

Calculating General Government Environmental Expenditure: Procedures of Reclassification of the Public Budgets and Estimate Coefficients

Il calcolo della spesa pubblica per l'ambiente: Procedure di riclassificazione dei bilanci pubblici e coefficienti di stima

Gianna Greca

Istat - Direzione Centrale Contabilità Nazionale, Via Ravà 150 - Roma, greca@istat.it

Giusy Vetrella

Istat - Direzione Centrale Contabilità Nazionale, Via Ravà 150 - Roma, vetrella@istat.it

Riassunto: Una delle tecniche più utilizzate per calcolare la spesa pubblica per la tutela ambientale è quella della riclassificazione funzionale dei rendiconti pubblici. L'efficace applicazione di tale tecnica si scontra spesso con i limiti dell'informazione disponibile nei rendiconti e con il rischio di ottenere risultati soggettivi. In Istat è stata messa a punto una metodologia che, per superare tali problemi, prevede l'uso di strumenti volti ad assicurare la replicabilità dei risultati ed una tecnica di riclassificazione in due stadi: al primo stadio si opera sulla base delle sole informazioni contenute nel rendiconto; al secondo stadio si ricorre a informazioni suppletive o a coefficienti di stima per le unità che non è stato possibile riclassificare in modo appropriato al primo stadio.

Keywords: EPEA, budget analysis, environmental expenditure, CEPA.

1. Introduction

In order to implement the European satellite Environmental Protection Expenditure Account (EPEA) it is necessary, *inter alia*, to collect data on expenditure for environmental protection (EP) by institutional sector, including General Government. In the EU countries, according to the Eurostat guidelines, one of the methods most frequently adopted to this end is the budget analysis. It consists in the analysis of all the financial expenditure items accounted for in a public budget in order to identify and classify those including EP expenditures. To follow such an analytical approach is generally due to the lack of the standard classifications used in the public budgets which usually do not include an *ad hoc* category for EP expenditures. The budget analysis can lead to subjective results and its effectiveness depends on the quantity and quality of the information shown in the public financial accounts. The solutions adopted in Istat in order to face these issues include both the use of suitable operating tools and the implementation of a two-stage reclassification process: the first stage is exclusively based on the use of the information contained in the budgets while the second stage involves the use of additional information and/or estimate coefficients.

This paper focuses on the Istat approach for reclassifying public budgets (§ 2) and on the estimate coefficients used in the second stage, here discussed for the first time (§ 3).

The methodology was applied in 2004 to produce the first time series of EP expenditure of the Italian Ministries and of a number of Regions for the years 1995-2002.

2. Procedures of reclassification of the public budgets

The Istat methodology for calculating General Government EP expenditure is based on the analysis of the elementary expenditure items included in the budgets of the different General Government units (Ministries, Regions, Provinces, Municipalities, etc.). Every year, each expenditure item included within each public budget is analysed in order to establish whether it falls within the scope of the EPEA. The analysis is based on all the information provided by the budget, i.e. the description of the item, the laws possibly cited in the description of the item, the section of the budget where the item is accounted for, all the possible classifications of the item (economic, functional, other).

The EP expenditure of each public body is classified according to two different criteria:

1. functional criterion: by CEPA class (Classification of Environmental Protection Activities and expenditure);
2. economic criterion: grouping the various economic kinds of expenditures according to accounting concepts consistent with the EPEA aggregates: a) *direct expenditures*, i.e. capital and current expenditures for purchasing EP goods and services for own use, or for producing EP services (mainly collective services accounted for as “collective consumption”); b) *fundings* of EP expenditures carried out by other units, i.e. capital and current transfers to finance the purchase of EP goods and services or the production of EP services made by other resident or non-resident units.

There are two main kinds of problems: a) problems due to the information source: one single expenditure item can include both EP and non-EP expenditures; EP expenditure in the same item can belong to different CEPA categories; the information on the expenditure item may not be enough to decide whether the expenditure item includes EP expenditure; b) problems due to the risk of introducing subjective criteria in the analysis of the expenditure items.

The solutions adopted in order to solve these problems include both the implementation of a two-stage reclassification process and the use of suitable operating tools. The first stage is exclusively based on the use of the information contained in the budgets while the second stage involves the use of additional information and/or estimate coefficients.

More specifically, the first stage aims at “sifting” or “scanning” the budget in order to:

- identify the expenditure items which do not need further analysis, i.e.:
 - items which certainly do Not include Environmental Protection Expenditures (NEPE items);
 - items which certainly only include Environmental Protection Expenditures and are homogeneous enough to be classified in a single CEPA class (EPE items);
- identify the expenditure items which do need further analysis, i.e.:
 - Uncertain Expenditure items, for which there is not enough information to exclude or select them as environmental protection items (UE items);
 - Non-Homogeneous Expenditure items, which include both EP and non-EP expenditure (NHE items);
 - items which are classified in more then one CEPA class (multi-CEPA items).

The second stage aims at finding additional financial information in order to:

- a) take decisions on the expenditure items which turned out to be uncertain in the first stage (UE);
- b) quantify and classify the EP expenditures included in the items classified as non-homogeneous in the first stage (NHE and multi-CEPA).

A second-best option is to use estimate coefficients based on physical indicators possibly correlated to the input or output of the activities carried out with the expenditure items which need further investigation (UE, NHE and multi-CEPA items). When this second-best solution can not be followed the last option is to use financial coefficients calculated on the basis of the budget data considered after the first stage of the reclassification process (§ 3).

The whole organisation of the approach aims at making the analysis as much as possible manageable, while maintaining the accuracy of the results; in practice, the aim is to minimise the number of expenditure items which has to be analysed in depth at the second stage, as well as the use of approximate methods (e.g. estimate coefficients). For example (see Table 1), for the years 1995-2002, the UE items which needed further analysis at the second stage were 16,2% of the expenditure items included in the Ministries financial accounts, corresponding to only 5,1% of total outlays. On the other side the estimate coefficients described below for NHE items (§ 3) were applied to 3,3% of the items, corresponding to only 1,2% of total outlays.

Table 1: *Uncertain Expenditures(UE) and Non-homogeneous Expenditures (NHE) items in the Central Government financial accounts (Ministries), 1995-2002*

Items	Percentage of the total Central Government expenditure (average of 1995-2002 period)	
	N. of expenditure items	Outlays
UE	16,2%	5,1%
NHE	3,3%	1,2%
		<i>(of which 96% has been attributed to NEPE at the 2^d stage)</i>

Practical experience shows that the different kinds of expenditure items (EPE, NEPE, UE, NHE, multi-CEPA) do not systematically appear under some particular sections or categories within public budgets; on the contrary they can be found anywhere. A number of environmental domains can be identified, however, which quite often need further analysis and/or estimation, like e.g.: water services expenditures, which are often shown as a whole and then have to be broken down into waste water (to be included in the EPEA) and water supply; soil protection expenditures, which often include NEPE, UE and NHE; etc. In order to guarantee the maximum standardization of the results, minimise the effect of subjective choices during the analysis and ensure consistency of data over time, the main operating tools adopted by Istat are: a “decision tree”, a set of “CEPA operational tables”, a set of “standardized classification rules” (see Istat, 2003).

3. Determination of estimate coefficients

In order to quantify and classify the EP expenditures included at the first stage in the NHE and multi-CEPA items, it is possible to use financial estimate coefficients calculated on the basis of the budget data considered after the first step of the reclassification process.

As far as the NHE items are concerned, the aim is to quantify the share regarding EP expenditure. If there is no additional data that allows to exactly quantify the EP share, estimate coefficients are used calculated on the basis of the following general equation:

$$Coe_{env} = \frac{EPE}{EPE + NEPE} \quad (1)$$

where Coe_{env} (ranging from 0 to 1) indicates how much of each expenditure item concerns environmental protection; EPE is the total amount of the items which, after the first stage of the reclassification process, certainly include EP expenditures; $NEPE$ is the total amount of the items which certainly do not include EP expenditures⁽¹⁾.

With regard to the multi-CEPA items, the aim is to break down the EP expenditure among the various CEPA classes under which the item is classified. In the absence of more detailed data the solution is to turn to the use of estimate coefficients, calculated on the basis of the following formula, exemplified for an item classified under two CEPA classes only, generally referred to as $CEPA_x$ and $CEPA_i$:

$$Coe_{CEPA_x} = \frac{EPE_{(CEPA_x)}}{EPE_{(CEPA_x)} + EPE_{(CEPA_i)}}, \quad Coe_{CEPA_i} = \frac{EPE_{(CEPA_i)}}{EPE_{(CEPA_x)} + EPE_{(CEPA_i)}} \quad (2)$$

where Coe_{CEPA_x} (ranging from 0 to 1) indicates how much of the EP expenditure of each item is classified in the CEPA class x ; $EPE_{(CEPA_x)}$ is the total amount of the items which, after the first stage of the reclassification process, certainly include EP expenditures and are classified exclusively in the CEPA classes x . Through the equation 2 a group of coefficient is calculated for each possible combination of two or more CEPA classes⁽²⁾ under which the items have been classified⁽³⁾. The multi-CEPA items can include exclusively environmental protection expenditures or include also expenditures other than for EP (NHE). In the first case the breakdown among CEPA classes concerns the expenditure as a whole, while in the second case the breakdown among CEPA classes concerns only the EP expenditure part, previously calculated possibly by means of the equation 1.

References

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⁽¹⁾ On the basis of equation 1, two different coefficients are calculated, one for the items to be included in the *direct expenditure* aggregate and the other one for those concerning the *fundings* aggregate (see § 2).

⁽²⁾ The CEPA is broken down into nine classes, then in equation 2 x and i range from 1 to 9.

⁽³⁾ On the basis of equation 2, for each possible combination of CEPA classes two groups of coefficients are calculated, one for the items to be included in the *direct expenditure* aggregate and the other for those concerning the *fundings* aggregate. For the years 1995-2002 the equation 2 was applied to 1,4% of the expenditure items included in the Ministries financial accounts.