

Cyclically-adjusted budget balances: a methodological note¹

The cyclically-adjusted balance is computed to show the underlying fiscal position when cyclical or automatic movements are removed. In terms of revenues, four different types of taxes are distinguished in the cyclical adjustment process: personal income tax; social security contributions; corporate income tax and indirect taxes. The sole item of public spending treated as cyclically sensitive is unemployment-related transfers. The adjustment is made at the level of total primary spending as time-series data on unemployment-related expenditure are not available across countries. The cyclically-adjusted balance (ratio to potential output), b^* , is thus defined as:

$$b^* = [(\sum_{i=1}^4 T_i^*) - G^* + X] / Y^* \quad [1]$$

where:

G^* = cyclically-adjusted current primary government expenditures

T_i^* = cyclically-adjusted component of the i th category of tax

X = non-tax revenues minus capital and net interest spending

Y^* = level of potential output

and the cyclically-adjusted components are calculated from actual tax revenues and expenditures adjusted according to the ratio of potential output to actual output, the ratio between structural unemployment and actual unemployment and the assumed elasticities:

$$T_i^*/T_i = (Y^*/Y)^{\mathcal{E}_{t_i, y}} \quad [2]$$

$$G^*/G = (U^*/U)^{\mathcal{E}_{g, u}} \quad [3]$$

where:

T_i = actual tax revenues for the i th category of tax

G = actual current primary government expenditures (excluding capital and interest spending)

Y = level of actual output

U^* = level of structural unemployment

U = level of actual unemployment

$\mathcal{E}_{t_i, y}$ = elasticity of the i th tax category with respect to the output gap

1. The detailed methodology is presented in Girouard and André (2005), "Measuring cyclically-adjusted budget balances for OECD countries", Economics Department Working Paper No.434.

$\varepsilon_{g, u}$ = elasticity of current primary government expenditure with respect to the ratio of structural to actual unemployment

From these relationships, the cyclically-adjusted balance can be derived as follows:

$$b^* = [(\sum_{i=1}^4 T_i (Y^*/Y) \varepsilon_{t_i, y}) - G (U^*/U) \varepsilon_{g, u} + X] / Y^* \quad [4]$$

Conceptually, the elasticities $\varepsilon_{t_i, y}$ can be separated into two components, an elasticity of tax proceeds with respect to the relevant tax base, ε_{t_i, tb_i} and an elasticity of the tax base relative to a cyclical indicator, $\varepsilon_{tb_i, y}$:

$$\varepsilon_{t_i, y} = \varepsilon_{t_i, tb_i} \varepsilon_{tb_i, y} \quad [5]$$

The elasticity of the tax proceeds with respect to the tax base is determined by the structure of the tax system. For proportional taxes, the value will be unity, but where there are several rates the elasticity can exceed unity (progressivity) or fall below it (regressivity). The personal income tax is generally progressive, being characterised by a statutory rate which rises with taxable income, while social security contributions are usually levied at a flat rate up to a ceiling, which makes them moderately regressive. Corporate income tax is normally levied at a single rate. For indirect taxes, two opposite effects weigh on the value of the elasticity. On the one hand, *ad valorem* indirect taxes such as the value added tax may have a progressive element to the extent that higher rates apply to more income-elastic parts of the base. On the other hand, specific taxes, which are determined by real consumption only and do not account for price movements, may be regressive. The elasticity of the tax base with respect to a cyclical indicator can be quite complex, depending on whether the base is income, expenditure or employment, the behaviour of which can vary across cycles. For instance, the mix between wage income and profits may influence the elasticity of the corporate tax base with respect to the output gap.

The OECD methodology calculates the business cycle's impact on fiscal balances using indicators capturing the effects of the degree of resource utilisation, *i.e.* deviation between actual and potential output and between actual and structural unemployment. This calculation is subject to measurement errors relating to estimates of potential output and structural unemployment. Moreover, this framework constitutes an approximation as it takes no account of the forces driving the business cycle which varies over time, with implications for revenues and spending. The cyclically-adjusted fiscal position may also be affected by temporary factors, not directly linked to the cycle, including one-off operations, creative accounting, classification errors and asset prices cycles.

The overall cyclical sensitivity of the budget to the economic cycle can be measured by the semi-elasticity of the budget balance (as a % of GDP) with respect to the output gap. It is defined as the difference between the cyclical sensitivity of the four categories of taxes and the one expenditure item, weighted by their respective shares in GDP. This measure is equal to 0.44 for the OECD as a whole and to 0.48 for the euro area. Sizeable variations exist across countries with Korea and Denmark providing the extremes.

Summary of elasticities

	Corporate tax	Personal tax	Indirect tax	Social security contributions	Current expenditure	Total balance
United States	1.53	1.30	1.00	0.64	-0.09	0.34
Japan	1.65	1.17	1.00	0.55	-0.05	0.33
Germany	1.53	1.61	1.00	0.57	-0.18	0.51
France	1.59	1.18	1.00	0.79	-0.11	0.53
Italy	1.12	1.75	1.00	0.86	-0.04	0.53
United Kingdom	1.66	1.18	1.00	0.91	-0.05	0.45
Canada	1.55	1.10	1.00	0.56	-0.12	0.38
Australia	1.45	1.04	1.00	0.00	-0.16	0.39
Austria	1.69	1.31	1.00	0.58	-0.08	0.47
Belgium	1.57	1.09	1.00	0.80	-0.14	0.52
Czech Republic	1.39	1.19	1.00	0.80	-0.02	0.39
Denmark	1.65	0.96	1.00	0.72	-0.21	0.59
Finland	1.64	0.91	1.00	0.62	-0.18	0.48
Greece	1.08	1.80	1.00	0.85	-0.04	0.47
Hungary	1.44	1.70	1.00	0.63	-0.03	0.47
Iceland	2.08	0.86	1.00	0.60	-0.02	0.37
Ireland	1.30	1.44	1.00	0.88	-0.11	0.38
Korea	1.52	1.40	1.00	0.51	-0.04	0.22
Luxembourg	1.75	1.50	1.00	0.76	-0.02	0.47
Netherlands	1.52	1.69	1.00	0.56	-0.23	0.53
New Zealand	1.37	0.92	1.00	0.00	-0.15	0.37
Norway (mainland)	1.42	1.02	1.00	0.80	-0.05	0.53
Poland	1.39	1.00	1.00	0.69	-0.14	0.44
Portugal	1.17	1.53	1.00	0.92	-0.05	0.46
Slovak Republic	1.32	0.70	1.00	0.70	-0.06	0.37
Spain	1.15	1.92	1.00	0.68	-0.15	0.44
Sweden	1.78	0.92	1.00	0.72	-0.15	0.55
Switzerland	1.78	1.10	1.00	0.69	-0.19	0.37
OECD average	1.50	1.26	1.00	0.71	-0.10	0.44
Euro area average	1.43	1.48	1.00	0.74	-0.11	0.48
New EU members average	1.38	1.15	1.00	0.71	-0.06	0.42

Note: The last column is the semi-elasticity which measures the change of the budget balance, as a per cent of GDP, for a 1% change in GDP. It is based on 2003 weights. Aggregate country zone averages are unweighted.

Source: OECD Economic Outlook 76 database and OECD estimates.

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