

## Is universal completion within reach? Results from EPDC education projections.

### What are EPDC education projections?

Projections developed by the Education Policy and Data Center (EPDC) at FHI 360 provide an overview of historical and projected enrollment trends based on calculations performed using the EPDC's forecasting model HIPE (High-level Interactive Projection for Education).\*

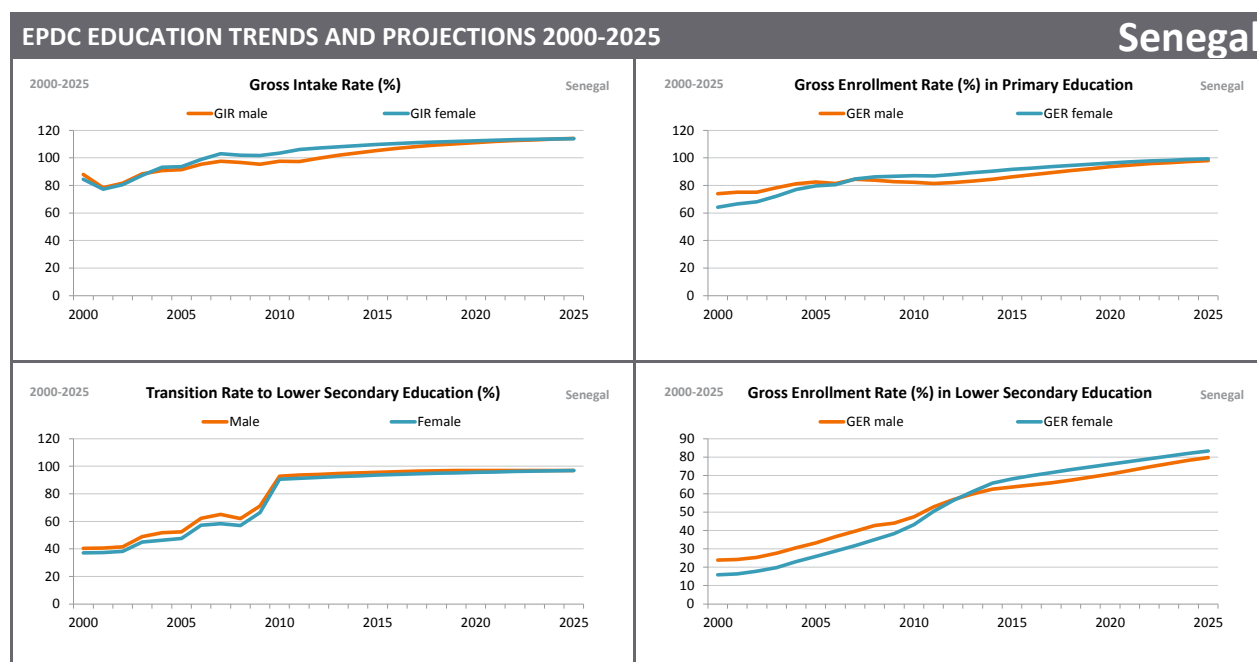
The model uses a cohort method in which cohorts of students are followed throughout the education system according to school entry

and student flow rates defined by the model's assumptions. EPDC has developed two versions of the HIPE model: 1) a target-driven tool that allows a user to set his/her own targets for certain indicators (such as gross intake rate into primary school) and see what kind of resources (such as teachers) reaching those goals will require, as well as play with different scenarios of possible progress; and 2) a trend-based version, where projections are made based on historical trends observed within the education systems of low income and low-middle income countries.

Figure 1: EPDC education profile



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\* A full description of the methodology used to generate projections with HIPE-Trend can be found on the EPDC website: <http://www.epdc.org/education-data-research/epdc-hipe-projections-methodology>

Regardless of the version, the foundation of the HIPE model is formed by the actual historical data on pupils and repeaters enrolled in each country's education system, broken out by grade and gender. Using this basic information, HIPE calculates the historical, grade- and gender-specific gross intake, repetition, dropout, and transition rates for each year for which information is available. Both versions of HIPE

can be used interchangeably – in fact, the trend version can inform the user interested in the target-driven approach in determining reasonable targets for future enrollment. The most important distinction is the manipulability of the target-based model, in contrast with the automated, pre-determined, and progressive nature of the trend model.

**Table 1: Indicator Assumptions in HIPE-Trend**

INDICATOR	SETTING
Gross Intake Rate	If higher than 100%, it stays constant for 5 years and then decreases gradually to 100%; if lower than 100%, it increases gradually to reach 119% (males) and 114% (females), then gradually decreases.
Repetition Rate	Set to decrease to a minimum of 1.3-3% depending on grade and gender; the higher the rate, the steeper the decrease.
Dropout Rate	Set to decrease to a minimum of 2%, the higher the rate; the steeper the decrease.
Transition Rate	Set to increase to a maximum of 100%; the higher the rate the slower the increase.

### Trend Based Approach

Projections presented in the EPDC projections profiles are developed using the trend-based version of HIPE. As noted above, the main drivers of the projections are the gross intake rate to the first grade of primary, repetition and dropout rates by grade, as well as transition to the first

grade of lower secondary. Calculated initially based on pupil and repeater enrollment data published by UNESCO Institute for Statistics, these rates are available for the period starting in 1999. At this time, the longest time series for a country may be 13 years – although in reality, data are usually available for 5-7 years in a given

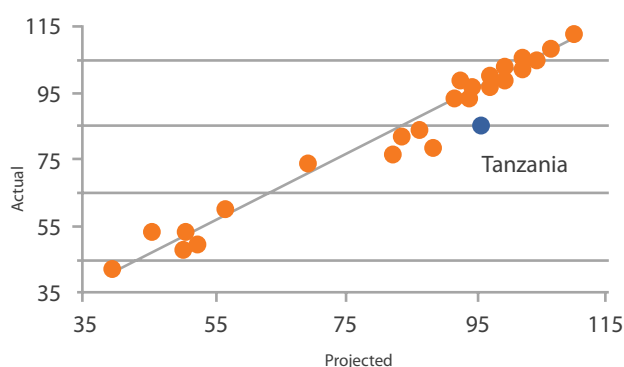
country. For the trend version of HIPE, EPDC compiles these country time series in a large cross-country panel dataset, and runs regression models on the combined dataset to extract common coefficients for projection equations. Thus, a projection equation is produced for each of the driver rates (gross intake into primary, repletion, dropout, transition).

It is important to note that the purpose of EPDC trend-based HIPE projection model is to set realistic goals for countries to achieve. As such, the model does not simply extrapolate past trends in all cases. Instead, the forecasting methodology imposes the rates of progress obtained from regression analysis on a restricted group of “good performers” (i.e. those countries that in the available historical period were moving in the desired direction towards optimal enrollment and full completion) in the past ten-year period, setting an expectation of moderate improvement, even in countries where historical trends have been negative. As a result, the EPDC trend-based projections are progressive, in that they aim to illustrate what’s possible, and not necessarily what is most likely to happen. In most cases, the HIPE model applies these common equations to calculate projected pupil enrollments in future years, using the most recent historical data as a starting point.

In addition, the current trend-based version of the HIPE model takes into consideration the statistical significance of historical trends. Therefore, even if the model settings allow for

the use of country-specific trends, using them is only possible if the country is progressing at a rate faster than the one observed among “good performers” AND if trends observed in country historical data appear to be statistically significant. Taking into account statistical significance is what distinguishes the current version of trend based HIPE model from previous trend based EPDC projections<sup>1</sup>. In fact, the current model uses country specific information only in rare cases, as most often countries do not have data available for a period of time sufficient to produce statistically sound trend coefficients.

**Figure 2: Primary Completion Rates, Females, Actual and Projected**



### How reliable are the projections?

Given that the purpose of the EPDC model is to set realistic targets, and not necessarily exactly predict future trends, results are not expected to mirror reality in all cases. Nonetheless, EPDC regularly assesses its projection methodology by comparing newest administrative figures to projected values for the same year calculated

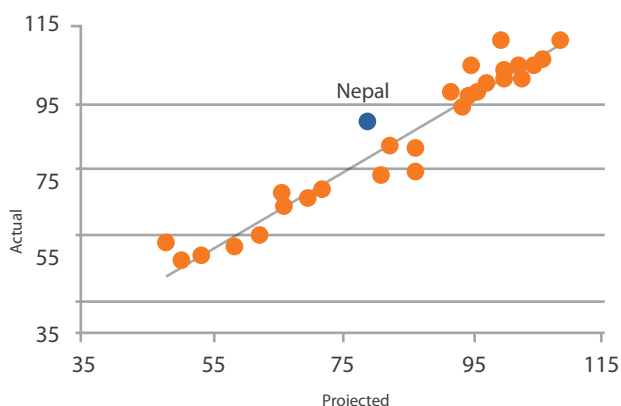
1. Results seen in Wils, A., & Ingram, G. (2011). Universal basic education: A progress-based path to 2025. Washington, DC: Education Policy and Data Center/FHI 360 are an example of a different trend based modeling methodology.

previously. Results of this exercise are shown in Figures 2 and 3, illustrating how well projected values predict actual figures. Each mark on the graphs represents one country and compares its most recent available primary completion figure, for either males or females, to a projected value for the same year that EPDC estimated using the HIPE model. Completion rate for primary school is defined here as a number of new students entering the last grade of primary, divided by the population of the last grade of primary school age.

As shown in these graphs, the projected and actual values are quite close in the majority of cases, suggesting that the expectations set by the model's assumptions are not too far from reality. The several outliers highlighted in the graphs shed some light on what circumstances can potentially result in a trend that diverges significantly from the model's projections. In the case of Tanzania (Figure 2), the most recent data available for 2012 suggests that promotion rates to the last grade of primary actually decreased as compared to the previous years, which resulted in a lower intake of new students to the last grade of primary school and thus, a completion rate about 10 percentage points lower than expected by the model.

In Nepal (Figure 3), on the other hand, the most recent data indicate that promotion rates in primary school have improved significantly and at a rate higher than one assumed by the model, thus resulting in a completion rate about 10 percentage points higher than projected last year.

**Figure 3: Primary Completion Rates, Males, Actual and Projected**



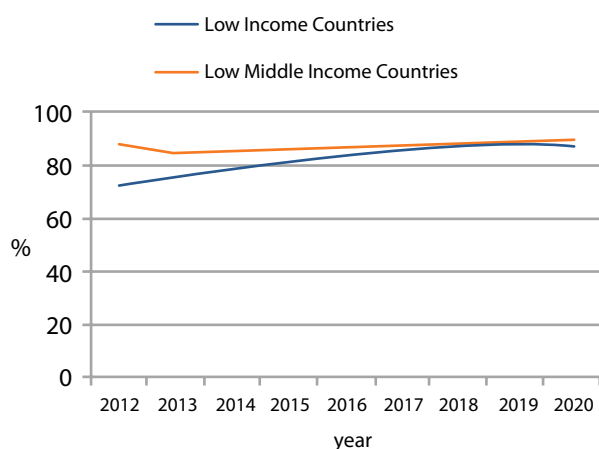
Such diversions from historical trends may suggest a beginning of a long-term improvement or deterioration, a temporary upturn or setback, or can be a result of a data reporting error. The use of coefficients based on a larger group of countries allows the projections performed by the model be less sensitive to erratic data.

### What kind of progress can be expected?

Figure 4 demonstrates projection results aggregated for 65 low-income and low-middle income countries, selected based on their GDP per capita and availability of enrollment data sufficient to produce projections (several conflict-affected countries with serious challenges in school enrollment, such as Afghanistan, Liberia and Sierra Leone, had to be excluded due to the lack of data).

The results show that while primary completion is currently on average about 15 percentage points lower in low income countries as compared to low middle income countries, this disparity can potentially be eliminated if low-income countries follow the rate of progress observed among “best performers” in the group. Still, the growth falls short of reaching universal completion in both groups of countries by 2020.

**Figure 4: Average Primary Completion Rate in 65 Low Income and Low Middle Income Countries**



In 2012, 8 out of 26 low income countries included in the projections have primary completion higher than 80%; in 2020, the number increases to 15 (see Figure 5). The highest progress could be expected in Eritrea, Chad and Burundi which, if followed rates of progress observed among “best performers” in the low income and low middle income country group, might improve their primary completion rate by as much as 30-40 percentage points by 2020. Among countries with current primary completion rates below 80%, Uganda, Guinea and Gambia show the slowest progress or lack of thereof. In most countries, intake, dropout and repetition rates will have to be improved at a much more significant level to accomplish the ambitious goal of enrolling all children of primary school within this timeframe.

**Figure 5: Primary Completion Rate in 2012 and 2020 in Low Income Countries**

