population in the nine countries and the country gets only 7 percent of total ODA for education. Whatever the number of deciles considered, Niger is strongly at a disadvantage; and this is all the more so as we consider children standing at lower levels of the Education Status Index.

4.4.2 Variation on the targeting of the deciles of ESI with weights for the cost of education

In the previous section, the reference to identify assistance was the child; and the fact for a child to be identified as being in "bad" conditions relative to generic education objectives, would entitle him/her to the same financial support, irrespective of his/her country of residence. As discussed before, an alternative view may be that what matters is not the child but the education needs of the child in his/her country of residence. With this qualification, the cost of education has to be factored in.

A basic observation is that it differs across countries; however various reasons may account for that: some are endogenous and correspond at large to national education policies (that may incorporate inefficient modes and low quality of

service), while some are exogenous, in relation with the level of economic development or specific country conditions. In such case, it is preferable to adopt a “normative” view and use the cost of similar and reasonable conditions of schooling in all the countries of the sample; this is the approach taken in that section. (Annex 7 provides a discussion on the cost of education per student in basic education in the nine countries of our samples and provides estimates according to two perspectives considered (positive and normative).

A second aspect is that, besides the country of residence, the cost of education may also differ within countries depending on the characteristics of the child. For example, it is obviously higher for children with special needs (but we have no information of these circumstances in the data we have used); but it could also be higher for girls is specific actions need to be taken for them in order to get rid of a gender bias. It may in particular be relevant to consider the geographical location of the child since a number of studies show that it generally turns out to be more costly to deliver education services in rural than in urban setting. A set of instrumental coefficients could have been used to take into account these aspects in the report; this has not been the case[17].

Table 8, below, is the companion of table 7 above, but incorporates a weighting by the normative cost of education services in the various countries of the sample. In spite of the fact that using the cost of education as a weighting factor somehow reshuffles the cards, the overall picture under in these circumstances remains reasonably similar with that depicted in the previous section (in which no weight was used for the cost of education). This global resemblance may be visually assessed by comparing Graph 5 (right hand side graph below, unweighted for the cost of schooling) with the left hand graph below, in which the number of children to be provided assistance is weighted by the cost of schooling attached to the country he/she lives in.

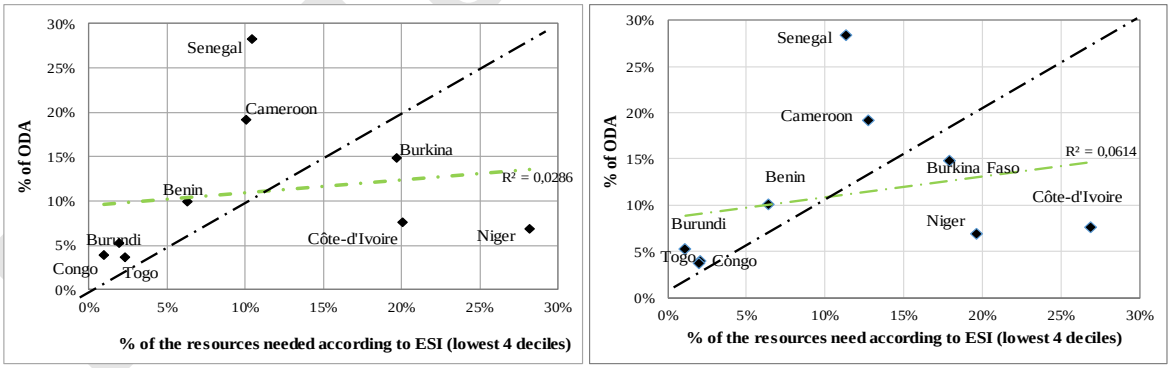
[17]It would however have marginally increased the difficulty of the case of Niger and Burkina Faso and made the case of Congo and Cameroon even more favorable; but this would unlikely alter significantly the overall picture.

Table 8: Distribution of external assistance to education to the countries sampled: comparing the use of CWB concept with weights for the cost of education with actual ODA

	Numbers of individuals 15-16 (ESI=FACT4)				ODA/year (Av 2010-14)		Norm. UC	First 2 deciles of ESI		First 4 deciles of ESI		First 6 deciles of ESI	
Countries	Dec<=2	Dec<=4	Dec<=6	Total	US$ (million)	%	USD	USD (million)	% (ODA/ref)	USD (million)	% (ODA/ref)	USD (million)	% (ODA/ref)
Benin	62,584	135,044	234,024	450,890	56.2	10.0 %	173	10.8	6.3% (1.61)	23.3	6.4% (1.56)	40.4	7.4% (1.36)
Burkina Faso	291,183	420,335	590,579	754,222	83.1	14.9 %	154	45.0	26.0% (0.57)	64.9	17.9% (0.83)	91.2	16.6% (0.89)
Burundi	0	41,727	204,383	422,733	29.6	5.3 %	97	0.0	0.0 % (-)	4.1	1.1% (4.74)	19.9	3.6 % (1.46)
Cameroon	61,989	214,440	334,375	976,282	107.3	19.2 %	216	13.4	7.7% (2.48)	46.3	12.8% (1.51)	72.1	13.2% (1.46)
Congo Rep.	2,074	19,967	64,011	182,751	22.0	3.9 %	369	0.8	0.4% (8.88)	7.4	2.0% (1.94)	23.6	4.3% (0.91)
Côte d'Ivoire	179,979	428,474	588,377	899,822	42.9	7.7 %	227	40.9	23.7% (0.32)	97.3	26.8% (0.29)	133.7	24.4% (0.31)
Niger	362,523	601,399	690,118	750,456	38.9	7.0 %	119	43.0	24.9% (0.28)	71.3	19.6% (0.35)	81.8	14.9% (0.47)
Senegal	91,515	223,197	346,385	610,398	158.4	28.3 %	184	16.8	9.7% (2.91)	41.0	11.3% (2.51)	63.7	11.6% (2.44)
Togo	14,968	49,531	150,201	290,178	20.6	3.7 %	146	2.2	1.3% (2.92)	7.2	2.0% (1.85)	21.9	4.0% (0.92)
Total	1,066,815	2,134,114	3,202,453	5,337,732	558.9	100 %	187	172.8	100 %	362.8	100 %	548.2	100 %
R^2 with ODA									0.03		0.06		0.08

Graph 5: Contrasting the "needed" resources estimated from the distribution of ESI (Lowest 4 deciles) with that of ODA

Raw numbers, unweighted for the cost of education	**Weighting the numbers by the cost of education**



The R^2 of the relationship between the distribution of ODA and the distribution of the resources needed by children in the lowest 4 deciles of ESI, is very low in both cases (2.9 % when the cost of schooling is not used and 6.1 % when the cost of education is taken into play as a weighting factor). At the same time, the R^2 between the distribution of the needs by country whether this distribution

derives or not from the use of the cost of education factor is 82 percent and this is why the two graphs (with and without the cost factor) look globally alike.

In fact, the location of most countries is as a whole very much the same in the two graphs; only the locations of Côte-d'Ivoire and Niger in the graph appear to differ. In both cases they stand well below the diagonal, indicating that the ODA contributions are low in relation to the magnitude of the educational needs of their young population; but, due to the fact that unit cost of education in Niger is about half of that of Côte-d'Ivoire in dollar terms, the location of the two countries is kind of inverted when cost is used as a weighting factor.

5. Summary: "CWB" approach versus actual pattern of allocation of ODA on education

This report is based on the comparison between something that does not exist but is only a concept (the CWB approach with some effort to operationalize it), and something that can be mostly identified by the resources it mobilizes (i.e. the donor community), but, in fact, is not geared by explicit and well defined concepts (mostly generic declarations blended with sometime opportunistic implementation). We have implicitly assume that the CWB approach is what corresponds more or less to the official and public declarations of the donors for providing assistance to education; and we tried to assess the extent to which the amount of assistance provided by the donors for education to the nine countries is, to some extent, aligned to what would have resulted from implementing the CWB approach.

Being based on a concept, the CWB approach needed first to be operationalized; it may be useful to remind the reader of the various steps that have been taken to this end.

5.1 Identification of the educational status of the individuals

We have seen that, beyond the point of mobilizing the appropriate data (not an easy task), this operationalization has been indeed quite a demanding exercise. A basic concept used to this end has been the characterization of the **Education Status Index** (ESI). The idea is to get a reduced form of the diversity of schooling careers of a generation of youngsters belonging to the nine countries under consideration. The ingredients towards estimating ESI are found among the following:

- Schooling career related variables: i) probability of having benefitted of preschool, ii) effective access to primary education, iii) highest grade attained by individuals 15-16 years of age (they still could be enrolled or have already put an end to their studies, iv) estimated level of learning in their country using a common instrument to base this assessment;

- Socio-economic variables: i) gender, ii) area of residence (urban/rural) and wealth index (based on the same set of quantifiable variables, living conditions and assets of the household).

From these elements, instrumental choices needed be made to determine which of these components were to be taken into account in the calculation of the ESI, and which method and formula would be used to assemble these components into a numerical value of ESI, likely to be attached to all of the targeted individuals in the global sample.

- Concerning the dimensions to be considered the choice has been restricted to three cases: 1) quantitative coverage only (consolidating the first three items in the list above); 2) quantitative coverage + quality of services (assessed from the score at a common test-PASEC-administered in 2014 in primary education in the nine countries of the sample) and 3) quantitative coverage + quality of service + social/geographical variables;

- Concerning the method used to reckon the index that would amalgamate the desired components, two approaches have been envisaged:

1) A traditional way of proceeding could be to create the index by adding its components after having standardizing their distribution; this opens the door for using weights if we want to give more importance to some of them;

2) The factor analysis way; using this technique starts from the idea that ESI is an unobservable variable. It can however be estimated using this statistical technique that consolidates the different components chosen to be taken into account into a summary indicator.

The work undertaken in this research has considered both the various possible choices of the components to be taken into ESI and the different methods to amalgamate these components into an empirical measure of ESI (including a set of weights to provide greater importance to quantity or quality). Ten alternative measures of ESI have then been estimated and the correlations between them analyzed. Different considerations have been used to reduce that number and finally make a choice for the specification of ESI to be used.

* First it appeared that the correlation was very high between the factor analysis and the traditional additive approaches when similar aspects were considered. For example, R^2 is 0.996 between the two estimates for the quantitative dimension of ESI; it is 0.946 between the two specification of ESI that take together the quantitative and qualitative dimensions of schooling;

* Second, it appeared also that using weights with the idea of providing greater emphasis for example on either quantity or quality had in fact very limited consequences upon the value of ESI since the correlations are always very high between cases with and without weights. For example, the R^2 between AG30 (equal weights for quantity and quality) and AG32 (double weight for quantity) is 0.979.

Finally, considering that the incidence of using the weights in the traditional additive approach is minimal and that the correlations between the estimates based on the factor analysis and the traditional additive approach, a choice has been to use the estimates of ESI generated by the factor analysis approach. Then given the argument that the main perspective of external support to education is not *per se* poverty and that school-related variables are already quite significantly loaded with the social characteristics of the youngsters[18], the choice of the specification of ESI has then been restricted to those taking into account only the school-related variables. Since the quality of services is a crucial aspect to consider (if coverage has improved over the last 15 years, and this has been much less the case for the quality of the services offered), there has been a strong preference to focus on the specification FACT4 of ESI (blending quantity and quality) than on FACT2 that concentrates only on the quantity dimension; the FACT4 specification of ESI has then been used as a basis for the analysis.

5.2 The distribution of the ESI statistics and "choice of a target" population

ESI is then a variable that can take an array of values; it is characterized by its mean and standard deviation, but the numerical values of these distributional parameters are conventional in nature. What matters is that we can rank all the youngsters 15-16 years of age of the nine countries of our sample by increasing numerical values of ESI.

The lowest deciles of ESI are then "saturated" of individuals with the "worst" schooling career; they tend also to carry unfavourable socio-economic characteristics (more often rural, poor and girl) and, more importantly, are not distributed evenly across the countries of our sample (some countries are over-

[18] This means that including the children currently out-of-school would have in itself a strong social dimension.

represented or under-represented by reference with their share in the overall sample). When considering for example the lowest 4 deciles of ESI instead of the lowest 2 deciles, the specificity (socioeconomic background and distribution by country) of the population belonging to the target group gets progressively less pronounced.

According to the official statements of most actors of the donor community, the objective is not to help systems of education to address the difficulties the low performers in the systems of schooling of the recipient countries. In this context, it would be useful to determine where is placed the "cut-off point" separating those who have a priority in getting support from those who are not eligible for that priority. Opinions may differ on where to put the threshold. To avoid making a choice on that count, we have conducted the analytical work using a set of three cases, namely the lowest 2, 4 and 6 deciles of ESI.

5.3 What amount of support to the targeted populations on a per child basis?

For each of these three target cases, it is straightforward to identify the number of individuals (and assess their distribution) according to their country of residence. The point is now to determine whether reference external assistance would be given "at a flat rate" for all the children concerned irrespective of their personal characteristics and in particular of the country they live in ("a child is a child"), or whether that rate is also pegged upon the cost of schooling in the various countries[19] ("an educated child is an educated child"). Again, to avoid choosing among these two reasonable possibilities, the analysis has been duplicated to take both approaches into consideration.

5.4 The results obtained

From the discussions above, six alternative estimates depending on the number of lowest deciles of ESI that are considered (2, 4 or 6) and depending upon whether the number of individuals identified as a reference for external assistance is unweighted or weighted by a normative estimative of the cost of educational services in basic education.

The results obtained show first a relatively high level of similarity among the distribution of the financial needs of the different countries across the six cases under consideration; this result identifies a noticeable degree of robustness of the

[19]. For the cost of education, a normative approach has been used to put the various countries on common grounds and avoid using actual figures that may incorporate inefficiencies and/or low quality in the delivery of services.

CWB approach over a large array of the concrete details considered for its implementation. This aspect may be replicable if this exploratory research on nine countries was to be extended to larger number of countries.

They also show a very large difference between the distribution of actual ODA to the countries in our sample and the distribution of the financial needs resulting from the CWB concept; and this irrespective of the variety in specific parameters of its implementation. To provide a factual information on this point, it is for example observed that none of the various R^2 between the two distributions country wise is larger than 0.06.

This suggests that the forces at the root of the allocation pattern of ODA to recipient countries are clearly not of the same nature than those taken into account in the CWB concept. In other words, it means that the current allocation of ODA is not based on the needs defined through this study. It suggests also that if the reference of the CWB theory can be accepted, this would imply first to understand why such a discrepancy exists, and second to examine how to improve the practices of the donors to grant assistance in education (possibly in other domains also) to the recipient countries.

Annex 1: Selection of age group to conduct the analysis and highest grade attained

Based on the pattern of the access rate to primary education by age of the individual at the date of survey (Graph 1 in section 3.2 above), it had been assessed that it could be preferable to target individual aged 15-16 to conduct the main analysis of this report. The sample size (before weighting) is 11,309 for those aged 15 and 9,932 for those aged 16. This means that for a single year there are on average 1,200 and 1,100 individuals per country; but since the size of the sample varies across countries, the figures happen to be small for countries such as Burundi, Congo, Côte-d'Ivoire, Niger or Togo, as documented in Table A.1, below.

Table A.1: Number of individuals 15 and 16 by country in global sample (not weighted)

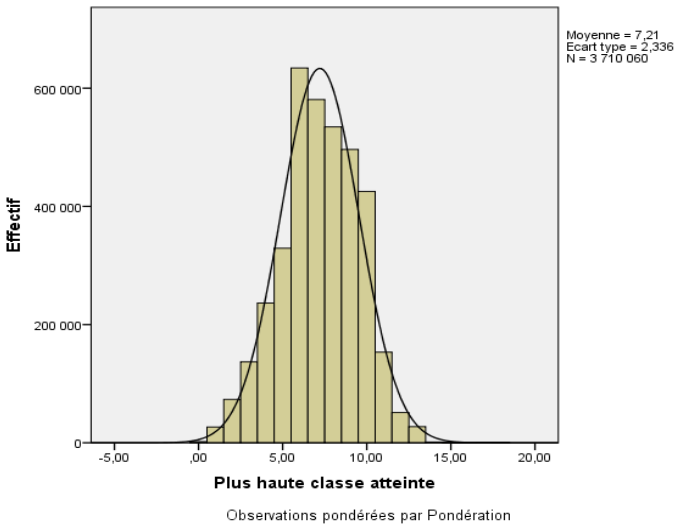
Pays	Bénin	Burkina Faso	Burundi	Cameroun	Congo	Côte d'Ivoire	Niger	Sénégal	Togo	Total
15 ans	1,871	1,717	608	1,579	974	887	1,027	1,796	850	11,309
16 ans	1,496	1,451	478	1,416	920	865	896	1,655	775	9,952

In spite of the fact that it would be indeed be neater to use a single age to conduct the analysis, the limitation of the size in 5 countries out of 9, it might be of interest to consider the 15 and 16 together. This would be preferable in terms of number, but it creates a practical difficulty that needs to be taken care of. The point is that those who are 15 have had "less time" to reach grade X than their counterparts of 16. The global distribution of the highest grade attained for those who ever had access to primary Grade 1 (graph A.3, below) comprises therefore individuals (those of 16) who have had better chances to get to Grade X than those of 15. Estimates shows that this argument has in fact little practical bearing for the students whose highest grade is 7/8 or less[20].

[20]. Because at the year of 15 or 16 very few are anyway both still in school and registered in a grade lower than 7.

Graph A.1: Distribution of highest grade attained

(Population 15-16 ever enrolled, all countries)



. At the age of 15 or 16, most of the students who are still in school, are generally attending a Grade above the 7th

. And it would be appropriate to increase the highest grade of the individuals 15 years of age by 0.7 grade to get an idea of the grade they are likely to be when thev are 16

Annex 2: Estimates concerning attendance of preschool

Recent research points out that children better equipped in terms of cognitive and socio-emotional competences when accessing school make significantly better schooling careers, to start with in primary education. In this context, preschool can be considered (if correctly organized) a powerful instrument towards both improving the pattern of student flow (reducing the frequency of grade repetition and dropout), and boosting the level of learning achievement of students in primary education.

Preschool is therefore to count as a significant component i) of the schooling careers of an individual, and ii) in the overall human capital strategy of a country. As mentioned in the body of the text, this aspect cannot however be identified directly for the individuals of the household surveys used (in particular for those of 15 or 16 years of age). To avoid being constrained to miss this dimension, a possibility consists in attaching to each of the individuals considered in the analysis his/her chances of having attended preschool. These chances can in principle be estimated from different sources.

* One possibility is to use a household survey, in particular the DHS that is used widely in this research for the nine countries of our sample. However even though the question on attending preschool for a five-year-old child exists in all of the surveys used, the coding is such in three of them (Benin, Burkina Faso and Burundi) that “preschool” is considered in the same category as “no education”.

* An alternative possibility consists in making use of the 2014 PASEC dataset which comprises a variable indicating whether the student has had preschool before accessing primary education. As the survey comprises also the same type of assets and conditions of living of the family as in the DHS, estimates of wealth quintiles that are generically similar to those estimated in the DHS can be made. Besides, PASEC surveys comprise also the gender of the student and the type of geographic area (urban/rural) he/she lives in.

Generally speaking, the DHS source appears preferable i) because it has a better coverage of the population than the PASEC; ii) because, when available, the information is obtained without resorting to the memory of the person surveyed and without the possible selectivity bias when estimating the chances of preschool in a population in school at the end of the primary cycle; and also iii) because there regional dimension is available in the DHS, and not in the PASEC, while it is known that this aspect carries a strong incidence in some of the countries of interest.

However, it is to be stressed that a problem cannot be avoided even using only the DHS surveys. It is linked to the fact that the concept of “preschool” is not fully

standardized. It happens quite often that community-based types of preschool or Koranic preschool are not considered in the official statistics; it happens also that attendance of such types of structure are considered in some national surveys but not in some others.

At the end, the strategy has been to use the DHS estimates in the 6 countries where the "preschool" variable is documented (Cameroon, Congo, Côte-d'Ivoire, Niger, Senegal and Togo), and to use the PASEC estimates in Benin, Burkina Faso and Burundi (for of these three countries, estimates have been recalibrated to ensure consistency with actual data on the coverage of pre-schooling).

It is then straightforward to estimate the following type of statistical relationship (Regions not taken into account in estimates from PASEC)

Prob (Prescho) = f[21] (Gender, Urban/Rural, Wealth Quintile, Regions)

Table A.2: The chances of preschool by country; DHS/PASEC data, years around 2012

Countries	Benin**	Burkina Faso**	Burundi**	Cameroon	Congo Rep.	Côte-d'Ivoire	Niger	Senegal	Togo	Together
Preschool coverage	31.2 %	7.7 %	8.7 %	41.9 %	17.2 %	11.0 %	9.4 %	19.1 %	20.9 %	19.2 %
Gender										
Boys	29.8 %	7.2 %	7.0 %	40.5 %	18.3 %	10.2 %	10.4 %	20.1 %	19.2 %	18.4 %
Girls	32.9 %	8.2 %	9.4 %	43.3 %	16.3 %	11.9 %	8.0 %	18.1 %	22.8 %	19.9 %
Type of Location										
Urban	45.8 %	16.8 %	26.9 %	57.7 %	21.2 %	16.5 %	17.5 %	27.3 %	31.9 %	31.8 %
Rural	20.4 %	4.6 %	6.6 %	25.5 %	8.4 %	3.8 %	7.3 %	12.8 %	14.2 %	11.1 %
Quintile of Wealth*										
Q1, poorer	18,0 %	2,2 %	2,4 %	5,2 %	9,5 %	1,7 %	6,8 %	7,7 %	12,4 %	6,6 %
Q2	18,6 %	2,8 %	3,0 %	24,7 %	10,4 %	3,4 %	5,4 %	10,5 %	11,5 %	11,0 %
Q3	23,6 %	4,6 %	4,1 %	40,9 %	16,9 %	4,3 %	5,4 %	20,9 %	21,8 %	16,2 %
Q4	37,0 %	8,0 %	8,5 %	61,2 %	18,8 %	8,4 %	7,9 %	21,3 %	31,6 %	23,2 %
Q5, richer	62,0 %	19,6 %	19,8 %	73,0 %	27,0 %	24,2 %	18,1 %	41,0 %	35,2 %	34,6 %
Minimum [1)]	16.1 %	2.0 %	2.3 %	5.0 %	6.8 %	1.7 %	4.9 %	6.8 %	11.4 %	1.7 %
Maximum [1)]	63.8 %	21.4 %	28.6 %	73.9 %	29.6 %	24.3 %	18.9 %	44.1 %	39.2 %	73.9 %

*: National quintile; ** Estimates from Pasec, all other from DHS

1) Minimum and maximum correspond to the lowest and highest average figures for extreme groups built on the three variables

[21]. Being a probability, the logistic specification can be used. There is also a possibility to recalibrate the equation so as to match the overall coverage figure at the time an individual 16 years of age in 2014 could have been in preschool in his/her own schooling career.

These estimates help simulate the chances of any child to benefit from preschool on the basis of his/her gender, whether he/she resides in a city or in the rural (using the national conventions to separate out these two types of areas) and the quintile of conditions of living of his/her parents in the national context, as well as his/her country of residency. Using these equations will therefore be convenient to get an estimate of the chances of preschool to the individuals considered in the main dataset of that research; as described thereafter, the numerical values of these estimates are to span from very low figures (around 2 percent in Burkina Faso, Burundi and Côte-d'Ivoire for a rural poor to relatively high figures (74 percent for a urban rich in Cameroon).

Concerning the country of residency, wide differences are observed between them in the analysis of preschool they offer in 2014 to their young population, Cameroon and Benin showing much higher figures than Burkina Faso or Niger[22]. Within countries, social disparities are generally quite pronounced in the access to preschool: while i) gender makes generally little difference; but this is not the case of both ii) the area of residency and even more iii) the quintile of income of the family.

Children living in urban setting are very significantly advantaged (on average 11 percent in rural against 31 percent in urban areas); supply side factors do play a significant role on that count. Demand side factors play also quite a significant influence, the wealthier and more educated population (who also resides mostly in cities) being i) much more inclined than poorer population to put their children a structure of preschool and ii) much more able to pay for these services since a relatively high proportion of the places offered are in the private. At the end, the chances of being getting to preschool services in 2014 (where coverage is generally on the low side) are much skewed in favor of the rich and urban population; this is absolutely not in line with the objective of the Dakar forum that emphasized the need to target in priority the vulnerable children.

[22]. UIS data show also that significant progress has been made on that count in some of these countries (yet, not all) over the last ten years.

Annex 3: Estimates concerning the learning score

In the absence of a direct information on the level of learning of each individual in the global dataset of the research, it remains important to bring some proxy for this aspect of his/her schooling career in the analysis. To do so, we can be opportunistic and use the data on student learning assessment raised by PASEC in 2014 in the different countries of our basic sample. These data concern learning in math and language of a fairly large number of students (about 29,000 students for the nine countries considered in that research) in the 6th and last grade of primary education; the same tests have been administered to all students using common procedures, while marking has also been performed using common standards.

Generally speaking and with the risk of simplifying a bit the framework, the score of a child may be seen as depending on the articulation of three factors: i) the "intrinsic" quality of the education services he/she has received; ii) his/her individual and social characteristics; and iii) his/her "personal" characteristics.

The quality of the services received by a child can itself be seen as resulting for the impact of a mix of a fairly large amounts of elements: curriculum; formal characteristics of the teacher (academic credentials and training) as well as his/her personal charisma, motivation and energy; size of the class; availability of pedagogic and didactic materials; effective number of days of school over the year; pedagogical approaches and methods used; the quality of the supervision… Within these factors some are currently matters of national educational policies (that may admittedly be different across countries), while some others are not, either because they are not considered as such, or because they have a strong personal or local dimension.

The social characteristics that may impact upon learning of the child may concern the economic and cultural context of the family as well as the behavior of parents (in general and vis-à-vis schooling) from the birth this the date of survey. We do not have in general access to these aspects and most researches relies of visible variables such as gender, geographic location and poverty as visible variables to "absorb" the incidence of the unobserved variables.

The personal characteristics of the child concern the cognitive and the personality dimensions. There no point to discuss here the extent to which they have been inherited or acquired; a point is that when a teacher provides a lesson to his/her class, it is patent that all students are not equally able to absorb it over a given period of time.

The difficulty we are facing to "import" the learning dimension from the PASEC into the on-going research is that the individuals are not the same in the two

datasets. It implies first that we are inevitably to lose the personal characteristics of the child. It is true that they were "implicitly" present in PASEC, but this aspect is at best only a matter of observation with no consequence likely to be drawn from that. Besides, since our perspective is in a sense "macro", losing this aspect may even be considered positive.

However. it remains interesting to see that we can keep track in the global analysis of both i) the individual and social (formal) characteristics of the individual and ii) the overall "intrinsic" quality of each national system of education; the latter being approached by estimating the level of learning in each country for students holding similar social characteristics.

The equation then to be estimated in each of the countries of our sample is as follows:

Score (average math/language) = f (gender. urban/rural. quintile of wealth)

The overall score has been standardized with a mean of 500 and a standard deviation of 100. The results obtained are presented in table A.3, below.

Table A.3: Regression estimates of the learning score by country; PASEC data, 2014

Countries	Benin	Burkina Faso	Burundi	Cameroon	Congo Rep.	Côte-d'Ivoire	Niger	Senegal	Togo	Together
Average raw score	493.4	530.3	569.9	509.7	509.2	493.7	407.1	528.6	500.6	[500, 100]
Male/female	-12.10***	8.38***	-23.61***	-3.98*	6.52**	10.25***	12.48***	2.76 (ns)	9.41***	
Urban/rural	60.70***	51.16***	3.04 (ns)	93.26***	54.60***	46.12***	50.98***	70.86***	67.98***	
Q1, poorer	-	-	-	-	-	-	-	-	-	-
Q2	- 9.22 (ns)	19.44***	2.34 (ns)	9.29*	- 4.37 (ns)	5.63 (ns)	7.72**	0.55 (ns)	0.41 (ns)	
Q3	- 4.37 (ns)	15.68***	- 0.27 (ns)	30.89***	3.92 (ns)	0.98 (ns)	6.64*	9.90 (ns)	7.23*	
Q4	11.38**	15.76***	21.55***	55.77***	12.03**	21.82***	9.50**	35.76***	35.31***	
Q5, richer	54.38***	50.23***	67.07***	71.36***	46.01***	23.71***	42.63***	46.01***	69.00***	
Constant	462.88	482.54	576.60	435.12	458.10	451.76	376.47	484.27	459.23	
Nb. Observations	3,033	3,416	3,461	3,817	2,673	2,972	3,196	2,951	3,258	31,033
R^2	0.203	0.112	0.098	0.364	0.245	0.124	0.147	0.165	0.239	
Minimum [1)]	450,8	482,5	553,0	431,1	458,1	451,8	376,5	484,3	459,2	
Maximum [1)]	578,0	592,3	646,7	599,7	565,2	531,8	482,6	603,9	605,6	
Range [max-min]	127,2	109,8	93,7	168,6	107,1	80,1	106,1	119,6	146,4	

1) Minimum and maximum correspond to the lowest and highest average figures for extreme groups built on the three variables

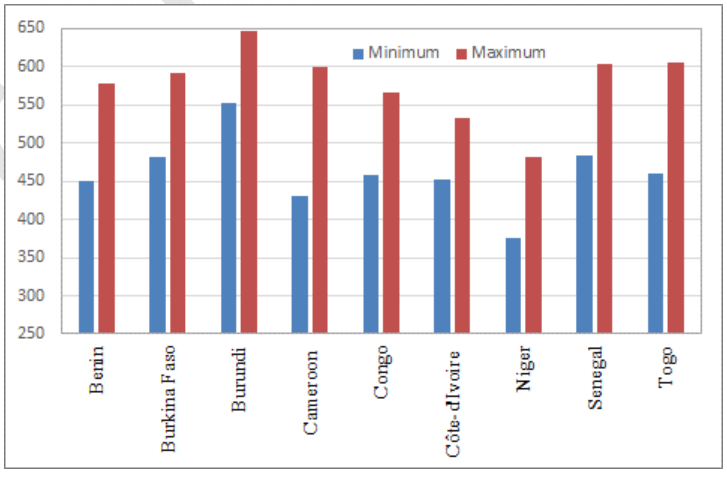
*: significant at 10 percent level; **: significant at 5 percent level; ***: significant at 1 percent level; (ns) for non-significant

These estimates call for two types of comments: i) the first concerns the impact of the three variables taken into account; ii) the second concerns the level and the distribution of students' scores across the various countries of the sample:

Concerning the impact of the various variables, there are both elements of similarity and elements of difference. In all countries, students from rich families have significantly better scores than their counterparts from poor families. Similarly students living in urban areas do in general much better than those living in the rural; this is true of all the countries analyzed with the exception of Burundi in which the distinction between urban and rural per se, makes no statistically significant difference. Boys (those who have "survived" till grade 6) have in general better scores than girls (in particular in Côte-d'Ivoire, Niger and Togo); but the contrary is observed in Burundi and Benin. Globally, the social variables considered here generate substantial disparities in learning. This is particularly the case in Cameroun and to a lesser extent in Togo, while Côte-d'Ivoire and (even more) Burundi are characterized by the lowest impact of the social variables on the distribution of students' learning scores at the end of the primary cycle of schooling.

But, notwithstanding the impact of the social variables to account for the distribution of the score, it is very important to note that the average level of that score differs quite substantially across the 9 countries of our sample. With an average close to 600, Burundi has by far the highest average score, followed by Burkina Faso, Senegal and Togo that stand around 540. Benin, Cameroun and Congo come after with average scores around 510. Slightly Below (around 490) is Côte-d'Ivoire. Niger, comes last with an average score of 430 that can be considered quite low. Graph A.1, below illustrates these differences while showing also the range between extreme social groups, taking into account gender, urban/rural and the "country specific quintiles" of the conditions of living.

Graph A.2: Range of the learning score according to "extreme" social groups by country



Blending the differences in student scores both i) between countries and ii) within countries according to the social categories of the student (gender, urban/rural and quintile of income), the scores that will be imputed to the individuals in the

main global dataset will span over a relatively wide range, from 376 to 647 in the scale conventionally used for assessing the student learning performance.

Annex 4: Estimating the Education Status Index

In the global dataset assembled for the nine countries, information attached to individuals 15-16 years old has been made available on a variety of dimensions:

* Schooling career: i) chances of getting to preschool services, imputed from external sources on the basis of the social characteristics (see annex A.2 for details); ii) access to school, identified by a binary variable which value is 0 is the individual has never had access to primary education, and 1 if this has been the case; and iii) for the individuals who have had once access to school the highest grade attained, irrespective of whether they are still enrolled or not at time of survey (see annex A.1).

* Besides, the dataset provides also information, imputed from external sources on the basis of the social characteristics (see annex A.3 for details) for all the targeted individuals on the estimated level of student learning of students with similar social characteristics and living in the country where they currently reside.

* Information is also available on gender, urban/rural place of living, poverty index estimated at the level of the nine country territory as a whole, and whether the child is orphan; however this latter characteristics has not been used since it did not prove to carry a significant incidence on schooling career as shown in annex A.5.

From this set of school-related items and social circumstances, an index of "educational status" (ESI) can be constructed so as to synthesize all or some of the various dimensions reported above. One can probably think of different ways of assembling the pieces to generate the ESI statistics; but one has to keep in mind that a fundamental objective is to make a ranking of the individuals targeted, from those who are in the most difficult circumstances to those who are in the most favourable ones.

In terms of the global technique to amalgamate various indicators, two main paths have been followed: the first consists in using a standard additive pattern of the figures attached to the different components chosen to contribute to the ESI. Then this can be done with no weighting factor, giving implicitly an equal weight to the various components. But one can also use explicit weight so as to give a greater to some component over the others; ii) the second starts from the fact that significant amounts of correlation do exist between the different potential components of ESI. In such circumstances, the additive approach above may lead to blur the picture by incorporating "implicit" weights in the calculation of ESI.

Factor analysis takes care of these “parasitical” correlations. This amounts to consider ESI as a non-observable variable that takes into account, with a fair manner, the components chosen to contribute to it.

The two techniques to estimate ESI are not mutually exclusive manner; both can be used. The idea being is that, if the “conceptual” factor analysis approach may be analytically preferable, the additive approach is more standard and more easily understandable by a wider audience. Table A.4, below, shows the set of ways by which ESI has been estimated. The upper part of the table is for the Factor Analysis (FACT1-6); and the lower part for the standard additive approach, including variations on the weight that are given to its components (AG1 to AG42).

Table A.4: Different ways by which ESI has been estimated

Estimates of ESI	Access to school	Highest Grade	Prob. (Preschool)	Learning score	Gender	Urban/rural	Global decile of wealth
FACT1	x	x					
FACT2	x	x	x				
FACT3			x	x			
FACT4	x	x	x	x			
FACT5					x	x	X
FACT6	x	x	x	x	x	x	X
AG1	1	1					
AG2	1	1	1				
AG30	1			1			
AG31	1.5			1			
AG32	2			1			
AG33	1			1.5			
AG34	1			2			
AG40	1				1		
AG41	1.5				1		
AG42	2				1		

Choices need be made since it would be cumbersome to use all 16 ways to estimate ESI in the development of the analysis. The matrix of correlations helps “eliminate” specifications of ESI that prove to be very similar. Table A.5, thereafter, provides that matrix for the cases in colors in table A.4, above.

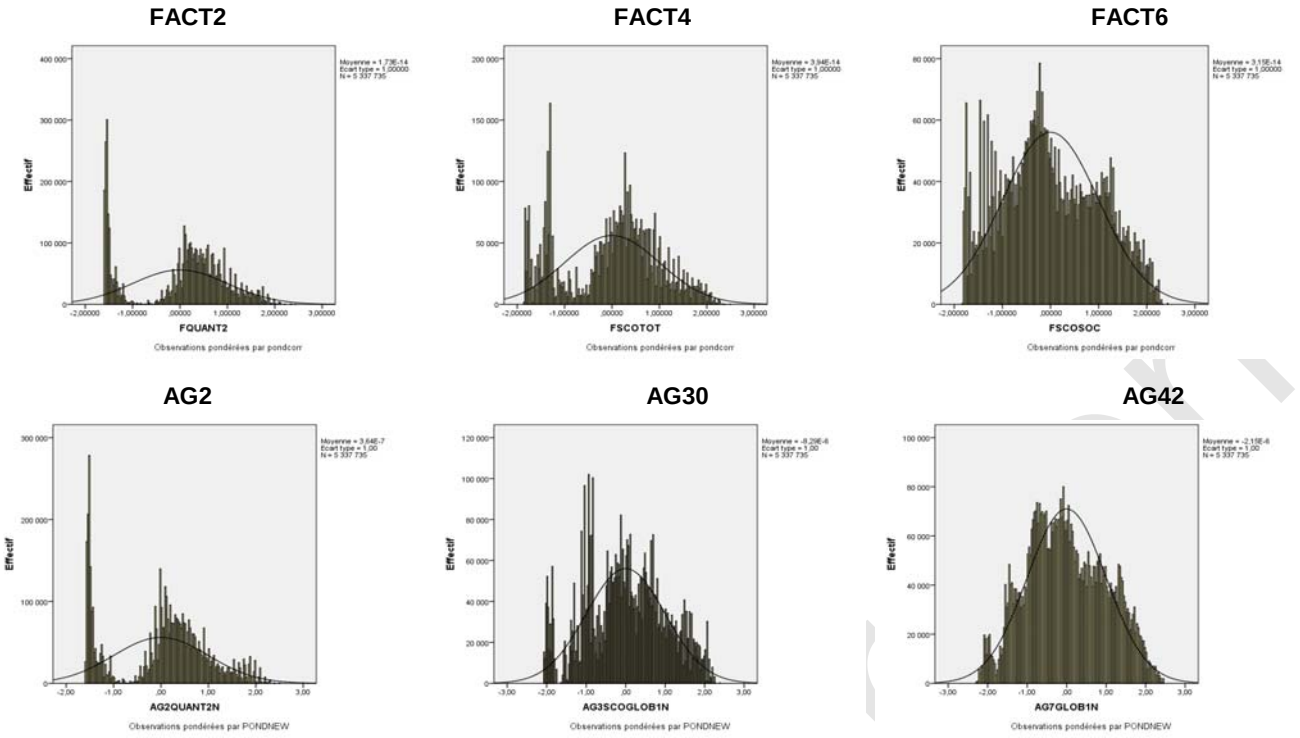
An initial observation is that the correlations between the different specifications of the ESI are generally relatively high. This is noticeably the case for the specifications using the same components but built respectively with the factor analysis approach and the additive approach (for example ρ=0.996 between AG2 and FACT2; ρ=0.946 between AG30 and FACT4 and ρ=0.929 between AG40 and FACT6.

Table A.5: Matrix of correlations for some of the specifications chosen for ESI

Specifications of ESI	AG2	AG30	AG32	AG40	AG42	FACT2	FACT4	FACT6
AG2	1	0.850	0.939	0.752	0.805	0.996	0.973	0.858
AG30	0.850	1	0.979	0.902	0.959	0.835	0.946	0.933
AG32	0.939	0.979	1	0.878	0.935	0.927	0.991	0.939
AG40	0.752	0.902	0.878	1	0.987	0.731	0.841	0.929
AG42	0.805	0.959	0.935	0.987	1	0.786	0.899	0.952
FACT2	0.996	0.835	0.927	0.731	0.786	1	0.968	0.842
FACT4	0.973	0.946	0.991	0.841	0.899	0.968	1	0.920
FACT6	0.858	0.933	0.939	0.929	0.952	0.842	0.920	1
Numbers	5,337,735	5,337,735	5,337,735	5,337,735	5,337,735	5,337,735	5,337,735	5,337,735

The correlations are also very high between the specifications of the additive approach depending on whether weights are used or not (for example, ρ=0.979 between AG 30 and AG32, or ρ=0.987 between AG40 and AG42. Beyond the correlations, the distribution attached to each of these ESI estimates is a simple and relevant way to visualize and compare them. Graphs A.3, below, provide these distributions for some of the cases previously envisaged.

Graphs A.3: Distribution of ESI with different specifications of that statistics



It seems clear that if there are indeed some similarities across the different distributions depicted above, there are also differences. All the distributions share the incidence of the case of the children that do not get to school at all, since most of them did not go to preschool have zero as their highest grade attained, are more often rural and poor. This is highly visible when ESI is estimated by either FACT2 or AG2, and remains significant with FACT4 and AG30/AG32, where the “inputted” quality of service comes into play (also because the level of learning a child that did not get to school would have had if he/she had attended primary school is part of construction of ESI). This specificity is somehow further smoothed when the social characteristics of the child are taken into account in specifications FACT6 and AG40/AG42).

Since first there is a fair amount of similarity between the factor analysis and the “additive” approaches, and second little incidence of the weighting in the additive approach, it has appeared preferable to conduct the analysis on the basis of the three specifications:

* FACT2, which takes into account only the schooling careers variables (probability of having attended preschool, access to primary education and highest grade attained;

* FACT4, which takes additionally into consideration the estimated learning score of the individual in his/her country of residency given his/her social characteristics;

* FACT6, which incorporates, additionally to FACT4, the social characteristics of the individual, gender, urban/rural place of living and overall poverty index.

Annex 5: Taking into account the case of orphan children

The point here is to get a sense of the impact for a child of being an orphan upon his/her schooling career. Here, the schooling career is approached by i) the likelihood of benefitting of preschool services, ii) the effective access to primary education, iii) an estimate of the quality of the services received at the primary level of education and iv) the highest grade attained by individuals of 15/16 years of age.

With the data we have currently in hand, whether the student is an orphan is not documented in the PASEC files; but it is in the EDS datasets (with the exception of that for Burundi). We are therefore led to assess the impact of being an orphan only, on the one hand, on the likelihood to ever get to schooling (primary grade 1) and, on the other, on the highest grade attained by individuals 15/16 years of age.

But it is to be stressed that, unlike being a male or a female, being an orphan is dated in the life of an individual; while at the date of conception, the child to be has admittedly his/her two parents, it is estimated (in our sample) that by the age of 3, 2.7 percent of children are orphans. At the age of 6, the proportion of orphans gets to 5.2 percent, to increase to 9.4 percent at the age of 10 and 17.5 percent at the age of 16.

* It is therefore not a surprise that, being an orphan at the age of 16 carries no statistically significant impact upon the chances of access to primary education at the age of 6 since most of the orphans of 16 were not orphans when they were at the age of getting to Primary Grade 1. Analysing the chances of having had access to school at the age of 9 shows some impact of being orphan (in particular if the missing parent is the father) but that impact is hardly significant and its magnitude is pretty small.

* Focusing now the highest grade attained at the age of 16, a negative impact is identified if the individual is orphan of his/her mother; but, again, the coefficient is hardly significant and its magnitude is quite small.

At the end, the conclusion, as far as this sample of countries is concerned) is that taking into account the fact that the child is an orphan does not appear to be very relevant. The proposition is therefore not to consider this characteristics of the child in the subsequent analyses

Annex 6: Estimates of global ODA disbursements for education

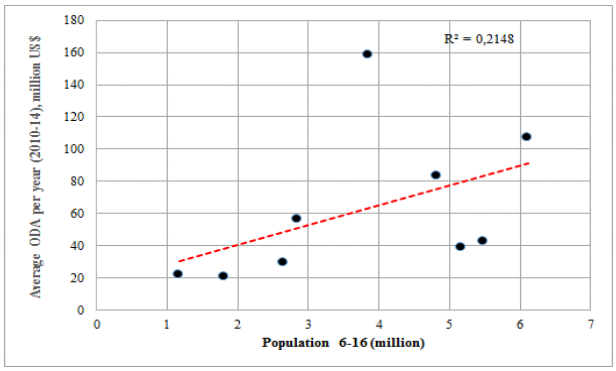
Estimates of the consolidated amount of external financing for education is important to be made in the context of this research since it provides the reference of what donors provide, in the current circumstances, to support education of the children "within borders". Table A.6, below, presents the consolidated (all donors) figures of the ODA for education, averaged over the years 2010-2014 so as to smooth the yearly variability that does exist in these data.

Table A.6: Average 2010-14 ODA for education (all donors), global and by population

Pays	ODA for education per year Average (2010-14) (million US$)	ODA for education per population (US$)	
		Total country population	Population 6-16
Benin	56.17	5.3	19.8
Burkina Faso	83.05	4.7	17.2
Burundi	29.63	2.7	11.2
Cameroon	107.30	4.9	17.6
Congo	21.98	4.9	18.7
Côte-d'Ivoire	42.91	1.9	7.8
Niger	38.86	2.0	7.5
Senegal	158.43	10.8	41.1
Togo	20.59	2.9	11.4
Total	558.92	4.3	16.5

Altogether, the nine countries of our sample have gotten 559 million US$ per year for education from external donors, on average over the period 2010-2014. Some countries have obtained much larger amounts than others; but one should probably expect that it be the case since the population of these countries differ also widely. However, if the population does seem to play a role in the matter, there is also a substantial randomness (R^2= 0.21) in the relationship between the two series of data, as illustrated in Graph A.4 thereafter.

Graph A.4: Total ODA for education and size of the 6 to 16 population

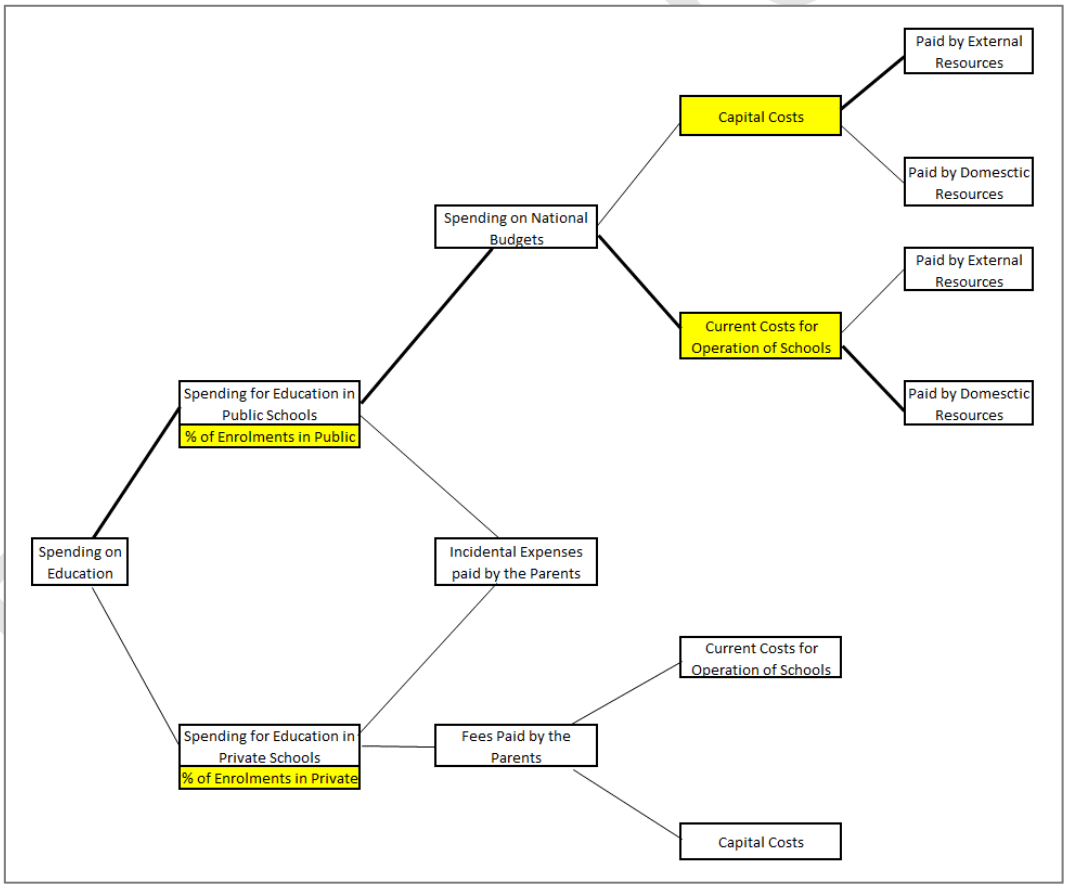


This randomness is also apparent if we base the judgment on the ratio between ODA and population (total or population 5-16). Figures provide in Table A.7, above, show that if the average per total population is US$ 4.3 for the group of countries, it varies widely from a low US$ 1.9 in Côte-d'Ivoire or US$ 2 in Niger, to a high US$ 10.8 in Senegal (more than 5 times larger in Senegal). Using instead the "school-age" (6-16) population, the same pattern applies, the average standing now at 16.5 US$, with a range from 7.5 to 41.1 US$. Even though only relating ODA to the population may not be totally appropriate, it remains that these differences are relatively wide.

Annex 7: Positive and normative perspectives in the costing of education services

Expenditure on education can be analysed by distinguishing on the one hand, what is paid on public budgets and what is paid by the parents and, on the other, what is paid for the current operation of the schools and of the system and what is paid for capital. Besides, within private spending, one can then distinguish the fees paid by parents who enrol their children in private schools and the various "incidental" expenses paid by parents to support the schooling of their children in whatever type of school they are enrolled; then, within public spending at large, what comes from domestic sources and is financed by external donors. The diagram below illustrates the general structure of cost and financing.

In this overall structure we will focus mostly on three items, namely i) the share of enrolments in private education; ii) the unit cost of education associated with the current operation of schools and iii) the capital cost per student associated to the use of the school buildings.



*** Share of enrolments in private schools,**

Data presented in Table 2, above, depict a substantial variability across the different countries of our sample; with low figures in Burundi for both primary (1.2 %) and lower secondary (6.6 %) education, as well as in Niger at the primary level of schooling (3.4 %). All other cases are above 13 % and sometimes quite high (27 % in Togo or 31 % in the Congo Republic at the primary level of education, or 37 % in Burkina Faso or 48 % in Côte-d'Ivoire in lower secondary education).

Beyond the description of the actual circumstances of the countries on that count, the issue at stake is to determine a reference on the public/private distribution of enrolments as far as expansion of coverage in the future is concerned. When current figures of the share of private education is high, it is probably safe and justified to suppose that expansion of coverage is to be taken by the public; the issue is à priori likely to be more debatable for the cases where the coverage of private education is very low.

*** Unit costs associated to the current delivery of education services**

Estimates of actual unit costs of primary and lower secondary education are available both from UIS as well as from Education Sector Studies conducted recently in the counties of interest; they are given in the left-hand side of the table A.7, below. These figures, expressed in per capita GDP terms, are quite diverse over the different countries at both levels of schooling; for example in primary education, they range from 7.4 percent in the Congo to 21.6 percent in Niger. Such a wide variability suggests that the normative perspective could be, complementarily, of interest.

Table A.7: Actual and normative unit costs in basic education by country

	Pc GDP	Actual Unit cost		Normative figures					
	USD	Primary Education	Lower Secondary	Teacher Salary		Unit Cost			
				Primary Ed.	Lower Sec.	Primary Ed.	Lower Sec.	Primary Ed.	Lower Sec.
Country	2013	% Pc GDP	% Pc GDP	Pc GDP	Pc GDP	% Pc GDP	% Pc GDP	USD	USD
Benin	883	13.5	17.5	3.70	4.44	12.6 %	24.0 %	111.0	211.6
Burkina Faso	709	13.1	16.6	4.01	4.81	13.8 %	26.3 %	97.9	186.1
Burundi	259	12.3	44.9	5.72	6.86	21.8 %	40.5 %	56.4	105.1
Cameroon	1,331	7.8	14.5	3.22	3.87	10.7 %	20.5 %	142.3	272.6
Congo	3.205	7.4	17.6	2.47	2.97	7.9 %	15.3 %	253.3	489.3
Côte d'Ivoire	1,447	15.1	31.5	3.15	3.78	10.4 %	20.0 %	150.6	288.8
Niger	418	21.6	40.2	4.75	5.70	17.2 %	32.3 %	71.9	135.2
Senegal	1,051	15.2	25.0	3.36	4.04	11.3 %	21.6 %	119.1	227.5
Togo	626	12.5	12.3	4.21	5.05	14.6 %	27.8 %	91.7	173.8
Average	1,103	13.2	24.5	3.85	4.61	13.4%	25.4 %	121.6	232.2

In conceptual terms, the normative approach is based on three simple ideas: i) the basic instrument used is a standard cost function of education, in which unit cost results from the articulation of the structural factors that, together, characterize the delivery of services; among these factors, ii) some, such as class-size, hours of instruction of students and of service of teachers, are "technical" and are set to be similar in all countries, while iii) some others, such as teacher salaries, may depend somehow on a country level of economic development.

The generic specification of the cost function is as follows:

UCR = [TSALR/CS * TS/TT * (1+PPEDOPL) + PEDOPI / PcGDP] * [1 / (1-PADM)]

In which:

UCR is the Unit Cost, expressed in per capita GDP Unit
CS is for Class Size
TS is for the Weekly hours of instruction received by the student
TT is for the Weekly hours of instruction provided by a teacher
TSALR is for the Teacher salary, expressed in per capita GDP Unit
PPEDOPL is for Spending on pedagogical/operational items locally purchased as proportion of teacher cost
PEDOPI is for Per student spending (US$) on pedagogical/operational items internationally purchased
PcGDP is for Per capita GDP (US$)
PADM is for Administration costs as percent of total

Table A.8, thereafter, provides the parameters used to operationalize this generic normative cost function for the case of the 9 countries of interest for both primary and lower secondary education. And since the figures below are normative parameters, changes can obviously be made, if needed.

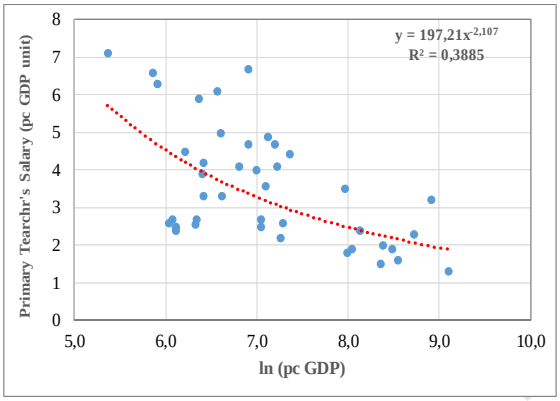
Table A.8: Set of values of the parameters used to operationalize the normative cost function

	TSALR	Class Size	Hours of students /week	Hours of teachers /week	Pedagogical Items purchased locally (% teacher cost)	Pedagogical Items purchased internationally	Administrative cost (% total)
Primary Education.	-	40	28	28	10 %	10 US$	10 %
Lower Secondary Education	-	40	28	18	15 %	15 US$	10 %

Concerning the salaries of teachers, the graph below, contrasting for a relatively large set of countries the average salary of teachers in primary education with the per capita GDP of the country, provides a useful information.

Graph A.5: Primary teacher's salary (pc GDP) according to per Capita GDP of country.

Comparative perspective. 2010-2013



Two elements emerge very clearly from this graph: i) in first place there is a global negative relationship (red dotted line) between the level of salary of the teachers in primary education and the level of development of the country; ii) there is also a substantial amount of variability on both sides of global relationship. Since the idea of the normative perspective aims somehow at "standardizing" the value of the parameter and at "filtering" the randomness in national specific choices[23], the salaries used for a country in the normative perspective are identified "on the line" given its current level of per capita GDP.

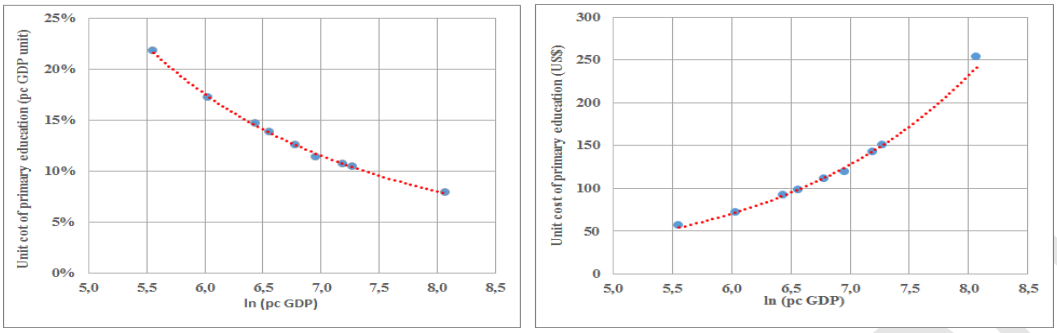
Based on these values for the salaries of teachers[24] and the numerical values of the parameters of the cost function, normative unit costs, expressed in per capita GDP units, are estimated for each country both for primary and lower secondary education. They are then transformed directly into unit costs expressed in US$ terms (last two columns on the right hand side of table A.8 above) using the per capita GDP figure of each country.

It is then apparent, from the data in Table A.8 and from Graph A.6, below, that the normative unit cost of education (at the primary as well as at the lower secondary level) i) declines significantly with the level of economic development of the country when the unit cost is expressed in per capita GDP units (Graph on the left), while ii) it increases quite substantially when expressed in dollar terms (Graph located on the right, below).

[23]. Experience suggests that teachers' salary need not be too high because it prevents the recruitment of the appropriate number of teachers, nor too low as it prevent recruit/maintain teachers with the desired credentials.

[24]. The normative values for lower secondary education are calculated on the basis of those for primary education and multiplied by a factor 1.2, the ratio found on average in the countries for which the information is available.

Graph A.6: Normative Unit cost of primary education in pcGDP unit and in US$, according to the level of economic development of the country



A striking consequence of this dual pattern is that:

i) The provision of education services tends to be all the more costly as countries are poorer (or less costly when they are wealthier), while;

ii) External funding of education services tends to be all the more costly for donors as the recipient country stands at a higher level of economic development;

At the end, poor countries, that suffer the most for internally finance education services for their children, are also those that would require the least financial burden on the donors to assist them doing so.[25]

*** The costs associated to the use of education buildings**

Capital costs and capital expenditure need be distinguished. Capital expenditure is what a country spends in a given year to finance items that will be used over a certain number of years; this is in particular the case of school and school-related (administrative and pedagogical services at central and decentralized levels) buildings. The infrastructures built during a given year either add to, maintain, upgrade or replace, already existing infrastructures. By nature, capital expenditure may vary (they often do, and sometimes substantially) from one year to another. While the amount of capital expenditure can be seen in budgetary documents, capital costs are more conceptual in that they correspond to the imputed cost associated to the use of an educational infrastructure during a single year.

[25]. This is the reason why A. Sen had defended the argument that it was both more efficient and more equitable for the donor community to allocate a larger share of their resources to the education of children in low-income countries than in countries standing at a higher level of economic development.

Assume that ICB is the Initial Cost of Building, r the opportunity cost of capital and n the number of years during which the infrastructure is expected to be used. Based on these elements, expression below allows to calculate the Annualized Cost of using the Building.

$$\mathbf{ACB = ICB *r* [r (1+r)^n] / [(1 + r)^n - 1]}$$

Table A5, below, simulates the annualized cost of a building per classroom based a set of numerical values of the three parameters, and per student/year cost of building, based on the class-size figure (40) used in Table A.8, above.

Table A.9: Parametrization of the annualized cost of building (US$), /classroom and /student

Initial Cost of Building (US$)			12 000		15 000		18 000		20 000	
Years of use of building			20	30	20	30	20	30	20	30
Opportunity cost of capital	3 %	ACB/classroom	807	612	1,008	765	1,210	918	1,344	1,020
		ACB/student	20.2	15.3	25.2	19.1	30.2	23.0	33.6	25.5
	5 %	ACB/classroom	963	781	1,204	976	1,444	1,171	1,605	1,301
		ACB/student	24.1	19.5	30.1	24.4	36.1	29.3	40.1	32.5
	7 %	ACB/classroom	1,133	967	1,416	1,209	1,699	1,451	1,888	1,612
		ACB/student	28.3	24.2	35.4	30.2	42.5	36.3	47.2	40.3