

**International Workshop on  
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***Non-market education services in Italy***

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# Summary

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The Italian public education services

Non-market education services in Italian National Accounts

Methods of output measurement

A comparison: input and output method

Conclusions

# The Education services

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The Italian public education services contain a wide range of institutional units (schools, universities, vocational institutes, etc.), across two GG sub-sectors (central and local government)

Various levels of government are involved in delivering education

services:

State

Regions

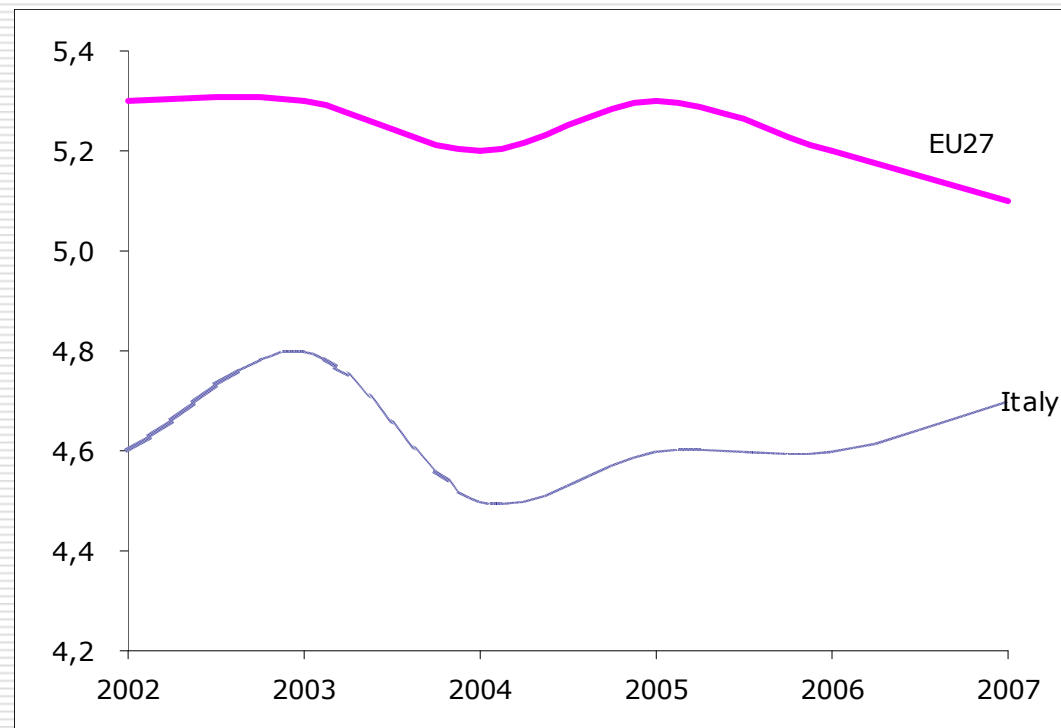
Provinces

Municipalities

Universities, etc..

# The Education services

Expenditure for education in percentage of GDP at current prices



Source: Eurostat GFS database (provisional data)

# Non-market education services in Italian National Accounts

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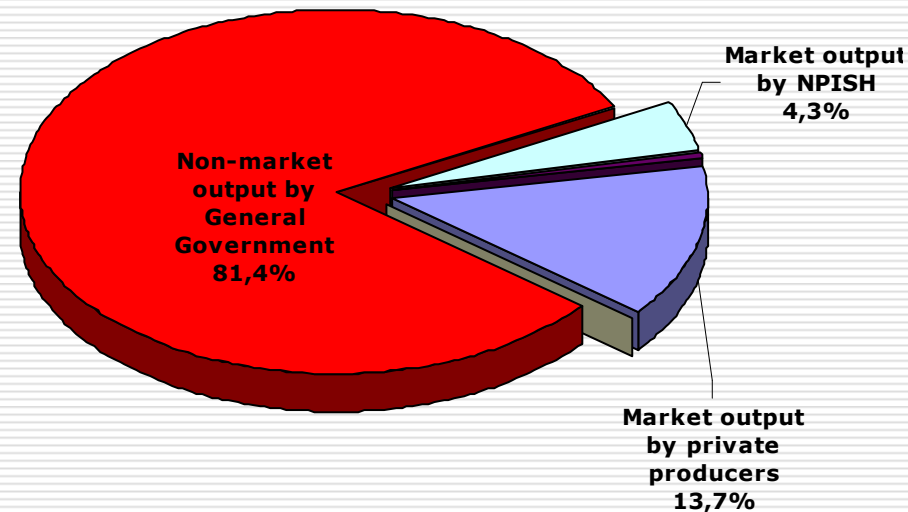
The education services are included in class M – Education, NACE rev. 1.1.

The direct measurement of Education output was introduced into Italian National Accounts in 1999, backdated to 1992.

In Italy the output measure relates mostly to State schools and universities

# Non-market education services in Italian National Accounts

The weight of public education provided by institutional sectors – Year 2007



# Non-market education services in Italian National Accounts – Some figures year 2007

Cofog	Cofog description	Government spending (%)	Government final consumption expenditure (%)	Government non-market output (%), current prices	Government non-market output on total economy output (%), current prices	Government non-market output on total education output (%), current prices	Education non-market output on GDP (%), current prices	Education Value Added on GDP (%), current prices
9	Education (Nace M)	9.72	20.85	23.44	2.05	81.35	4.24	3.68
9.1.1	Pre-primary Education	1.09	2.50	2.73	0.24	9.46	0.49	0.44
9.1.2	Primary Education	2.56	5.96	6.50	0.57	22.54	1.18	1.08
9.2.1	Lower-secondary education	1.68	3.97	4.32	0.38	14.98	0.78	0.72
9.2.2	Upper-secondary education	2.55	6.01	6.71	0.59	23.28	1.21	1.08
9.3.0 and 9.5.0	Post-secondary non tertiary education, Education not definable by level	0.44	0.53	1.05	0.09	3.65	0.19	0.06
9.4.1 and 9.4.2	Tertiary education	0.89	1.23	1.93	0.17	6.70	0.35	0.26
9.6.0	Subsidiary services to education	0.51	0.65	0.20	0.01	0.74	0.04	0.05

*Provisional data*

# The Education services: output method

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*2001 Eurostat Handbook on price and volume measures in national accounts* defines the education output as follows:

*“The quantity of teaching received by students, adjusted to allow for the qualities of the services provided, for each type of education”*

# The School system: output method

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Public school system is supplied in State schools managed by the Ministry of Education and in the other public schools managed by local authorities: Municipalities, Provinces and Regions.

Scholastic education is supplied mainly in State schools, and is divided into four levels:

- pre-primary education;
- primary education;
- lower secondary;
- upper secondary education.

# The School system: output method

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## Data Sources

### Quantities

Number of pupils in state schools and non-state schools are broken down into the above mentioned four levels of education.

The upper secondary education is further on classified by type of schools:

- “liceo classico e scientifico”
- teacher-training schools
- vocational schools
- technical schools
- art schools.

Detailed breakdown of the basic data is essential in order to ensure homogeneity among the elementary indexes and the its costs.

### Costs

The costs are based on the Cofog classification. The Division 9 - Education, decomposes cost items summing up to output value into sectors of activity.

For the part concerning services provided to individuals (groups from 9.1 to 9.6), education expenses are classified in categories based upon ISCED 97 classification.

The quality adjustments are based on the number of pupils per class (standard pupils)

# The School system: output method

	State schools	Non state schools	Total
Pupils	95,48	4,52	100,00
Classes	95,39	4,61	100,00
Average pupils per class	20,44	19,98	20,42
Corrective factor	0,916	0,923	0,916
Standard pupils	95,45	4,55	100,00
Output	92,23	7,77	100,00
<i>Output (milions euro)</i>	<i>51.591</i>	<i>4.344</i>	<i>55.935</i>

# The School system: output method

## PYP Laspeyres volume index

$$\frac{\sum_{i=1}^{n\_of\_levelsof\_education} (p_{i,t-1} \cdot q_{i,t}) \cdot \frac{q_t}{q_{t-1}}}{\sum p_{i,t-1} \cdot q_{i,t-1}} = \frac{\sum_{i=1}^{n\_of\_levelsof\_education} p_{i,t-1} \cdot q_t}{\sum p_{i,t-1} \cdot q_{i,t-1}}$$

Where:

$i$

$t=2000...2007$

$$\frac{q_{i,t}}{q_{i,t-1}}$$

$$\frac{p_{i,t-1} \cdot q_{i,t-1}}{(p_{i,t-1} \cdot q_{i,t-1})}$$

is the level of education (pre-primary, primary etc)

adopting predominance criteria, the generic school year  $(t-1)/t$  corresponds to the year  $t$

quantity indicator of level of education

weight associated to level of education  $i$  in the year  $t-1$

In the volume index the quantities are represented by the number of standard pupils.

The index is calculated at the ISCED level of analysis

In addition each level is broken down by:

State schools

Non-State schools

# The Tertiary education: quantity

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The production of services supplied by universities is split in two CPA classes :

1. Research and Development, for the part related to research
2. Education, for the part concerning didactic services.

The first is deflated using the input method, while the second one is deflated by the output method.

The quantity indicator used is the number of students per faculty and/or group of homogenous faculties (18 faculties).

The quantities are weighted by the cost per student by faculty.

The per capita cost is defined taking into account a methodology based on the standard cost per student.

# The Tertiary education: quality

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The **quality adjustments** are outcome-based.

The indicators used are:

- The ratio between “regular students” and enrolled students
- The reduction of the distance between the actual number of years for graduation and the theoretical length

The two indicators have the same direction, they both tend to 1, the simplest aggregation to measure the efficiency and/or effectiveness of the educational procedures has been preferred, supposing that both indicators have the same weight.

# The tertiary education: volume index

PYP Laspeyres volume index

$$L_{t/t-1} = \frac{\sum_{j=1}^{18} c_{j,(t-1)} \cdot s_{j,t} \cdot \frac{q_{j,t}}{q_{j,(t-1)}}}{\sum_{j=1}^{18} c_{j,(t-1)} \cdot s_{j,(t-1)}}$$

where:

$t$  is the time unit

$C$  is the unitary cost of a student of the faculty  $j$

$S$  is the number of students enrolled in the faculty  $j$

$q$  is quality indicators in the faculty  $j$

# Education services: Input and Output method

## The Education Output at constant prices

	2000	2001	2002	2003	2004	2005	2006	2007
previous year price, millions euro								
Input method	48,795	51,292	52,042	56,238	59,541	56,619	59,305	60,859
Output method	48,622	51,148	54,073	55,875	57,304	56,788	59,781	61,670
<i>Difference</i>	-173	-144	2,031	-363	-2,237	169	476	811
current prices, millions euro								
Output	50,099	52,897	54,858	57,963	56,551	60,173	61,119	64,665
Compensation of employees	41,506	43,660	45,971	48,322	46,476	49,654	50,996	54,540
price index, previous year = 100								
Input method	102.7	103.1	105.4	103.1	95.0	106.3	103.1	106.3
Output method	103.0	103.4	101.5	103.7	98.7	106.0	102.2	104.9

# Conclusions

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- This methodology should be considered as a starting point.
- The revised ESA devotes a broader section to the measurement of Non-market sector.
- The proposed new ESA draft chapter 10 is open to the possibility of using the output method without quality correction (B method)
- The B method, based on the simple output indicator, should be considered as the reference method since the correction for quality should be reserved to satellite accounts.
- However any analysis on public sector productivity should use output measures quality adjusted

# Conclusions

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Implementations of quality measures in the future can be based on experimental studies :

- Using indicators for primary and secondary education based on PISA scores
- Using credit goals for tertiary education
- Using average graduation mark for tertiary education

Moreover, when **pupil registers** (longitudinal data) will be available, a “best” measure of education services output will be implemented.

*..... I hope soon ... Thanks for your attention!*