





## UIS Workshop on Education Financing

Dakar, May-30 to June-03, 2016









### **Educational Finance Indicators**



### Indicators derived from UIS QB

- Government expenditure on education as % of total government expenditure
- Government expenditure on education as % of GDP
- Expenditure on primary (secondary, tertiary) as % of expenditure on education
- Expenditure per pupil, per level (as % of GDP per capita, in PPP\$)
- Expenditure by nature: Share of spending on teacher salaries, other current expenditure, capital expenditure



### How does UIS derive indicators

1. Public expenditure on education as % of total government expenditure

= Total expenditure on education from the government Government expenditure from all sectors

2. Public expenditure on education as % of GDP

 $= \frac{Total\ expenditure\ on\ education\ from\ the\ government}{Gross\ domestic\ product}$ 

- ✓ Total government expenditure from data reported to UIS or the IMF.
- ✓ GDP data from the World Bank



### How does UIS derive indicators

3. Educational expenditure in primary (secondary, tertiary, etc.) as % of total educational expenditure

= Government expenditure on an education level (ex.primary, secondary)
Government expenditure on education on all levels

4. Public expenditure per pupil as a % of GDP per capita

Total expenditure on an education level (ex.primary, secondary)

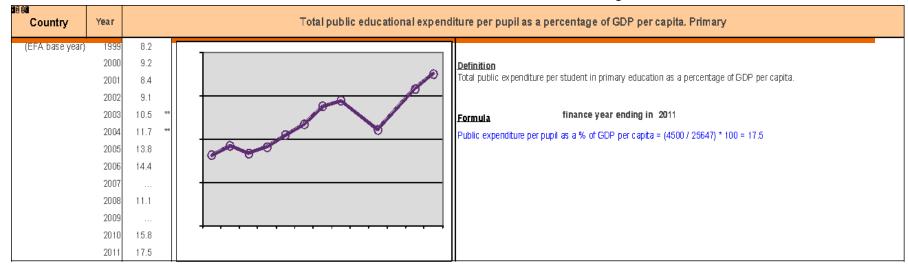
Number of pupils in that level

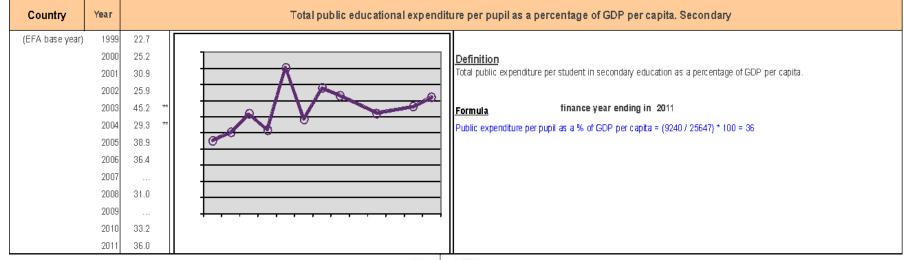
Gross domestic product per capita

- ✓ Expenditure on education as reported to UIS
- ✓ GDP per capita data from the World Bank



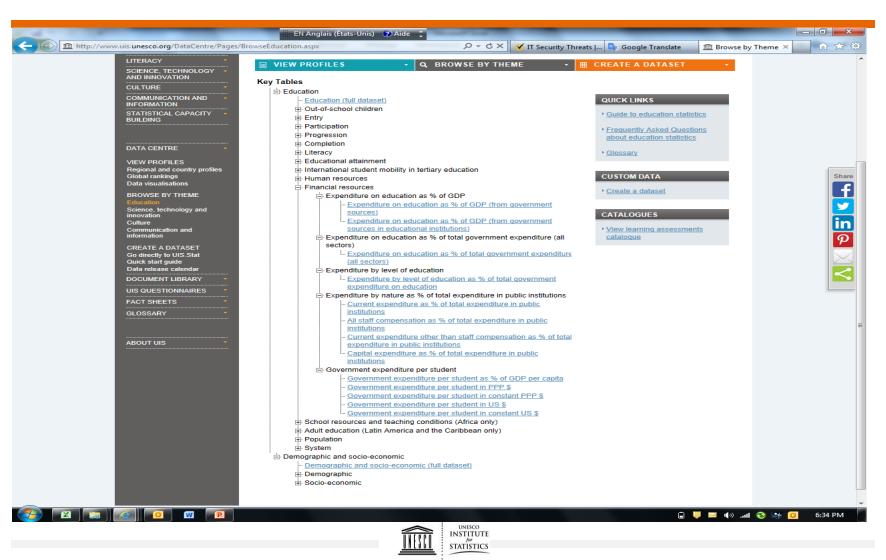
### Refer to UIS annual Country Review







### @<u>UIS data centre</u>, download data to compare how your country performs compared to others in your region



Cultural Organization

## Salient points for policy making, based on Government expenditures

- Indicators on government expenditure may suggest how important education is for a country – for example when comparing priority between countries.
- Indicators suggest relative importance of different levels compared to total education spending. For example, where the economy is expanding, higher/more technical level skills may be needed and more may have to be spent on secondary and post-secondary levels of education.
- Combined with private and international expenditures provides information on the relative contribution of the private sector (including households)



### Financing in Education 2030 agenda

- Education expenditures by pupil/student, education level and financing source
- 2. Average teacher salary relative to other professionals (requiring comparable level of training and qualification)
- 3. Percentage of total education expenditure borne by households
- 4. Percentage of total aid to education allocated to low-income countries
- 5. Number of higher education scholarships awarded by beneficiary country
- 6. Percentage of countries which have an explicit formula-based policy reallocating education resources to disadvantaged populations
- 7. Volume of official development assistance (ODA) flows for higher education scholarships by beneficiary country.

http://www.uis.unesco.org/Education/Documents/tag-proposed-thematic-indicators-post2015-education-agenda.pdf



### **Estimation of missing data**



### Why imputation of missing data?

### Key education finance indicators require availability of specific data per education level:

- ✓ Total expenditures in education and by source (Government, private, international)
- ✓ Number of teachers and mass salary
- ✓ Number of students
- ✓ Mass salary of non-teaching staff
- ✓ Cost for administrative services and capital expenditures, etc.
- ➤ All these data are not always readily available, hence the necessity to use estimates for the calculation of the indicators of interest through compensation procedures.



### Compensation procedures

Generally applied to micro data such as school census surveys data, households-based surveys data, etc where three different situations occur:

- i) non coverage:
  - ✓ weighting adjustments based on an external data source
- ii) total non-response
  - ✓ weighting adjustment
- iii) item non-response
  - ✓ Imputations, by assigning values for missing responses



### Somme imputation procedures

Two classes of imputations (i. use of auxiliary variables, and ii. a randomization process is used in assigning imputed values:

- 1. Deductive imputation
- 2. Mean imputation overall
- 3. Random imputation overall
- 4. Mean imputation with classes
- 5. Random imputation with classes
- 6. Hot-deck imputation
- 7. Flexible matching imputation
- 8. Predicted regression imputation (Education sector review studies, estimates of number teachers in lower secondary and in upper secondary in countries where both cycles happen to be mixed or separate; using number of students as explanatory variable)
- 9. Random regression imputation
- 10. Distance function matching



## Splitting expenditure data by level (Use of auxillary variables)

#### Four main choices:

- 1. Wage bill estimate (number of teachers + average salary by level and grade)
- 2. Number of teachers by level
- 3. Number of students by level
- 4. Based on already split expenditure



### Splitting spending by education levels

#### In this order:

- 1. Assign easy items
  - > Ex. if a Ministry is responsible for tertiary education, all of its expenditure can be allocated to tertiary education
- 2. Focus on largest expenditure item(s)—usually staff compensation
  - If expenditure reports do not separate the teacher wage bill by education level, need to look at payroll and other HR documents to estimate
- 3. Use qualitative analysis of remaining programmes + where needed, help from enrolment data
  - ➤ What does the programme do? Who benefits?
- 4. Remaining unallocated items (ex. general administration) can be split following already allocated proportions



### Splitting the wage bill

Splitting the wage bill based on teachers per level and average teacher salary

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Available information	G1-6 (primary)	G7-9 (lower- secondary)	G10-12 (uppe secondary)	er- Total G1-12
	" ,	,	,	
Number of teachers by grades	100		80	50 230
Tatal calculations in Ministry of Education				\$450,000
Total salary expenditure in Ministry of Education	unknown	unknown	unknown	(\$150,000
Average teacher salary	\$400	9	\$600	\$700
Estimation				
Estimated salary mass per level	\$40,000	\$48,000	\$35,000	\$123,000
Estimated shares per level	33%	39%	28%	100%
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Applying share per level to actual total salary mass	\$48,780	\$58,537	\$42,683	\$150,000

33%\*\$150,000 = \$ 48,780 39%\*\$150,000 = \$58,500

28%\*\$150,000 = \$42,000

33%\*(\$150,000-\$123,000) + \$40,000= \$ 48,910 39%\*(\$150,000-\$123,000) + \$48,000= \$ 58,530 33%\*(\$150,000-\$123,000) + \$35,000= \$ 43,910



#### **Using enrolment data**

➤ Assumes unit/pupil costs are the same across levels, which is rarely true

	Primary	Lower- secondary	Upper- secondary	Total line-item
Available information	unknown	unknown	unknown	\$150,000
Estimation	\$65,217	\$52,174	\$32,609	\$150,000

Available information	G1-6 (primary)	G7-9 (lower-	G10-12 (upper-secondary)	Total G1-12	
Available information	G1-0 (primary)	Secondary)	secondary)	10tal G1-12	
Number of pupils by grades	100,000	80,000	50,000	230,000	
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Estimated resource allocation	(439	% 35	% 22	2%	100%

43%\*\$150,000 = \$ 65,217



#### Allocation based on spending already allocated

 Good option when main items have already been split, and what is left is admin. costs, ministry, research, etc.

	Pre- primary	Primary	Lower- secondary	Upper-	Post- secondar y non- tertiary	Tertiary	Unknown /unalloca ted	Total
Expenditure	50	500	300	150	25	600	250	1875
Share of total expenditure	3%	27%	16%	8%	1%	32%	13%	
Share out of allocated expenditure	3%	31%	18%	9%	2%	37%		
Expenditure unknown/not allocated reallocated by ISCED	8	77	46	23	4	92	0	250
All expenditure reallocated by level	58	577	346	173	29	692	0	1875



#### **Exercises**



# Thank you www.uis.unesco.org

