

**45th Congress of the European Regional Science Association
Amsterdam
23-27 August 2005**

Miguel Roig-Alonso
Public Finance and Public Sector Economics Research Unit
Universitat de València
Valencia, Spain
Fax: +34 96 382 84 15
E-mail: Miguel.Roig@uv.es

**VISIBILITY OF PUBLIC BUDGET BURDENS AND
BENEFITS IN NEW EUROPEAN UNION MEMBER
COUNTRIES**

ABSTRACT

The aim of this contribution is to apply fiscal visibility indicators to territorial government levels in Poland as a new European Union member country by using data and qualitative information provided by the International Monetary Fund. Initial estimates obtained from different assumptions on tax and expenditure shifting by simultaneously using additive and arithmetic indices to measure the visibility of revenue burden and expenditure benefit of central and local fiscal sub-systems now in force in such an economy show that significant allocation improvements can be obtained by implementing economic policy changes (public accounting, tax reforms, reduction of public deficits...) to design future policies for tax reforms.

Key works: Fiscal visibility, fiscal federalism, Public Economics.

JEL Classification System: H7 State and Local Government. Intergovernmental Relations.

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 and OECD member countries [Roig-Alonso, 1998, 2000, 2001, 2003].

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 approach to measure the visibility of burden and benefit of a public budget consisted of combining these parameters in an additive instead of a multiplicative form. Then a null parametric value does not necessarily result in a 0 estimate, 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 Universitat de València, is to present:

- A) Additive and multiplicative indicators to be applied to the several - central, intermediate, local - territorial government levels of new European Union member countries from data and qualitative information provided by the International Monetary Fund.
- B) Initial alternative estimates of fiscal visibility referred to the two territorial government levels in Poland.

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

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

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

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

3. Burden visibility of a specific public revenue

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

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

where:

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

b) p_{iL}^R = full ($p_{iL}^R = 0$) or null ($p_{iL}^R = 1$) proportionality of the quantity of public revenue R of type 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 $0 \leq p_{iL}^R \leq 1$.

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

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

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

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 has been redefined in an additive - instead of multiplicative - form, as follows:

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

4. An 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 $f = 1, 2, \dots, q$; 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:

$$y_{fL}^E = v_{fL}^E p_{fL}^E m_{fL}^E q_{fL}^E i_{fL}^E \quad (3)$$

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 $0 \leq v_{fL}^E \leq 1$.

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 required monetary burden* borne by the policy intended - or legal - user or beneficiary (proportionality parameter), with $0 \leq p_{fL}^E \leq 1$.

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 $0 \leq m_{fl}^E \leq 1$.

d) $q_{fl}^E = \text{full}$ ($q_{fl}^E = 1$) 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 $0 \leq q_{fl}^E \leq 1$.

e) $i_{fl}^E = \text{intermediate}$ ($i_{fl}^E = 0$) 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 $0 \leq i_{fl}^E \leq 1$.

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. In order to avoid this problem, this visibility or perceptibility factor has been redefined in an additive - instead of a multiplicative - form, as follows:

$$y_{fl}^E = [v_{fl}^E + p_{fl}^E + m_{fl}^E + q_{fl}^E + i_{fl}^E] / 5 \quad (4)$$

6. Estimates on burden visibility of total public revenue

Tables 2 and 3 present alternative estimates on burden visibility of public revenue and grants in Poland by applying index

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

previously defined, to the central and local fiscal sub-systems now in force in this country.

Such values have been calculated mainly from information and primary data on public cash flows provided by both the Commission of the European Communities², reflecting tax structures of - and the institutional situation in - every member country on January 1, 2002, and the International Monetary Fund³.

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 old European Union and OECD countries [Roig-Alonso, 1998, 2000, 2001, 2003].

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, Poland has a very low visible sub-system since

a) multiplicative values range from 22.05 to 3.25 and

b) additive values range from 43.06 to 5.62.

B) Table 3, presenting V_M , V_p , and V_m visibility estimates of burden revenue and grants for the local level government, such a country has a much more visible local sub-system. Now

a) multiplicative values range from 89.43 to 22.13 and

a) additive values range from 92.15 to 74.32.

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

Public Revenue Concepts	v	n	m	a	iv	i	i
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	0.00
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 2002 Public Revenue Visibility in Poland
Consolidated Central Government
(percentages)

TYPES OF ESTIMATES	V_M	V_p	V_m
Multiplicative	22.05	12.65	3.25
Additive	43.06	24.34	5.62

*Source: own elaboration from data on **Government Finance Statistics Yearbook 2003**, volume XXVII, International Monetary Fund, Washington.*

TABLE 3
Estimates of 2002 Public Revenue Visibility in Poland
Local Government Level
(percentages)

TYPES OF ESTIMATES	V_M	V_p	V_m
Multiplicative	89.43	55.78	22.13
Additive	92.15	83.23	74.32

*Source: own elaboration from data on **Government Finance Statistics Yearbook 2003**, volume XXVII, International Monetary Fund, Washington.*

7. Estimates on benefit visibility of total public expenditure

In turn, tables 5 and 6 present alternative estimates on benefit visibility of public expenditure and grants in Poland, obtained by applying index

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

to the central and local fiscal sub-systems now in force in this country.

Such values have been calculated mainly from information and primary data on public cash flows provided by the International Monetary Fund³.

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 4 - are the same previously used for old European Union and OECD countries [Roig-Alonso, 1998, 2000, 2001, 2003].

As regards results, according to:

- A) Table 5, presenting V_M , V_p , and V_m visibility estimates of public expenditure for the consolidated central government level, Poland also has a fiscal sub-system where
- multiplicative visibility values range from 46.52 to 21.30 and
 - additive visibility values range from 87.25 to 76.42,

These expenditure values are significantly higher than the respective revenue values for the same territorial level of government.

- B) Table 6, presenting V_M , V_p , and V_m visibility estimates of public expenditure for the local government level, Poland has a fiscal sub-system where
- multiplicative visibility values range from 37.68 to 14.16 and
 - additive visibility values range from 75.32 to 63.14.

These expenditure values are significantly lower than the respective revenue values for the same territorial level of government.

TABLE 4
Values Imputed to Fiscal Visibility Parameters of Public Expenditure
(approximate average values)

Public Expenditure Concepts	v	n	m	a	iv	i	i₁
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. Secondary 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	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

Notes for table 5:

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 required 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 5
Estimates of 2002 Public Expenditure Visibility in Poland
Consolidated Central Government
(percentages)

TYPES OF ESTIMATES	V_M	V_p	V_m
Multiplicative	46.52	33.91	21.30
Additive	87.25	81.83	76.42

Source: own elaboration from data on *Government Finance Statistics Yearbook 2003*, volume XXVII, International Monetary Fund, Washington.

TABLE 6
Estimates of 2002 Public Expenditure Visibility in Poland
Local Government Level
(percentages)

TYPES OF ESTIMATES	V_M	V_p	V_m
Multiplicative	37.68	25.92	14.16
Additive	75.32	69.23	63.14

*Source: own elaboration from data on **Government Finance Statistics Yearbook 2003**, volume XXVII, 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 alternative indices of fiscal visibility previously redefined by combining significant parameters in additive and multiplicative formulas bring forward a 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 multiplicative and additive indices to measure the visibility of revenue burden and expenditure benefit of central and local fiscal sub-systems now in force in Poland as a new European Union member country offer the following conclusions:

First.- Burden visibility values for the central level of government are lower than those previously estimated [Roig, 1998, 2000, 2001, 2003] for this level of government in old European Union and OECD member countries.

Second.- Quite the opposite, burden visibility values for the Poland local level of government are higher than those previously estimated [Roig, 1998, 2000, 2001, 2003] for this level of government in old European Union and OECD member countries.

Third.- 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.

Fourth.- Burden visibility values for the consolidated central government are significantly lower than those estimated for the local level, while differences of expenditure visibility values between these two levels of government are less important.

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 still lower than 100.00.

Sixth.- In general benefit values are higher than burden values at the central government, suggesting a tendency to a public over-provision of goods and services at this level of government because of visibility asymmetries.

Seventh.- Benefit values are higher than burden values at the local government, also suggesting a tendency to a public over-provision of goods and services at this level of government.

Eighth.- Policy implications of these alternative estimates seem straightforward: as both

present revenue and benefit visibility are lower than 100.00, allocation improvements could be obtained by implementing changes and reforms to raise such values in general and by approaching these two types of budget visibility (specially as regards public revenue) to their optimal value.

Footnotes

¹By 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.

Bibliographical 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*, Associação 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.
- Roig-Alonso, M. (2003): "Arithmetic Visibility Estimates for OECD Countries with Three Government Levels", *International Advances in Economic Research*, Vol. 9, No. 4, November, pp. 295-303.
- Wagner, R.E. (1976): "Revenue structure, fiscal illusion, and budgetary choice", *Public Choice*, 25, pp. 45-61.