This chapter provides detailed descriptions of the ADePT Edu output. It also presents the formulas for calculating the various indicators and explains how to interpret the indicators.

ADePT Edu produces two types of tables, which appear as formatted Excel spreadsheets. Output information tables include tables of contents, lists of errors and warnings, and variable settings. Indicator tables provide information on school participation, school progression, school attainment, education expenditures, and labor market outcomes (table 4.1).

Indicators are disaggregated by the following characteristics:

- Residence (urban and rural)
- Gender
- Residence and gender
- Household expenditure quintiles
- Household expenditure quintiles and gender
- Gender of household head
- Educational level of household head.

Standard errors or frequencies can be requested for all indicators. All indicator tables can thus be produced in three versions (table 4.2).

The level of geographical representation of the indicators for these sub-populations depends on the sampling framework of the household survey. As long as selection into the survey sample is unrelated to these sub-populations,
the results will generally be unbiased estimators. However, as the sample size gets smaller, there may be an increase in the sampling variation and a decrease in accuracy. Hence, it is important to examine the standard errors reported by ADePT Edu to calculate the confidence interval of the indicator. Users should consult the documentation of the household survey to understand the sampling frame in order to determine how representative the selected subpopulation is.

ADePT Edu allows users to produce eight types of graphs (figures):

- Attainment profiles for young and older cohorts
- Enrollment profiles
- Cohort grade survival profiles
- Enrollment pyramids

Table 4.1: Topics Covered by ADePT Indicator Tables

<table>
<thead>
<tr>
<th>Topic</th>
<th>Indicators</th>
</tr>
</thead>
</table>
| School participation | • Gross and net attendance ratios for primary, secondary, and postsecondary education  
                     | • Proportion of out-of-school children for primary- and secondary-school age  
                     | • Gross and net intake ratios for the first grade of primary education  
                     | • Survival rate to the fifth grade of primary education  
                     | • Proportion of children who are on-time, under-age, and over-age in each grade of primary education  
                     | • Percentage of the population 6–17 that ever attended school  
                     | • Reasons why children are out of school  
                     | • Typology of out-of-school children (late entry, dropout, never in school)  
| School progression   | • Promotion, repetition, dropout, and completion rates for each grade of primary and secondary education  
                     | • Primary to secondary education transition rates  
| School attainment    | • School attainment of the adult population  
                     | • Average number of years of schooling by age group (15–19, 20–29, 30–39, 40–49, and 50+)  
                     | • Proportion of population age groups that completed grades 1–9, by grade  
                     | • Inequality in years of schooling (Gini coefficients and Theil index)  
| Education expenditures | • Household expenditures on primary, secondary, and postsecondary education  
| Labor market outcomes | • Earnings by education level  
                     | • Returns to education  
                     | • Employment by sector  
                     | • Youth employment/unemployment  
                     | • Earning inequalities (Gini coefficients and Theil index)  

Source: Authors.

Table 4.2: Versions of Tables Available in ADePT

<table>
<thead>
<tr>
<th>Excel spreadsheet contents</th>
<th>Color of tab</th>
</tr>
</thead>
<tbody>
<tr>
<td>Main print-ready tables</td>
<td>Neutral</td>
</tr>
<tr>
<td>Main print-ready tables with standard errors</td>
<td>Green</td>
</tr>
<tr>
<td>Main print-ready tables with frequencies</td>
<td>Blue</td>
</tr>
</tbody>
</table>

Source: Authors.
Chapter 4: Generating and Interpreting Output Tables and Graphs

- Typology of out-of-school children
- Education attainment Lorenz curves
- Mean hourly earnings by education level
- Mean hourly earnings by years of education.

Output Information Tables

ADePT Edu produces three types of output information tables: the contents table, the notifications table, and the original data report table. Each type of table is described below.

The Contents Table

The first sheet contains the ADePT Edu table of contents (screenshot 4.1). Users select a data table by clicking on its name. Links denoted TABLE_SE (column C) indicate tables with standard errors. Links denoted TABLE_FREQ (column D) indicate tables with frequencies. Not shown in the screenshot is a list of graphs produced by ADePT Edu, which follows the list of tables.

The Notifications Table

The Notifications sheet contains error, warning, and notification messages about problems discovered during the preparation of the output file. There are three levels of problem/error reporting in ADePT: notifications, warnings, and errors. To alert users about problems, the color of the Notification tab changes from neutral to yellow for warnings and to red for error messages.

During computations, the error, warning, and notification messages appear in the System Messages window of the Main form (screenshot 4.2). Once the computations are completed, the messages are stored with the report in the Notifications sheet.

Notifications convey information about the processing of the data and report names of the loaded data files. They have no impact on the content of the tables or graphs produced. They serve to remind users about parameter values that were used during the analysis that are not in the user’s dataset but that still reflect the user’s assumptions. For example, if the user specifies that the duration of primary school is five years, this value will appear as a notification.
### Original Data Report

**Table A1:** School attendance ratios and out-of-school, by level, according to background characteristics, primary grade one intake overage in first grade, and survival rates to grade 5, according to background characteristics.

**Table A2:** On-time, under-age and over-age in primary education, according to background characteristics.

**Table A3:** Percentage of the population that has ever attended school, by age, according to background characteristics.

**Table A4:** Promotion, repetition, dropout and completion rates by level, and transition rates according to background characteristics.

**Table A5:** School attainment of adult population by background characteristics.

**Table A6:** Proportion of 10-19 years olds that completed each grade, according to background characteristics.

**Table A7:** Proportion of 10-19 years olds that completed each grade, according to background characteristics.

**Table A8:** Proportion of inequalities in years of schooling.
ADePT issues a warning if it detects a suspicious situation in the data but cannot be sure that the finding represents an error. Examples include the following:

- An observation violates assumptions imposed by the parameters of ADePT (for example, students in the sample report that they attend the fifth grade of primary school in a dataset in which the duration of primary schooling is four years).
- A value of a categorical variable seems too far off compared with other values of this variable (an outlier) (ADePT may flag this value as not legitimate).
- Information is inconsistent or implausible (for example, a two-year-old child who is reported as employed).
- Definitions of categories differ across rounds of the same survey (for example, a variable that contains codes for regions contains a different number of unique values in the datasets collected for the same country in two years).

When a warning is issued, no actions are taken; ADePT uses all non-missing observations in the loaded datasets to produce tables and graphs. Warnings simply inform the user about potential problems with the data. An example of a warning is a message that informs a user that no weight variable is defined and that tables and graphs are produced on unweighted data.

ADePT reports an error when it finds a problem that prevents the use of a variable in the analysis, such as a variable that does not exist in the dataset. After reporting the error, ADePT continues as if the variable were
not specified. When ADePT can determine the source of the problem in a particular variable field, this field is highlighted on the form.

Problems may be resolved in one of two ways. First, users can adjust the parameters/input of ADePT—by, for example, checking that parameters of the educational system agree with the actual situation in the country under consideration. Second, users can adjust the input datasets, using Stata or SPSS to correct the problem.

Notifications, warnings, and errors are just as important as the results that ADePT produces. They should be carefully reviewed before any conclusions are drawn from tables and graphs.

Screenshot 4.3 provides an example of ADePT output showing some of the errors and warnings discussed above. In the next to the last line in this screenshot, a warning indicates that 4,105 observations with a grade of secondary are out of the specified range for the country [1, 5]. This discrepancy could reflect an error in the dataset, or it could mean that the variable value specified for the country does not correspond to the variable value used to construct the dataset. Users should review all warnings and decide whether to change the parameters, implement procedures to clean up the data, or use the data as they are.

In the example shown in screenshot 4.3, if the user decides to run the report without changing the parameters or cleaning up the data, the program will not use the 4,105 out-of-range observations in the calculation of any table requiring the out-of-range information; it will treat these values as missing. The 4,105 observations could, however, be included in the estimation of other indicators.

The Notifications sheet also includes notes about the definitions of key variables in the dataset. For example, the note for the parameter STAGE

### Screenshot 4.3: Examples of Errors and Warnings in ADePT Output

<table>
<thead>
<tr>
<th>Type</th>
<th>Tag</th>
<th>Message</th>
</tr>
</thead>
<tbody>
<tr>
<td>NOTE</td>
<td></td>
<td>Checking variables in C:\DHSS\NICARA\1200\NCPR41FL.DTA:</td>
</tr>
<tr>
<td>WARNING</td>
<td>GRADE</td>
<td>Suspected outliers with code(s); 999 in variable hr107</td>
</tr>
<tr>
<td>NOTE</td>
<td>STAGE</td>
<td>Age of start of schooling is set to 7</td>
</tr>
<tr>
<td>NOTE</td>
<td>PRDUR</td>
<td>Duration of primary schooling is set to 6</td>
</tr>
<tr>
<td>NOTE</td>
<td>SCITUR</td>
<td>Duration of secondary schooling is set to 2</td>
</tr>
<tr>
<td>NOTE</td>
<td>MAGE</td>
<td>Maximum age of post-secondary schooling is set to 9</td>
</tr>
<tr>
<td>NOTE</td>
<td>MONT</td>
<td>Beginning of the school year is set to</td>
</tr>
<tr>
<td>NOTE</td>
<td>AGE</td>
<td>6134 values of age decreased by 1 year to account for the time passed since the beginning of the school year.</td>
</tr>
<tr>
<td>WARNING</td>
<td>GRADE</td>
<td>4105 observations with grade of secondary out of range [1,5]</td>
</tr>
<tr>
<td>WARNING</td>
<td>GRADE</td>
<td>91 persons attending grades higher than the next-after-completed</td>
</tr>
</tbody>
</table>
clarifies that the age at start of schooling is set to seven. The note on the parameter MONST (month to start school) indicates that the beginning of the school year is set to the value 2, meaning the month of February. These parameters are set on the Education tab of the form in the Educational System group. UNESCO regularly provides updates for the beginning and duration of each educational level in each country.

**Original Data Report**

The Original Data Report table provides basic information on datasets and variables loaded in ADePT (screenshot 4.4). For each variable specified, this table presents information on the number of nonmissing observations; the mean, minimum, maximum, and selected percentiles; and the number of unique values in the variable. It provides useful information about the data loaded into ADePT, in many cases resolving problems related to the discrepancy of the results generated on different datasets. The Original Data Report should always be carefully reviewed before starting analysis of the data with ADePT.

The Original Data Report lists all the variables required for the tables produced by the report, along with the sample size (denoted N), the average value of each variable (mean), the minimum and maximum values for each variable in the table (min and max), and the variable values for the 1st, 50th, and 99th percentiles (p1, p50, and p99). The column labeled N_unique shows the total number of observations with unique identifiers. In the example shown in screenshot 4.4, there are 6,386 households with unique identifiers.

**Screenshot 4.4: Original Data Report**
School Participation Indicator Tables

ADePT Edu produces seven tables of indicators for measuring school participation:

- Table A1: School attendance ratios and out-of-school children
- Table A2: Primary grade 1 intake, over-age in first grade, and survival rate to grade 5
- Table A3: On-time, under-age, and over-age in primary education
- Table A4: On-time, under-age, and over-age by single grade of primary education
- Table A5: Percentage of the population age that has ever attended school
- Table A6: Reasons for being out of school
- Table A7: Typology of out-of-school children.

In all the formulas below where age of a child is used, the age can be adjusted to take into account the timing of the survey (based on variable interview month) relative to the beginning of the school year (as indicated in the parameters of the educational system).

Table A1: School Attendance Ratios and Out of School, by Level

Tracking the participation of children in school is one of the most basic measures of performance in the education sector. Attendance at primary school is a prerequisite for Education for All. Disaggregating attendance indicators by subpopulation provides a means of capturing inequality in attendance across subpopulations. Measuring the proportion of children out of school is also crucial to policy makers who want to advance Education for All and educational attainment. The disaggregation calculated by ADePT Edu describes who the out-of-school children are (screenshot 4.5).

Indicator A1.1: Gross Attendance Rate for Primary School

The gross attendance rate for primary school is the number of primary school students of any age expressed as a percentage of all children of primary school age:
Table A1: School attendance ratios and out-of-school by level, according to background characteristics, [Data1]

<table>
<thead>
<tr>
<th></th>
<th>Primary</th>
<th></th>
<th></th>
<th>Secondary</th>
<th></th>
<th></th>
<th></th>
<th>Post-</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Gross</td>
<td>Net</td>
<td>Proportion</td>
<td>Gross</td>
<td>Net</td>
<td>Proportion</td>
<td></td>
<td>Gross</td>
</tr>
<tr>
<td></td>
<td>Attendance</td>
<td>Attendance</td>
<td>of out-of-school</td>
<td>Attendance</td>
<td>Attendance</td>
<td>of out-of-school</td>
<td>Attendance</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>123.79</td>
<td>79.01</td>
<td>19.64</td>
<td>39.44</td>
<td>27.89</td>
<td>34.10</td>
<td>1.97</td>
<td></td>
</tr>
<tr>
<td>Gender</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Boys</td>
<td>124.05</td>
<td>78.17</td>
<td>20.54</td>
<td>40.22</td>
<td>26.76</td>
<td>32.74</td>
<td>2.00</td>
<td></td>
</tr>
<tr>
<td>Girls</td>
<td>123.52</td>
<td>79.91</td>
<td>18.68</td>
<td>38.63</td>
<td>29.05</td>
<td>35.48</td>
<td>1.93</td>
<td></td>
</tr>
<tr>
<td>Area of residence</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Urban</td>
<td>131.31</td>
<td>89.56</td>
<td>6.11</td>
<td>89.15</td>
<td>58.41</td>
<td>16.58</td>
<td>7.64</td>
<td></td>
</tr>
<tr>
<td>Rural</td>
<td>122.86</td>
<td>77.69</td>
<td>21.33</td>
<td>31.62</td>
<td>23.10</td>
<td>36.85</td>
<td>0.77</td>
<td></td>
</tr>
<tr>
<td>Residence and gender</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Urban - Boys</td>
<td>131.97</td>
<td>90.45</td>
<td>5.95</td>
<td>97.59</td>
<td>59.89</td>
<td>11.97</td>
<td>7.93</td>
<td></td>
</tr>
<tr>
<td>Urban - Girls</td>
<td>130.55</td>
<td>88.56</td>
<td>6.29</td>
<td>81.88</td>
<td>57.14</td>
<td>20.55</td>
<td>7.38</td>
<td></td>
</tr>
<tr>
<td>Rural - Boys</td>
<td>123.03</td>
<td>76.58</td>
<td>22.42</td>
<td>32.10</td>
<td>22.08</td>
<td>35.68</td>
<td>0.80</td>
<td></td>
</tr>
<tr>
<td>Rural - Girls</td>
<td>122.68</td>
<td>78.87</td>
<td>20.18</td>
<td>31.12</td>
<td>24.18</td>
<td>38.08</td>
<td>0.75</td>
<td></td>
</tr>
<tr>
<td>Household wealth</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Quintile 1</td>
<td>94.54</td>
<td>60.79</td>
<td>39.16</td>
<td>7.73</td>
<td>5.77</td>
<td>56.76</td>
<td>0.00</td>
<td></td>
</tr>
<tr>
<td>Quintile 2</td>
<td>124.74</td>
<td>75.63</td>
<td>24.10</td>
<td>14.30</td>
<td>10.79</td>
<td>40.78</td>
<td>0.03</td>
<td></td>
</tr>
<tr>
<td>Quintile 3</td>
<td>134.60</td>
<td>84.80</td>
<td>15.03</td>
<td>26.28</td>
<td>19.38</td>
<td>34.70</td>
<td>0.04</td>
<td></td>
</tr>
<tr>
<td>Quintile 4</td>
<td>141.70</td>
<td>90.17</td>
<td>8.55</td>
<td>48.02</td>
<td>35.51</td>
<td>25.04</td>
<td>0.32</td>
<td></td>
</tr>
<tr>
<td>Quintile 5</td>
<td>128.99</td>
<td>89.31</td>
<td>3.99</td>
<td>93.69</td>
<td>62.94</td>
<td>17.83</td>
<td>7.49</td>
<td></td>
</tr>
<tr>
<td>Household wealth and gender</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Quintile 1 - Boys</td>
<td>94.00</td>
<td>59.03</td>
<td>40.93</td>
<td>8.53</td>
<td>5.61</td>
<td>55.15</td>
<td>0.00</td>
<td></td>
</tr>
<tr>
<td>Quintile 2 - Boys</td>
<td>124.55</td>
<td>74.47</td>
<td>25.25</td>
<td>14.38</td>
<td>10.22</td>
<td>39.90</td>
<td>0.00</td>
<td></td>
</tr>
</tbody>
</table>
primary gross attendance rate = 
\[ \sum_i w_i 1(1) \]
\[ \sum_i w_i 1(\text{level} = \text{primary}) \]
\[ \sum_i w_i 1(\text{age} \in [\text{entry age}, \text{entry age + primary duration} - 1]) \],

where \( i \) denotes the \( i \)th individual in the survey, \( 1(\cdot) \) is the indicator function (equal to 1 when the condition is true, 0 when false), and \( w_i \) is the sample weight for the \( i \)th individual.

Because children above and below primary school age attend primary school, the gross attendance rate can exceed 100 percent. In the example shown in screenshot 4.5, the gross attendance rate for primary schools is 123.79, indicating that many primary students are likely over-age. There is little difference between girls and boys, with the figure for both rounding to 124 percent.

Indicator A1.2: Net Attendance Rate for Primary School

The net attendance rate for primary school is the proportion of children of the official primary school age who attend primary school:

primary net attendance rate = 
\[ \sum_i w_i 1(\text{level} = \text{primary and} \]
\[ \sum_i w_i 1(\text{age} \in [\text{entry age}, \text{entry age + primary duration} - 1]) \]
\[ \sum_i w_i 1(\text{age} \in [\text{entry age}, \text{entry age + primary duration} - 1]) \],

The primary school age is based on the values of the parameters of the educational system—the starting age and the duration of primary school. In the example in screenshot 4.5, 79.01 percent of primary school–age children are attending primary school. Inequality in this measure of attendance is evident: among the top income quintile of households, 89.31 percent of children are attending primary school, while only 60.79 percent of primary children from the poorest quintile of households are attending primary school.

Indicator A1.3: Proportion of Out-of-School Children for Primary School

The proportion of out-of-school children for primary school is the number of children in the official primary school–age range who are not attending
primary or secondary education, expressed as a percentage of children of the official primary school–age range:

proportion out-of-school primary =

\[ \frac{\sum_i w_i 1 \left( \text{age}_i \in [\text{entry age}, \text{entry age} + \text{primary duration} - 1] \text{ and } \text{level}_i \neq \text{primary} \text{ and } \text{level}_i \neq \text{secondary} \text{ and } \text{level}_i \neq \text{tertiary} \right)}{\sum_i w_i 1 \left( \text{age}_i \in [\text{entry age}, \text{entry age} + \text{primary duration} - 1] \right)} . \]

By definition, children in the official primary school–age range who are attending preprimary education are considered out of school. The sum of the net primary attendance rate and the proportion out-of-school children does not add to 100 percent because the net primary attendance rate does not count students who are in secondary school.

There may be large differences in household survey data. For example, in many countries, parents can opt to have their student start a year early if they feel the child is prepared. When this child is in the first year of secondary school, he or she is still within the primary school–age group but not in primary school and so would not be counted in the numerator of the net enrollment rate.

**Indicator A1.4: Gross Attendance Rate for Secondary School**

The gross attendance rate for secondary school is the number of secondary school students of any age, expressed as a percentage of children of secondary school age:

secondary gross attendance rate =

\[ \frac{\sum_i w_i 1 (\text{level}_i = \text{secondary})}{\sum_i w_i 1 \left( \text{age}_i \in [\text{entry age} + \text{primary duration}, \text{entry age} + \text{primary duration} + \text{secondary duration} - 1] \right)} . \]

This rate is typically below 100 percent, because in most countries many children drop out of the education system after finishing primary school. In the example in screenshot 4.5, the secondary gross attendance rate for the poorest quintile is 7.73 percent.
Indicator A1.5: Net Attendance Rate for Secondary School

The net attendance rate for secondary school is the proportion of children of official secondary school age who are attending secondary school:

\[
\text{secondary net attendance rate} = \frac{\sum_i w_i 1 \left( \text{level}_i = \text{secondary and } \begin{cases} \text{entry age + primary duration,} \\ \text{entry age + primary duration + secondary duration - 1} \end{cases} \right)}{\sum_i w_i 1 \left( \begin{cases} \text{entry age + primary duration,} \\ \text{entry age + primary duration + secondary duration - 1} \end{cases} \right)}
\]

This percentage is typically well below 100 percent. A large disparity between quintiles is apparent in the example shown in screenshot 4.5: the top quintile has a rate of 62.94 percent, whereas the bottom quintile has a rate of 5.77 percent.

Indicator A1.6: Proportion Out of School for Secondary School

The proportion out of school for secondary school is the number of children in the official secondary school–age range who are not attending primary, secondary, or postsecondary school, expressed as a percentage of the number of children of the official secondary school–age range.\(^4\)

\[
\text{proportion out of secondary school} = \frac{\sum_i w_i 1 \left( \text{age}_i \in \begin{cases} \text{entry age + primary duration,} \\ \text{entry age + primary duration + secondary duration - 1} \end{cases} \text{ and } \text{level}_i \neq \text{primary and } \text{level}_i \neq \text{secondary and } \text{level}_i \neq \text{tertiary} \right)}{\sum_i w_i 1 \left( \begin{cases} \text{entry age + primary duration,} \\ \text{entry age + primary duration + secondary duration - 1} \end{cases} \right)}
\]

In the example in screenshot 4.5, 34.10 percent of secondary school–age children are out of school.
Indicator A1.7: Gross Attendance Rate for Postsecondary Education

The gross attendance rate for postsecondary education is the number of postsecondary school students of any age, expressed as a percentage of children of postsecondary school age:

\[
\text{tertiary gross attendance rate} = \frac{\sum_i w_i 1(\text{level}_i = \text{tertiary})}{\sum_i w_i 1\left(\text{age}_i \in \left[\text{entry age} + \text{primary duration}, \text{primary duration} + \text{secondary duration}, \text{secondary duration} + \text{maximum age of tertiary}\right]\right)}.
\]

Postsecondary school age is defined as the age range from graduation from secondary school to the maximum age set as a parameter of the educational system. This age, which the user of the program selects, is usually the age by which it is expected that a person must complete studies. In the example in screenshot 4.5, the postsecondary gross attendance rate is 1.97 percent.

Table A2: Primary Grade 1 Intake, Over-Age in First Grade, and Survival Rate to Grade 5

Table A2 (screenshot 4.6) shows the gross and net intake rates for the first grade of primary school, the percentage of students who are over the age of entry into first grade, and the survival rate to grade 5. These indicators provide evidence on access problems and the internal efficiency of the educational system. Their disaggregation indicates whether the education system serves some subpopulations differently from others and identifies which groups of individuals are struggling most within the school system.

Indicator A2.1: Gross Intake Rate to Grade 1

The gross intake rate to grade 1 is the number of new students attending the first grade of primary education, regardless of age, expressed as a percentage of the children of official entrance age to primary education:

\[
\text{gross intake rate to grade 1} = \frac{\sum_i w_i 1(\text{grade}_i = 1)}{\sum_i w_i 1(\text{age}_i = \text{entry age})}.
\]
In the example in screenshot 4.6, there are 150.92 students in grade 1 for every 100 children of entry age for primary.

**Indicator A2.2: Net Intake Rate to Grade 1**

The net intake rate to grade 1 is the number of new students attending the first grade of primary education who are of the official primary school entrance age, expressed as a percentage of the children of official entrance age to primary education:
Indicator A2.3: Percentage of Grade 1 Students Older Than Official Grade 1 Age

The percentage of grade 1 students older than official grade 1 age is the number of children in the first grade of primary school who are one or more years older than the target entry age for the grade, expressed as a percentage of the total number of students attending grade 1:

\[
\text{percentage of grade 1 students older than official grade 1 age} = \frac{\sum_i w_i 1(\text{grade}_i = 1 \text{ and age}_i > \text{entry age})}{\sum_i w_i 1(\text{grade}_i = 1)}.
\]

In the example shown in screenshot 4.6, 44.80 percent of entry-age boys are in grade 1.

Indicator A2.4: Survival Rate to Grade 5

The survival rate to grade 5 is the percentage of a cohort of students (total, male, female) attending the first grade of a primary cycle in a given school year who are expected to reach grade 5, regardless of repetition. It is calculated on the basis of the reconstructed cohort method of UNESCO (UNESCO 2010). In the example in screenshot 4.6, 38.65 percent of students in the top quintile reach grade 5 and 28.94 percent of students in the bottom quintile reach grade 5.

Table A3: On-Time, Under-Age, and Over-Age in Primary Education

Table A3 (screenshot 4.7) presents indicators on the extent to which children are in the correct grade for their age. Like the indicator on over-age in grade 1, these indicators measure how efficient the education system is at enrolling children of primary age range in primary school.
Indicator A3.1: Percentage On-Time for Primary School

The on-time for primary school rate is the sum of the number of students in each grade of primary school who are of the official age for that grade, expressed as a percentage of the number of students attending primary school:

<table>
<thead>
<tr>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
<th>F</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Children on time for Primary, (%)</td>
<td>Under-age children in Primary, (%)</td>
<td>Over-age children in Primary, (%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Table A3: On-time, under-age and over-age in primary education, according to background characteristics, [Data1]</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Total</td>
<td>21.85</td>
<td>15.21</td>
<td>62.95</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Gender</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Boys</td>
<td>20.62</td>
<td>13.96</td>
<td>65.42</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Girls</td>
<td>23.16</td>
<td>16.55</td>
<td>60.29</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Area of residence</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Urban</td>
<td>27.46</td>
<td>26.97</td>
<td>45.57</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Rural</td>
<td>21.10</td>
<td>13.64</td>
<td>65.26</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>Residence and gender</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>Urban - Boys</td>
<td>26.87</td>
<td>26.89</td>
<td>46.25</td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>Urban - Girls</td>
<td>28.14</td>
<td>27.06</td>
<td>44.80</td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>Rural - Boys</td>
<td>19.76</td>
<td>12.17</td>
<td>68.07</td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>Rural - Girls</td>
<td>22.52</td>
<td>15.20</td>
<td>62.28</td>
<td></td>
</tr>
<tr>
<td>14</td>
<td>Household wealth</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>Quintile 1</td>
<td>17.38</td>
<td>10.74</td>
<td>71.88</td>
<td></td>
</tr>
<tr>
<td>16</td>
<td>Quintile 2</td>
<td>18.79</td>
<td>9.75</td>
<td>71.45</td>
<td></td>
</tr>
<tr>
<td>17</td>
<td>Quintile 3</td>
<td>20.85</td>
<td>11.26</td>
<td>67.90</td>
<td></td>
</tr>
<tr>
<td>18</td>
<td>Quintile 4</td>
<td>24.33</td>
<td>15.77</td>
<td>59.91</td>
<td></td>
</tr>
<tr>
<td>19</td>
<td>Quintile 5</td>
<td>29.08</td>
<td>32.88</td>
<td>38.04</td>
<td></td>
</tr>
</tbody>
</table>

Assessing Sector Performance and Inequality in Education
on-time for primary school =
\[
\frac{\sum_i w_i 1(\text{age}_i = \text{entry age} + \text{grade}_i - 1 \text{ and } \text{grade}_i \in (1; p))}{\sum_i w_i 1(\text{level}_i = \text{primary and } \text{grade}_i \in (1; p))},
\]

where \( p \) is the highest grade of primary school.

In the example in screenshot 4.7, 21.85 percent of primary school students are in the grade they should be in for their age, ranging from 17.38 percent in the poorest wealth quintile to 29.08 percent in the richest quintile.

**Indicator A3.2: Percentage Under-Age in Primary School**

Under-age in primary school is the sum of the number of students in each grade of primary school who are one or more years younger than the official age for that grade, expressed as a percentage of the number of students attending primary school:

\[
\text{under-age in primary school} = \frac{\sum_i w_i 1(\text{age}_i < \text{entry age} + \text{grade}_i - 1)}{\sum_i w_i 1(\text{level}_i = \text{primary})}.
\]

In the example in screenshot 4.7, 13.96 percent of boys and 16.55 percent of girls are under-age.

**Indicator A3.3: Percentage Over-Age in Primary School**

Over-age in primary school is the sum of the number of students in each grade of primary school who are one or more years older than the official age for that grade, expressed as a percentage of the number of students attending primary school:

\[
\text{over-age in primary school} = \frac{\sum_i w_i 1(\text{age}_i > \text{entry age} + \text{grade}_i - 1)}{\sum_i w_i 1(\text{level}_i = \text{primary})}.
\]

The sum of this indicator and the preceding two indicators is 100 percent. In low-income countries, resource constraints by the household, distance to the school, and other factors often prevent children from starting school or force them to stop going. In the example in screenshot 4.7, 45.57 percent of students in urban areas and 65.26 percent of students in rural areas are over-age.
Table A4: On-Time, Under-Age, and Over-Age by Single Grade of Primary Education, according to Background Characteristics

Table A4 is similar to table A3 except it calculates on-time, over-age, and under-age by grade level, giving a more detailed picture of how efficient the education system is at enrolling children and youth at the targeted schooling level.

Indicator A4.1: Percentage On-Time for Grade X

The percentage on-time for grade X is the number of students who are of the official primary school age for grade X, expressed as a percentage of the number of students attending grade X:

$$\text{on-time for grade } X = \frac{\sum_i w_i 1(\text{age}_i = \text{entry age} + X - 1 \text{ and grade}_i = X)}{\sum_i w_i 1(\text{grade}_i = X)}.$$

Indicator A4.2: Percentage Under-Age for Grade X

The percentage under-age for grade X is the number of students who are one or more years younger than the official primary school age for grade X expressed as a percentage of the number of students attending grade X:

$$\text{under-age for grade } X = \frac{\sum_i w_i 1(\text{age}_i < \text{entry age} + X - 1 \text{ and grade}_i = X)}{\sum_i w_i 1(\text{grade}_i = X)}.$$

Indicator A4.3: Percentage Over-Age for Grade X

The percentage over-age for grade X is the number of students who are one or more years older than the official primary school age for grade X expressed as a percentage of the number of students attending grade X:

$$\text{over-age for grade } X = \frac{\sum_i w_i 1(\text{age}_i > \text{entry age} + X - 1 \text{ and grade}_i = X)}{\sum_i w_i 1(\text{grade}_i = X)}.$$
Table A5: Percentage of the Population That Has Ever Attended School, by Age

Table A5 presents the percentage of the student-age population that has ever attended school, by age (screenshot 4.8). This figure is the number of people of a given age who have ever attended school, expressed as a percentage of the population of that age:

\[
\text{ever attended school at age } X = \frac{\sum_{i} w_i \mathbb{1}(\text{ever attended school} = 1 \text{ and } \text{age}_i = X)}{\sum_{i} w_i \mathbb{1}(\text{age}_i = X)}.
\]

Table A5 yields insights into who is being excluded by the education system. In the example in screenshot 4.8, 67.66 percent of 6-year-olds and 86.73 percent of 17-year-olds have attended school. Among 8-year-olds, 97.26 percent in urban areas and 86.03 percent in rural areas have attended school.

Table A6: Out-of-School Reasons

Table A6 shows why children are out of school (screenshot 4.9). For household survey datasets that contain a question about why a student is out of school, ADePT provides a breakdown of these reasons. This information is important to policy makers wishing to reduce the incidence of out-of-school children.

Screenshot 4.8: Table A5: Percentage of the Population That Has Ever Attended School, by Age
Indicator A6.1: Percentage Out of School by Reason, Primary School–Age Children

ADePT calculates the number of primary school–age children out of school for a particular reason per 100 primary age children out of school:

\[
\frac{\sum_i w_i 1 \left( \text{reason out of school}_i = X \quad \text{and} \quad \text{age}_i \in \left[ \text{entry age}, \text{entry age} + \text{primary duration} - 1 \right] \right)}{\sum_i w_i 1 \left( \text{age}_i \in \left[ \text{entry age}, \text{entry age} + \text{primary duration} - 1 \right] \quad \text{and level}_i = \text{none} \right)}
\]

Note that ADePT allows only one variable for each reason for being out of school. If the survey contains multiple variables with this information, users enter the main reason for being out of school in the form. In the example shown in screenshot 4.9, the main reason (40.90 percent) why primary school–age children are out of school is lack of money. The second most important reason is different for girls and boys: 14.25 percent of out-of-school boys but just 4.91 percent of girls report that school does not interest them.

Table A7: Typology of Out of School

Table A7 classifies out-of-school children into three categories: late entry, dropout, and never in school (screenshot 4.10). It uses UNESCO's methodology for estimating these percentages (box 4.1).
**Late entry** refers to the proportion of out-of-school children who are currently out of school but are expected to enter the education system later than they should. **Dropout** refers to children who were in school but are no longer attending school. **Never in school** refers to children who are very likely to never go to school and are not classified in either of the first two categories.

---

**Box 4.1: UNESCO’s Method for Estimating the Percentage of Children Out of School**

UNESCO estimates the percentage of out-of-school children in the following manner:

Let $R_{\text{age}}$ = rate of out-of-school children for each age; $R_{\text{min}}$ = minimum of all $R_{\text{age}}$; $AGE_{\text{min}}$ = age for which $R_{\text{age}}$ is the minimum; and $POP_{\text{age}}$ = population by single year of age. The number of out-of-school children expected to never enter school is estimated as follows:

$$OOSC_{\text{never}} = \text{Sum}(R_{\text{min}} \times POP_{\text{age}})$$

for all ages.

The number of out-of-school children expected to enter school in future years is estimated as follows:

$$OOSC_{\text{late entry}} = \text{Sum}( (R_{\text{age}} - R_{\text{min}}) \times POP_{\text{age}})$$

for ages $< \text{AGE}_{\text{min}}$

The number of out-of-school children who drop out is estimated as follows:

$$OOSC_{\text{dropout}} = \text{Sum}( (R_{\text{age}} - R_{\text{min}}) \times POP_{\text{age}})$$

for ages $> \text{AGE}_{\text{min}}$.

$\text{AGE}_{\text{min}}$ is the youngest age for which $R_{\text{age}}$ is zero.

*Source: UNESCO 2005.*

---

**Screenshot 4.10: Table A7: Typology of Reasons for Being Out of School (UNESCO Method)**

<table>
<thead>
<tr>
<th></th>
<th>Primary</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Never in school</td>
<td>Late entry</td>
<td>Dropout</td>
</tr>
<tr>
<td>Total</td>
<td>62.24</td>
<td>34.56</td>
<td>3.19</td>
</tr>
<tr>
<td>Gender</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Boys</td>
<td>62.11</td>
<td>36.34</td>
<td>1.55</td>
</tr>
<tr>
<td>Girls</td>
<td>62.22</td>
<td>32.61</td>
<td>5.17</td>
</tr>
<tr>
<td>Area of residence</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Urban</td>
<td>48.95</td>
<td>51.05</td>
<td>0.00</td>
</tr>
<tr>
<td>Rural</td>
<td>63.24</td>
<td>33.59</td>
<td>3.17</td>
</tr>
</tbody>
</table>
Understanding this typology is important for policy makers trying to reduce the number of out-of-school children. If the majority of out-of-school children are late entrants, mitigating the out-of-school problem requires different policy choices than if a majority are dropouts.

Indicator A7.1: Percentage of Out-of-School Children Classified as Never in School

This indicator is probabilistic, as no survey can tell if a student-age person will never attend school. UNESCO’s methodology (2005) estimates the proportion of children who will never attend school as the proportion out of school for the age group with the highest rate of attendance. This methodology assumes no dropout before the age at which enrollment rates peak and no late entry after the age with peak enrollment. In figure 4.1, the age-nine group has the highest attendance rate, so the proportion of out-of-school children from this age group is assumed to equal the highest proportion of children who will never attend school. In screenshot 4.10,

Figure 4.1: Estimates of Percentage of Out-of-School Children, by Type

62.24 percent of out-of-school primary school–age children are classified this way.

**Indicator A7.2: Percentage of Out-of-School Children Classified as Late Entry, by Level**

The proportion of out-of-school children classified as late entrants at each level is the proportion left over after the percentages of children never in school and in school are summed, expressed as a percentage of the proportion out of school for children younger than the age with the highest attendance rate (the black area in figure 4.1). In the example in screenshot 4.10, the percentage of primary school–age children who are out of school because they are late entrants is 51.05 in urban areas and 33.59 in rural areas.

**Indicator A7.3: Percentage of Out-of-School Children Classified as Dropouts, by Level**

The proportion of out-of-school children classified as dropouts at each level is the proportion of children not classified as never in school, expressed as a percent of the proportion of out-of-school children older than the age with the highest attendance rate (the gray portion of the bar in figure 4.1). In the example in screenshot 4.10, dropouts account for 1.55 percent of out-of-school boys and 5.17 percent of out-of-school girls.

**School Progression Tables**

School progression tables display information on promotion, repetition, dropout, and completion rates for primary and secondary school and by grade level. These indicators provide a measure of internal efficiency, because they describe the extent to which children progress toward completion once they enter the school system.

**Table B1: Promotion, Repetition, Dropout, and Completion Rates by Level, and Transition Rates**

Table B1 presents the promotion, repetition, dropout, and completion rates for primary, secondary, and postsecondary school (screenshot 4.11).
Table B1: Promotion, Repetition, Dropout, and Completion

<table>
<thead>
<tr>
<th></th>
<th>Promotion rate, (%)</th>
<th>Repetition rate, (%)</th>
<th>Dropout rate, (%)</th>
<th>Completion rate, (%)</th>
<th>Promotion rate, (%)</th>
<th>Repetition rate, (%)</th>
<th>Dropout rate, (%)</th>
<th>Completion rate, (%)</th>
<th>Primary to Secondary transition rate, (%)</th>
<th>Repetition rate, (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total</td>
<td>92.18</td>
<td>3.15</td>
<td>4.58</td>
<td>90.72</td>
<td>75.23</td>
<td>3.14</td>
<td>21.16</td>
<td>12.31</td>
<td>79.80</td>
<td>4.86</td>
</tr>
<tr>
<td>Gender</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Boys</td>
<td>91.74</td>
<td>3.63</td>
<td>4.54</td>
<td>92.39</td>
<td>76.47</td>
<td>2.98</td>
<td>19.91</td>
<td>16.57</td>
<td>76.80</td>
<td>4.12</td>
</tr>
<tr>
<td>Girls</td>
<td>92.62</td>
<td>2.66</td>
<td>4.62</td>
<td>89.20</td>
<td>73.95</td>
<td>3.31</td>
<td>22.47</td>
<td>8.39</td>
<td>82.52</td>
<td>6.19</td>
</tr>
<tr>
<td>Area of residence</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Urban</td>
<td>94.77</td>
<td>1.66</td>
<td>3.52</td>
<td>89.23</td>
<td>73.51</td>
<td>3.91</td>
<td>21.80</td>
<td>22.76</td>
<td>82.89</td>
<td>1.87</td>
</tr>
<tr>
<td>Rural</td>
<td>91.34</td>
<td>3.63</td>
<td>4.92</td>
<td>91.19</td>
<td>76.45</td>
<td>2.60</td>
<td>20.70</td>
<td>5.38</td>
<td>78.36</td>
<td>21.74</td>
</tr>
</tbody>
</table>

Note: The results for table B1 are specific to Zimbabwe and are used only for illustrating ADePT Edu's Output. The remaining tables use data from Nicaragua.
Indicator B1.1: Primary Promotion Rate

The primary promotion rate is the proportion of students in any grade of primary school promoted to the next grade the following school year. Sometimes this rate includes a small number of students who move forward more than one grade (that is, skip a grade).

\[
\text{primary promotion rate} = \frac{\sum_i w_i \left( \begin{array}{l}
1 (\text{last year level}_i = \text{primary}) \\
-1 (\text{level}_i = \text{none and highest level attained}_i < \text{primary} \text{ and last year level}_i = \text{primary}) \\
-1 (\text{grade}_i = \text{last year grade}_i \text{ and last year level}_i = \text{primary})
\end{array} \right)}{\sum_i w_i 1 (\text{last year level}_i = \text{primary})}.
\]

Indicator B1.2: Primary Repetition Rate

The primary repetition rate is the proportion of students in any grade of primary school in a given school year that attend the same grade the following school year:

\[
\text{primary repetition rate} = \frac{\sum_i w_i 1 (\text{grade}_i = \text{last year grade}_i \text{ and last year level}_i = \text{primary})}{\sum_i w_i 1 (\text{last year level}_i = \text{primary})}.
\]

Students who remain in the same grade are counted as repeaters. In the Zimbabwe example in screenshot 4.11, 3.63 percent of boys and 2.66 percent of girls in primary school the previous year were in the same grade in the current year.

Indicator B1.3: Primary Dropout Rate

The primary dropout rate is the proportion of students in any grade of primary in a given school year that no longer attends school the following school year:

\[
\text{dropout rate} = \frac{\sum_i w_i 1 (\text{level}_i = \text{none and highest level attained}_i < \text{primary} \text{ and last year level}_i = \text{primary})}{\sum_i w_i 1 (\text{last year level}_i = \text{primary})}.
\]
In screenshot 4.11, 1.66 percent of urban students in primary school the previous year were not in school in the current year.

**Indicator B1.4: Primary Completion Rate**

The primary completion rate is the total number of students of any age in the last grade of primary school minus the number of repeaters in that grade, divided by the number of children of official graduating age:

\[
\text{primary completion rate} = \frac{\sum_i w_i \left( \begin{array}{l} 1 \text{ (level}_i = \text{primary and grade}_i = \text{primary duration)} \\ \text{and last grade}_i \neq \text{primary duration} \end{array} \right)}{\sum_i w_i \left( \begin{array}{l} 1 \text{(age}_i = \text{entry age} + \text{primary duration} - 1) \end{array} \right)}.
\]

The completion rate can exceed 100 percent if many over-age students in the system graduate. This is not the case in screenshot 4.11, where the primary completion rate in urban areas is 89.23.

**Indicator B1.5: Secondary Promotion Rate**

The secondary promotion rate is the proportion of students in any grade of secondary school who are promoted to the next grade the following school year (screenshot 4.11):

\[
\text{secondary promotion rate} = \frac{\sum_i w_i \left( \begin{array}{l} 1 \text{(last year level}_i = \text{secondary)} \\ -1 \text{ (level}_i = \text{none and highest level attained}_i < \text{secondary and last year level}_i = \text{secondary)} \\ 1 \text{(grade}_i = \text{last year grade}_i \text{ and last year level}_i = \text{secondary}) \end{array} \right)}{\sum_i w_i \left( \begin{array}{l} 1 \text{(last year level}_i = \text{secondary)} \end{array} \right)}.
\]

As with the primary promotion rate, this rate may include a small number of students who move forward more than one grade the following school year. In screenshot 4.11, 73.95 percent of girls who were in secondary school the previous year were promoted to the next grade.
Chapter 4: Generating and Interpreting Output Tables and Graphs

Indicator B1.6: Secondary Repetition Rate

The secondary repetition rate is the proportion of students in any grade of secondary in a given school year who attend the same grade the following school year. Students who stay in the same grade are counted as repeaters.

\[
\text{secondary repetition rate} = \frac{\sum_i w_i \mathbf{1}(\text{grade}_i = \text{last year grade}_i \text{ and } \text{last year level}_i = \text{secondary})}{\sum_i w_i \mathbf{1}(\text{last year level}_i = \text{secondary})}.
\]

In screenshot 4.11, 3.14 percent of secondary students repeated a grade.

Indicator B1.7: Secondary Dropout Rate

The secondary dropout rate is the percentage of students in any grade of secondary in a given school year and who no longer attend school the following school year and did not graduate:

\[
\text{secondary dropout rate} = \frac{\sum_i w_i \mathbf{1}(\text{level}_i = \text{none and highest level attained}_i < \text{secondary} \text{ and last year level}_i = \text{secondary})}{\sum_i w_i \mathbf{1}(\text{last year level}_i = \text{secondary})}.
\]

In the example in screenshot 4.11, the secondary dropout rate for urban areas is 21.80 percent.

Indicator B1.8: Secondary Completion Rate

The secondary completion rate is the total number of students of any age in the last grade of secondary school, minus the number of repeaters in that grade, divided by the number of children of official graduation age:

\[
\text{secondary completion rate} = \frac{\sum_i w_i \mathbf{1}(\text{grade}_i > \text{last year grade}_i \text{ and } \text{grade}_i = \text{primary duration } + \text{secondary duration})}{\sum_i w_i \mathbf{1}(\text{age}_i = \text{entry age } + \text{primary duration } + \text{secondary duration} - 1)}.
\]
In the example in screenshot 4.11, the secondary completion rate among urban areas is 22.76, while for rural areas, it is much lower at 5.38 percent.

**Indicator B1.9: Primary to Secondary Transition Rate**

The primary to secondary transition rate is the proportion of students in the last grade of primary who are promoted to the first grade of secondary the following school year:

\[
\text{primary to secondary transition rate} = \frac{\sum_i w_i 1(\text{level}_i = \text{secondary and last year level}_i = \text{primary})}{\sum_i w_i 1(\text{last year level}_i = \text{primary and last year grade}_i = \text{duration of primary})}.
\]

In the example in screenshot 4.11, boys have a lower primary to secondary transition rate (76.80 percent) than do girls (82.52 percent).

**Indicator B1.10: Postsecondary Repetition Rate**

The repetition rate postsecondary is the proportion of students in any grade of postsecondary in a given school year who also attend that same grade in the following school year:

\[
\text{postsecondary repetition rate} = \frac{\sum_i w_i 1(\text{grade}_i \leq \text{last year grade}, \text{and last year level}_i = \text{postsecondary})}{\sum_i w_i 1(\text{last year level}_i = \text{postsecondary})}.
\]

Students who stay in the same grade one school year after another are counted as repeaters. In the above example, the postsecondary repetition rate is 4.86 percent.

**Table B2: Promotion, Repetition, and Dropout Rates by Single Grade of Primary Education**

Table B2 contains the same information as table B1 (promotion, repetition, dropout, and completion rates) broken down by grade level (screenshot 4.12).
### Screenshot 4.12: Table B2: Promotion, Repetition, and Dropout Rates by Single Grade of Primary Education

<table>
<thead>
<tr>
<th>Column</th>
<th>Grade 1</th>
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<th>Grade 3</th>
<th>Grade 4</th>
<th>Grade 5</th>
<th>Grade 1</th>
<th>Grade 2</th>
<th>Grade 3</th>
<th>Grade 4</th>
<th>Grade 5</th>
<th>Grade 1</th>
<th>Grade 2</th>
<th>Grade 3</th>
<th>Grade 4</th>
<th>Grade 5</th>
</tr>
</thead>
<tbody>
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<td>84.89</td>
<td>82.68</td>
<td>87.36</td>
<td>32.34</td>
<td>17.92</td>
<td>13.31</td>
<td>14.55</td>
<td>8.30</td>
<td>17.97</td>
<td>1.68</td>
<td>1.80</td>
<td>2.78</td>
<td>4.13</td>
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<td></td>
</tr>
<tr>
<td>Boys</td>
<td>79.95</td>
<td>83.95</td>
<td>81.60</td>
<td>86.20</td>
<td>33.40</td>
<td>18.24</td>
<td>15.11</td>
<td>15.50</td>
<td>9.22</td>
<td>16.98</td>
<td>1.81</td>
<td>1.92</td>
<td>2.90</td>
<td>4.57</td>
<td>48.19</td>
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<tr>
<td>Girls</td>
<td>80.99</td>
<td>87.13</td>
<td>83.84</td>
<td>88.52</td>
<td>31.19</td>
<td>17.57</td>
<td>11.21</td>
<td>13.51</td>
<td>7.78</td>
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<td>1.54</td>
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<td>2.65</td>
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<tr>
<td>Urban</td>
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<td>89.43</td>
<td>87.09</td>
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<td>12.45</td>
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<td>10.92</td>
<td>7.69</td>
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<td>0.89</td>
<td>0.59</td>
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<td>Rural</td>
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<td>82.02</td>
<td>86.69</td>
<td>32.21</td>
<td>18.34</td>
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<td>15.03</td>
<td>8.65</td>
<td>18.77</td>
<td>1.77</td>
<td>1.96</td>
<td>2.39</td>
<td>4.66</td>
<td>46.89</td>
</tr>
</tbody>
</table>
Indicator B2.1: Promotion Rate by Grade in Primary School

The promotion rate by grade in primary school is the proportion of students in a given grade of primary school who are promoted to the next grade the following school year:

\[
\text{promotion rate in grade } X = \frac{\sum_i w_i \left( \begin{array}{l}
1 \text{ (last year grade}_i = X \text{ and last year level}_i = \text{primary)} \\
< 0 \text{ (primary and last year grade}_i = X \text{ and last year level}_i = \text{primary)} \\
-1 \text{ (grade}_i = X \text{ and last year grade}_i = X \text{ and last year level}_i = \text{primary)} \\
\end{array} \right)}{\sum_i w_i 1 (\text{last year grade}_i = X \text{ and last year level}_i = \text{primary})}.
\]

In the example in screenshot 4.12, the promotion rate drops dramatically as the grade level increases, falling from 80.41 percent in grade 1 to 32.34 percent by grade 5.

Indicator B2.2: Repetition Rate by Grade in Primary School

The repetition rate by grade in primary school is the proportion of students in a given grade of primary school who were enrolled in the same grade the previous school year:

\[
\text{repetition rate in grade } X = \frac{\sum_i w_i 1 \left( \text{grade}_i = X \text{ and last year grade}_i = X \text{ and last year level}_i = \text{primary} \right)}{\sum_i w_i 1 (\text{last year grade}_i = X \text{ and last year level}_i = \text{primary})}.
\]
Indicator B2.3: Dropout Rate by Grade in Primary School

The dropout rate by grade in primary school is the proportion of students in a given grade of primary school who no longer attend school the following school year:

\[
\text{dropout rate in grade } X = \frac{\sum_{i} w_i 1 \left( \begin{array}{l}
\text{level}_i = \text{none and highest level attained}_i < \text{primary} \\
\text{and last year grade}_i = X \\
\text{and last year level}_i = \text{primary}
\end{array} \right)}{\sum_{i} w_i 1 \left( \text{last year grade}_i = X \text{ and last year level}_i = \text{primary} \right)}.
\]

Table B3: Promotion, Repetition, and Dropout Rates by Single Grade of Secondary Education

Table B3 contains the same information as table B2 (promotion, repetition, dropout, and completion rates by grade) for secondary school (screenshot 4.13).

School Attainment Tables

The next set of tables describes school attainment by various segments of the population. In addition to providing measures of how effective the education system has been, these tables provide a picture of the structure of human capital within a country, which has implications for economic performance.

Table C1: School Attainment of Adult Population

Table C1 presents two types of indicators: attainment by age group and average years of schooling by age group (screenshot 4.14).
### Table B3: Promotion, Repetition, and Dropout Rates by Single Grade of Secondary Education

<table>
<thead>
<tr>
<th></th>
<th>Grade 1</th>
<th>Grade 2</th>
<th>Grade 3</th>
<th>Grade 4</th>
<th>Grade 5</th>
<th>Grade 6</th>
<th>Grade 1</th>
<th>Grade 2</th>
<th>Grade 3</th>
<th>Grade 4</th>
<th>Grade 5</th>
<th>Grade 6</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Total</strong></td>
<td>87.34</td>
<td>88.17</td>
<td>89.69</td>
<td>65.53</td>
<td>94.04</td>
<td>94.33</td>
<td>6.98</td>
<td>7.53</td>
<td>5.40</td>
<td>21.50</td>
<td>3.21</td>
<td>4.45</td>
</tr>
<tr>
<td><strong>Gender</strong></td>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Boys</strong></td>
<td>87.10</td>
<td>88.80</td>
<td>90.31</td>
<td>64.62</td>
<td>93.71</td>
<td>96.59</td>
<td>8.25</td>
<td>7.69</td>
<td>5.17</td>
<td>22.86</td>
<td>4.89</td>
<td>3.41</td>
</tr>
<tr>
<td><strong>Girls</strong></td>
<td>87.59</td>
<td>87.60</td>
<td>89.08</td>
<td>66.48</td>
<td>94.47</td>
<td>91.41</td>
<td>5.69</td>
<td>7.39</td>
<td>5.62</td>
<td>20.07</td>
<td>1.07</td>
<td>5.79</td>
</tr>
</tbody>
</table>

Note: The table provides rates for promotion, repetition, and dropout by grade, with columns for individual grades and overall totals. The data suggests a general trend of increasing dropout rates with higher grades, though the specific rates vary by gender.
Indicator C1.1: Percentage of Age Group by Attainment Level

The percentage of the specified age range that has attained a specified level of education is calculated as follows:

\[
\text{percentage of people age } X-Y \text{ with education } = \frac{\sum_i w_i 1(\text{highest level attained}_i = Z \text{ and } age_i \geq X \text{ and } age_i \leq Y)}{\sum_i w_i 1(\text{age}_i \geq X \text{ and } age_i \leq Y)}.
\]

Age ranges are broken into five categories: 15–19, 20–29, 30–39, 40–49, and 50 and over (screenshot 4.16 shows the screenshot for the 10–19 age group). Attainment levels are broken into six categories: no education, incomplete primary, primary, incomplete secondary, secondary, and some higher.

Indicator C1.2: Average Years of Schooling by Age Group

The average years of schooling of an age group population is calculated as follows:
average years of school of people age $X–Y = \frac{\sum_i w_i \text{ highest grade attained}, 1(\text{age}_i \geq X \text{ and age}_i \leq Y)}{\sum_i w_i 1(\text{age}_i \geq X \text{ and age}_i \leq Y)}$.

**Tables C2–C5: Proportion of Adult Population That Completed Each Grade**

Tables C2–C5 present the percentage of an age group that completed each of the grades in a series, calculated as follows:

\[
\text{percentage of population age } X–Y \text{ that attained grade } Z = \frac{\sum_i w_i 1\left(\text{age}_i \geq X \text{ and age}_i \leq Y \text{ and highest grade attained}_i \geq Z\right)}{\sum_i w_i 1\left(\text{age}_i \geq X \text{ and age}_i \leq Y\right)}.
\]

Screenshot 4.15 displays these data for 15- to 19-year-olds.

**Table C6: Proportion of 10- to 19-Year-Olds Expected to Complete Each Grade**

Table C6 presents estimates of grade completion based on survival analysis of the sample data. It shows the percentage of each subgroup of a given age range that is expected to complete each grade (screenshot 4.16).

In the example shown in screenshot 4.16, 48.84 percent of boys 10–19 and 44.88 percent of girls are expected to complete eight grades of education.

**Table C7: Inequality in Years of Schooling**

Table C7 presents the application of the Gini and Theil measures of income and wealth equality to years of schooling (screenshot 4.17). This information helps policy makers understand how equally human capital within a country is distributed. (Chapter 5 provides full explanations of the Gini coefficient and the Theil index.)
Table C2: Table C2: Proportion of 15- to 19-Year-Olds That Completed Each Grade

<table>
<thead>
<tr>
<th></th>
<th>1 year</th>
<th>2 years</th>
<th>3 years</th>
<th>4 years</th>
<th>5 years</th>
<th>6 years</th>
<th>7 years</th>
<th>8 years</th>
<th>9 years</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total</td>
<td>84.31</td>
<td>79.20</td>
<td>69.57</td>
<td>59.10</td>
<td>45.02</td>
<td>34.42</td>
<td>27.18</td>
<td>20.22</td>
<td>10.73</td>
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<tr>
<td>Gender</td>
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<td></td>
</tr>
<tr>
<td>Boys</td>
<td>84.05</td>
<td>78.69</td>
<td>68.62</td>
<td>57.90</td>
<td>44.24</td>
<td>33.52</td>
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<td>19.46</td>
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<tr>
<td>Girls</td>
<td>84.57</td>
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<td>60.28</td>
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<tr>
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<td>27.51</td>
<td>20.42</td>
<td>14.17</td>
<td>6.08</td>
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</table>
Table C6: Proportion of Population 10–19 Expected to Complete Each Grade

<table>
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</tr>
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</table>

Table C7: Inequality in Years of Schooling
**Indicator C7.1: Gini Coefficient for Years of Schooling, by Age Group**

The Gini coefficient\(^5\) for years of schooling is calculated like the Gini coefficient for income or wealth. It measures the degree of inequality in years of schooling. The Gini coefficient ranges from 0 to 100, with 0 indicating perfect equality and 100 indicating perfect inequality. The ADePT Edu software estimates this indicator for three age groups (15–19, 20–24, 25–29) as well as for the 15+ age group.

Gini coefficient for years of schooling =

\[
\frac{n \sum_{i=1}^{n} \sum_{j=1}^{n} \left[ \text{highest grade attained}_{ij} - \text{highest grade attained}_{ij} \right]}{n(n-1) 2n \sum_{i=1}^{n} \text{highest grade attained}_{i}}.
\]

Knowing the inequality of human capital among youth, for example, is important because it is a measure of equality of opportunity. (This topic is covered in detail in chapter 5.)

**Indicator C7.2: Theil Index for Years of Schooling, by Age Group**

The Theil index is an alternative indicator of inequality. Although it is less intuitive than the Gini coefficient, it has a distinct advantage in that it can provide information on the contribution of different subgroups to total inequality.

Theil index for years of schooling =

\[
\sum_{i=1}^{n} \ln \left( \frac{\sum_{j=1}^{n} \text{highest grade attained}_{ij}}{n \times \text{highest grade attained}_{i}} \right).
\]

**Education Expenditure Tables**

Many countries have adopted a policy of free primary education in order to eliminate barriers to access. Even when schools are free, however, households still have to pay for transportation, school uniforms, school supplies,
and other expenditures, depending on the country, and contribute to parent-teacher associations. For children from extremely poor families, such expenditures can be an effective barrier to entry. Policies targeting those facing financial barriers to education can be implemented rapidly. Household education expenditures are shown for primary (table D1), secondary (table D2), and postsecondary (table D3) levels.

**Table D1: Primary Level**

*Indicator D1: Average Share of Household Expenditure on Education, per Student, by Level of Education*

The education share of household expenditure by level of education is the proportion of annual educational expenditures divided by the total annual household expenditures:

average share of household expenditure on education for level $X = \frac{\sum_i w_i 1(level_i = X) \text{household expenditure on education}_i}{\sum_i w_i 1(level_i = X) \text{total household expenditure}_i}.$

This indicator is based on how much the household spends per child in school. In screenshot 4.18, the average share of household expenditure per primary school student is 3.99 percent—4.04 percent for girls and 3.93 percent for boys.

**Table D2: Secondary Level**

*Indicator D2: Average Education Spending per Student, by Level of Education*

The annual average education spending per student by level of education is the total educational expenditures divided by the total enrollment in each level:

average per pupil spending at level $X = \frac{\sum_i w_i 1(level_i = X) \text{household expenditure on education}_i}{\sum_i w_i 1(level_i = X)}.$

In the example in screenshot 4.18, average spending per student in primary school was 1,702.44 Nicaraguan córdobas.
### Table D1: Household Expenditure on Primary Education

<table>
<thead>
<tr>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
<th>F</th>
<th>G</th>
<th>H</th>
<th>I</th>
<th>J</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Education share of household expenditure, (%)</td>
<td>Annual average education spending per child attending</td>
<td>School registration fees</td>
<td>Books and school supplies</td>
<td>Transportation to/from school</td>
<td>Foods, board and lodging at school</td>
<td>School uniforms</td>
<td>Contribution to parent-teacher association</td>
<td>Other educational expenditures</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>3.99</td>
<td>1,702.44</td>
<td>3.41</td>
<td>0.68</td>
<td>17.84</td>
<td>51.09</td>
<td>19.61</td>
<td>2.84</td>
</tr>
<tr>
<td></td>
<td>Gender</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Boys</td>
<td>3.93</td>
<td>1,724.40</td>
<td>3.26</td>
<td>0.76</td>
<td>18.01</td>
<td>50.09</td>
<td>20.00</td>
<td>3.04</td>
</tr>
<tr>
<td></td>
<td>Girls</td>
<td>4.04</td>
<td>1,679.57</td>
<td>3.56</td>
<td>0.59</td>
<td>17.66</td>
<td>52.13</td>
<td>19.20</td>
<td>2.63</td>
</tr>
<tr>
<td></td>
<td>Area of residence</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Urban</td>
<td>3.57</td>
<td>1,974.68</td>
<td>6.70</td>
<td>1.14</td>
<td>27.45</td>
<td>32.12</td>
<td>21.16</td>
<td>4.14</td>
</tr>
<tr>
<td></td>
<td>Rural</td>
<td>4.37</td>
<td>1,455.38</td>
<td>0.32</td>
<td>0.24</td>
<td>8.81</td>
<td>68.90</td>
<td>18.14</td>
<td>1.61</td>
</tr>
</tbody>
</table>
Table D3: Postsecondary Level

Indicator D3: Percentage of Household Education Expenditure by Category, by Level

The proportion of household education spending by category is the amount of annual per student spending on a selected category divided by the annual educational expenditures of the household:

\[
\text{average proportion of household education expenditure spent on } Z = \frac{\sum w_i \mathbb{I}(\text{level}_i = X) \text{ expenditure on } Z_i}{\text{household education expenditure}_i}.
\]

The categories include school registration fees; books and school supplies; transportation to and from school; food, board, and lodging at school (where applicable); school uniforms; contributions to parent-teacher associations; and other educational expenditure. In the example in screenshot 4.18, 51.09 percent of education expenditure goes to food and lodging at school, 19.61 percent is spent on school uniforms, and 17.84 percent goes to transportation.

Labor Market Outcome Tables

Labor market outcomes are an important measure of the success of a country’s education system in terms of both quality and equality. Earnings of youth are often considered a measure of the quality and relevance of their education. Highly unequal earnings have important implications for the country’s overall welfare. Tables E1–E6 present several indicators of earnings, earnings inequality, and returns to education.

Table E1: Earning Inequalities

Table E1 (screenshot 4.19) presents the Gini coefficients and Theil index values for earnings for various age groups.

Indicator E1.1: Gini Coefficient for Earnings, by Age Group

In general, there is a positive correlation between educational attainment and earnings. If access to education is unequal, earnings are also likely to be
### Table E1: Earning Inequalities

<table>
<thead>
<tr>
<th></th>
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<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Total</td>
<td>49.34</td>
<td>51.45</td>
<td>53.89</td>
<td>58.94</td>
<td>42.31</td>
<td>48.12</td>
<td>54.80</td>
<td>77.99</td>
</tr>
<tr>
<td>Boys</td>
<td>45.97</td>
<td>49.96</td>
<td>52.16</td>
<td>59.68</td>
<td>36.84</td>
<td>45.69</td>
<td>49.77</td>
<td>82.91</td>
</tr>
<tr>
<td>Girls</td>
<td>55.78</td>
<td>50.34</td>
<td>54.09</td>
<td>55.90</td>
<td>59.90</td>
<td>45.24</td>
<td>61.37</td>
<td>61.48</td>
</tr>
<tr>
<td>Area of residence</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Urban</td>
<td>49.11</td>
<td>50.28</td>
<td>52.52</td>
<td>57.50</td>
<td>41.54</td>
<td>44.81</td>
<td>52.11</td>
<td>76.52</td>
</tr>
<tr>
<td>Rural</td>
<td>48.80</td>
<td>51.15</td>
<td>55.37</td>
<td>58.50</td>
<td>41.84</td>
<td>51.07</td>
<td>57.74</td>
<td>69.28</td>
</tr>
</tbody>
</table>
unequal. As a rule of thumb, a Gini coefficient above 40 is considered unequal and one above 50 as highly unequal. A high degree of inequality suggests that access to education needs to be improved, along with education quality. In the example shown in screenshot 4.19, the Gini coefficient among 15- to 19-year-olds is higher for girls (55.78) than for boys (45.97). For all individuals 15 and older, however, women have lower earnings inequality than males.

*Indicator E1.2: Theil Index for Earnings, by Age Group*

The same pattern for gender inequality is found using the Theil index: initially women have more inequality in earnings than men, but for all people 15 and older, the Theil index is much higher for men (82.91) than women (61.48).

**Tables E2, E2a, and E2b: Employment for Youth**

Table E2 presents three key employment indicators by age group and subpopulation (screenshot 4.20). These data provide a general picture of how youth are faring in the labor market, as well as a picture of how different subpopulations are faring.

The employment of youth who have finished their education is an indirect indicator of the success of the education system. Table E2 provides information on the employment status of youth and young adults by age groups.

*Indicator E2.1: Percentage Employed, by Age Group*

The percentage of an age cohort that is employed is calculated as follows:

\[
\text{percentage of people age } X-Y \text{ who are employed} = \frac{\sum_i w_i \mathbb{1}(\text{status}_i = \text{employed} \text{ and } \text{age}_i \geq X \text{ and } \text{age}_i \leq Y)}{\sum_i w_i (\text{age}_i \geq X \text{ and } \text{age}_i \leq Y)}.
\]

In the example shown in screenshot 4.20, 39.69 percent of 15- to 19-year-olds in Nicaragua are employed. This percentage increases with age. At all ages, the inequalities in employment between men and women are large. For the 20–24 cohort, 80.92 percent of men but only 38.82 percent of women are employed.
### Screenshot 4.20: Table E2: Employment for Youth

<table>
<thead>
<tr>
<th></th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
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<td></td>
</tr>
<tr>
<td>Total</td>
<td>39.69</td>
<td>0.66</td>
<td>59.66</td>
<td>60.85</td>
<td>1.25</td>
<td>37.90</td>
<td>65.94</td>
<td>0.71</td>
<td>33.36</td>
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<td>Gender</td>
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<td></td>
</tr>
<tr>
<td>Boys</td>
<td>59.59</td>
<td>0.84</td>
<td>39.58</td>
<td>80.92</td>
<td>1.51</td>
<td>17.56</td>
<td>88.12</td>
<td>0.56</td>
<td>11.32</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Girls</td>
<td>18.31</td>
<td>0.46</td>
<td>81.23</td>
<td>38.82</td>
<td>0.97</td>
<td>60.21</td>
<td>46.52</td>
<td>0.83</td>
<td>52.65</td>
<td></td>
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</tr>
<tr>
<td>Area of residence</td>
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<td></td>
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<td></td>
</tr>
<tr>
<td>Urban</td>
<td>29.23</td>
<td>1.11</td>
<td>69.66</td>
<td>59.32</td>
<td>1.81</td>
<td>38.87</td>
<td>68.50</td>
<td>0.93</td>
<td>30.57</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rural</td>
<td>52.27</td>
<td>0.11</td>
<td>47.62</td>
<td>63.24</td>
<td>0.38</td>
<td>36.38</td>
<td>62.09</td>
<td>0.37</td>
<td>37.53</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table E2: Employment for youth, [Nicaragua LSMS 2005]
Indicator E2.2: Percentage Unemployed, by Age Group

The percentage of an age cohort that is unemployed is calculated as follows:

\[
\text{percentage of people age } X\text{–}Y \text{ who are unemployed} = \frac{\sum_i w_i \mathbf{1}(\text{status}_i = \text{unemployed} \text{ and age}_i \geq X \text{ and age}_i \leq Y)}{\sum_i w_i \mathbf{1}(\text{age}_i \geq X \text{ and age}_i \leq Y)}.
\]

In the example shown in screenshot 4.20, unemployment rates for youth are relatively low, with only 0.71 percent in the 25–30 cohort unemployed (the figure may be low because job seekers stop looking for work). Unemployment is higher among women (0.83 percent) than men (0.56 percent).

Indicator E2.3: Percentage Inactive, by Age Group

The percentage of an age cohort that is inactive is calculated as follows:

\[
\text{percentage of people age } X\text{–}Y \text{ who are inactive} = \frac{\sum_i w_i \mathbf{1}(\text{status}_i = \text{inactive} \text{ and age}_i \geq X \text{ and age}_i \leq Y)}{\sum_i w_i \mathbf{1}(\text{age}_i \geq X \text{ and age}_i \leq Y)}.
\]

inactive = \begin{cases} 
1, & \text{if status}_i \neq \text{employed and status}_i \neq \text{unemployed} \\
0, & \text{if status}_i = \text{employed or status}_i = \text{unemployed}.
\end{cases}

Data on inactivity need not be inputted into ADePT. The variable is calculated based on data on employment and unemployment.

In the example shown in screenshot 4.20, large gender differences are evident, with 11.32 percent of men 25–30 and 52.65 percent of women inactive.

Table E3: Employment by Sector

Table E3 presents the percentage of employment of each sector by age group (screenshot 4.21). This information reveals the types of work youth engage in. Because this information confounds the skills demanded with the skills
### Screenshot 4.21: Table E3: Employment by Sector

<table>
<thead>
<tr>
<th></th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
<th>F</th>
<th>G</th>
<th>H</th>
<th>I</th>
<th>J</th>
<th>K</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total</td>
<td>72.28</td>
<td>2.46</td>
<td>2.69</td>
<td>0.00</td>
<td>0.06</td>
<td>0.06</td>
<td>0.14</td>
<td>0.85</td>
<td>0.13</td>
<td>2.12</td>
<td></td>
</tr>
<tr>
<td>Boys</td>
<td>73.41</td>
<td>1.75</td>
<td>4.14</td>
<td>0.00</td>
<td>0.13</td>
<td>0.06</td>
<td>0.29</td>
<td>0.02</td>
<td>0.00</td>
<td>0.20</td>
<td></td>
</tr>
<tr>
<td>Girls</td>
<td>71.30</td>
<td>3.07</td>
<td>1.41</td>
<td>0.00</td>
<td>0.00</td>
<td>0.06</td>
<td>0.00</td>
<td>0.79</td>
<td>0.24</td>
<td>3.80</td>
<td></td>
</tr>
<tr>
<td>Urban</td>
<td>43.38</td>
<td>1.51</td>
<td>3.61</td>
<td>0.00</td>
<td>0.00</td>
<td>0.17</td>
<td>0.42</td>
<td>1.49</td>
<td>0.48</td>
<td>3.17</td>
<td></td>
</tr>
<tr>
<td>Rural</td>
<td>82.82</td>
<td>2.80</td>
<td>2.35</td>
<td>0.00</td>
<td>0.08</td>
<td>0.02</td>
<td>0.03</td>
<td>0.61</td>
<td>0.00</td>
<td>1.73</td>
<td></td>
</tr>
</tbody>
</table>
supplied, however, it cannot be used as a measure of the types of skills the economy needs or the types of skills students were prepared for.

The percentage of people of a certain age employed in a particular sector is calculated as follows:

\[
\text{percentage of people age } X-Y \text{ employed in sector } Z = \frac{\sum_i w_i \mathbb{1}(\text{status}_i = \text{employed and sector}_i = Z \text{ and age}_i \geq X \text{ and age}_i \leq Y)}{\sum_i w_i \mathbb{1}(\text{age}_i \geq X \text{ and age}_i \leq Y \text{ and status}_i = \text{employed})}.
\]

**Table E4: Earnings by Education Level**

Table E4 reveals the relationships between earnings and education among youth (screenshot 4.22 displays the data for the 15–19 and 20–24 cohorts; the table also includes data on people 25–30 and 15–30). The education levels are no education, incomplete primary, primary, incomplete secondary, secondary, and some higher education. These categories are mutually exclusive. This information highlights the opportunity cost of attending school in terms of forgone income and the impact of inequality in education access across subgroups in the population.

The earnings of a cohort with a given level of education are calculated as follows:

\[
\text{earnings of people age } X-Y \text{ with level } Z \text{ education} = \frac{\sum_i w_i \mathbb{1}(\text{age}_i \geq X \text{ and age}_i \leq Y \text{ and highest level attained}_i = Z \text{ earnings}_i)}{\sum_i w_i \mathbb{1}(\text{age}_i \geq X \text{ and age}_i \leq Y \text{ and highest level attained}_i = Z)}.
\]

The data shown in screenshot 4.22 suggest that education has no impact—or even a negative impact—on earnings: people in Nicaragua with no education earn more than those with some education. There are many reasons why educational attainment may be negatively correlated with earnings. The main reason is that people with less education may have more work experience.
## Table E4: Earnings by Education Level

<table>
<thead>
<tr>
<th></th>
<th>Population 15-19</th>
<th>Population 20-24</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No education</td>
<td>Incomplete primary</td>
</tr>
<tr>
<td>Total</td>
<td>2,152.53</td>
<td>4,272.26</td>
</tr>
<tr>
<td>Gender</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Boys</td>
<td>2,152.53</td>
<td>4,418.65</td>
</tr>
<tr>
<td>Girls</td>
<td>1,673.62</td>
<td>251.67</td>
</tr>
<tr>
<td>Area of residence</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Urban</td>
<td>3,832.70</td>
<td>1,394.45</td>
</tr>
<tr>
<td>Rural</td>
<td>1,873.42</td>
<td>4,607.87</td>
</tr>
</tbody>
</table>
Table E5: Economic Independence

The status of the household head or spouse of the household head is used as a proxy for economic independence. Based on this proxy, table E5 shows the percentages of people in a cohort that can be considered economically independent:

\[
\text{percentage of people age } X-Y \text{ that are household heads} = \frac{\sum_i w_i \mathbf{1}(\text{age}_i \geq X \text{ and age}_i \leq Y \text{ and household head}_i = \text{yes or spouse of household head}_i = \text{yes})}{\sum_i w_i \mathbf{1}(\text{age}_i \geq X \text{ and age}_i \leq Y)}.
\]

The relationship between education and economic independence is strongly mediated by the economic situation of the country, the quality and market relevance of formal education, and the returns to education in a given economic context. The results from table E5 indicate that in the 25- to 29-year-old age group, the percentage of people who are economically independent is higher among people with lower levels of education (screenshot 4.23).

Table E6: Returns to Education

A measure of the success of an education system is the productivity of various levels of educational attainment or years of schooling. One common way to measure this productivity is to look at the economic returns to education—that is, the net financial return of additional schooling. Intuitively, an individual’s decision to continue studying will depend on the difference between the cost of pursuing additional studies and the added earnings received as a result. Information on returns to additional education provides an idea of the incentives students face when deciding to continue their formal education. High rates of return may induce students to spend more time in school; low rates may discourage them from staying in school longer.

Indicator E6.1: Rate of Return for Years of Schooling

The rate of return for years of schooling is calculated using the Mincer earnings function, where the natural log of earnings is a function of the years of
schooling, experience, and the square of experience (to capture the diminishing marginal effect of experience).\(^6\)

\[
\ln(earnings_{it}) = \beta_0 + \beta_1 \text{ years of schooling}_{it} + \beta_2 \text{ experience}_{it} = \beta_3 \text{ experience}_{it}^2 + u_{it}.
\]

This equation is estimated using linear regression. This approach assumes that each additional year of schooling has an equal impact on earnings.

**Indicator E6.2: Returns by Level of Schooling**

An alternative specification of the Mincer earnings function uses binary variables for the level of schooling. In the above example, the return to primary school compared with less than primary is 12.75 percent, the return to secondary is 3.99 percent, and the return to more than four years of higher education is 20.89 percent (see screenshot 4.24).
Table E6 indicates that the annual economic return to university education in Nicaragua is high (20.89 percent) (screenshot 4.24). For individuals who just finished secondary education, this information is very valuable. It indicates that they could expect to increase their annual earnings by about 21 percent by completing a university education. In contrast, the decision to continue from primary to secondary education is less clear: the annual economic returns of adding secondary education are low (3.99 percent). The results suggest that some education policy intervention may be needed to increase the relevance of secondary education to the labor market.

\[
earnings_i = \beta_0 + \beta_1 1\left(\text{highest level attained}_i \geq \text{primary} \right.
\text{ and highest level attained}_i < \text{secondary}\right)
\]

\[
= \beta_2 1\left(\text{highest level attained}_i \geq \text{secondary} \right.
\text{ and highest level attained}_i < 4 \text{ years of tertiary}\right) + \beta_3 1\left(\text{highest level attained}_i \geq 4 \text{ years of tertiary}\right)
+ \beta_4 \text{ experience}_i + \beta_5 \text{ experience}_i^2 + u_i.
\]

Screenshot 4.24: Table E6: Returns to Education

<table>
<thead>
<tr>
<th></th>
<th>Years of schooling</th>
<th>Primary</th>
<th>Secondary</th>
<th>More than 4 years of higher</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total</td>
<td>9.26</td>
<td>12.75</td>
<td>3.99</td>
<td>20.89</td>
</tr>
<tr>
<td>Gender</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Boys</td>
<td>10.84</td>
<td>16.40</td>
<td>5.71</td>
<td>18.33</td>
</tr>
<tr>
<td>Girls</td>
<td>6.99</td>
<td>-1.20</td>
<td>5.70</td>
<td>23.03</td>
</tr>
<tr>
<td>Area of residence</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Urban</td>
<td>7.14</td>
<td>4.88</td>
<td>2.35</td>
<td>21.59</td>
</tr>
<tr>
<td>Rural</td>
<td>7.73</td>
<td>8.71</td>
<td>1.43</td>
<td>12.44</td>
</tr>
</tbody>
</table>
ADePT Education Graphs

In addition to tables, ADePT Edu creates related graphs (figures). These graphs are based on the table results and an algorithm that produces enrollment pyramids and grade survival profiles by age and other characteristics. The ADePT Edu software produces more than 30 graphs, classified into 10 groups. The graphs in this section are taken from the 2005 Living Standards Measurement Survey results for Nicaragua.

Graph 4.1 shows the percentage of 15- to 19-year-olds that completed each grade from 1 to 9. Graphs are available by income level for the following age groups: 15–19, 20–29, and 30–39. The graph shows the percentage differences between the income groups and the large gap between the highest and lowest income quintiles. For example, nearly 90 percent of people in the highest income quintile but only about 10 percent of those in the lowest income quintile completed seven years of education.

Graph 4.2 presents attendance rates for the 6–14 age group, for boys and girls in urban and rural areas. It shows that urban girls have the highest and most stable rates of enrollment; their enrollment rates are about...
20 percentage points higher than the rates of rural boys. The graph also shows that enrollment peaks between the ages of 8 and 12.

Graph 4.3 shows the grade survival profile of children 10–19 by income quintile. It indicates that children from poorer households are less likely than children from less poor households to reach grade 7. Grade survival rates of children from the bottom two income quintiles are substantially lower than the rates of children from the top three quintiles.

Enrollment pyramids depict attendance rates by age group. In graph 4.4 the percentage of 6- to 24-year-olds currently enrolled in school is shown for the highest and lowest income quintiles. The results indicate that by age 10, there is a considerable difference in the rates of primary school enrollment by income level. By age 11, a significant proportion of children from households in the top quintile have moved on to secondary school, perhaps a year earlier than the official age of entry. By age 13, most children from households in the top quintile are enrolled in secondary school; for children from the bottom quintile, the proportion of children enrolled in primary or secondary school has decreased substantially. By age 15, more than 75 percent of children from the top quintile and only about 25 percent of children from the bottom quintile are still in school. These results
point to the need to increase school attainment of the poor if poverty is to be reduced in the long run.

Graph 4.5 presents educational attainment rates for men and women 30–39 in urban and rural areas. It shows that attainment rates are lower in rural areas, where only about 30 percent of the population has seven years of schooling. In contrast, 75 percent of people in urban areas attained this level of schooling. In both areas, women have more years of schooling than men.

Graph 4.6 shows the typology of out-of-school children (never in school, late entry, and dropout). It shows that 75 percent of rural children classified as out of school were never in school, a percentage that is slightly higher than that of urban children. Dropouts account for only a small proportion of out-of-school children overall but the highest proportion of out-of-school children in urban areas.

Graph 4.7 presents a breakdown of the reasons given by out-of-school children for not attending school (following the classification given by the household survey). The main reason why primary school–age children are out of school is because they have to work in the fields (33.4 percent); the second most important reason is lack of money (26.3 percent).
Graph 4.4: Enrollment Pyramid for 6- to 24-Year-Olds in Nicaragua, by Income Quintile

Graph 4.8 presents the Gini index and Lorenz curve for years of schooling. Briefly, the Lorenz curve is a measure of the cumulative distribution of schooling attainment (see chapter 5 for a full explanation of the Lorenz curve and other indicators of education inequality). If the Lorenz curve followed the 45-degree line, the distribution of schooling attainment would be perfectly equal: every fraction of the population would have the same fraction of total years of schooling. In graph 4.8, the Lorenz curve for years of schooling diverges significantly from the line of equality: about 60 percent of the population has about 25 percent of the total years of schooling, meaning that the remaining 75 percent of the total years of schooling is held by 40 percent of the population. These data indicate that human capital (represented by the years of schooling) is unequally distributed across the population.
Assessing Sector Performance and Inequality in Education

Graph 4.5: Educational Attainment Profiles for Men and Women 30–39 Years Old in Rural and Urban Areas in Nicaragua

Graph 5: Attainment profiles for older cohorts, [Nicaragua LSMS 2005]

Graph 4.6: Typology of Out of School, by Subpopulation and Level in Nicaragua

Graph 6: Typology of out-of-school, [Nicaragua LSMS 2005]
Graph 4.9 is an age-earnings profile by education level. It shows average hourly earnings for various age groups and educational levels. People with some higher education earn more than people with less education for most age groups (although the variance of the sample is high). There is no clear pattern for other levels of education.

Graph 4.10 plots average hourly earnings by years of schooling for three different levels of labor market experience (1, 5, and 10 years). It shows that hourly earnings increase as the number of years of schooling increase for all years of experience. An individual with 10 years of experience and 5 years of schooling earns less per hour than one with 12 years or more of schooling and 1–5 years of experience.
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Graph 4.8: Lorenz Curve for Years of Schooling in Nicaragua

Graph 4.9: Age-Earnings Profile by Education Level
Notes

1. ADePT formats the output, but all data are stored with full precision, facilitating further analysis.
2. Standard errors in the indicator tables are calculated using Stata’s implementation of the linearized standard errors to account for intracluster correlation. BRR (balanced repeated replication) and Jackknife methods are also available. See the Stata documentation for details on these calculations.
3. For simplicity, all formulas for proportions, percentages, and rates do not show the multiplication of the result by 100. It is assumed that users will do the multiplication themselves.
4. Some estimates count secondary school-age children who are enrolled in primary or postsecondary education as being out of school. This approach results in overestimation, especially in countries with high gross attendance rates for primary school. Considering youth attending primary
school as out of school can lead to erroneous conclusions about the number of out-of-school children and adolescents, potentially misguiding policy.

5. The formula for the Gini coefficient is conceptually accurate, but it is not intended for computation. The computational algorithm involves a large amount of source code that is too cumbersome to be included here.

6. The Mincer function is named after Jacob Mincer, who established the relationship between earnings and schooling in the United States in 1958. For a recent estimation of the returns to education in other countries in the world, see Psacharopoulos and Patrinos (2002).

References

