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ALTERNATIVE FISCAL VISIBILITY ESTIMATES FOR SOME OECD COUNTRIES WITH THREE LEVELS OF TERRITORIAL GOVERNMENT LEVELS

ABSTRACT:

The size and pattern of any public budget depend, among other factors, on the **visibility** of both the burdens and benefits of public revenue and expenditure. Furthermore, such **visibility** is a necessary - not a sufficient - condition for an efficient allocation of resources between the private and public sectors of an economy. Although the importance of this **visibility** has been well known by academicians and practitioners for a long time, attempts to quantify it by taking the internal structure of every type of revenue or expenditure and its relative financial weight in a fiscal system into consideration are recent, and indicators used till now rest on several structural parameters, each of them ranging from 0 to 1, which are combined in a multiplicative form. For this reason a 0 estimate will always result as one of such factors is, at least, also 0. Starting from the same parameters, factors, and initial values, an alternative way to measure **visibility** of burdens and benefits of a public budget can consist of combining them in an additive instead of a multiplicative form. Then a null parametric value will not result in a 0 estimate, and calculations can show higher final values which could be much more sensitive to the initial values of other parameters and factors.

The aim of this contribution, based on a recent research, is to present and compare new additive indicators applied to local, intermediate, and central territorial government levels in Australia, Austria, Canada, Germany, Spain, Switzerland, and USA by using data and qualitative information provided by the International Monetary Fund. Comparisons, conclusions, and comments are offered for general criticism, discussion and development.

1. INTRODUCTION

An insufficient fiscal visibility[1] of burden and benefit of public revenue and expenditure can introduce important biases in both the size and pattern of government budgets [Wagner, 1976; Pommerehne and Scheneider, 1978; Oates, 1988]. That is why to measure and raise such visibility is so important.

Initial indicators were defined to take the influence on fiscal visibility of internal structures of types of public revenue and expenditure into account; and first estimations were made for several territorial government levels of the European Union member countries [Roig-Alonso, 1998, 2000, 2001]. But because of the multiplicative combination of relevant parameters used for such indicators, a 0 estimate will always result as anyone of such parameters was also 0.

An alternative to measure **visibility** of burden and benefit of a public budget can consist of combining these parameters in an additive instead of a multiplicative form. Then a null parametric value will not necessarily result in a 0 estimate, and calculations can show higher final values and be much more sensitive to values of other non-null parameters.

The aim of this contribution, based on a recent research project carried out at the Public Finance and Public Sector Economics Research Unit of the University of Valencia, is to present:

A) New additive - instead of multiplicative - indicators to be applied to the several - central, intermediate, local - territorial government levels of OECD member countries from data and qualitative information provided by the International Monetary Fund.

B) First alternative estimates of fiscal visibility referred to the several territorial government levels of Australia, Austria, Canada, Germany, Spain, Switzerland, and USA, for which the International Monetary Fund has data available.

Conclusions and comments are offered at the end of the paper.

2. AN INDEX OF BURDEN VISIBILITY OF TOTAL PUBLIC REVENUE

In general, for every level, **L**, of territorial public administrations of an economy, a visibility index, V_L^R, of its total public revenue, **R**, was defined in such a way that $0 \leq V_L^R \leq 1$, based on the following formula:

$$V_L^R = \sum_{i=1}^{n} x_{iL}^R \, y_{iL}^R$$

where:

a) $\mathbf{n}$ = number of types of public revenue $\mathbf{R}$ for level $\mathbf{L}$ of territorial public administrations;

b) $\mathbf{x_{iL}}^{\mathbf{R}}$ = relative financial weight of public revenue $\mathbf{R}$ of type $\mathbf{i}$ for level $\mathbf{L}$ of territorial public administrations, with $\mathbf{i = 1, 2, ..., n}$; that is to say:

$$0 \le x_{iL}^{R} = \frac{GF_{iL}^{R}}{\sum_{i=1}^{n} GF_{iL}^{R}} \le 1$$

with $\mathbf{GF_{iL}}^{\mathbf{R}}$ = absolute quantity of public revenue $\mathbf{R}$ of type $\mathbf{i}$ for level $\mathbf{L}$ of territorial public administrations;

c) $\mathbf{y_{iL}}^{\mathbf{R}}$ = visibility or perceptibility (for the policy intended - or legal - revenue-provider) factor of burden of public revenue $\mathbf{R}$ of type $\mathbf{i}$ to which level $\mathbf{L}$ of territorial public administrations is entitled, with $\mathbf{0 \le y_{iL}}^{\mathbf{R}} \le \mathbf{1}$.

3. BURDEN VISIBILITY OF A SPECIFIC PUBLIC REVENUE

An objective estimate of $\mathbf{y_{iL}}^{\mathbf{R}}$ - factor of perceptibility of the direct burden by a policy intended - or legal - revenue-provider of a public revenue $\mathbf{R}$ of type $\mathbf{i}$ for level $\mathbf{L}$ of territorial public administrations - was initially defined (Roig-Alonso, 1998) according to the following criteria:

$$\mathbf{y_{iL}}^{\mathbf{R}} = \mathbf{v_{iL}}^{\mathbf{R}} \, \mathbf{p_{iL}}^{\mathbf{R}} \, \mathbf{m_{iL}}^{\mathbf{R}} \, \mathbf{q_{iL}}^{\mathbf{R}} \, \mathbf{i_{iL}}^{\mathbf{R}} \qquad\qquad (1)$$

where:

a) $\mathbf{v_{iL}}^{\mathbf{R}}$ = voluntary ($\mathbf{v_{iL}}^{\mathbf{R}} = \mathbf{0}$) or coercive ($\mathbf{v_{iL}}^{\mathbf{R}} = \mathbf{1}$) nature of public revenue $\mathbf{R}$ of type $\mathbf{i}$ for its policy intended - or legal - revenue-provider (coerciveness parameter), with $\mathbf{0 \le v_{iL}}^{\mathbf{R}} \le \mathbf{1}$.

b) $\mathbf{p_{iL}}^{\mathbf{R}}$ = full ($\mathbf{p_{iL}}^{\mathbf{R}} = \mathbf{0}$) or null ($\mathbf{p_{iL}}^{\mathbf{R}} = \mathbf{1}$) proportionality of the quantity of public revenue $\mathbf{R}$ of type $\mathbf{i}$ - the burden of which is borne by a policy intended - or legal - revenue-provider - to the cost of efficiently producing the good or service *specifically* received by him in return for his burden (proportionality parameter), with $\mathbf{0 \le p_{iL}}^{\mathbf{R}} \le \mathbf{1}$.

c) $\mathbf{m_{iL}}^{\mathbf{R}}$ = full ($\mathbf{m_{iL}}^{\mathbf{R}} = \mathbf{1}$) or null ($\mathbf{m_{iL}}^{\mathbf{R}} = \mathbf{0}$) information to the policy intended - or legal - revenue-provider on the concept of the direct burden he is bearing when providing public revenue $\mathbf{R}$ of type $\mathbf{i}$ (concept-information parameter), with $\mathbf{0 \le m_{iL}}^{\mathbf{R}} \le \mathbf{1}$.

d) $\mathbf{q_{iL}}^{\mathbf{R}}$ = full ($\mathbf{q_{iL}}^{\mathbf{R}} = \mathbf{1}$) or null ($\mathbf{q_{iL}}^{\mathbf{R}} = \mathbf{0}$) information to the policy intended - or legal - revenue-provider on the quantity of the direct burden he is bearing when providing public revenue $\mathbf{R}$ of type $\mathbf{i}$ (quantity-information parameter), with $\mathbf{0 \le q_{iL}}^{\mathbf{R}} \le \mathbf{1}$.

e) $\mathbf{i_{iL}}^{\mathbf{R}}$ = intermediate ($\mathbf{i_{iL}}^{\mathbf{R}} = \mathbf{0}$) or final ($\mathbf{i_{iL}}^{\mathbf{R}} = \mathbf{1}$) position of the policy intended - or legal - revenue-provider in relation to his direct burden (burden-shifting parameter), with $\mathbf{0 \le i_{iL}}^{\mathbf{R}}$

≤ 1.

In any case, all V_L^R, x_{iL}^R, y_{iL}^R, v_{iL}^R, p_{iL}^R, m_{iL}^R, q_{iL}^R and i_{iL}^R were continuous variables ranging from 0 to 1, i and L were subscripts for the type of revenue and level of territorial public administration respectively and R was a superscript - non an exponent - for public revenue.

Because of the multiplicative combination of such five significant parameters in y_{iL}^R, as any one of them takes a null value a 0 estimate will necessarily result, although other parameters can show high values.

In order to avoid this problem, this visibility or perceptibility factor can be redefined in an additive - instead of multiplicative - form, as follows:

$$y_{iL}^R = [v_{iL}^R + p_{iL}^R + m_{iL}^R + q_{iL}^R + i_{iL}^R] / 5 \tag{2}$$

4. INDEX OF BENEFIT VISIBILITY OF TOTAL PUBLIC EXPENDITURE

Similarly to the case of public revenue, for every level of territorial public administrations, L, a general index, V_L^E, of benefit visibility of total public expenditure, E, was be defined in such a way that $0 \leq V_L^E \leq 1$, based on the following formula:

$$V_L^E = \sum_{f=1}^{q} x_{fL}^E \, y_{fL}^E$$

where:

a) q = number of types of public expenditure E performed by level L of territorial public administrations;

b) x_{fL}^E = relative financial weight of public expenditure E of type f performed by level L of territorial public administrations, with $f = 1, 2, ..., q$; that is to say:

$$0 \leq x_{fL}^E = \frac{GF_{fL}^E}{\sum_{f=1}^{q} GF_{fL}^E} \leq 1$$

with GF_{fL}^E = absolute quantity of public expenditure E of type f performed by level L of territorial public administrations;

c) y_{fL}^E = visibility or perceptibility (by the policy intended - or legal - consumer) factor of benefit of public expenditure E of type f performed by level L of territorial public administrations, where $0 \leq y_{fL}^E \leq 1$.

5. BENEFIT VISIBILITY OF A SPECIFIC PUBLIC EXPENDITURE

An objective estimate of y_{fL}^E (factor of perceptibility by a policy intended - or legal - consumer of the direct benefit of a public expenditure E of type f performed by level L of territorial public administrations) was initially defined according to the following criteria:

$$y_{fL}^E = v_{fL}^E \; p_{fL}^E \; m_{fL}^E \; q_{fL}^E \; i_{fL}^E \tag{3}$$

where:

a) v_{fL}^E = null ($v_{fL}^E = 0$) or full ($v_{fL}^E = 1$) consumption of a publicly supplied good of type f by its policy intended - or legal - user or beneficiary (consumption parameter), with $0 \le v_{fL}^E \le 1$.

b) p_{fL}^E = full ($p_{fL}^E = 0$) or null ($p_{fL}^E = 1$) proportionality of cost of efficient production of the publicly supplied good of type f to a *specifically requited monetary burden* borne by the policy intended - or legal - user or beneficiary (proportionality parameter), with $0 \le p_{fL}^E \le 1$.

c) m_{fL}^E = full ($m_{fL}^E = 1$) or null ($m_{fL}^E = 0$) information to the policy intended - or legal - consumer or user on the concept of the direct benefit he is receiving when public expenditure E of type f is being performed (concept-information parameter), with $0 \le m_{fL}^E \le 1$.

d) q_{fL}^E = full ($q_{fL}^E = 1$) or null ($q_{fL}^E = 0$) information to the policy intended - or legal - consumer or user on the quantity of the direct benefit he is receiving when public expenditure E of type f is performed (quantity-information parameter), with $0 \le q_{fL}^E \le 1$.

e) i_{fL}^E = intermediate ($i_{fL}^E = 0$) or final ($i_{fL}^E = 1$) position of the policy intended - or legal - user or beneficiary of the publicly supplied good of type f in relation to his direct benefit (benefit-shifting parameter), with $0 \le i_{fL}^E \le 1$.

Similarly to the previous case of public revenue, all V_L^E, x_{fL}^E, y_{fL}^E, v_{fL}^E, p_{fL}^E, m_{fL}^E, q_{fL}^E and i_{fL}^E were continuous variables always ranging from 0 to 1, f and L were subscripts for the type of public expenditure and level of territorial public administration respectively and E was a superscript - non an exponent - for public expenditure.

Again, as anyone of such five parameters takes value 0, the multiplicative combination of them in y_{fL}^E necessarily results in a 0 estimate although other parameters can show high values; and in order to avoid this problem, this visibility or perceptibility factor can be redefined in an additive - instead of a multiplicative - form, as follows:

$$y_{fL}^E = [v_{fL}^E + p_{fL}^E + m_{fL}^E + q_{fL}^E + i_{fL}^E] / 5 \tag{4}$$

6. ESTIMATES ON BURDEN VISIBILITY OF TOTAL PUBLIC REVENUE

Tables 2, 3, and 4 present alternative and more recent estimates on burden visibility of public revenue and grants of Australia, Austria, Canada, Germany, Spain, Switzerland, and USA by applying index

$$V_L^R = \sum_{i=1}^{n} x_{iL}^R \ y_{iL}^R$$

previously defined, to the central, intermediate, and local fiscal sub-systems now in force in these countries.

Such values have been calculated mainly from information and primary data on public cash flows provided by both the Commission of the European Communities[2], reflecting tax structures of - and the institutional situation in - every member country on January 1, 1992, and the International Monetary Fund[3].

To obtain a sensitivity analysis, three hypotheses on minimum, plausible, and maximum shifting of tax burden have been assumed, giving rise to the corresponding series of maximum, V_M, plausible, V_p, and minimum, V_m, values of weighted-visibility estimates of revenue burden for policy intended - or legal - revenue-providers. The initial values for the fiscal visibility parameters v, p, m, q, i_M, i_p, i_m - shown in Table 1 - are the same previously used for the multiplicative version of indicators [Roig-Alonso, 1998, 2000, 2001].

As regards results, according to:

A) Table 2, presenting V_M, V_p, and V_m visibility estimates of burden of revenue and grants for the consolidated central government level, USA has the most visible sub-system, Switzerland having the least visible one: plausible values range from 86.40 to 77.32, with a difference of 9.08 points. Differences among OECD countries compared are not very significant in general.

B) Table 3, presenting V_M, V_p, and V_m visibility estimates of burden revenue and grants for intermediate level government, Canada has the most visible intermediate sub-system, Spain having the least visible one: now plausible values range from 72.99 to 39.18, with an important difference of 33.81 points, this level of government showing the highest differences among such OECD countries.

C) Table 4, presenting V_M, V_p, and V_m visibility estimates of burden revenue and grants for the local level, Austria has the most visible local sub-system, USA having the least visible one: plausible values range from 70.00 to 55.04, with a difference of 14.96. At this level of government differences between countries are quite significant.

TABLE 1
Values Imputed to Fiscal Visibility Parameters
(approximate average values)

Public Revenue Concepts	v	p	m	q	i_M	i_p	i_m
1. Income, profits, capital gains taxes							
1.1. Individual	1.00	1.00	1.00	1.00	1.00	0.75	0.50
1.2. Corporate	1.00	1.00	1.00	1.00	1.00	0.50	0.00
1.3. Other unallocable taxes	1.00	1.00	1.00	1.00	1.00	0.62	0.25
2. Social security contributions							
2.1. Employees	1.00	0.50	1.00	1.00	1.00	0.75	0.50
2.2. Employers	1.00	1.00	1.00	1.00	1.00	0.50	0.00
2.3. Self-employed or non-employed	1.00	0.50	1.00	1.00	1.00	0.50	0.00
2.4. Other unallocable contributions	1.00	0.50	1.00	1.00	1.00	0.50	0.00
3. Taxes on payroll and work force	1.00	1.00	1.00	1.00	1.00	0.75	0.50
4. Taxes on property							
4.1. Recurrent on immovable property	1.00	1.00	1.00	1.00	1.00	0.75	0.50
4.2. Recurrent on net wealth							
4.2.1. Individual	1.00	1.00	1.00	1.00	1.00	0.75	0.50
4.2.2. Corporate	1.00	1.00	1.00	1.00	1.00	0.50	0.00
4.3. Estate, inheritance, gift taxes	1.00	1.00	1.00	1.00	1.00	0.75	0.50
4.4. Financial and capital transactions	1.00	1.00	1.00	1.00	1.00	0.50	0.00
4.5. Nonrecurrent taxes on property	1.00	1.00	1.00	1.00	1.00	0.50	0.00
4.6. Other recurrent taxes on property	1.00	1.00	1.00	1.00	1.00	0.75	0.50
5. Domestic taxes on good and services							
5.1. General sales and value-added	1.00	1.00	1.00	0.75	1.00	0.87	0.75
5.2. Excises	1.00	1.00	0.00	0.00	1.00	0.87	0.75
5.3. Profits of fiscal monopolies	1.00	1.00	0.00	0.00	1.00	0.87	0.75
5.4. Taxes on specific services	1.00	1.00	1.00	1.00	1.00	0.87	0.75
5.5. Taxes on use of goods or activities							
5.5.1. Business/professional licenses	1.00	1.00	1.00	1.00	1.00	0.50	
5.5.2. Motor vehicle taxes	1.00	1.00	1.00	1.00	1.00	0.75	0.50

5.5.3. Other taxes on use of goods	1.00	1.00	1.00	1.00	1.00	0.75	0.50
5.6. Other taxes on goods and services	1.00	1.00	1.00	1.00	1.00	0.50	0.00
6. Taxes on international trade							
6.1. Import duties							
6.1.1. Customs duties	1.00	1.00	0.00	0.00	1.00	0.75	0.50
6.1.2. Other import charges	1.00	1.00	0.00	0.00	1.00	0.75	0.50
6.2. Export duties	1.00	1.00	0.00	0.00	1.00	0.75	0.50
6.3. Profits export/import monopolies	1.00	1.00	0.00	0.00	1.00	0.75	0.50
6.4. Exchange profits	1.00	1.00	0.00	0.00	1.00	0.75	0.50
6.5. Exchange rates	1.00	1.00	1.00	1.00	1.00	0.75	0.50
6.6. Other taxes on international trade	1.00	1.00	0.50	0.50	1.00	0.50	0.00
7. Other taxes							
7.1. Poll taxes	1.00	1.00	1.00	1.00	1.00	0.75	0.50
7.2. Stamp taxes	1.00	1.00	1.00	1.00	1.00	0.50	0.00
7.3. Taxes not elsewhere classified	1.00	1.00	1.00	1.00	1.00	0.50	0.00
8. Entrepreneurial and property income							
8.1. Cash operating surpluses	0.00	0.00	1.00	1.00			
8.2. From public financial institutions	0.00	0.00	1.00	1.00			
8.3. Other property income	0.00	0.00	1.00	1.00			
9. Administrative fees and charges	0.50	0.00	1.00	1.00	1.00	0.50	0.00
10. Fines and forfeits	1.00	1.00	1.00	1.00	1.00	0.75	0.50
11. Contributions to government employee pensions							
11.1. Employees	1.00	0.50	1.00	1.00	1.00	0.75	0.50
11.2. Employer	1.00	1.00	1.00	1.00	1.00	0.50	0.00
12. Other nontax revenue	0.00	0.50	1.00	1.00			
13. Sales on fixed capital assets	0.00	0.00	1.00	1.00			
14. Sales of stocks	0.00	0.00	1.00	1.00			
15. Sales of land and intangible assets	0.00	0.00	1.00	1.00			
16. Capital transfers from nongovernmental sector							
16.1. From residents	0.00	1.00	1.00	1.00			

16.2. From abroad	0.00	1.00	1.00	1.00			
17. Grants from abroad							
17.1. Current	0.00	1.00	0.00	0.00			
17.2. Capital	0.00	1.00	0.00	0.00			
18. Grants from other levels of national government							
18.1. Current	0.00	1.00	0.00	0.00			
18.2. Capital	0.00	1.00	0.00	0.00			
19. Grants from supranational authorities to member countries							
19.1. Current	0.00	1.00	0.00	0.00			
19.2. Capital	0.00	1.00	0.00	0.00			
20. Grants to supranational authorities							
20.1. Current	0.00	1.00	0.00	0.00			
20.2. Capital	0.00	1.00	0.00	0.00			
DEFICIT	0.00	0.00	1.00	1.00			

Notes for table 1:
v = degree of coercion of public revenue for its legal provider.
p = degree of specific requital of public revenue for its legal provider.
m = degree of information on the public revenue concept for its legal provider.
q = degree of information on the public revenue quantity for its legal provider.
i_M = maximum incidence of the direct monetary burden onto the legal provider of public revenue.
i_p = plausible incidence of the direct monetary burden onto the legal provider of public revenue.
i_m = minimum incidence of the direct monetary burden onto the legal provider of public revenue.

Source: Roig-Alonso, 2001.

TABLE 2
Estimates of Public Revenue Visibility in the European Union
Consolidated Central Government
(percentages)

OECD COUNTRIES / YEARS	V_M	V_p	V_m
Australia, 1998	92.81	86.30	78.86
Austria, 1994	88.69	82.26	75.87
Canada, 1997	90.44	83.94	77.47
Germany, 1996	87.78	80.86	73.97
Spain, 1997	90.65	84.10	77.58
Switzerland, 1998	83.15	77.32	71.52
USA, 1999	93.85	86.40	79.00

Source: own elaboration from data on *Government Finance Statistics Yearbook 2000*, Vol. XXIV, International Monetary Fund, Washington.

TABLE 3
Estimates of Public Revenue Visibility in the European Union
Intermediate Government Level
(percentages)

OECD COUNTRIES / YEARS	V_M	V_p	V_m
Australia, 1998	58.29	54.88	51.47
Austria, 1994	58.50	54.97	51.46
Canada, 1997	78.34	72.99	67.65
Germany, 1996	75.28	70.20	65.15
Spain, 1997	41.11	39.18	37.25
Switzerland, 1998	64.69	60.61	56.53
USA, 1999	64.46	60.68	56.92

Source: own elaboration from data on *Government Finance Statistics Yearbook 2000*, volume XXIV, International Monetary Fund, Washington.

TABLE 4
Estimates of Public Revenue Visibility in the European Union
Local Government
(percentages)

OECD COUNTRIES / YEARS	V_M	V_p	V_m
Australia, 1998	70.71	66.23	61.76
Austria, 1994	74.98	70.00	65.03
Canada, 1997	60.71	56.98	53.26
Germany, 1996	59.99	56.46	52.93
Spain, 1997	64.18	60.18	56.20
Switzerland, 1998	72.32	67.58	62.86
USA, 1999	58.56	55.04	51.54

Source: own elaboration from data on *Government Finance Statistics Yearbook 2000,* volume XXIV, International Monetary Fund, Washington.

7. ESTIMATES ON BENEFIT VISIBILITY OF TOTAL PUBLIC EXPENDITURE

In turn, tables 6, 7, and 8 present alternative and more recent estimates on benefit visibility of public expenditure and grants of Australia, Austria, Canada, Germany, Spain, Switzerland, and USA, obtained by applying index

$$V_L^E = \sum_{f=1}^{q} x_{fL}^E \ y_{fL}^E$$

to the central, intermediate, and local fiscal sub-systems now in force in these countries.

Such values have been calculated mainly from information and primary data on public cash flows provided by the International Monetary Fund[3].

As before, three hypotheses on minimum, plausible, and maximum shifting of expenditure benefit have been assumed to obtain a sensitivity analysis, giving rise to the corresponding series of maximum, V_M, plausible, V_p, and minimum, V_m, values of weighted-visibility estimates of expenditure benefit for the policy intended - or legal - beneficiary of every type of good and service publicly provided. The initial approximate values for the fiscal visibility parameters v, p, m, q, i_M, i_p, i_m - now shown in Table 5 - are the same previously used for the multiplicative indicators [Roig-Alonso, 1998, 2000, 2001].

As regards results, according to:

A) Table 6, presenting V_M, V_p, and V_m visibility estimates of public expenditure for the consolidated central government level, Germany has the most visible fiscal sub-system, and USA the least visible one, with plausible values ranging from 82.19 to 80.31, with only 1.88 points of difference. So differences among OECD countries compared are not significant at this level of government.

B) Table 7, presenting V_M, V_p, and V_m visibility estimates of public expenditure for the intermediate government level, Germany also has the most visible fiscal sub-system, and Australia the least visible one, with plausible values ranging from 80.68 to 78.97, with a difference of 1.71. Again differences among countries compared are insignificant at this level of government.

C) Table 8, presenting V_M, V_p, and V_m visibility estimates of public expenditure for the local government level, Germany always has the most visible fiscal sub-system, and Canada the least visible one, with plausible values ranging from 80.94 to 73.60, with a difference of 7.34 points. Now differences among countries compared are significant.

TABLE 5
Values Imputed to Fiscal Visibility Parameters of Public Expenditure
(approximate average values)

Public Expenditure Concepts	v	p	m	q	i_M	i_p	i_m
1. General public services							
1.1. Executive and legislative organs, financial and fiscal affairs, external affairs other than foreign aid	1.00	1.00	1.00	0.50	0.75	0.50	0.25
1.2. Foreign economic aid	1.00	1.00	1.00	0.50	0.75	0.50	0.25
1.3. Fundamental research affairs and services	1.00	1.00	0.25	0.25	0.75	0.50	0.25
1.4. General services	1.00	1.00	1.00	0.50	0.75	0.50	0.25
1.5. General public services not elsewhere classified	1.00	1.00	1.00	0.50	0.75	0.50	0.25
2. Defense affairs and services							
2.1. Military and civil defense administration and operation	1.00	1.00	1.00	0.50	0.75	0.50	0.25
2.2. Foreign military aid	1.00	1.00	1.00	0.50	0.75	0.50	0.25

2.3. Defense-related applied research and experimental development	1.00	1.00	0.25	0.25	0.75	0.50	0.25
2.4. Defense affairs not elsewhere classified	1.00	1.00	1.00	0.50	0.75	0.50	0.25
3. Public order and safety affairs							
3.1. Police and fire protection	1.00	1.00	1.00	0.50	0.75	0.50	0.25
3.2. Law courts	1.00	0.75	1.00	0.50	0.75	0.50	0.25
3.3. Prison administration and operation	1.00	1.00	1.00	0.50	0.75	0.50	0.25
3.4. Public order and safety affairs not elsewhere classified	1.00	1.00	1.00	0.50	0.75	0.50	0.25
4. Education affairs and services							
4.1. Pre-primary and primary education affairs and services	1.00	1.00	1.00	0.50	0.75	0.50	0.25
4.2. Second. education affairs and services	1.00	1.00	1.00	0.50	0.75	0.50	0.25
4.3. Tertiary education affairs and services	1.00	0.50	1.00	0.50	0.75	0.50	0.25
4.4. Education services not definable by level	1.00	0.75	1.00	0.50	0.75	0.50	0.25
4.5. Subsidiary services to education	1.00	1.00	1.00	0.50	0.75	0.50	0.25
4.6. Education affairs and services not elsewhere classified	1.00	1.00	1.00	0.50	0.75	0.50	0.25
5. Health affairs and services							
5.1. Hospital affairs and services	1.00	1.00	1.00	0.50	1.00	0.75	0.50
5.2. Clinics, and medical, dental, and paramedical practitioners	1.00	0.75	1.00	0.50	1.00	0.75	0.50
5.3. Public health affairs and	1.00	1.00	1.00	0.50	1.00	0.75	0.50
5.4. Medicaments, prostheses, medical equipment and appliances, or other prescribed health-related products	1.00	0.75	1.00	0.50	1.00	0.75	0.50
5.5. Applied research and experimental development related to the health and medical delivery system	1.00	1.00	0.50	0.50	1.00	0.75	0.50
5.6. Health affairs and services not elsewhere classified	1.00	1.00	1.00	0.50	1.00	0.75	0.50
6. Social security and welfare affairs and services							
6.1. Social security affairs and services	1.00	0.25	1.00	0.75	1.00	0.75	0.50
6.2. Welfare affairs and services	1.00	1.00	1.00	0.75	1.00	1.00	1.00

6.3. Social security and welfare affairs not elsewhere classified	1.00	1.00	1.00	0.50	1.00	0.75	0.50
7. Housing and community amenity affairs and services							
7.1. Housing and community development	1.00	0.50	1.00	0.50	1.00	0.75	0.50
7.2. Water supply affairs and services	1.00	0.50	1.00	0.50	1.00	0.75	0.50
7.3. Sanitary affairs and services including pollution abatement and control	1.00	1.00	1.00	0.50	1.00	0.75	0.50
7.4. Street lighting affairs and services	1.00	1.00	1.00	0.50	1.00	0.75	0.50
7.5. Housing and community amenity affairs and services not elsewhere classified	1.00	1.00	1.00	0.50	1.00	0.75	0.50
8. Recreational, cultural affairs							
8.0. Recreational, cultural, and religious affairs and services	1.00	1.00	1.00	0.50	1.00	0.75	0.50
9. Fuel and energy affairs and services							
9.1. Fuel affairs and services	1.00	0.75	1.00	0.50	0.75	0.50	0.25
9.2. Electricity and other energy sources	1.00	0.75	1.00	0.50	0.75	0.50	0.25
9.3. Fuel and energy affairs and services not elsewhere classified	1.00	0.75	1.00	0.50	0.75	0.50	0.25
10. Agriculture, forestry, fishing. and hunting affairs and services							
10.1. Agriculture affairs and services	1.00	0.50	1.00	0.50	0.75	0.50	0.25
10.2. Forestry affairs and services	1.00	0.50	1.00	0.50	0.75	0.50	0.25
10.3. Fishing and hunting affairs and services	1.00	0.75	1.00	0.50	0.75	0.50	0.25
10.4. Agricultural research and experimental development not elsewhere classified	1.00	1.00	0.25	0.50	0.75	0.50	0.25
10.5. Agriculture, forestry, fishing, and hunting affairs and services not elsewhere classified	1.00	1.00	1.00	0.50	0.75	0.50	0.25
11. Mining and mineral resource affairs and services, other than fuels; manufacturing affairs and services; and construction affairs and services							
11.1. Mining and mineral resource affairs and services, other than fuels	1.00	1.00	1.00	0.50	0.75	0.50	0.25

11.2. Manufacturing affairs and services	1.00	1.00	1.00	0.50	0.75	0.50	0.25
11.3. Construction affairs and services	1.00	1.00	1.00	0.50	0.75	0.50	0.25
11.4. Mining and mineral resource affairs and services not elsewhere classified; manufacturing affairs and services not elsewhere classified; and construction affairs and services not elsewhere classified	1.00	1.00	1.00	0.50	0.75	0.50	0.25
12. Transportation and communication affairs and services							
12.1. Road transport affairs and services	1.00	0.75	1.00	0.50	0.75	0.50	0.25
12.2. Water transport affairs and services	1.00	0.75	1.00	0.50	0.75	0.50	0.25
12.3. Railway affairs and services	1.00	0.50	1.00	0.75	0.75	0.50	0.25
12.4. Air transport affairs and services national government	1.00	0.25	1.00	0.75	0.75	0.50	0.25
12.5. Pipeline transport and other transport system affairs and services	1.00	0.75	1.00	0.50	0.75	0.50	0.25
12.6. Transportation system affairs and services not elsewhere classified	1.00	0.75	1.00	0.50	0.75	0.50	0.25
12.7. Communication affairs and services	1.00	0.25	1.00	0.75	0.75	0.50	0.25
12.8. Transportation and communication affairs and services not elsewhere classified	1.00	0.50	1.00	0.75	0.75	0.50	0.25
13. Other economic affairs and services							
13.1. Distribution trade affairs and services including storage and warehousing; hotel and restaurant affairs and services	1.00	0.75	1.00	0.50	0.75	0.50	0.25
13.2. Tourism affairs and services	1.00	0.75	1.00	0.50	1.00	0.75	0.50
13.3. Multipurpose development project affairs and services	1.00	0.75	1.00	0.50	0.75	0.50	0.25
13.4. General economic and commercial affairs other than general labour affairs	1.00	0.75	1.00	0.50	0.75	0.50	0.25
13.5. General labour affairs and services	1.00	1.00	1.00	0.50	0.75	0.50	0.25
13.6. Other economic affairs and services not elsewhere classified	1.00	0.75	1.00	0.50	0.75	0.50	0.25
14. Expenditures not classified by major group							
14.0. Expenditures not classified by major group	1.00	1.00	1.00	0.50	0.75	0.50	0.25

v = degree of consumption of a publicly supplied good by the policy-intended or legal beneficiary.

p = degree of proportional cost of the efficient production of the publicly supplied good to a specifically requited monetary burden born by the policy-intended or legal beneficiary.

m = degree of information to the policy-intended or legal beneficiary on the concept of the direct benefit he is receiving when public expenditure is being performed.

q = degree of information to the policy-intended or legal beneficiary on the quantity of the direct benefit he is receiving when public expenditure is being performed.

i_M = maximum incidence of the direct monetary benefit onto the policy-intended or legal beneficiary of a publicly supplied good.

i_p = plausible incidence of the direct monetary benefit onto the policy-intended or legal beneficiary of a publicly supplied good.

i_m = minimum incidence of the direct monetary benefit onto the policy-intended or legal beneficiary of a publicly supplied good.

Source: Roig-Alonso, 2001.

TABLE 6
Estimates of Public Expenditure Visibility in the European Union
Consolidated Central Government
(percentages)

OECD COUNTRIES / YEARS	V_M	V_p	V_m
Australia, 1998	85.34	80.93	76.14
Austria, 1994	85.81	81.58	76.87
Canada, 1997	85.72	81.49	77.16
Germany, 1996	86.36	82.19	78.00
Spain, 1997	85.82	81.48	76.97
Switzerland, 1998	85.74	81.55	77.25
USA, 1999	84.83	80.31	75.70

Source: own elaboration from data on *Government Finance Statistics Yearbook 2000*, volume XXIV, International Monetary Fund, Washington.

TABLE 7
Estimates of Public Expenditure Visibility in the European Union
Intermediate Government Level
(percentages)

OECD COUNTRIES / YEARS	V_M	V_p	V_m
Australia, 1998	83.61	78.97	72.30
Austria, 1994	84.45	79.83	74.11
Canada, 1997	84.97	80.28	74.48
Germany, 1996	85.27	80.68	75.44
Spain, 1997	84.24	79.33	73.08
Switzerland, 1998	83.92	79.20	73.24
USA, 1999	84.37	79.67	73.44

Source: own elaboration from data on *Government Finance Statistics Yearbook 2000*, volume XXIV, International Monetary Fund, Washington.

TABLE 8
Estimates of Public Expenditure Visibility in the European Union
Local Government

OECD COUNTRIES / YEARS	V_M	V_p	V_m
Australia, 1998	83.87	78.97	74.06
Austria, 1994	-	-	-
Canada, 1997	78.21	73.60	66.84
Germany, 1996	85.26	80.94	76.63
Spain, 1997	84.38	79.46	74.33
Switzerland, 1998	84.53	79.77	73.85
USA, 1999	83.70	78.83	71.79

- Insufficient available data.

Source: own elaboration from data on *Government Finance Statistics Yearbook 2000*, volume XXIV, International Monetary Fund, Washington.

8. CONCLUSIONS

The quality of public revenue and expenditure sub-systems and systems as policy

instruments for efficiently allocating economic resources among private and public sectors and sub-sectors varies as a result of economic, political, and social factors.

The new and alternative indices of fiscal visibility previously redefined by combining significant parameters in an additive - instead a multiplicative - formula bring forward a more sensitive measurement methodology which can be used to make relevant quantified comparisons among member countries of the International Monetary Fund provided that detailed statistic figures on execution of public budgets as well as information about the nature of the different types of public administrations' revenue and expenditure programmes are available to researchers.

Estimates obtained from different assumptions on tax and expenditure shifting by using these new additive indices to measure the visibility of revenue burden and expenditure benefit of central, intermediate, and local fiscal sub-systems now in force in Australia, Austria, Canada, Germany, Spain, Switzerland, and USA, offer, in addition to previous remarks, the following observations:

First.- Burden visibility values for all these countries are higher than those previously estimated [Roig, 1998, 2000, 2001] in general. Such relatively higher values stem from the fact that by applying the new formula here presented a null parameter affecting any specific type of public revenue does not result necessarily in a 0 estimate for its visibility.

Second.- The concurrence of several factors (such as non-coerciveness, non-existence of specific requitals, lack of information on concepts and quantities, partial shifting of burden by tax-payers, intergovernmental grants, etc.) can explain why burden visibility values are lower than the optimal value 100.00.

Third.- Burden visibility values for the consolidated central government are higher than those estimated for the intermediate and local levels of same countries, mainly owing to significant grants received by sub-central public administrations from central public administration.

Fourth.- In general, benefit visibility values for all countries compared are also higher than those previously estimated [Roig, 2000, 2001]. Again such relatively higher values stem from the fact that with the new formula a null parameter affecting a specific type of public expenditure does not result necessarily in a 0 estimate for its visibility.

Fifth.- The concurrence of several factors (specially an insufficient information on costs of goods and services publicly provided to users and consumers) can explain why benefit visibility values are lower than 100.00.

Sixth.- Contrary to burden visibility, differences of benefit visibility values are not important at the central and intermediate government levels, but remain significant at the local government.

Seventh.- Benefit visibility values are lower than those of burden visibility for all countries compared - except for Germany and Switzerland - at the consolidated central government.

Eighth.- In general benefit visibility values are higher than burden visibility values at intermediate and local levels for the same countries, suggesting a tendency to a public over-provision of goods and services at these government levels stemming from grants received by sub-central authorities from central public administrations.

Ninth.- Policy implications of these alternative estimates seem straightforward: as both present revenue and benefit visibility are not near to 100.00, allocation improvements could be obtained by implementing changes and reforms to raise values in general and by approaching these two types of budget visibility to such an optimal value.

FOOTNOTES

[1]By revenue visibility we mean visibility *of direct burden* of public revenue. Some types of public revenue (for instance, revenue from public property) do not involve any burden in the strict sense here reserved for this term. Symmetrically, by public expenditure visibility, visibility *of direct benefit* of public expenditure must be understood. Again, some types of public expenditure (for example, public purchases of private financial assets at market prices) might not carry any benefit with them.

[2]*Inventory of Taxes Levied in the Member States of the European Communities*, 15th edition, Commission of the European Communities, Luxembourg, 1993.

[3]*A Manual on Government Finance Statistics*, International Monetary Fund, Washington, 1986, and *Government Finance Statistics Yearbook 2000*, volume XXIV, International Monetary Fund, Washington.

REFERENCES

- Commission of the European Communities (1993): *Inventory of Taxes Levied in the Member States of the European Communities*, 15th edition, Commission of the European Communities, Luxembourg.

- International Monetary Fund (1986): *A Manual on Government Finance Statistics*, International Monetary Fund, Washington.

- International Monetary Fund (2001): *Government Finance Statistics Yearbook 2000*, Volume XXIV, International Monetary Fund, Washington.

- Oates, W.E. (1988): "On the nature and measurement of fiscal illusion: A survey", in G. Brennan et al., eds., *Taxation and Fiscal Federalism: Essays in Honour of Russel Mathews*, Australian National University Press, pp. 65-82.

- Pommerehne, W.W.; Schneider, F. (1978): "Fiscal illusion, political institutions, and local public spending", *Kyklos*, 31, pp. 381-408.

- Roig-Alonso, M. (1989): "El beneficio del gasto público: algunos criterios para facilitar su imputación", *De Economía Pública*, No. 5, pp. 77-91.

- Roig-Alonso, M. (1998): "Fiscal visibility in the European Union member countries: new estimates", *International Advances in Economic Research*, Vol. 4, No. 1, February, pp. 1-15.

- Roig-Alonso, M. (2000): "Visibility of public expenditure benefit in European Union Member countries", *Economia Pública Regional e Local*, Associaçao Portuguesa para o Desenvolvimento Regional, Coimbra, pp. 103-18.

- Roig-Alonso, M. (2001): "Budget burden and benefit visibility of European central level governments", *International Advances in Economic Research*, Vol. 7, No. 2, May, pp. 184-98.

- Wagner, R.E. (1976): "Revenue structure, fiscal illusion, and budgetary choice", *Public Choice*, 25, pp. 45-61.