

AN EQUITY BENCHMARK FOR SDG 4: OPTIONS FOR DISCUSSION

A Brief for the Technical Cooperation Group

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Background

In August 2019, the sixth meeting of the Technical Cooperation Group (TCG) on SDG 4 indicators endorsed seven indicators to be benchmarked in fulfilment of the commitment made in paragraph 28 of the framework for Action for countries to set intermediate benchmarks. While six of the seven indicators were well defined, the seventh indicator, which was meant to focus on equity, was left to be determined at a subsequent stage. The seventh (virtual) TCG meeting in October 2020 approved a technical and political process for setting benchmarks, which have since been implemented. This paper aims to address the outstanding gap on the seventh benchmark offering a range of options for discussion.

Issues

Drawing on the 2018 UIS handbook on measuring equity in education, which proposes a conceptual and methodological framework, this paper discusses alternative approaches to selecting a benchmark indicator for measuring and assessing inequality.

Three criteria were used to select the other six benchmarked indicators. In particular, they:

- were part of the SDG 4 monitoring framework;
This was strictly true for five of the indicators (minimum proficiency level, completion rate, out-of-school rate, pre-primary education attendance rate and trained teachers), while the sixth (finance indicators) were selected from SDG 1 and the Education 2030-SDG Framework for Action.
- had high coverage; and
- were universally relevant for policy.

An equity benchmark will consist of two parts:

- the underlying indicator; and
- the measure used to describe the type and size of inequality in the distribution of the indicator.

The choice of an indicator and measure entails decisions over the following questions, although it is fair to say that answers to these questions need not be mutually exclusive.

1a. Should inequality be expressed in terms of a specific characteristic (i.e. equality of opportunity) or be characteristic-free (i.e. equality of condition)?

1b. Should the indicator be binary or continuous?

The parity index, which is the global indicator 4.5.1 on equity, expresses equality of opportunity with respect to a characteristic, based on the idea that education outcomes should be distributed equally with respect to differences which should be irrelevant, such as sex, wealth or location. Despite its status as a global indicator, the challenge is that, unlike sex, other characteristics are somewhat less comparable between countries. The administrative definition of urban/rural used varies by country (and over time). The definition of wealth (or income or consumption) also varies and cannot be aligned between all surveys, although of course such comparisons are common between similar countries. Other characteristics are either even less inherently comparable (e.g. ethnicity) or data availability is low (e.g. disability). The gender parity index has the advantage that, unlike the wealth parity index, its evolution relative to the value of the underlying indicator is often less predictable (see annex).

Aside from using sex, an alternative is to simply look at the distribution of an education indicator across persons, regardless of their different circumstances. Such equality of condition analysis can be applied

easily to continuous indicators, for which any of the common measures of statistical dispersion would be suitable, although discrete variables can also be analysed in some ways. Such univariate measures provide equity indicators that are comparable over time and between countries, as for instance in the case of analyses of economic inequality based on income or wealth. However, no SDG 4 indicators are continuous. For instance, although the minimum proficiency level indicator is defined as a cut-off point on an implicit scale, there is yet no such commonly defined score. Likewise, the number of years of education attained is not in the monitoring framework.

2. Should inequality be expressed in terms of the absolute value of the measure or in terms of a relative variation from an average?

The global indicator value in and of itself is not informative if taken out of context. The gender parity index of indicators, such as the minimum proficiency level or the completion rate, depend on the absolute value of the underlying indicator. For instance, the closer a country is to universal primary completion, the closer the parity index is to gender parity; it is potentially more interesting to see whether a country is more or less equal, *given the level of the primary completion rate*. In other words, one needs to assess inequality levels by comparing the relationship between the inequality measure and the average value of the indicator ('performance') across countries.

For example, the figure below displays the relationship between one (continuous) indicator (average years of schooling) and three inequality measures. The blue line summarizes the relationship of the inequality measure with the level of underlying indicator ('performance'). Countries above the blue line exhibit larger inequality than expected for their performance, e.g. compare Gambia in 2013 (that has high disparity) and Sao Tome and Principe in 2008 (that has low disparity) for the same level of average education attainment (i.e. just under 6 years):

- standard deviation;
- top-bottom 20% difference, i.e. gap in years of schooling between the top and bottom quintile; and
- average interpersonal difference, i.e. average value of absolute differences between all possible pairs of individuals in the population, which is equivalent to the Gini coefficient, multiplied by two times the mean of the distribution (Friedman et al., 2020).

Figure 1 - Mean years of schooling vs. three inequality measures

Figure 1.a - Standard deviation

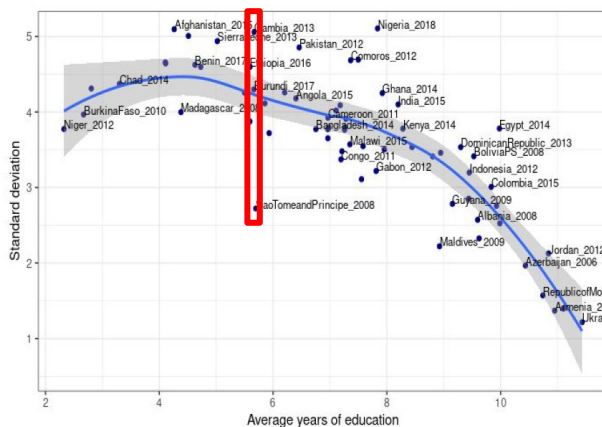


Figure 1.b - Bottom-top 20% difference

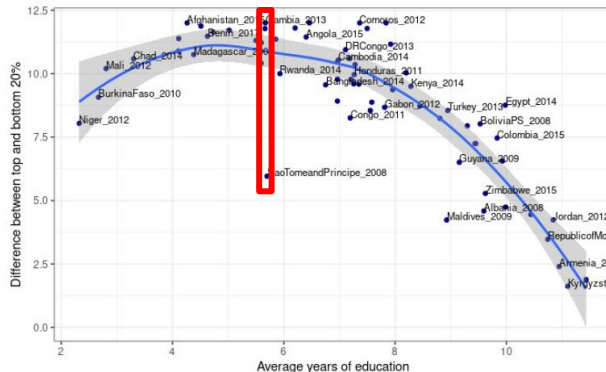
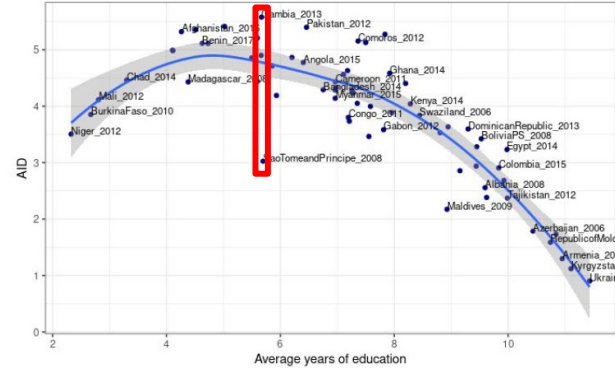


Figure 1.c - Average interpersonal difference



An inverse-U-shaped relationship is consistently observed: inequality initially increases with performance and decreasing above a certain level of performance. The equality of condition indicator is derived from this relationship. For example, for the standard deviation with the regression:

$$SD_i = \alpha_0 + \alpha_1 MEAN_i + \alpha_2 MEAN_i^2 + \varepsilon$$

where SD is the standard deviation and MEAN is the average value of years of schooling across countries i . The residual ε is the equality of condition indicator. It measures the difference between the observed SD and the expected SD given observed performance levels. That is, the distance between the dots and the blue line in the graphs above. Positive values indicate inequalities are larger than expected and negative values lower than expected.

Despite the advantage of this approach in taking the level of the education indicator into account, there is a risk that the number of observations may be too low, especially at the extreme ends of an indicator's distribution, which could bias the relationship and undermine the concept of an average level of inequality.

3. Should the indicator for the equity benchmark be selected from among the other benchmark indicators and what are the implications?

There are three choices, in particular selecting the underlying indicator of the equity benchmark:

- From the other benchmark indicators: This solution will ensure that the set of benchmark indicators remains compact. One challenge may be to ensure that the (proposed and adopted) benchmark values are consistent with the benchmark values for that indicator.
- From the other SDG 4 indicators: This solution will meet the criterion used for the selection of the other benchmark indicators although it could raise the question why that indicator was not selected to be benchmarked.
- Outside of the SDG 4 monitoring framework: This solution would enable a continuous indicator to be selected (e.g. years of schooling) and an equality of condition measure to be used but will be inconsistent with the criterion used for the selection of the other benchmark indicators.

Proposals

To simplify and summarize the preceding discussion, the upper secondary completion rate is taken as a basis on the indicator side. The following table presents three options for discussion, noting their advantages and disadvantages. In selecting the indicator/measure pair for the equity benchmark, ease of calculation and communication are important.

| OPTION | BENCHMARK SETTING | ADVANTAGE | DISADVANTAGE |
|--|---|--|---|
| 1. Gender parity index of the completion rate | Benchmark values will have been set for the completion rate. The change on the gender parity index can be predicted based on average trends. The proposed equity benchmark level will assume a trend faster than the predicted one. | This option maintains a compact set of indicators related to each other and is relatively transparent. | There is no straightforward and easy to interpret trends. As the graph in the annex shows, the parity index is well below one for (poorer) countries with low completion rates and above one for (richer) countries with high completion rates. |
| 2. Residual of a regression of the parity index on the completion rate | A regression of the gender parity index on the completion rate will generate the predicted level of the index at each level of the completion rate. The equity benchmark level will be proposed assuming that progress towards the global trend will be faster than average. | This option responds to the need to focus on countries with higher than average disparity. | In addition to the disadvantage of option 1, this residual measure is not directly interpretable in terms of a male-female gap. |
| 3. Standard deviation of the secondary completion rate by survey cluster | There is no clear benchmark setting process. There are two alternatives: 1. Benchmark values are set with reference to the min observed value among all countries, which all countries will need to reach. 2. A regression of the standard deviation on the completion rate will lead to the residual identifying countries that are more unequal than predicted. | This option provides a characteristic-free measure (variation across enumeration areas) unlike the previous two options, which focus on one characteristic (sex) that is comparable. | The survey cluster design may differ substantially between countries also affecting interpretation. |

A fourth option can also be considered for a different underlying indicator, namely SDG indicator 4.4.3, which is the attainment distribution.

| OPTION | BENCHMARK SETTING | ADVANTAGE | DISADVANTAGE |
|--|---|--|--|
| 4. Ordinal inequality measure of the attainment distribution | There is no clear benchmark setting process. There are two alternatives: 1. Benchmark values are set with reference to the min observed value among all countries, which all countries will need to reach. 2. A regression of the standard deviation on the completion rate will lead to the residual identifying countries that are more unequal than predicted. | This option provides a characteristic-free inequality measure (by contrast, option 3 reflects spatial inequality), using ordinal versions of standard inequality measures, e.g. ordinal Gini. A similar method referring to years of schooling has been used before (Thomas et al., 2001). | There is no straightforward and easy to interpret trends. Cross-country comparability is required across more levels of education. |

All four options depend on household survey analysis. They therefore have two additional disadvantages relative to the other six benchmark indicators.

- Although efforts will be made to share the benchmark-setting methodology for countries to estimate, for efficiency reasons calculations will need to be centralized.
- As with many other survey-based measures, the frequency of the indicator will not be annual. However, this disadvantage has already been acknowledged and the TCG has already decided that it is important to maintain one equity benchmark.

Annex. Gender parity index of the secondary completion rate level

