

# STRUCTURAL BUDGET BALANCES: THE METHOD APPLIED BY THE OECD

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## 1. Introduction

Since 1994, the Economics Department of the OECD calculates structural budget balance indicators using potential output estimates based on a production function approach. The results are published twice a year in the OECD Economic Outlook and are also used regularly for the annual surveys of the individual OECD member countries. This paper provides a brief description of the method used, gives some results and contains a section on possible future developments<sup>1</sup>.

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<sup>1</sup> Further information on the method used can be found in:

- Giorno, C., P. Richardson, D. Rosevaere and P. Van den Noord (1995), "Estimating potential output, output gaps and structural budget balances", OECD, Economics Department, Working Paper, No. 152.
- Giorno, C., P. Richardson, D. Rosevaere and P. Van den Noord (1995), "Potential output, output gaps and structural budget balances", OECD, Economic Studies, No. 24, pp. 167-209.
- OECD (1994), "Estimating potential output, output gaps and structural budget balances", in OECD, Economic Outlook, No. 56, pp. 31-37.
- Giorno, C. and W. Suyker (1997), "Les estimations de l'écart de production de l'OCDE", *Économie Internationale*, No. 69, pp. 109-134.

## 2. Production function approach to estimate potential output

A production function approach is applied by the Economics Department of the OECD to estimate potential output, using a two-factor constant returns-to-scale Cobb-Douglas production function for the business sector, with employment and capital as production factors<sup>2</sup>. Potential output depends on potential employment, the actual capital stock and trend labour efficiency. Trend labour efficiency is a Hodrick-Prescott filter of actual labour efficiency. Potential employment depends on the trend labour force and the NAWRU, the non-accelerating wage rate of unemployment. The exact formulae can be found in the Annex. However, if details are ignored, the method can be summarised in only four formulae:

$$\ln \text{GDP}_t^* = a [\ln N_t^* + \ln E_t^*] + (1-a) \ln K_t \quad (1)$$

$$N_t^* = \text{LFS} (1-\text{NAWRU}) \quad (2)$$

$$E_t^* = \text{HP-filter}(E_t) \quad (3)$$

$$\text{GAP}_t^* = [ (\text{GDP}_t / \text{GDP}_t^*) - 1 ] * 100 \quad (4)$$

$E_i$	labour efficiency
$E_i^*$	trend labour efficiency
GAP	output gap
GDP	the level of actual output at current prices
GDP*	the level of potential output in current prices
K	capital stock
LFS	trend labour force
$N_i^*$	structural labour input
NAWRU	non-accelerating wage rate of unemployment

<sup>2</sup> A CES production function is used for Japan.

Historical data on wages and unemployment are used to estimate the NAWRU. It is assumed that the change in wage inflation is proportional to the difference between actual unemployment and NAWRU. Assuming also that the NAWRU changes only gradually over time, successive annual observations on the changes in inflation and actual unemployment are used to get “crude” NAWRU estimates (see Figure 1)<sup>3</sup>. To eliminate erratic movements, these crude estimates are smoothed, using a Hodrick-Prescott filter. Finally, up to the Economic Outlook of December 1998, the results of the filter were adjusted by OECD Secretariat country experts on the basis of additional country information. However, this type of ad-hoc adjustments will no longer be made for coming Economic Outlook, while there may be a correction of the NAWRU estimates to allow for sluggish adjustment of real wages to productivity<sup>4</sup>.

### **3. Using potential output to calculate cyclically-adjusted government revenues, expenditures and balances**

General government revenues and expenditures are separated into those revenues and expenditures (disbursements) which are affected by cyclical developments - the divergence between actual output and potential output - and those which are of a structural or non-cyclical nature. In most cases, developments in non-cyclical revenues and expenditures reflect policy decisions made by governments and provide an indication of discretionary fiscal policy. But some revenue and expenditure flows may reflect neither cyclical factors nor discretionary fiscal policy, for example,

<sup>3</sup> See for more information on the method:

- Elmeskov, J. and M. Macfarlan (1993), “Unemployment persistence”, OECD. Economic Studies, No. 21 (Winter).
- Elmeskov, J. (1993), “High and persistent unemployment: assessment of the problem and its causes”, OECD. Economics Department. Working Paper, No. 132, 1993.

<sup>4</sup> OECD (1999), “Secretariat estimates of the NAWRU”, annex 2.1 of “The OECD Jobs strategy: assessing performance and policy”, ECO/CPE/WP1(99)2/ANN2.

changes in resource revenues due to oil price movements or changes in interest payments due to interest-rate variation. Nevertheless, these movements are included in the structural or non-cyclical part of revenues and expenditures<sup>5</sup>.

The structural component of revenues and expenditures are derived by calculating the revenues and expenditures that would pertain if output were at its potential level. The structural levels of revenues ( $T_{it}^*$ ) and expenditures ( $G_t^*$ ) that are sensitive to the level of output are derived from actual taxes ( $T_{it}$ ) and current primary expenditures ( $G_t$ ) as follows:

$$T_{it}^* = T_{it}(\text{GDP}_t^*/\text{GDP}_t)^{a_i} \quad a_i > 0 \quad (5)$$

$$G_t^* = G_t(\text{GDP}_t^*/\text{GDP}_t)^b \quad b < 0 \quad (6)$$

where  $\text{GDP}^*$  is the level of potential output in current prices and  $\text{GDP}$  is the level of actual output at current prices. The elasticities of different types of taxes with respect to nominal output growth are given by  $a_i$  and  $b$  is the elasticity of current primary expenditure with respect to nominal output. The tax categories which are cyclically adjusted are household direct taxes, business taxes, social security contributions and indirect taxes. Once the cyclically-adjusted taxes and expenditures have been calculated, non-adjusted items such as interest payments and receipts and capital spending are added to derive total structural revenues, expenditures and net lending<sup>6</sup>.

#### 4. Current estimates of structural budget balances

The current estimates of structural budget balances, as presented in the OECD Economic Outlook of December 1998, are given in Table 1,

<sup>5</sup> However, an adjustment is made in the case of Norway for oil price and oil production changes.

<sup>6</sup> See the annex for a detailed description.

while Table 2 and 3 show respectively the total budget balance and the cyclical balance. The underlying output gaps are given in Table 5. Results for the euro area over a somewhat longer period are shown in Figure 2<sup>7</sup>. For the euro area, the budget deficit of 2.3% of GDP in 1998 is estimated to be mainly structural. Only 0.7 percentage points is seen as caused by excess supply.

The tax and outlay elasticities currently used are shown in Table 4. The differences between countries are substantial. A clear outlier within the euro area is Italy, with substantially lower elasticities for taxes on households and for social security contributions, while current outlays are estimated to be non-cyclical. To illustrate the sensitivity of the structural budget indicators for the elasticities, the euro-area estimates are applied for Italy (see Figure 3 and 4). While the development over time is the same, the impact on the indicator is certainly policy relevant.

The structural budget balance indicators are even more sensitive for measurement errors in the output gap estimates (see Table 6). For the euro area countries, the underestimation of the output gap by 1 percentage points leads to an overestimation of the structural budget deficit indicator varying from 0.4 to 0.8 percentage points.

Therefore, given the uncertainty on output gaps and elasticities, in presenting the calculated structural budget balances in the Outlook and in other OECD publications, the significant margins of error in the structural budget balance indicators are always stressed.

## 5. Future developments

The Economics Department will present in the Autumn of 1999 a paper on automatic fiscal stabilisers to Working Party 1 of the OECD Economic Policy Committee. The paper may review the policy objectives government seek to achieve with automatic stabilisation, the factors that condition the effectiveness of automatic stabilisation and the possible supplementary role of discretionary fiscal measures. Furthermore, it may

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<sup>7</sup> For the method used to aggregate the euro area countries see "A complete and consistent macro-economic data set for the euro area, methodological issues and results", <http://www.oecd.org/eco/data/euroset.htm>.

assess the scope for automatic stabilisation in the medium term. It is unlikely that this work will lead to a substantial change in the method currently applied to calculate structural budget balance indicators. However, as part of the work, the tax and expenditure elasticities currently used to calculate the structural budget indicators may be updated. In this context, the national delegations to the OECD will be asked to provide information on the elasticities they are currently using to measure the cyclical component of budget deficits and on the way these elasticities were estimated.

**Table 1**  
**General Government Structural Balances**

	Surplus (+) or deficit (-) as a percentage of potential GDP									
	1991	1992	1993	1994	1995	1996	1997	Estimates and projections		
								1998	1999	2000
United States <sup>b</sup>	-3.3	-3.8	-3.1	-2.1	-1.6	-0.9	-0.1	0.8	0.4	0.5
Japan <sup>cd</sup>	1.8	0.8	-1.4	-1.7	-2.8	-4.2	-3.0	-4.1	-5.4	-5.7
Germany <sup>e</sup>	-4.8	-4.1	-2.9	-2.2	-2.7	-2.5	-1.8	-1.8	-1.4	-1.2
France	-2.1	-3.6	-3.8	-4.4	-3.7	-2.7	-1.7	-2.1	-1.9	-1.7
Italy	-10.6	-9.6	-8.4	-8.3	-7.3	-5.8	-1.7	-1.4	-1.0	-0.8
United Kingdom	-2.7	-5.1	-6.3	-6.2	-5.5	-4.2	-2.2	-0.9	-0.7	-0.6
Canada	-5.8	-5.8	-5.6	-4.5	-3.4	-0.6	1.6	2.4	2.6	2.7
Total of above countries	-3.0	-3.6	-3.5	-3.1	-2.9	-2.4	-1.1	-0.8	-1.1	-1.0
Australia	-1.3	-2.3	-2.2	-3.3	-1.8	-0.8	0.2	0.4	0.8	0.7
Austria	-3.8	-2.2	-3.3	-4.3	-4.5	-2.8	-1.1	-1.8	-1.9	-1.8
Belgium	-6.9	-7.1	-5.3	-3.2	-2.5	-1.3	-0.7	-0.8	-0.7	-0.7
Denmark	-0.7	-0.2	-0.1	-1.6	-1.7	-0.7	-0.1	0.6	2.1	2.8
Finland	1.2	-0.5	-1.6	-1.5	-2.3	-1.7	-0.8	0.1	1.5	1.7
Greece	-11.8	-12.5	-12.1	-8.3	-8.8	-6.1	-3.2	-2.1	-2.2	-2.1
Ireland	-1.9	-1.0	0.5	0.9	-1.6	0.3	1.1	1.6	2.3	2.6
Netherlands	-3.8	-4.3	-2.4	-3.4	-3.3	-2.0	-1.3	-2.0	-1.9	-1.7
New Zealand	-1.5	-0.7	0.6	3.1	3.1	2.5	1.8	1.7	0.1	0.3
Norway	-4.4	-6.5	-8.2	-7.3	-3.2	-2.1	-2.5	-3.2	-1.7	-1.8
Portugal	-7.3	-4.1	-5.7	-5.2	-5.0	-2.6	-2.1	-2.2	-2.1	-2.2
Spain	-7.1	-5.5	-6.2	-5.5	-6.5	-3.3	-1.6	-1.3	-1.3	-1.0
Sweden	-2.5	-7.4	-9.2	-8.6	-6.3	-2.3	0.6	2.1	1.1	2.1
Total of above smaller countries	-4.6	-4.6	-4.7	-4.4	-4.2	-2.2	-0.9	-0.8	-0.6	-0.4
Total of above OECD countries	-3.2	-3.7	-3.7	-3.2	-3.1	-2.4	-1.1	-0.8	-1.0	-1.0
<i>Memorandum items</i>										
Total of above European Union countries	-5.1	-5.3	-5.1	-4.9	-4.6	-3.4	-1.6	-1.4	-1.1	-0.9
Euro area	-5.6	-5.1	-4.4	-4.2	-4.1	-3.1	-1.6	-1.6	-1.3	-1.1

a) See footnote a table 2.

b) Receipts relating to Operation Desert Storm, amounting to 0.6 per cent of GDP in 1991, are excluded.

c) Excludes expenditure related to Operation Desert Storm in 1991 amounting to 0.2 per cent of GDP for Japan and to 0.4 per cent of GDP for Germany.

d) The 1998 deficit would rise by 5.4 percentage points if account were taken of the expected assumption by the central government of the accumulated deficits of the Japan National Railway Settlement Corporation and the National Forest service.

Table 2

General Government Financial Balances<sup>a</sup>

	Surplus (+) or deficit (-) as a percentage of nominal GDP									
	1991	1992	1993	1994	1995	1996	1997	Estimates and projections		
								1998	1999	2000
United States	-3.3	-4.4	-3.6	-2.3	-1.9	-0.9	0.4	1.6	0.8	0.6
Japan <sup>b</sup>	2.9	1.5	-1.6	-2.3	-3.6	-4.3	-3.3	-6.1	-7.8	-8.3
Germany <sup>c</sup>	-3.3	-2.6	-3.2	-2.4	-3.3	-3.4	-2.6	-2.4	-2.1	-1.8
France	-2.0	-3.9	-5.7	-5.7	-4.9	-4.1	-3.0	-2.9	-2.4	-1.9
Italy	-10.1	-9.6	-9.5	-9.2	-7.7	-6.7	-2.7	-2.6	-2.2	-1.8
United Kingdom	-2.8	-6.5	-8.0	-6.8	-5.8	-4.4	-2.0	-0.4	-0.7	-1.0
Canada	-7.2	-8.0	-7.5	-5.5	-4.3	-2.0	0.9	2.0	2.2	2.4
Total of above countries	-2.7	-3.8	-4.3	-3.5	-3.4	-2.7	-1.2	-1.0	-1.6	-1.7
Australia	-2.7	-4.1	-3.8	-4.0	-2.0	-0.9	0.2	0.5	0.8	0.5
Austria	-2.7	-1.9	-4.2	-5.0	-5.1	-3.7	-1.9	-2.2	-2.2	-2.1
Belgium	-6.3	-6.9	-7.1	-4.9	-3.9	-3.1	-1.9	-1.5	-1.3	-1.1
Czech Republic	..	..	0.0	-0.8	-2.2	-1.1	-2.2	-1.6	-2.5	-2.8
Denmark	-2.4	-2.2	-2.8	-2.6	-2.2	-0.9	0.2	1.0	2.2	2.6
Finland	-1.5	-5.7	-7.9	-6.2	-5.2	-3.7	-1.4	0.8	1.9	1.8
Greece	-11.5	-12.8	-13.8	-10.0	-10.6	-7.5	-4.0	-2.7	-2.5	-2.1
Hungary	..	..	-7.8	-7.5	-6.4	-3.0	-4.9	-4.5	-4.3	-4.5
Iceland	-2.9	-2.8	-4.5	-4.7	-3.0	-1.6	-0.5	-0.1	0.1	0.1
Ireland	-2.4	-2.5	-2.4	-1.6	-2.1	-0.2	1.5	2.5	2.8	2.8
Korea	2.0	1.5	2.8	3.4	4.7	4.5	4.5	-1.0	-1.5	-1.5
Netherlands	-2.9	-3.9	-3.2	-3.8	-3.7	-2.0	-0.9	-1.2	-1.3	-1.4
New Zealand	-3.8	-3.3	-0.6	3.0	3.3	2.7	2.0	0.9	-1.0	-0.5
Norway	0.1	-1.7	-1.4	0.4	3.5	6.5	7.5	4.4	5.4	5.9
Poland	..	..	-4.5	-3.7	-3.0	-4.4	-3.3	-3.1	-2.7	-2.5
Portugal	-6.0	-2.9	-6.1	-6.0	-5.8	-3.3	-2.5	-2.3	-2.0	-2.1
Spain	-4.5	-4.1	-7.0	-6.4	-7.3	-4.7	-2.6	-1.9	-1.8	-1.5
Sweden	-1.1	-7.8	-12.3	-10.3	-7.0	-3.5	-0.8	1.2	0.3	1.5
Total of above smaller countries	-2.9	-3.7	-4.5	-3.8	-3.2	-1.8	-0.6	-1.0	-1.0	-0.8
Total of above OECD countries	-2.7	-3.8	-4.3	-3.6	-3.4	-2.6	-1.1	-1.0	-1.5	-1.5
<i>Memorandum items</i>										
Total of above European Union countries	-4.4	-5.2	-6.4	-5.7	-5.4	-4.3	-2.4	-1.9	-1.7	-1.4
Euro area	-4.6	-4.6	-5.5	-5.0	-4.8	-4.1	-2.5	-2.3	-1.9	-1.6

a) For Germany (starting 1992), France (starting 1991) and Sweden (starting 1995): "Maastricht definition". Denmark: ENS95 standard.

b) The 1998 deficit would rise by 5.4 percentage points if account were taken of the expected assumption by the central government of the accumulated deficits of the Japan National Railway Settlement Corporation and the National Forest service.

c) Includes balances of the German Railways Fund from 1994 onwards and of the Inherited Debt Fund from 1995 onwards.



**Table 3**

**General Government Cyclical Balances**

	Surplus (+) or deficit (-) as a percentage of potential GDP									
	1991	1992	1993	1994	1995	1996	1997	Estimates and projections		
								1998	1999	2000
United States	-0.1	-0.6	-0.5	-0.2	-0.2	0.0	0.4	0.7	0.3	0.2
Japan	1.0	0.6	-0.2	-0.6	-0.8	-0.1	-0.3	-2.0	-2.4	-2.6
Germany	1.4	1.5	-0.3	-0.2	-0.6	-0.8	-0.8	-0.7	-0.7	-0.6
France	0.1	-0.3	-1.9	-1.4	-1.2	-1.4	-1.3	-0.7	-0.5	-0.2
Italy	0.5	0.1	-1.0	-0.9	-0.4	-0.9	-0.9	-1.2	-1.2	-1.0
United Kingdom	-0.1	-1.4	-1.7	-0.6	-0.3	-0.2	0.2	0.5	-0.1	-0.5
Canada	-1.4	-2.2	-2.0	-1.0	-1.0	-1.4	-0.7	-0.4	-0.4	-0.3
Total of above countries	0.3	-0.2	-0.7	-0.5	-0.5	-0.3	-0.1	-0.2	-0.5	-0.6
Australia	-1.4	-1.8	-1.5	-0.7	-0.3	-0.1	0.0	0.1	0.0	-0.2
Austria	1.1	0.3	-0.9	-0.6	-0.6	-0.9	-0.8	-0.4	-0.4	-0.3
Belgium	0.7	0.2	-1.8	-1.7	-1.4	-1.8	-1.2	-0.7	-0.6	-0.4
Denmark	-1.7	-2.0	-2.6	-1.0	-0.5	-0.1	0.3	0.4	0.1	-0.2
Finland	-2.6	-5.3	-6.3	-4.7	-2.9	-2.0	-0.5	0.7	0.4	0.2
Greece	0.2	-0.3	-1.6	-1.7	-1.8	-1.4	-0.8	-0.6	-0.4	-0.1
Ireland	-0.5	-1.5	-3.0	-2.5	-0.5	-0.5	0.4	0.9	0.4	0.2
Netherlands	0.9	0.4	-0.8	-0.3	-0.4	0.0	0.4	0.8	0.6	0.3
New Zealand	-2.3	-2.6	-1.3	-0.1	0.1	0.2	0.2	-0.8	-1.1	-0.7
Norway (a)	4.6	4.7	6.8	7.7	6.6	8.6	10.0	7.6	7.0	7.7
Portugal	1.3	1.1	-0.4	-0.8	-0.8	-0.7	-0.4	0.0	0.1	0.1
Spain	2.6	1.4	-0.9	-0.9	-0.9	-1.3	-1.1	-0.6	-0.5	-0.5
Sweden	1.4	-0.4	-3.1	-1.8	-0.7	-1.2	-1.4	-0.9	-0.8	-0.6
Total of above smaller countries	1.7	1.0	0.2	0.6	0.9	0.5	0.3	-0.2	-0.4	-0.4
Total of above OECD countries	0.5	0.0	-0.6	-0.3	-0.3	-0.2	0.0	-0.2	-0.5	-0.6
<i>Memorandum items</i>										
Total of above European Union countries	0.7	0.1	-1.3	-0.9	-0.7	-0.9	-0.7	-0.5	-0.5	-0.5
Euro area	1.0	0.5	-1.1	-0.8	-0.7	-1.0	-0.9	-0.7	-0.6	-0.5

(a) Including revenues from oil production

Table 4

**Elasticities Applied to Correct Government Receipts and Outlays  
for Cycle**

Elasticities	Direct tax on households	Direct tax on business	Indirect tax	Social security contributions	Current outlays (excluding interest payments)
United States	1.1	2.5	1	0.8	-0.1
Japan	1.2	3.7	1	0.6	-0.1
Germany	0.9	2.5	1	0.7	-0.2
France	1.4	3	1	0.7	-0.1
Italy	0.4	2.9	1	0.3	0
U. K.	1.3	4.5	1	1	-0.1
Canada	1	2.4	1	0.8	-0.3
Austria	1.2	2.5	1	0.5	-0.1
Belgium	1.2	2.5	1	0.8	-0.1
Denmark	0.7	2.2	1	0.6	-0.2
Finland	1.1	2.5	1	0.8	-0.1
Greece	1.2	2.5	1	0.5	-0.2
Ireland	1.3	2.5	1	0.5	-0.2
Netherlands	1.3	2.5	1	1	-0.2
Norway	1.2	2.5	1	0.9	-0.1
Portugal	1.2	2.5	1	0.5	-0.2
Spain	1.9	2.1	1	1.1	-0.3
Sweden	1.4	2.4	1	1.2	-0.1
Australia	0.8	2.5	1	0.8	-0.2
New Zealand	0.4	2.5	1	0.4	-0.2
Euro area	1.1	2.6	1	0.7	-0.1
Minimum	0.4	2.1	1	0.3	-0.3
Maximum	1.9	4.5	1	1.2	0

Table 5

Output Gaps<sup>a</sup>

Deviations of actual GDP from potential GDP as a percentage of potential GDP

	1989	1990	1991	1992	1993	1994	1995	1996	1997	Estimates and projections		
										1998	1999	2000
United States	2.3	1.1	-1.9	-1.4	-1.3	-0.3	-0.6	0.0	1.3	2.0	0.8	0.4
Japan	0.7	2.4	3.1	1.5	-0.5	-1.5	-1.9	-0.1	-0.7	-4.7	-5.6	-6.0
Germany	0.1	2.1	3.6	2.8	-0.6	-0.3	-1.1	-1.6	-1.7	-1.4	-1.4	-1.2
France	1.4	1.5	0.2	-0.6	-3.5	-2.4	-2.1	-2.5	-2.2	-1.2	-0.9	-0.4
Italy	2.0	2.1	1.4	0.2	-2.6	-2.3	-1.1	-2.3	-2.6	-3.2	-3.2	-2.7
United Kingdom	5.5	3.3	-0.7	-2.7	-2.9	-0.8	-0.4	-0.2	0.6	0.9	-0.4	-0.9
Canada	3.4	1.6	-2.5	-3.7	-3.4	-1.8	-1.8	-2.7	-1.3	-0.7	-0.8	-0.5
Total of above countries	2.0	1.7	0.0	-0.4	-1.5	-0.9	-1.1	-0.7	-0.1	-0.4	-1.2	-1.4
Australia	0.6	-0.7	-4.0	-4.3	-3.3	-1.2	-0.5	-0.1	0.0	0.4	-0.2	-0.6
Austria	1.5	2.5	2.2	0.6	-1.8	-1.2	-1.2	-1.7	-1.5	-0.8	-0.7	-0.6
Belgium	1.2	2.1	1.2	0.4	-3.1	-2.9	-2.4	-3.1	-2.1	-1.2	-1.0	-0.7
Denmark	-2.6	-3.1	-3.4	-3.9	-4.9	-1.6	-0.9	-0.2	0.6	0.8	0.2	-0.4
Finland	6.2	4.3	-4.7	-8.9	-10.9	-8.0	-4.9	-3.3	-1.0	1.3	0.8	0.3
Greece	2.0	-0.3	0.6	-0.6	-3.4	-3.5	-3.5	-3.0	-1.8	-1.3	-0.8	-0.1
Ireland	0.0	3.1	-1.0	-3.1	-6.0	-5.0	-1.1	-1.1	1.0	2.0	1.0	0.4
Netherlands	0.9	2.0	1.3	0.5	-1.2	-0.5	-0.6	0.1	0.7	1.4	1.0	0.4
New Zealand	-1.0	-2.6	-5.6	-6.0	-3.2	-0.3	0.3	0.7	0.4	-2.0	-2.7	-1.9
Norway <sup>b</sup>	-4.7	-5.0	-4.9	-4.5	-3.1	-1.4	-0.7	0.7	1.7	2.2	0.9	-0.1
Portugal	2.3	3.4	2.8	2.5	-1.3	-1.8	-1.7	-1.5	-0.8	0.1	0.2	0.3
Spain	4.1	4.7	4.1	2.1	-1.3	-1.4	-1.3	-2.1	-1.7	-1.0	-0.8	-0.8
Sweden	5.0	4.3	1.9	-0.6	-3.8	-2.2	-0.9	-1.5	-1.9	-1.2	-1.0	-0.9
Switzerland	-1.1	1.1	-1.2	-2.1	-3.2	-3.6	-3.8	-4.5	-3.8	-3.3	-2.8	-2.2
Total of above smaller countries	1.7	1.9	0.4	-0.9	-2.8	-2.0	-1.5	-1.6	-1.0	-0.4	-0.5	-0.5
Total of above OECD countries	1.9	1.8	0.1	-0.5	-1.7	-1.1	-1.2	-0.8	-0.2	-0.4	-1.1	-1.2
<i>Memorandum items</i>												
Total of above North American countries	2.4	1.2	-2.0	-1.6	-1.4	-0.4	-0.7	-0.2	1.1	1.8	0.7	0.3
Total of above European Union countries	2.2	2.4	1.4	0.2	-2.4	-1.6	-1.3	-1.7	-1.4	-1.0	-1.2	-1.0
Euro area	1.6	2.4	2.0	1.0	-2.0	-1.5	-1.4	-1.9	-1.7	-1.3	-1.2	-1.0

a) For further details, see Giorno *et al.*, "Potential output, output gaps and structural budget balances", *OECD Economic Studies*, No. 24, 1995/1.

b) Mainland Norway.

**Table 6**

**Error in the Structural Budget Balance Caused by an  
Overestimation of the Output Gap by 1 Percentage Point**  
*(percentage of GDP)*

	First year	From second year onwards
Germany	0.5	0.5
France	0.5	0.6
Italy	0.4	0.4
United Kingdom	0.5	0.6
Austria	0.5	0.5
Belgium	0.6	0.6
Denmark	0.5	0.5
Finland	0.6	0.6
Greece	0.4	0.4
Ireland	0.5	0.5
Netherlands	0.6	0.6
Portugal	0.4	0.5
Spain	0.6	0.6
Sweden	0.8	0.8
Minimum	0.4	0.4
Maximum	0.8	0.8

**Fig. 1**

**Method Applied to Estimate the NAWRU**

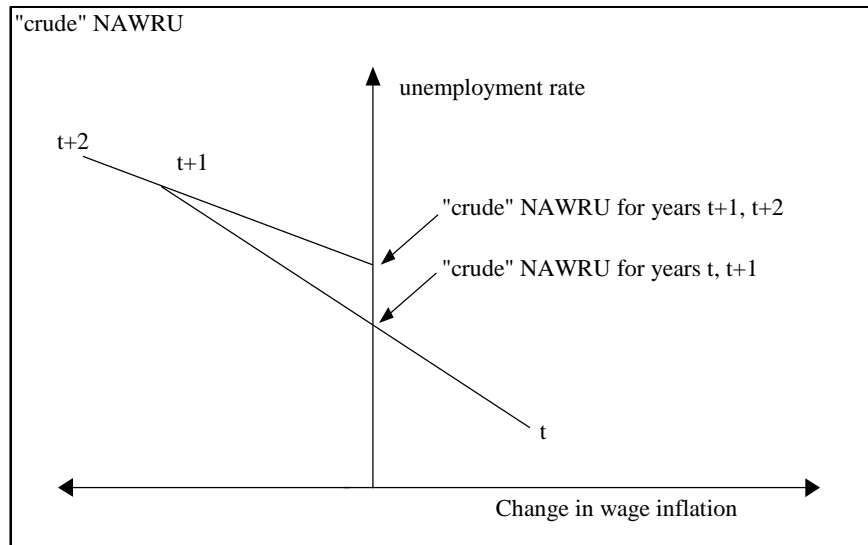
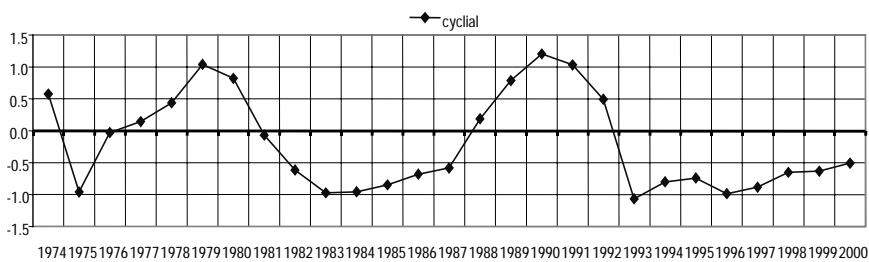
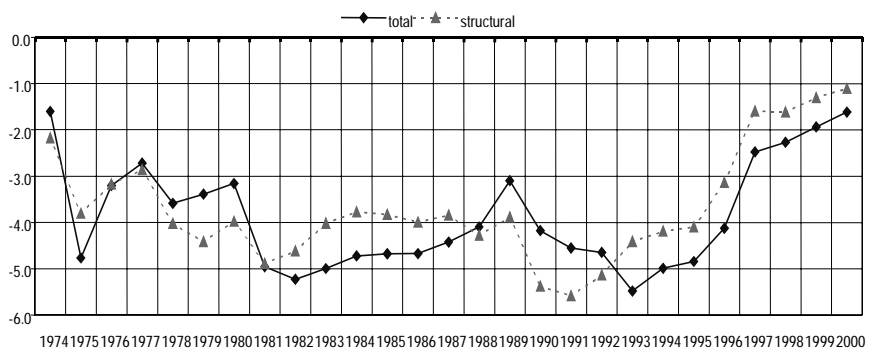


Fig. 2

General Government Balances of the Euro-Area



Government financial liabilities (as a percentage of

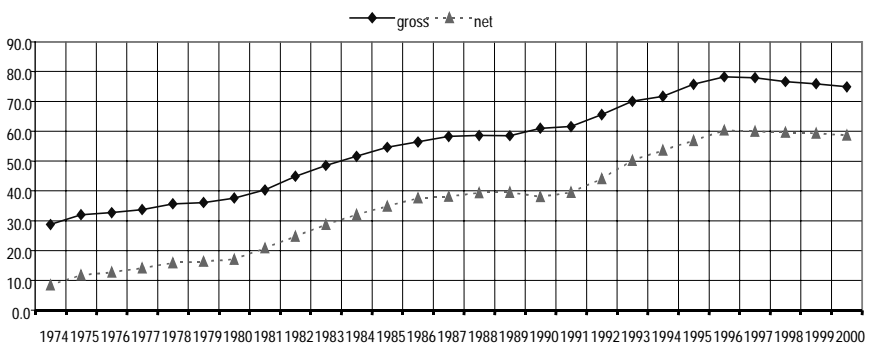


Fig. 3

**Italian General Government Structural Balance**

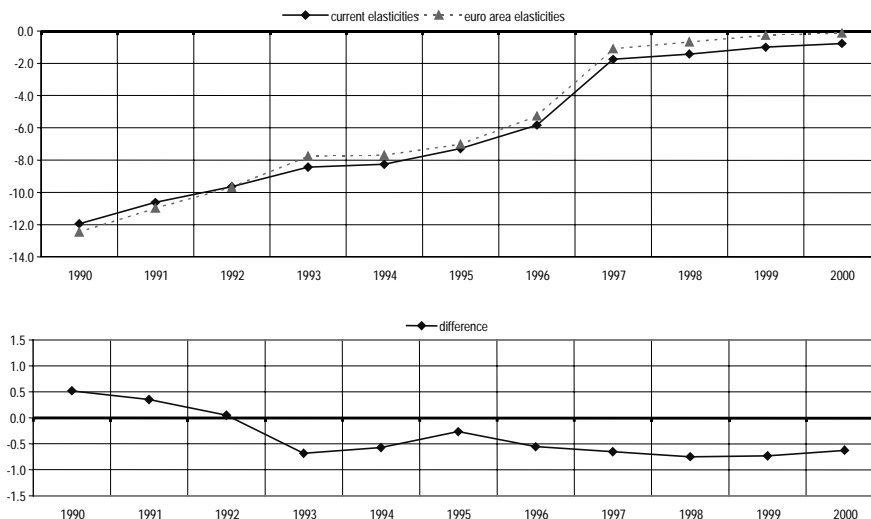
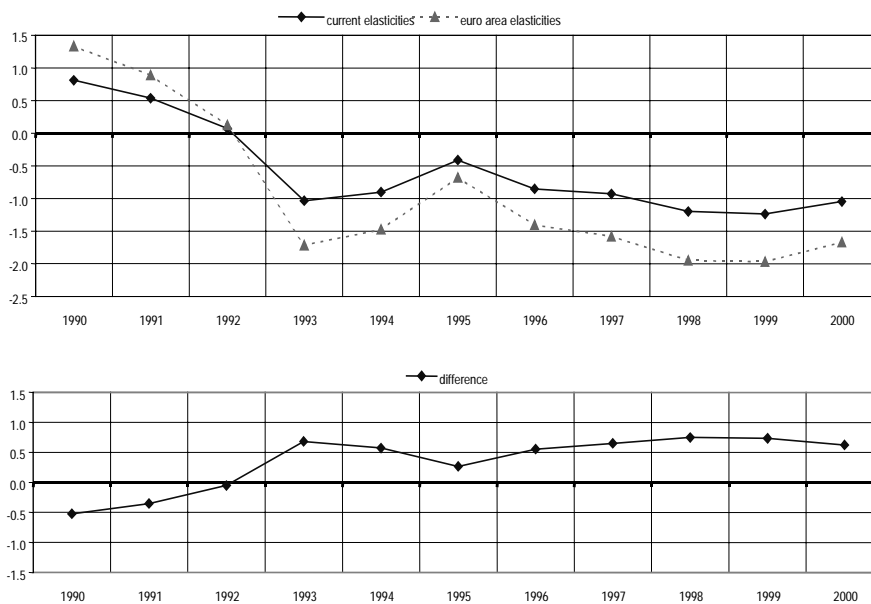


Fig. 4

**Italian General Government Cyclical Balance**



## ANNEX

### **Detailed description of method used to estimate structural budget balance indications**

This annex provides the equation relevant for the calculation of structural budget balances. These equations are part of INTERLINK, the OECD's Secretariat world economic model. INTERLINK has a semi-annual frequency and, as a consequence, the relations hold exactly on a semi-annual level. However, due to non-linearity, relations will not hold exactly on an annual level.



**1. Supply block**

- 1  $LFS = LFPRS * POPT / 100$
- 1a  $LFS = LFPRS * ZCS001 / 100$  [IRE]
- 2  $ETBPT = XLFS * LFS - EG - XLFS * LFS * UNRMIN / 100.$
- 2a  $ETBPT = CLFS * LFS - EG - CLFS * LFS * UNRMIN / 100.$  [USA, ITA, FIN, IRE]
- 2b  $ETBPT = XLFS * LFS - EG - ECSA - XLFS * LFS * UNRMIN / 100.$  [GBR, NOR]
- 3  $QBVTR = ((ELEFF2 * ETBPT) ** XTAU) * (KBV ** (1 - XTAU))$
- 3a  $QBVTR = ((ELEFF2 * ETBPT * HRST) ** XTAU) * (KBV ** (1 - XTAU))$  [USA, DEU]
- 3b  $QBVTR = ((ELEFF2 * ETBPT * HRS) ** XTAU) * (KBV ** (1 - XTAU))$  [FRA]
- 3c  $QBVTR = (XOBETA / 10 ** 10 * ((ELEFF2 * ETBPT * HRST / 100) ** ((XTAU - 1) / XTAU)) + XOGAMA * (KBV ** ((XTAU - 1) / XTAU))) ** (XTAU / (XTAU - 1))$  [JPN]
- 4  $GDPVTR = (QBVTR + CFKG / PIG) / (1 - XNITV) + CGW / PCGW$
- 4a  $GDPVTR = (QBVTR + GDPCSA + CFKG / PIG) / (1 - XNITV) + CGW / PCGW - GDPCSA$  [NOR]
- 4b  $GDPVTR = (QBVTR + CFKG / PIG + SDGDPV) / (1 - XNITV) + CGW / PCGW$  [IRE]
- 5  $GAP = (GDPV / GDPVTR - 1) * 100$
- 5a  $GAP = (ZCS004 / GDPVTR - 1) * 100$  [NOR]

**2. Supply block, miscellaneous**

6	$IFU3 = GDPVTR / GDPV$	
6a	$IFU3 = GDPVTR / ZCS004$	[NOR]
7	$GDPTR = GDP * IFU3$	
7a	$GDPTR = ZCS005 * IFU3$	[NOR]
8	$LFPR = LF / POPT * 100$	
9	$NITV = XNITV * (GDPV - CGW/PCGW)$	
10	$GDPBV = GDPV - CGW/PCGW - NITV -$ $CFKG/PIG$	
10a	$GDPBV = GDPV - CGW/PCGW - NITV -$ $CFKG/PIG - SDGDPV$	[IRE]
10b	$GDPBV = GDPV - CGW/PCGW - NITV -$ $CFKG/PIG - GDPCSA$	[NOR]
11	$ELEFFU = (GDPBV / ((ETB**XTAU) * KBV**(1-$ $XTAU))) ** (1/XTAU)$	
11a	$ELEFFU = (GDPBV / (((ETB*HRS)**XTAU) *$ $KBV**(1-XTAU))) ** (1/XTAU)$	[USA, DEU, FRA]
11b	$ELEFFU = (((GDPBV**((XTAU-1)/XTAU)$ $- XOGAMA*(KBV**((XTAU-1)/XTAU)))$ $/(XOBETA/10**10)**(XTAU/(XTAU-1)))$ $/(ETB*HRS/100))$	[JPN]

**3. Government current revenues (unadjusted)**

- 12  $TYB = ZCS006 + ZCS011$  [NOR]
- 13  $TY = TYH + TYB$
- 13a  $TY = TYH + TYB + ZCS020$  [DEU]
- 13b  $TY = TYH + TYB + ZCS002$  [NLD]
- 14  $TIND = ZCS007 + ZCS012$  [NOR]
- 15  $YPERG = YPERGX + GGINTR$
- 16  $ZCS008 = YPERG - ZCS013$  [NOR]
- 17  $YRG = TY + TIND + SSRG + TRRG + YPERG$
- 18  $YRGX = YRG - GGINTR$

**4. Government current outlays (unadjusted)**

- 19  $CG = CGW + CGNW$
- 19a  $CGAA = CGW + CGNW$  [FRA, ITA, AUS,  
IRE, NOR, PRT]
- 20  $YPEPG = YPEPGX + GGINTP$
- 21  $YPG = CG + YPEPG + TSUB + SSPG +$   
 $TRPG$
- 21a  $YPG = CGAA + YPEPG + TSUB + SSPG +$  [FRA, ITA, AUS,  
 $TRPG$  IRE, NOR, PRT]
- 22  $YPGX = YPG - GGINTP$

**5. Government capital account (unadjusted)**

- 23 SAVG = YRG - YPG
- 24 CAPOG = IG + RESTG - KTRRG - CFKG
- 25 YPGT = YPG + CAPOG
- 26 NLG = SAVG - CAPOG
- 27 GNINTP = GGINTP - GGINTR
- 28 NLGX = NLG + GNINTP
- 29 NLGQ = NLG / GDP \* 100
- 30 NLGXQ = NLGX / GDP \* 100

**6. Government current revenues (adjusted)**

- 31 TYHA = TYH \* IFU3\*\*XTYHEL
- 31a TYHA = (TYH + ZCS020) \* IFU3\*\*XTYHEL [DEU]
- 32 TYBA = TYB \* (XALPHA\*IFU3\*\*XTYBEL + (1-XALPHA)\*IFU3(-1)\*\*XTYBEL)
- 32a TYBA = (TYB+ZCS002) \* (XALPHA\*IFU3\*\*XTYBEL + (1-XALPHA)\*IFU3(-1)\*\*XTYBEL) [NLD]
- 32b TYBA = ZCS011\*(XALPHA\*IFU3\*\*XTYBEL+(1-XALPHA)\*IFU3(-1)\*\*XTYBEL) [NOR]
- 33 TINDA = TIND \* IFU3\*\*XTINDE
- 33a TINDA = ZCS012 \* IFU3\*\*XTINDE [NOR]
- 34 SSRGA = SSRG \* IFU3\*\*XSSRGE
- 35 YRGA = TYHA + TYBA + TINDA + SSRGA + TRRG + YPERG
- 35a YRGA = TYHA + TYBA + TINDA + SSRGA + TRRG + ZCS013 [NOR]

**7. Government current outlays (adjusted)**

$$36 \quad YPGXA = (YPG - GGINTP) * IFU3**XYPGEL$$

$$37 \quad YPGA = YPGXA + GGINTP$$

**8. Government net lending (adjusted)**

$$38 \quad NLGA = YRGA - YPGA - CAPOG$$

$$39 \quad NLGXA = NLGA + GNINTP$$

$$40 \quad NLGQA = NLGA / GDPTR * 100$$

$$41 \quad NLGXQA = NLGXA / GDPTR * 100$$

**9. Government debt**

$$42 \quad GNFL = GNFL(-1) - NLG + SDGNFL$$

$$43 \quad GGFL = GNFL + GFAR * GDP / 100$$

$$44 \quad GGFLM = GGFLM(-1) + GGFL - GGFL(-1)$$

[European Union countries; projection period]

$$45 \quad GNFLQ = GNFL / GDP * 100$$

$$46 \quad GGFLQ = GGFL / GDP * 100$$

$$47 \quad GGFLMQ = GGFLM / GDP * 100$$

**Description of variable codes**

1	CAPOG	NET CAPITAL OUTLAYS, GOVERNMENT
2	CFKG	CONSUMPTION OF FIXED CAPITAL, GOVERNMENT
3	CG	GOVERNMENT CONSUMPTION, VALUE
4	CGAA	GOVERNMENT CONSUMPTION, VALUE (APPROPRIATION ACCOUNT)
5	CGNW	GOVERNMENT CONSUMPTION, EXCL.WAGES
6	CGW	GOVERNMENT CONSUMPTION, WAGES
7	CLFS	RATIO OF TOTAL EMPLOYMENT NATIONAL ACCOUNTS BASIS AND SURVEY BASIS
8	ECSA	EMPLOYMENT, COUNTRY SPECIFIC
9	EG	EMPLOYMENT, GOVERNMENT
10	ELEFF2	TREND LABOR EFFICIENCY, BUSINESS SECTOR
11	ELEFFU	LABOR EFFICIENCY, BUSINESS SECTOR
12	ETB	EMPLOYMENT, BUSINESS
13	ETBPT	EMPLOYMENT, BUSINESS, POTENTIAL
14	EXCH	EXCHANGE RATE (\$US PER LOCAL)
15	GAP	OUTPUT GAP
16	GDP	GROSS DOMESTIC PRODUCT (MARKET PRICES), VALUE
17	GDPBV	GROSS DOMESTIC PRODUCT, BUSINESS (FACTOR COST), VOLUME
18	GDPCSA	GROSS DOMESTIC PRODUCT, COUNTRY SPECIFIC, VOLUME(see note)
19	GDPTR	POTENTIAL OUTPUT, TOTAL ECONOMY AT CURRENT PRICES
20	GDPV	GROSS DOMESTIC PRODUCT (MARKET PRICES), VOLUME
21	GDPVTR	POTENTIAL OUTPUT, TOTAL ECONOMY, VOLUME
22	GFAR	RATIO OF GOVERNMENT ASSETS TO GDP
23	GGFL	GROSS GOVERNMENT DEBT
24	GGFLM	GROSS GOVERNMENT DEBT, MAASTRICHT CRITERION
25	GGFLMQ	GROSS GOVERNMENT DEBT, MAASTRICHT CRITERION, % GDP

26	GGFLQ	GROSS GOVERNMENT DEBT, % GDP
27	GGINTP	GROSS GOVERNMENT INTEREST PAYMENTS
28	GGINTR	GROSS GOVERNMENT INTEREST RECEIPTS
29	GNFL	GOVERNMENT, NET FINANCIAL LIABILITIES
30	GNFLQ	GOVERNMENT, NET FINANCIAL LIABILITIES, % GDP
31	GNINTP	NET GOVERNMENT INTEREST PAYMENTS
32	GNINTQ	NET GOVERNMENT INTEREST PAYMENTS, %GDP
33	HRS	AVERAGE HOURS PER EMPLOYEE
34	HRST	TREND - AVERAGE HOURS PER EMPLOYEE
35	IFU3	RATIO OF ACTUAL AND POTENTIAL OUTPUT
36	IG	FIXED INVESTMENT, GOVERNMENT, VALUE
37	IGAA	GOVERNMENT INVESTMENT (APPROPRIATION ACCOUNT)
38	KBV	CAPITAL STOCK, BUSINESS
39	KTRRG	NET CAPITAL TRANSFERS RECEIVED BY GOVERNMENT
40	LF	LABOR FORCE, TOTAL
41	LFPR	LABOR FORCE, PARTICIPATION RATIO
42	LFPRS	LABOR FORCE, PARTICIPATION RATIO, TREND
43	LFS	LABOR FORCE, TREND
44	NITV	NET INDIRECT TAXES , VOLUME
45	NLG	NET LENDING, GOVERNMENT
46	NLGA	NET LENDING, GOVERNMENT, CYCLICALLY ADJUSTED
47	NLGM	NET LENDING, GOVERNMENT, MAASTRICHT DEFINITION
48	NLGMQ	NET LENDING, GOVERNMENT, MAASTRICHT DEFINITION, % of GDP
49	NLGQ	NET LENDING, GOVERNMENT, % GDP
50	NLGQA	NET LENDING, GOVERNMENT, CYCLICALLY ADJUSTED, % POTENTIAL GDP
51	NLGX	PRIMARY GOVERNMENT BALANCE
52	NLGXA	PRIMARY GOVERNMENT BALANCE, CYCLICALLY ADJUSTED
53	NLGXQ	PRIMARY GOVERNMENT BALANCE, % GDP
54	NLGXQA	PRIMARY GOVERNMENT BALANCE, CYCLICALLY ADJUSTED, % POT. GDP

55	PCGW	DEFLATOR, GOVERNMENT CONSUMPTION OF GOODS & SERVICES, WAGES
56	PCP	DEFLATOR, PRIVATE CONSUMPTION
57	PIG	DEFLATOR, FIXED INVESTMENT, GOVERNMENT
58	POPT	WORKING-AGE POPULATION
59	PPP	PURCHASING PARITY
60	QBVTR	GROSS OUTPUT, BUSINESS, VOLUME, TREND
61	RESTG	OTHER CAPITAL TRANSACTIONS, GOVERNMENT
62	SAVG	SAVINGS, GOVERNMENT
63	SDGDPV	STATISTICAL DISCREPANCY, REAL GDP
64	SDGNFL	STATISTICAL DISCREPANCY OF GOVERNMENT NET FINANCIAL LIABILITIES
65	SSPG	SOCIAL BENEFITS PAID BY GOVERNMENT
66	SSRG	SOCIAL SECURITY CONTRIBUTIONS RECEIVED BY GOVERNMENT
67	SSRGA	SOCIAL SECURITY CONTRIB. RECEIVED BY GOVERNMENT, CYCLICALLY ADJUSTED
68	TIND	INDIRECT TAXES
69	TINDA	INDIRECT TAXES, CYCLICALLY ADJUSTED
70	TRPG	OTHER CURRENT TRANSFERS PAID BY GOVERNMENT
71	TRRG	OTHER CURRENT TRANSFERS RECEIVED BY GOVERNMENT
72	TSUB	SUBSIDIES
73	TY	TOTAL DIRECT TAXES
74	TYB	DIRECT TAXES, BUSINESS
75	TYBA	DIRECT TAXES, BUSINESS, CYCLICALLY ADJUSTED
76	TYH	DIRECT TAXES, HOUSEHOLDS
77	TYHA	DIRECT TAXES, HOUSEHOLDS, CYCLICALLY ADJUSTED
78	UNR	UNEMPLOYMENT RATE
79	UNRMIN	NAWRU, NON-ACCELERATING WAGE RATE OF UNEMPLOYMENT
80	YPEPG	PROPERTY INCOME PAID BY GOVERNMENT
81	YPEPGX	PROPERTY INCOME PAID BY GOVERNMENT, EXCL. INTEREST



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82	YPERG	PROPERTY INCOME RECEIVED BY GOVERNMENT
83	YPERGX	PROPERTY INCOME RECEIVED BY GOVERNMENT, EXCL. INTEREST
84	YPG	CURRENT DISBURSEMENTS, GOVERNMENT
85	YPGA	CURRENT DISBURSEMENTS, GOVERNMENT, CYCLICALLY ADJUSTED
86	YPGT	TOTAL DISBURSEMENTS GOVERNMENT
87	YPGX	CURRENT DISBURSEMENTS, GOVERNMENT, EXCLUDING INTEREST
88	YPGXA	CURRENT DISBURSEMENTS EXCL. INTEREST, GOV., CYCLICALLY ADJUSTED
89	YRG	CURRENT RECEIPTS, GOVERNMENT
90	YRGA	CURRENT RECEIPTS, GOVERNMENT, CYCLICALLY ADJUSTED
91	YRGQ	CURRENT RECEIPTS, GOVERNMENT, % GDP
92	YRGX	CURRENT RECEIPTS, GOVERNMENT, EXCLUDING INTEREST
93	ZCS001	IRELAND: WORKING-AGE POPULATION, TREND
94	ZCS002	NETHERLANDS: OTHER DIRECT TAXES
95	ZCS004	NORWAY: MAINLAND GDP , VOLUME
96	ZCS005	NORWAY: MAINLAND GDP, VALUE
97	ZCS006	NORWAY: DIRECT TAXES, BUSINESS, OIL-SECTOR
98	ZCS007	NORWAY: INDIRECT TAXES, RELATED TO OIL PRODUCTION
99	ZCS008	NORWAY: PROPERTY INCOME RECEIVED BY GOVERNMENT, RELATED TO OIL PRODUCTION
100	ZCS009	DESERT STORM VARIABLES
101	ZCS011	NORWAY: DIRECT TAXES, BUSINESS EXCLUDING OIL SECTOR
102	ZCS012	NORWAY: INDIRECT TAXES, NOT RELATED TO OIL PRODUCTION
103	ZCS013	NORWAY; PROPERTY INCOME RECEIVED BY GOVERNMENT, NOT RELATED TO OIL PRODUCTION
104	ZCS017	FRANCE and GERMANY, NET LENDING, GOVERNMENT, MAASTRICHT DEFINITION

105 ZCS020 ADJUSTMENT  
GERMANY: OTHER DIRECT TAXES  
(INCLUDES TAX RECEIPTS FROM REST OF  
THE WORLD, DIRECT TAXES PAID BY  
HOUSEHOLDS SUCH AS CAR TAX AND DOG  
TAX)