Measuring universal primary completion in Latin America

2003

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INTRODUCTION

In September 2000, the UN member states adopted the Millennium Declaration, which establishes a series of agreements, goals and targets so that all the countries can reach human development by the year 2015. The Millennium Development Goals (MDGs) include 8 targets translated into 18 goals and a set of indicators to monitor their progress.

One out of the 8 MDGs relates specifically to education and to universal primary completion (UPC). That is, to “ensure that, by 2015, children everywhere, boys and girls alike, will be able to complete a full course of primary schooling”.

The MDGs reflect the increasing international consensus on the meaning of human development, which includes among others, not only access to, but also completion of primary education. The targets also reflect the experience of different UN agencies on their specific areas of expertise.

In the case of education, the MDGs reflect the agreements and targets of Education for All, adopted in 2000 in Dakar. This conference established that “by 2015 all children, particularly girls, children in difficult circumstances and those belonging to ethnic minorities, have access to and complete free and compulsory primary education of good quality”.

However, there are several problems associated with monitoring the target of universal primary completion. The first problem relates to the meaning of the target, and the second relates to reaching a consensus about the best way to measure it. This paper seeks to contribute to the international debate over these issues.

The first part of the paper discusses possible interpretations of the target and the second section presents the different approaches on how to measure it, including an alternative proposal. The third part explores the differences among the approaches by applying them to one country: Peru. Finally, the conclusion presents the disadvantages and advantages of the different approaches.

INTERPRETING UPC

1. Definition of primary education

Some countries in the region call the first years of schooling “primary” education, others “basic” or “fundamental” education. The duration of these varies widely across countries. For example, Brazilian fundamental education lasts 8 years, Argentina's basic education is equal to 9 years of schooling, while Peruvian “primary” education lasts 6 years.
However, in order to make information comparable UNESCO created the International Standard Classification of Education (ISCED).\textsuperscript{4} According to this classification, primary education corresponds to ISCED 1 and it aims at “giving students a sound basic education in reading, writing and mathematics”.\textsuperscript{5} In order to achieve this goal, most of the countries in the region and worldwide, have adopted a curriculum of five or six years of schooling—a sufficient period of time for attaining this objective before making the transition to more diversified and specialized education.\textsuperscript{6}

Thus, despite the countries’ own definition of “primary”, “basic” or “fundamental” education, in order to monitor both EFA and MDGs the equivalent of ISCED 1 for all countries should be used.

The following table contains some basic information for all countries in the region relating to ISCED1:

**Table 1: ISCED 1 in Latin America**

<table>
<thead>
<tr>
<th>Country</th>
<th>Duration (years)</th>
<th>Starting age</th>
<th>Final age</th>
</tr>
</thead>
<tbody>
<tr>
<td>Argentina</td>
<td>6</td>
<td>6</td>
<td>11</td>
</tr>
<tr>
<td>Bolivia</td>
<td>6</td>
<td>6</td>
<td>11</td>
</tr>
<tr>
<td>Brazil</td>
<td>4</td>
<td>7</td>
<td>10</td>
</tr>
<tr>
<td>Chile</td>
<td>6</td>
<td>6</td>
<td>11</td>
</tr>
<tr>
<td>Colombia</td>
<td>5</td>
<td>6</td>
<td>10</td>
</tr>
<tr>
<td>Costa Rica</td>
<td>6</td>
<td>6</td>
<td>11</td>
</tr>
<tr>
<td>Cuba</td>
<td>6</td>
<td>6</td>
<td>11</td>
</tr>
<tr>
<td>Dominican Republic</td>
<td>6</td>
<td>6</td>
<td>11</td>
</tr>
<tr>
<td>Ecuador</td>
<td>6</td>
<td>6</td>
<td>11</td>
</tr>
<tr>
<td>El Salvador</td>
<td>6</td>
<td>7</td>
<td>12</td>
</tr>
<tr>
<td>Guatemala</td>
<td>6</td>
<td>7</td>
<td>12</td>
</tr>
<tr>
<td>Honduras</td>
<td>6</td>
<td>7</td>
<td>12</td>
</tr>
<tr>
<td>Mexico</td>
<td>6</td>
<td>6</td>
<td>11</td>
</tr>
<tr>
<td>Nicaragua</td>
<td>6</td>
<td>7</td>
<td>12</td>
</tr>
<tr>
<td>Panama</td>
<td>6</td>
<td>6</td>
<td>11</td>
</tr>
<tr>
<td>Paraguay</td>
<td>6</td>
<td>6</td>
<td>11</td>
</tr>
<tr>
<td>Peru</td>
<td>6</td>
<td>6</td>
<td>11</td>
</tr>
<tr>
<td>Uruguay</td>
<td>6</td>
<td>6</td>
<td>11</td>
</tr>
<tr>
<td>Venezuela</td>
<td>6</td>
<td>6</td>
<td>11</td>
</tr>
</tbody>
</table>

Source: UIS for school year started in 1999

2. Definition of completion

Countries also differ in their definition of graduation criteria. In the case of primary education, some countries require passing an examination, while others expect the student to fulfill a number of required hours, or just passing from the last grade of primary education to the next level.

Since we are opting in this paper to use ISCED to make comparison across countries valid, the national requirements become unnecessary to the point that they would either apply or not depending on the correspondence between this stage and ISCED 1.

Thus, for the sake of international comparability, completing successfully ISCED 1 and being entitled to enroll in any subsequent ISCED level should be adopted as an internationally comparable definition of primary education completion.

3. The target population

Both the MDGs and EFA targets related to UPC leave room for different interpretations on who should complete primary education by 2015. There are three possible interpretations: (1) all the children in the country (primary school age children and older children alike), (2) all children of primary school age, (3) 100% of the children who have access to the educational system.

According to these interpretations, the target population gets smaller as we go on. In other words, we start (interpretation 1) by looking at all the children in the country (primary school age or not), then we focus only on primary school age children (interpretation number 2), and finally we narrow down to the ones who have access to school (interpretation number 3).

In the first case, we need to establish who do we consider to be children. The Convention on the Rights of the Child defines as children all human beings under the age of 18.\(^7\) Thus, if we adhere to this definition everybody below the age of 18 in a given country should have the same chance of enrolling in and successfully completing primary education.

In the second case, we should monitor primary completion in the ISCED 1 age group, which varies from country to country. In the case of Latin America, ISCED 1 corresponds to the age groups shown in Table 1.

The last one refers only to the children enrolled in primary education, and it means that the ones who have access to the educational system should finish successfully primary education.

It is worth noting that, in the case of UPC, the choice of the indicator may determine the target population. For example, a survival rate, based upon the reconstructed cohort method, can only provide information on those within the system. Therefore, this indicator only applies to interpretation 3 (children enrolled in the system).

However, in the case of Latin America, data show that there are still large groups of school age children who have never had the opportunity to enroll. Although the average net enrollment rate for the region is 97%, this rate can drop as low as 80% in countries as Guatemala and Haiti.\(^8\) Moreover, the region presents high repetition and drop out rates. For example, in Guatemala average repetition in primary education reaches 16%, while accumulated drop out in primary school is 48%.\(^9\)

These combined phenomena emphasize the need for the region to adopt the first interpretation. This is so, because it provides us with a complete picture of the educational situation of all children (and adults if we wish) in Latin America as far as primary school completion is concerned.

This is important particularly if we think of education as a human right. According to the Declaration of Human Rights (1948) “elementary” education shall be free and compulsory

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\(^7\) Convention of the Rights of the Children in http://www.unicef.org/crc/crc.htm

\(^8\) Educational Panorama of the Americas, UNESCO- OREALC and Ministry of Education – Chile, 2002.

\(^9\) UIS data for school years 1999 and 2000.
for all. Therefore, those denied access to it, and this includes overage children and adults, should be monitored as well.

4. **Equity and quality** issues

Both the MDGs and EFA targets relate to equity. In the case of the MDGs gender is the main focus, while EFA explores other dimensions of equity such as ethnic minorities and children in difficult circumstances.

Latin America is a region with severe equity problems, which include but go beyond, gender differences. For this reason, EFA Regional Forum has adopted a broader view of equity for the region including, in addition to gender, dimensions such as social economic status or income, linguistic, racial or cultural groups, geographical distribution (urban/rural), school governance (public, private, private dependent), age and special needs.

Thus, it is important for the region to have a UPC indicator capable of capturing the relevant inequalities. This means that, besides national aggregates, the indicator must allow for relevant breakdowns making possible to identify the groups in disadvantage, which is a key information for policymaking.

EFA also introduces the issue of quality in the delivery of the primary education. The debate over this topic is currently focused on student achievement, since its measurement is used as a proxy for quality. This is a critical debate and it relates to equity, since receiving a different quality of education can determine the opportunities different groups in society will have. Despite the fact that much still needs to be done in the area of quality, our region has made some advances.\(^\text{10}\)

Completion and quality are two different phenomena that must be used together in order to monitor EFA goals. Nevertheless, each one requires a specific approach. Therefore, the scope of this paper will be limited to completion alone, but not because quality is less important or irrelevant. The idea is to define a good, meaningful and reliable measure of completion, that will allow us to build into it a measure of quality.

**MEASURING UPC**

Indicators of access to primary education are sometimes used as a proxy for primary school completion. For example, when evaluating the preliminary results of the education MDGs for Latin America, Hicks and Wodon uses net enrollment rates to measure UPC by arguing that is just “a bit different” from primary completion.\(^\text{11}\)

However, primary net enrollment rates measure the proportion of primary school-age children enrolled in any grade at this level. Therefore it accounts for the access this specific population (primary school-age children) has to primary education.

This indicator presents two major pitfalls if used for measuring UPC. First, it does not account for the proportion of enrolled students who actually complete primary school. Second, unless you have a net enrollment rate of 100%, you overlook the portion of the primary school aged population outside the educational system who can eventually enroll late and even complete primary school. Therefore, this indicator is not a good proxy, and its use to monitor how far we are from EFA and MDGs targets of UPC can be misleading.

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\(^{10}\) The Latin American Laboratory of Quality Education (LLECE) has carried out a comparative study assessing quality in the region and they are now preparing a second study. For more information see www.unesco.cl/llece

On the other hand, the use of gross enrollment rates is even less appropriate, since they are not indicators of access but a relative measure of enrollment size. That is why UNESCO considers it an indicator of the countries’ capacity to supply education at a given level.\textsuperscript{12}

The need to find a direct and proper measure of UPC has led some international organizations to promote the development of new indicators. The approaches currently being considered on the international debate are:

1. Survival Rate

The survival rate is an indicator generated by the reconstructed cohort method\textsuperscript{13} for the purpose of evaluating the internal efficiency of education systems. It shows the probability that a certain number of individuals entering the system will reach (but not necessarily complete) a certain grade.

UNESCO has traditionally calculated the survival rate to grade 5 as a proxy for UPC as it measures “progress towards universal primary education”.\textsuperscript{14} In fact, this indicator is part of both the EFA and MDGs monitoring system. It expresses the proportion of students who were registered in 1\textsuperscript{st} grade and would reach 5\textsuperscript{th} grade, under current conditions.

According to UNESCO, the fact that an individual has finished at least 4\textsuperscript{th} grade is a good benchmark for assuring acquisition of the basic language and math skills to keep this individual away from illiteracy.

It is worth noting that this method can be used for any given grade, be it the final grade of primary education or the following grade. For example, in the case of primary schools lasting 6 years, we can calculate the survival rate to 6\textsuperscript{th} grade (the final grade of primary education) or the survival rate to 7\textsuperscript{th} grade as a “proxy” of the individuals who complete 6\textsuperscript{th} grade.

However, both cases pose problems. Because the first example is not an indicator of completion but survival to 6\textsuperscript{th} grade, it may overestimate completion (some students enrolled in 6\textsuperscript{th} grade may not finish it). On the other hand, the second example may underestimate 6\textsuperscript{th} grade completion, since students enrolled in 7\textsuperscript{th} grade may represent only a fraction of those who completed 6\textsuperscript{th} grade. This is the case of many rural areas in Latin America. Because secondary schools are distantly located, many students stop going to school despite the fact that they have successfully graduated from primary education. For instance, in Peru 23.568 out of 32.946 primary schools are located in rural areas while secondary schools (8.216) are mostly located in urban settings.\textsuperscript{15}

\textsuperscript{12} According to UNESCO (\textit{CD World Education Indicators}, 1998) gross or apparent enrollment rates should be used to “show the general level of participation in a given education level, and it shows the capacity the system has to enroll students of an specific age-group”. However, this definition assumes that transaction costs related to given access to education to those outside the system are equal to all students, which is not necessarily true in real world. In fact, in many countries in Latin America the supply of educational services is concentrated in urban areas, which means that although the system might be theoretically able to absorb all students (gross enrollment rates higher than 100%), this might not be true for the student in rural areas. Therefore, in many cases, if we interpret a gross enrollment rate higher than 100% as an indicator that the country does not need to build new schools or hire new teachers, we may be denying school access to the rural population.

\textsuperscript{13} A reconstructed cohort method uses the information on enrollment and repetition by grade for two consecutive academic years. With this information we can calculate the promotion rate (by comparing the number of new enrollees in a given grade with the enrollment at the previous grade the previous year), repetition (by comparing the number of repeaters in a given year with the total enrollment for the same grade the previous year), and dropouts (the difference between the two figures). Assuming that these rates are constant over time, we can simulate the flow through the system for a given number of entrants and grades. (For more information see: UNESCO, \textit{A statistical study of wastage at school}. IBE. 1972)

\textsuperscript{14} UIS, \textit{Measuring Completion in Primary Education}. Background Paper, December, 2002, mimeo.

Furthermore his indicator refers only to students within the school system, rather than to the entire school-eligible population or to children in general. Therefore, a solution to this problem would be to weight this indicator to intake or enrollment rates.

By multiplying this indicator by the net intake rate\(^{16}\) we may know the proportion of the school-eligible population who has entered the system timely, and would also finish primary school. However, for the purpose of measuring UPC in Latin America we need to go beyond this group, since we know that a large number of students enter the system later than officially established. For instance, in Guatemala 37% of the population in the official age to be registered in the first grade of primary, is not enrolled at that grade. This proportion reaches values as high as 63% in El Salvador and is about 50% for the whole Latin American region.\(^{17}\)

A second option is to multiply this indicator by the gross intake rate.\(^{18}\) The problem with this procedure is that this rate does not indicate coverage or access to school, but it is rather an indicator of relative size of the intake population in relation to the population that should be getting into the system. In this sense, this rate is a proxy for the supply capacity of the school system and the limitations attributable to the gross enrollment rates mentioned above apply here as well.

For example, how can we interpret a completion rate higher than 100%, a value that could be generated through the use of this methodology? Panama\(^{19}\) illustrates this limitation. By multiplying the survival rate to grade 5\(^{th}\) (91.9%) by the gross or apparent intake rate (113.9%) we get a number higher than 100% (104.7%). If we assume that Panama has achieved universal primary completion (which is not the case) and that this 4.7 is a measure of inaccuracy, how can we know the size of this “inaccuracy” when the resulting rate is lower than 100%?

An alternative approach would require multiplying the survival rate by the net enrollment rate to primary education, given that the latter corresponds to the proportion of the eligible population who has entered the system and is currently enrolled.

Certainly, the fact that the numerator of this indicator consists of students distributed in different grades within primary education introduces a complex bias. However, given the nature of this indicator its results might be more meaningful than those derived from the use of gross intake rates. Again, using Panama as an example, we find that the net enrollment rate (98.0%) combined with the survival rate to 5\(^{th}\) grade yield a “completion” proxy of 90.1%.

Last but not least, it is worth noting that the survival rate can only be calculated for national aggregates – in cases where immigration is not a significant issue – and the only possible breakdown is gender. Neither the model nor the database used to generate the cohort method allow controlling for migration or transfers within the country, nor collecting other types of information related to the student (SES, race/ethnicity, etc). Thus, other types of equity comparisons are not possible.

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\(^{16}\) Percentage of people having the official age to enter a given level (in this case, primary education) who are enrolled at the first grade of this level.

\(^{17}\) UIS data for school year started in 1999.

\(^{18}\) It is defined as the magnitude represented by the total number of entrants in a given year (independent of their age) relative to the population at the official entry age.

\(^{19}\) UIS data for school year started in 1999.
2. Completion Rate

Taking the reconstructed cohort model, as well as information on the number of graduates\(^\text{20}\) as starting points, this “completion rate” multiplies the survival rate to the final grade of primary education\(^\text{21}\) by the corresponding graduation rate.

Different from the survival rate alone, this completion rate allows for a picture of the proportion of students who not only enter first grade but actually complete primary education.\(^\text{22}\) However, because it is based upon a reconstructed cohort model, it presents the same limitations as this model does.

From the perspective of the EFA and the MDGs target of UPC, this completion rate refers only to the population already in the system. Thus, this rate can answer questions about the proportion of the children who enter the system and finish primary school but not those referred to all children in a given country.

By multiplying this “completion rate” by the intake or enrollment rates, we may attempt to solve this problem. However, the same limitations explored on the section above (survival rate) on the use of intake and enrollment rates apply in this case.

Also, as in the case of the survival rate, this indicator can only be calculated for national aggregates, provided that migration is not a significant issue. Here too, gender is the only possible breakdown.

3. Primary Completion Rate

The World Bank has been suggesting a measure of universal primary completion called primary completion rate.\(^\text{23}\) This rate is described in EdStats\(^\text{24}\) and it is identical to the rate used by OECD to measure secondary completion.\(^\text{25}\)

This indicator measures all graduates of the last grade of primary education against the number of school-aged children eligible to attend this grade.\(^\text{26}\) However, when information on graduates is not available, a proxy is used: new entrants (enrollees minus repeaters) divided by the eligible-age population.

It is worth noting that this rate reveals the relative volume of primary school graduates in relation to the students that theoretically should be graduating (given their age). However, it does not take into account the gap produced either by repetition or late entrance, which are both characteristics of the educational systems in Latin America. For example, in

\(^{20}\) Nowadays UIS does not collect information on graduates. This proposal assumes this info will be added to its regular operations. The number of graduates in a given year allows us to estimate the graduation rate by comparing it to total enrollment for the last grade of the given level.

\(^{21}\) As noted before, the survival rate is calculated on the basis of a reconstructed cohort method and it is equal to the proportion of entrants that reach a certain grade. It is possible to calculate a survival rate for second grade or any of the remaining grades. In this case, we are using the last grade of the corresponding level.

\(^{22}\) In order to make national education systems internationally comparable, UNESCO created this classification, known as ISCED, and UNESCO’s indicators are calculated based on this. The first version was created in 1976 and in 1997 there were a review, which is currently in use. It is worth noting that ISCED 97 classifies the educational programs in 7 different levels according to their objectives (0: preschool; 1: primary; 2: lower secondary, 3: higher secondary, 4: post-secondary non-tertiary; 5: tertiary y 6: advanced research) and three orientations (academic, vocational, labor-oriented education). Thus, equivalents are made out of the diversity of national definitions. For instance, Chile has a “basic education” program of 8 years (equivalent to ISCED 1 –6 years and ISCED 2 –2 years-), while Bolivian “primary” also has 8 grades (ISCED 1 –6 years y ISCED 2 –2 years-). On the other hand, Brazil has a “fundamental education” program composed of two cycles of 4 years each (equivalent to ISCED 1 –4 years and ISCED 2 – 4 years-).

\(^{23}\) The World Bank publishes this rate as a staff estimate, therefore the Bank is institutionally not responsible for them (http://www.developmentgoals.org/Education.htm)

\(^{24}\) http://devdata.worldbank.org/edstats/SummaryEducationProfiles/Dgoal/PCR_notes.doc

\(^{25}\) For more information, see OCDE Education at a Glance.

\(^{26}\) If, for example, the duration of primary study is 6 years and the normal age of admission is 6, the required denominator will be the number of 11-year-old children
2001, 49% of the new entrants in primary education in Brazil were older than the official entrance age.\(^{27}\)

When using the proxy for graduates, the numerator excludes those who will be graduating with one or more years of delay, but at the same time includes other segments of the population that are above or below the official age and are enrolled at the grade. In other words, the numerator and denominator in this formula do not refer to the same population. The result, then, can be useful as a measure of relative size of the graduate population, but not as a measure of coverage.

Although it uses the same methodology applied by the OECD to measure secondary education completion, there are some problems related to using it for primary education.

The first problem concerns the fact that in most countries secondary education is not compulsory as is the case with primary education. This means that we do not expect that 100% of the young children will graduate from secondary education, but we rather want to know the volume of the graduates both in absolute and relative (in relation to the entire eligible population) terms. On the other hand, since universal primary completion is a desired goal, the logic behind the indicator must be different. The similarity in terminology ("completion") is not enough to justify using the same procedure, since the political nature underlying the indicators is different.

Secondly, OECD calculates this indicator based on a standard classification of educational levels which makes them comparable internationally. As mentioned earlier in this paper, given the variance in the names given to the levels of education in different countries, using the ISCED is a must in order to make comparisons between different countries valid. Another pitfall of the primary completion rate is the fact that these countries use their national definitions of primary education and not the international standardized classification.\(^{28}\)

Moreover, this indicator allows us to produce a rate higher than 100%, which makes clear that this is not a proper indicator for measuring UPC, and as in the case of the completion rates described above, it can be misleading even when we get a rate lower than 100%.

A good example of this limitation can be found in the World Bank analysis of the educational target of the Millennium Goals.\(^{29}\) By using their primary completion rate or its proxy,\(^{30}\) they found that some countries are likely to reach the education target of the MDGs by 2015, while others will fail to do so.


\(^{28}\) See http://devdata.worldbank.org/edstats/SummaryEducationProfiles/Dgoal/PCR_notes.doc

\(^{29}\) See http://www.developmentgoals.org/

\(^{30}\) It is assumed they are using a proxy for graduates (number of new entrants at the final grade minus the repeaters) as explained in UIS, Measuring Completion in Primary Education. December 2002. Background Paper, mimeo.
According to this map the educational situation of Nicaragua is better than Chile’s as far as UPC is concerned. However, evidence shows that this is not the case.

For example, Chile has one of the best educational profiles of the region. Its population averages 8.8 years of schooling, while the average for Nicaragua is practically half of that: 4.7 years of schooling. This example shows how misleading this indicator can be in measuring UPC.

4. Alternative Approach: Educational Attainment

This alternative approach aims to overcome the flaws of the previous measurements in relation to both the methodological adequacy and its use for dealing with equity issues.

In the case of the target population, this methodology allows us to look not only at the school-age children flowing in and out of the educational system, but also at the total number of children - or even adults if necessary.

Graph 2: Percentage of people who has attained at least primary education (ISCED 1) by age groups (projection for under 15 population)

This methodology calculates the probability of a given population of finishing primary education given actual data on those who have had the opportunity to do so given their age. This is possible by projecting and estimating from the data available for the adult population. The graph illustrates an example.

It is worth noting that this projection makes two assumptions. The first one is

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that a projection can operate as a benchmark to identify the direction the country is taking and if this is enough to fulfill the target of UPC by 2015. In this sense, it could show that the country needs more aggressive educational and social policies in the future in order to reach the target.

Depending on the quality of the data, or in the case of a sample, how representative it is, we can compute not only national aggregates, but also equity related breakdowns. For example, we can calculate this indicator for girls, indigenous population, poor people, etc.

Although the target focuses on children we have defined as individuals 18 years old or less, one may argue that UPC relates to the entire population (universal) and it is important to measure the proportion of the entire population who has finished primary education including adults.

Education-related information regularly collected by population censuses or household surveys should provide an easy solution. Both instruments gather data on the population educational profile, and therefore can be used directly to measure UPC among those above 15 year old, assuming that by this time all people should have had the opportunity to finish at least primary schooling. To this end, one needs only to apply the ISCED, in order to make data from different countries comparable.

This methodology has the advantage of shedding light on the problems related to adult education, since it relates to the “wide vision of education” adopted during the World Conference on Education for All held in Jomtien (1990) and ratified in 2000 in Dakar, which is also part of the MDG’s.

**A Practical Application to Compare Methodologies: Peru 1999**

So far, this paper has shown the different approaches to measure primary completion that are currently under international scrutiny. The paper has explored them in terms of how well they inform about the phenomenon they are intended to measure, both in methodological and in theoretical terms. Now, the paper turns to a practical application of the different approaches.

This exercise is useful to illustrate in actual terms the strengths and weaknesses of the different approaches.

The example uses data on Peru. The information corresponds to 1999, and the sources are as follows:

1. Survival rate to grade 5: UIS database
2. Apparent intake rate: UIS database
   - Enrollment and repeaters in primary final grade: national source (Ministerio de Educación http://escale.minedu.gob.pe)

\(\text{32}\) Proxy number 3 has two different computing procedures depending upon data availability corresponding to graduates. Both procedures are shown.

\(\text{33}\) This rate is defined as the number of students who successfully passed the final grade of ISCED 1 expressed as a fraction of the number of students enrolled at that grade.
5. Primary completion rate (as suggested in this paper): National Household Survey 1999 (second trimester)

The following table shows the results of applying the above reviewed procedures to actual data:

**Table 2: Comparison among different UPC indicators**

<table>
<thead>
<tr>
<th>Measure of completion</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Survival rate to grade 5</td>
<td>87.9%</td>
</tr>
<tr>
<td>2. Survival rate to grade 5 * Apparent intake rate (126.9%)</td>
<td>111.5%</td>
</tr>
<tr>
<td>3. Primary completion rate (using graduation rate, 95.4%)</td>
<td>96.8%</td>
</tr>
<tr>
<td>Using entrants to the final grade</td>
<td>98.1%</td>
</tr>
<tr>
<td>4. Completion rate (graduate rate * survival rate to final grade -77.4%)* AIR</td>
<td>98.2%</td>
</tr>
<tr>
<td>5. Alternative proposal. Likelihood to complete primary for:</td>
<td></td>
</tr>
<tr>
<td>Children 0-4 (projection)</td>
<td>95.3%</td>
</tr>
<tr>
<td>Children 5-9 (projection)</td>
<td>94.1%</td>
</tr>
<tr>
<td>Children 10-14 (projection)</td>
<td>92.5%</td>
</tr>
<tr>
<td>Population 15-19 (actual data)</td>
<td>90.6%</td>
</tr>
</tbody>
</table>

Measure number 5 has been computed from data obtained for the 15+ population by age groups then making a logarithmic estimation\(^{35}\) of the expected values for younger population (given actual data for the other age groups) as shown in the following table and graphic:

**Table and Graph 3: Population who has attained at least 6 years of schooling (ISCED 1) by age groups in Peru (1999)**

<table>
<thead>
<tr>
<th>Age group</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 to 4</td>
<td>95.3%</td>
</tr>
<tr>
<td>5 to 9</td>
<td>94.1%</td>
</tr>
<tr>
<td>10 to 14</td>
<td>92.5%</td>
</tr>
<tr>
<td>15 to 19</td>
<td>90.6%</td>
</tr>
<tr>
<td>20 to 24</td>
<td>90.1%</td>
</tr>
<tr>
<td>25 to 29</td>
<td>86.0%</td>
</tr>
<tr>
<td>30 to 34</td>
<td>88.6%</td>
</tr>
<tr>
<td>35 to 39</td>
<td>82.9%</td>
</tr>
<tr>
<td>40 to 44</td>
<td>78.8%</td>
</tr>
<tr>
<td>45 to 49</td>
<td>72.0%</td>
</tr>
<tr>
<td>50 and over</td>
<td>50.1%</td>
</tr>
</tbody>
</table>

Italics show projected values.

Source: National household survey 1999 (second trimester)

Looking at the result carefully, the following observations can be made with relation to each of the measures:

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\(^{34}\) Note that for Peru, ISCED 1 corresponds to the national “educación primaria”. This allowed for having information on graduates (number of students who successfully passed the final grade of ISCED 1) since this number is regularly collected and the corresponding rate, as well as its combination with cohort-model indicators, were published in 2001 (see Ministerio de Educación (2001) *Resumen de datos e indicadores* section 3)

\(^{35}\) There are different procedures to estimate a trend line: for instance a linear, logarithmic or variable-means could be used. In this case, a logarithmic function appears to be more adequate since the slope of the function tends to be flattened while the indicator values get higher making marginal differences smaller. In a country where schooling has been increasing in the last decades (as it is the case for the whole Latin-American region) a linear projection would reach and surpass 100% quite easily while, in reality, this goal becomes harder to reach once higher stages have been achieved.
1. **Survival rate to grade 5**: Being a measure perfectly coherent with reconstructed-cohort methodology it says that only 87.9% of entrants would reach grade 5.

Do we have any empirical evidence to assess this? Yes.

Let us assume that from that point on, if every student succeeds up to the end of primary education (no drop-outs), that value will be equivalent to the maximum completion rate for those who entered primary school in the first place.

Let us make a further assumption that every child enters primary education; this value becomes a limit for the actual completion rate for the whole population. Thus, 87.9% would be the maximum completion rate value expected given both assumptions.

Finally, let us assume that the Peruvian education system has made no improvement in access and internal efficiency in the last 10 years, so that this survival rate has been stable for that period. If this were the case, we should find that no more than 87.9% of the population who has recently left primary education has attained 6 years of schooling or more.

Looking at the actual data for this population (those who are 15-19 years of age) we found that 90.6% has completed at least primary education. This value is higher than that expected given the “optimistic” assumptions made above. Certainly we know that neither of those assumptions holds: drop-out exist in grades 5 and 6, there is a proportion of children who has never entered primary education, and the survival rate observed in 1999 is higher than that of previous years. Thus, if the measure were to be accurate, we know that the limit of 87.9% could not be surpassed, but actual data shows something different.

This clearly shows that reconstructed-cohort-based indicators have important limitations and, therefore, they should be used very carefully. First, the assumption concerning no re-entry to the school system once a student has dropped-out does not hold in this case. At the same time, the model is very sensitive to lack of accuracy in registering repetition data.

2. **Survival rate to grade 5 * Apparent intake rate**: Given that AIR value is 126.9% the procedure suggested yields a higher that 100% value that has no sensible interpretation. Do 111.5% of students complete primary education in Peru?

As stated in the previous section, when the indicator goes beyond its natural or logical limit of 100% its is easy to show its flaws, but a most critical situation becomes evident when the indicator does not surpass this threshold since, in that case, its bias would be hidden.

3. **Primary completion rate**: This measure has been proposed stating that it can be computed using actual data on graduates or using the number of entrants in the absence of graduates data. The difference between the two procedures would be proportional to the degree of academic success students in the final grade of primary education can expect. In this example, the difference is rather small since the first procedure yields a 96.8% value for the indicator, while the other a 98.1% (a difference smaller than 2 percentage points)

The values obtained in this exercise do not show any evident flaw. Nevertheless, one must keep in mind that the indicator has been conceived in such a manner that it can lead to higher-than-100% values, thus the qualification stated above concerning the second procedure would also apply in this case.

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36 When trying to measure universal completion, if the intention were to talk about graduates volume or size (as in the case of OECD secondary completion rate) that could make sense.
If taken at its face-value, the indicator would suggest that Peru is very close to reaching universal primary education (around 3% or 2% of the children would not do so). Is this the actual situation?

According to a reconstructed-cohort model developed by the Peruvian Ministry of Education, only 77.4% of the entrants would finish primary education. How can we then, expect 98% of the children to finish primary education?

Even though the reconstructed-cohort-based indicators can underestimate completion, could the magnitude be that high?

4. **Completion rate**: It is the most complex approach, since it uses 3 elements (survival, graduation and intake). According to this procedure primary completion in Peru is equal to 98.2%

Again, it poses the same familiar question: is Peru that close to achieving the UPC goal?

For reasons already discussed this is not the case. This methodology clearly overestimates the rate by using AIR (126.9% in this case) to “weight” the rate.

Thus, this measure shares the same flaws and methodological restrictions derived from the use of a reconstructed-cohort model, associated with the rate of primary completion.

Moreover, the limitations related to calculations of the third measure, also apply in this case.

5. **Alternative completion rate**: the application of this procedure yields different values, one for each age group for which it is computed. First of all, we know that 90.6% of the 15-19 year-old population has already completed primary education. It is worth noting that this is not an estimation, or a proxy, but actual data. The same applies to any age-group above 15 years of age.

Based on actual data, a historical trend can be estimated allowing us to produce completion rates for population age-groups below the age of 15. In this manner, the likelihood of completing primary education, given historical trends, has been computed for people 0-4, 5-9 and 10-14 years of age. The corresponding figures range from 92.5% to 95.3%

Back-tracking if we may, it is worth comparing results based on actual data on 15-19 years old (90.6% completion rate) and the graduation rate derived from the reconstructed-cohort model (only 77.4% of the entrants would complete primary). This difference reveals the weakness of the reconstructed-cohort model.

If we assume an “optimistic” approach (100% of population has entered school, and internal efficiency rates have been as “good” as they are now) the model would predict a completion 13 points lower than the observed value. This reveals that the main assumptions of the model (no re-entries, stable efficiency rates) and/or the data it is based upon (enrollment and number of repeaters) do not stand the test of actual data.

Thus, it is possible to assert that in this specific case, a reconstructed-cohort model is a weak approach to the actual situation and, therefore any completion indicator based upon it would be biased.

The limitation of this proposal lies on the fact that it projects a trend for the younger population based upon adult population data availability. In order to improve the projection, though, as new data comes in from census or household surveys, the projection can be re-estimated. In Latin America, household surveys are usually carried out on an annual basis. In any case, if no new population data is available, a

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37 As reported from national data. See Ministerio de Educación (2001) Resumen de datos e indicadores.
procedure based on net intake and internal efficiency changes can be easily designed in order to improve this indicator.

CONCLUSIONS
This paper has scrutinized the current main approaches to measure completion of primary education. By doing so, it has identified some critical problems that need to be sorted out in order to have a politically-relevant measure of completion:

- Using ISCED is a must if we are to assure international comparability. "Primary education" is not a matter of national denominations, but of educational contents. That is what ISCED is all about.

- Proxies based on reconstructed-cohort methods have many built-in difficulties that can be revealed when confronted against actual data. In the case used to illustrate the procedures, the pitfalls of this model are rather evident.

- Proxies using the gross intake rates (AIR) introduce a theoretical problem (participation rates are not coverage rates) and insoluble methodological difficulties (how to interpret a completion rate higher than 100% or how to identify the bias when the indicator value is lower than 100%)

- Replicating OECD secondary completion rate also introduce a theoretical problem (participation rates are not coverage rates) and leads to confusion when interpreting the indicator. The OECD indicator, and its version for primary education, looks at the relative size of the graduated population, not at how many out of a specific group are effectively graduating.

- The alternative proposed in this paper offers a direct measure of completion for the older population and reasonable projections for the younger population. This measure is based on actual data and allows for as many breakdowns as possible depending on data availability.

It is important to remember that choosing indicators to monitor a goal is not merely a technical exercise. It certainly depends on a rigorous technical analysis. However, its aim is to serve a political purpose, that is, to inform policymaking. In this sense, a bad choice of indicators could be misleading and lead policymakers to take wrong political decisions.
Annex: a brief note on data sources

This paper has focused exclusively on the methodological and theoretical issues implied in defining a sound approach to measuring universal primary completion. Nevertheless, in order to establish if the approach is not only sound, but also feasible and reliable given data availability and characteristics, a discussion about data sources is also required.

It is important to take into account that this issue can be deeply scrutinised only at the national level. Data availability and reliability can only be determined on a case-by-case basis since this refers to rather specific issues. For this reason, this is a brief note that generally reviews availability and suggests some topics embedded in the assessment of data reliability.

Firstly, we need to recall that each suggested proxy requires different data sources that can be specified as follows:

- **Survival rate**: data on enrolment and repeaters for two consecutive years.
- **Survival rate by AIR**: data on enrolment and repeaters for two consecutive years, entrants (enrolment minus repeaters) and population data (for the official entry age population)
- **Gross completion rate**: data on enrolment and repeaters and population data (for the official age population for the corresponding grade)
- **Completion rate**: data on enrolment and repeaters for two consecutive years, entrants, graduates and population data (for the official entry age population)
- **Alternative approach**: population data on age and educational attainment for a single year.

Data on enrolment, entrants, and repeaters are usually taken from Ministry of Education (MoE) statistical units that produce regular reports based on either administrative records or questionnaires filled out by school principals.

Graduates data is presumably produce by MoE statistical units based on either administrative records or questionnaires filled out by school principals.

Population figures are usually reported from population censuses or projections based on those figures.

Population data on educational attainment is usually reported from population censuses or household surveys.

Thus, the present note is concerned with data availability and reliability stemming from three basic sources: MoE data on enrolment and repeaters; population data (provided by censuses or projections); educational attainment data (provided by censuses or household surveys)

1. DATA RELIABILITY

MoE data

As mentioned above, this data is usually provided by either administrative records or questionnaires filled out by school principals, being this second procedure the more common.

In the first situation, assessing data quality should imply looking at how accurately enrolment and repetition are recorded in the official documents that are the primary source of data. It is possible to assume that given the nature of this official documents, there is a strong likelihood that their recording is made in a rather careful manner.
In the case of questionnaires, assessing data quality implies looking at explicit or implicit mechanisms that encourage or prevent good reporting. For instance, if enrolment reports are used for allocating teacher positions, salary bonuses, or establishing school categories (with budgetary implications), this could be an incentive to distort data reporting. This is the case in many Latin American countries where statistical reports are independent from administrative records, which means that this is not a risky operation unless sanctioning mechanisms are also in place.

For this reason, several Latin American MoE have expressed their interest in estimating over-reporting bias in their own data. At least two of them have already estimated this. Peru over reports between 2-3% for primary education enrolment, and Bolivia around 8% for the same enrolment.

Schiefelbein and Grossi, as well as others authors\(^{38}\), have already shown lack of congruency between age-specific data and repetition data. Age-specific data has been used to estimate repetition rates that appear to be under-estimated in MoE figures. Nevertheless, there is no concluding reason to assume that reporting of age-specific data is done in a better way. In fact, there is clear evidence that this could not be the case, since over-reporting of enrolment figures should also be translated into age-specific data. For instance, according to the Peruvian MoE data of enrolment in 1999 some 47 thousand 5-year-old students were enrolled in the first grade of primary education\(^{39}\); nevertheless the Height Census carried of by the same MoE in the same year\(^{40}\) yielded a figure of some 100 thousand, and at the same time, it showed that total enrolment in the first four grades of primary education was smaller than the reported in a magnitude similar to the already mentioned estimation.\(^{41}\)

Lastly, it is important to notice that coverage of MoE data is not necessarily complete. Several countries have reported problems concerning getting data form private institutions or from remote schools. At the same time, coverage gaps are seldom reported, and estimation of omitted data is even a less frequent and known.

**Population data**

Population figures used as denominators in computing the above mentioned indicators are as reliable as the census and projections procedures on which they are based upon.

This paper can not enter in any detail concerning these issues. Nevertheless, many people have expressed that UNPD population figures are not necessarily accurate because lack of information on demographic phenomena that should be introduced in making projections, such as migration.

**Educational attainment data**

Since this data comes from population censuses or household surveys, its quality depends upon the characteristics of the census and surveys used. Again, this is something that need to be addressed on a case-by-case basis; nevertheless, some general concerns are:


\(^{39}\) The official entry age is 6 years. The total population for this age-group is about 600 thousand children.

\(^{40}\) There was a difference of only two weeks in the reference period for computing ages. Take into account that the Height Census implied to measure each child (what prevented or, at least, diminished over-reporting) thus, and was not perceived as something that could be used for assessing enrolment.

\(^{41}\) The educational statistic unit explained this taking into account the following facts: high coverage for several years, improvement in internal efficiency and demographic changes led to a reduction of enrolment size jeopardising teachers positions. The reaction has been to incorporate younger children (reporting their ages in a distorted way) and to over-report enrolment.
Population censuses are carried out once every ten years or even less often. Thus, there are concerns related to how to monitor progress on a short period of time if new data is not available, or, even worse, if the data source seems to be too old even for establishing a baseline.

Household surveys, on their part, are not necessarily carried out on a regular basis, and in those cases, it raises the same concerns as for population censuses in relation to monitoring progress. Nevertheless, in both cases it is possible to devised a mechanism to update the proposed estimations using access and internal efficiency data. At least in Latin America, household surveys are carried out often enough to monitor progress in almost every country.

Household surveys also require checking about its representativeness. For instance, two countries in Latin America (Argentina and Uruguay) carry out surveys that do not represent rural areas. However, in both countries (especially in Uruguay) rural areas represents a very small share of the total population.

Household surveys also require checking for sampling biases, and for breakdowns computed Even though, this is one of the strongest points for making a case in favour of using these surveys. We need caution in dealing with sampling power.

Expansion factors are other basic concern while using household surveys. The quality of these factors critically affects survey reliability. In any case, it is important to recall that the procedure proposed, is not intended to get population figures but ratios or likelihood values that, however, are also affected by expansion factors.

It should be added that the combination of different sources of data to compute indicators, implies adding up different sources of bias. This can explain why in several countries computing Net Enrolment Ratios yields to higher than 100% values (what is theoretically impossible) This happens when enrolment is over-reported and/or population figures are under-estimated given projection limitations.

This combination of sources is a typical procedure for computing many educational indicators. In this sense, using indicators originated in a unique source reduces the bias to a unique source for which bias can be estimated.

2. DATA AVAILABILITY

MoE data

This data is widely used for computing common indicators. In Latin America, most of the above mentioned indicators can be easily computed using this data.

The recently published EFA Monitoring Report, shows that AIR, SUR5 are world-wide available for 133 and 55 countries respectively.

Population data

UNPD produces population figures for most of the countries with the exemption of those with population smaller than 150,000 inhabitants. This includes Caribbean countries.

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42 If data is not regularly produce, a single set can be used for establishing a baseline projection, and then, for instance, changes in NIR and Survival rates can be used to adjust the projections.

43 Education for all. Is the world on track? Table 5 and 10 in annex.

44 UNPD, World Population Prospects 1998, p.3. 184 countries do have these projections by age and sex, while only 44 do not.
Educational attainment data

Household surveys data is commonly and increasingly used for several purposes including:

- The assessment of attendance: for instance the recent EFA Monitoring Report uses household surveys data for 40 countries only in Africa.45
- Private expenditure levels: household surveys are the primary source for getting the data internationally collected by UIS using its Questionnaire B.
- Social outcomes of education: in general information on educational attainment, but mainly to establish relations between it and other facts as earning differentials, return rates, etc. This is the case of the recent Financing Education. Investment and Returns published by UNESCO/OECD

These examples show that educational-related household surveys data are currently used on a regular and legitimate basis for several international purposes.

Besides, it should be added that in Latin America, this data is available for 18 out of 19 countries, and WB, IDB and ECLAC have been developing substantial efforts to ensure that these surveys meet some basic quality and comparability-related criteria.

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45 Education for all. Is the world on track? p.49. Data in this case have been taken from UNICEF MICS (Multiple Indicator Cluster Survey) or USAID DHS (Demographic and Health Survey)