Structural Budget Balances: Calculation, Problems and Benefits

Lukas Reiss[1]

The reform of the Stability and Growth Pact and the incorporation of "debt brake" rules into national legislation have heavily increased the importance of structural balances in economic policymaking in Europe. As defined by the European Commission, structural balances are calculated by subtracting the estimated cyclical component of government revenue and spending as well as certain temporary factors from the headline balance.

Structural balance estimates can be subject to significant measurement errors, which are mainly related to uncertainties about potential output and nonlinear reactions of tax revenue to sharp changes in GDP growth. The definition of temporary factors can also cause substantial problems.

While these problems do not render structural balances useless for the implementation of fiscal policy, they imply that policymakers should not aim to reach the target values for the structural balance exactly a specified each year, but rather on average over much longer time periods (unless exceptionality clauses apply). Achieving the targets on average can be ensured by using appropriately specified control accounts.

JEL classification: E62, H6
Keywords: structural balance, cyclically adjusted balance, fiscal rules, fiscal policy

Changes in government revenue and spending are not only driven by discretionary policy action but also by changes in economic conditions through the impact of automatic stabilizers. When GDP growth is below trend, tax revenue typically grows below trend as well, while social transfers to the unemployed will likely increase. Furthermore, changes in spending or revenue can also be driven by noncyclical transitory factors like one-off transfers to troubled banks or one-off taxes on wealth or specific forms of fiscal "gimmickry." When assessing short-term consolidation needs or long-term fiscal sustainability, one should try to adjust for such factors, i.e. perform the analysis on the basis of the structural balance. The (unobservable) structural balance indicates how large the budget balance would have been if the economy were at mid-cycle and if (certain) transitory noncyclical effects had not materialized.

At the European level, the reform of the Stability and Growth Pact (see for example Holler and Reiss, 2011) and agreement on the fiscal compact (contained in the Treaty on Stability, Coordination and Governance in the Economic and Monetary Union) have heavily increased the importance of structural/cyclically adjusted balances in economic policymaking. Above all, the fiscal compact requires countries to implement rules on structural balances in national legislation (preferably at the constitutional level).

Section 1 of this article describes how cyclically adjusted and structural balances are calculated, essentially outlining the European Commission's method. Section 2 discusses the shortcomings of these concepts, while section 3 focuses on how to handle these problems in policy implementation.

1 Calculation of the Structural Budget Balance

According to the European Commission's method, the structural balance is typically calculated in two steps. First one deducts the cyclical component,

Refereed by:
Geert Langenus,
Nationale Bank
van België

[1] *Oesterreichische Nationalbank, Economic Analysis Division, lukas.reiss@oenb.at.* *The author thanks Walpurga Köhler-Töglhofer and Geert Langenus for valuable suggestions and discussions.*

which is the product of the output gap (section 1.1) and the budgetary semi-elasticity (section 1.2), from the headline budget balance to arrive at the cyclically adjusted budget balance. Then one deducts certain one-off factors (section 1.3) from the cyclically adjusted balance to arrive at the structural balance.

1.1 Calculation of the Output Gap

The output gap is the relative difference of actual GDP from "potential GDP." The latter term can be confusing as it refers to the level of GDP which would prevail if the economy were at the midpoint of the cycle (Larch and Turrini, 2009) rather than indicating GDP at 100% capacity utilization and full employment. Thus, potential GDP should represent a relatively smooth underlying trend in GDP, which is estimated by a combination of structural equations and statistical filtering methods. In the European Commission's "production function approach" (D'Auria et al., 2010) GDP is decomposed into labor (L), capital stock (K) and the residual total factor productivity (TFP):

$$Y = L^{\alpha} K^{1-\alpha} TFP$$

The trend components of these three elements are calculated as follows:

- The capital stock is calculated by accumulating past gross fixed capital formation (investment), which is discounted by an annual depreciation rate (perpetual inventory method). The result is then taken to calculate the contribution of capital to potential output; there is no cyclical adjustment of the capital stock.
- The labor component is decomposed into the product of working-age population, participation rate, employment rate and hours worked per person. The developments of the latter three are divided into a trend and a cyclical component. While the trends of the participation rate and hours worked per person are calculated with an atheoretical HP filter, the trend of the unemployment rate (the nonaccelerating wage rate of unemployment – NAWRU) is computed with a Kalman Filter making use of additional macroeconomic data (wages, terms of trade, …). The product of the working-age population with the trend components of the other elements yields the labor contribution to potential output.
- The TFP component to potential output is calculated by applying a Kalman Filter making use of data on capacity utilization.

Chart 1 shows the European Commission's estimate of potential growth for Austria from its most recent forecast. According to the European Commission, potential growth has significantly slowed since the mid-2000s; this is also due to a smoothing of GDP developments around the strong downturn in 2009. The chart also illustrates that whenever actual growth is above (below) potential growth, the output gap increases (decreases).

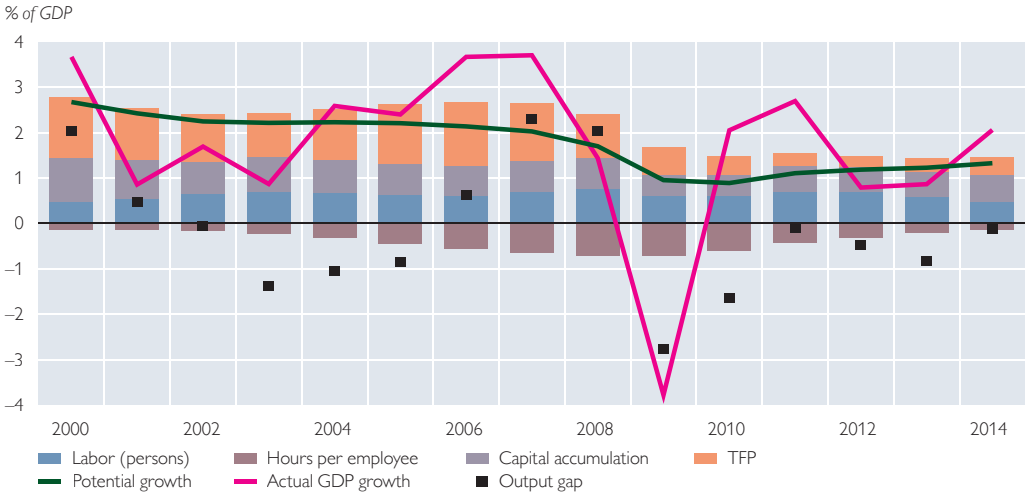
An alternative way to smooth GDP would be to simply use the HP filter on a series of real GDP figures directly. The HP filter minimizes

$$\sum_{t=1}^{T} (y_t - \tau_t)^2 + \lambda \sum_{t=2}^{T-1} [(\tau_{t+1} - \tau_t) - (\tau_t - \tau_{t-1})]^2$$

by choosing an appropriate (unobservable) trend τ_t and where y_t is the logarithm of real GDP and λ is the so-called smoothing parameter. The European Commission calls the result of this filtering "trend GDP" in its publications. While the HP filter is simpler and easier to replicate than the production function approach, it is relatively more prone to revisions.

Chart 1

European Commission Estimate of Potential Growth for Austria



Source: European Commission (autumn forecast 2012).

The cyclical adjustment only applies to fluctuations in real variables, i.e. there is no adjustment for fluctuations in the CPI or any other deflators.

1.2 Defining Cyclical Fiscal Variables and Calculating the Budgetary Semi-Elasticity

The budgetary semi-elasticity indicates by how much the budget balance changes as a ratio to GDP when the output gap increases by 1 percentage point (i.e. when actual GDP increases by 1% for a given potential GDP). The European Commission (Mourre et al., 2013) bases its budgetary semi-elasticity measure on the work of the OECD (Girouard and André, 2005).

The first step in calculating the budgetary semi-elasticity is to identify which components of government revenue and spending react automatically to the cycle ("passive reaction" of fiscal variables). Discretionary (active) policy measures are by definition not cyclical, even if they come as a direct response to the state of the economy, which can be countercyclical (e.g. stimulus packages as a reaction to a negative output gap) or procyclical (e.g. lower investment of municipalities in economically bad times due to balanced-budget restrictions). This distinction between the passive and the active reaction of fiscal policies to changes in cyclical conditions has to be made for two reasons:

1. The structural balance should give some information about the amount and direction of discretionary (i.e. active) fiscal policy.
2. As stated in the introduction, the structural balance should indicate where the headline balance would be if everything were "back to normal." Including unspecified "typical" active responses of fiscal policy to the cycle in the cyclical component of the budget balance would make it impossible to assess consolidation needs from the size of the structural balance.

On the revenue side it is assumed that all current revenue in taxes and social contributions is cyclical (which make up around 90% of revenue in Austria; see table 1), while on the expenditure side only unemployment-related pay-

Table 1

Government Revenue and Expenditure in Austria in 2011

	EUR billion	% of GDP	% of total
Government revenue	**144.4**	**48.0**	**100.0**
Taxes on production and imports	43.1	14.3	29.8
of which: VAT	*22.4*	*7.5*	*15.5*
of which: petroleum tax	*4.2*	*1.4*	*2.9*
of which: employers' contribution to Family Burden Equalization Fund	*5.0*	*1.7*	*3.4*
Current taxes on income, wealth, etc.	39.0	13.0	27.0
of which: personal income tax	*3.1*	*1.0*	*2.2*
of which: wage income tax	*23.0*	*7.7*	*15.9*
of which: corporate income tax	*5.6*	*1.9*	*3.9*
Social contributions	48.7	16.2	33.7
Capital taxes	0.1	0.0	0.0
Non-tax revenue	13.5	4.5	9.4
Government expenditure (EDP)	**152.0**	**50.6**	**100.0**
Social transfers	73.9	24.6	48.6
of which: unemployment (COFOG 10.5)	*3.6*	*1.2*	*2.3*
Other current primary expenditure	59.9	19.9	39.4
Interest payments (EDP)	7.8	2.6	5.2
Capital expenditure	10.4	3.4	6.8

Source: Statistics Austria.

Note: COFOG = classification of the functions of government; EDP = excessive deficit procedure.

Table 2

Calculation of the Budgetary Semi-Elasticity for Austria

	Share in GDP[1]	Macro base	Elasticity of fiscal variable with regard to base[2]	Elasticity of base with regard to output gap[2]	Elasticity of fiscal variable with regard to output gap[3]	Sensitivity of fiscal variable with regard to output gap	**Semi-elasticity of ratio to GDP with regard to output gap**
	A		B	C	D = B x C	E = A x B x C	**F = A x (D – 1)**
Total revenue	0.48	–	–	–	0.87	0.42	**–0.06**
Personal income tax	0.11	Wage bill	2.2	0.6	1.31	0.14	
Corporate income tax	0.02	Profits	1.0	1.7	1.69	0.04	
Social contributions	0.16	Wage bill	1.0	0.6	0.58	0.09	
Indirect taxes	0.15	Consumption	1.0	1.0	1.00	0.15	
Other revenue	0.04	–	–	–	0.00	0.00	
Total expenditure	–0.51	–	–	–	–0.08	0.04	**0.55**
Unemployment-related expenditure	–0.01	Unemployment	1.0	–3.3	–3.30	0.04	
Other expenditure	–0.49	–	–	–	0.00	0.00	
Budget balance	–0.02	–	–	–		0.47	**0.49**

Source: Mourre et al. (2013), Girouard and André (2005).

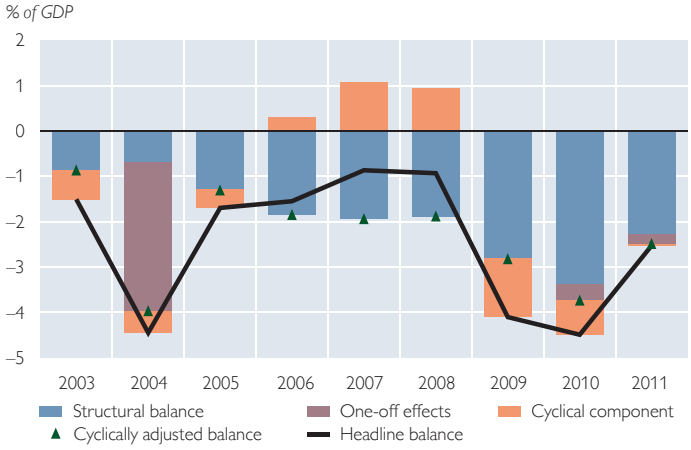
[1] *Values refer to the average from 2002 to 2011 (see Mourre et al., 2013, for details).*
[2] *Taken from Girouard and André (2005).*
[3] *Taken from Mourre et al. (2013).*

Note: The variables in columns C, D and F are called (semi-)elasticities as they could also refer to reactions to changes in actual GDP in % (for a given potential GDP) instead of reactions to changes in the output gap in percentage points.

ments are seen as cyclical. Table 2 shows how the European Commission (Mourre et al., 2013) computes the budgetary semi-elasticity of 0.49 for Austria. Current tax revenue is divided into personal income tax, corporate income tax, indirect taxes and social contributions; all of them are assigned to a

Chart 2

Structural, Cyclically Adjusted and Headline Budget Balance in Austria



Source: European Commission (autumn forecast 2012).

macroeconomic base variable with which the respective fiscal variable should have a high correlation. Then – based on tax codes – elasticities of the fiscal variables are computed with regard to their respective macro bases; in the case of Austria these elasticities all correspond to 1, except for the one of the progressive personal income tax. To arrive at the measure of sensitivity with regard to the output gap, these variables are then combined with estimated elasticities of the macro variables with regard to the output gap and the share of the fiscal variable in GDP. Finally, the budgetary semi-elasticity is computed by transforming these sensivities into the semi-elasticities of the revenue and expenditure ratio with regard to the output gap and adding them up.[2]

1.3 From Cyclically Adjusted to Structural Balances: Adjustment for One-Off Effects

To assess the underlying budgetary position of a country, it is also seen as necessary to adjust for (certain) one-off effects. The updated code of conduct published by the European Commission (2012, page 4) on the Stability and Growth Pact and on stability and convergence programmes gives the following general definition: "One-off and temporary measures are measures having a transitory budgetary effect that does not lead to a sustained change in the intertemporal budgetary position." The European Commission (2006, page 114) provides more detail and also gives a relatively long list of examples.[3] More recently, large capital transfers to banks in the context of government interventions due to the financial crisis have also been (at least partly) recognized as temporary measures. Notable is an asymmetry between deficit-increasing and deficit-decreasing measures, the latter being more likely to be deducted for computing the structural balance (for reasons of prudence). For example, temporary tax cuts are not accounted by the European Commission as temporary measures, while temporary increases are.

1.4 Example: Structural and Cyclical Budget Developments in Austria since 2003

Chart 2 shows how Austria's structural balance has evolved since 2003. Due to consolidation measures in the early

[2] *Note that column F in table 2 refers to the number currently employed by the European Commission (Mourre et al., 2013), while the sensitivity of the budget balance in column E is based on the previous method (European Commission, 2005).*

[3] *Tax amnesties implying a one-off tax payment, sales of nonfinancial assets, exceptional revenues linked to the transfer of pension obligations, changes in revenues or expenditure owing to court or other authorities' rulings, exceptional revenues from state-owned companies, short-term emergency costs associated with major disasters or other exceptional events, securitization operations and temporary legislative changes in the timing of expenditure or revenues (the latter two only when they have a positive impact on the budget balance).*

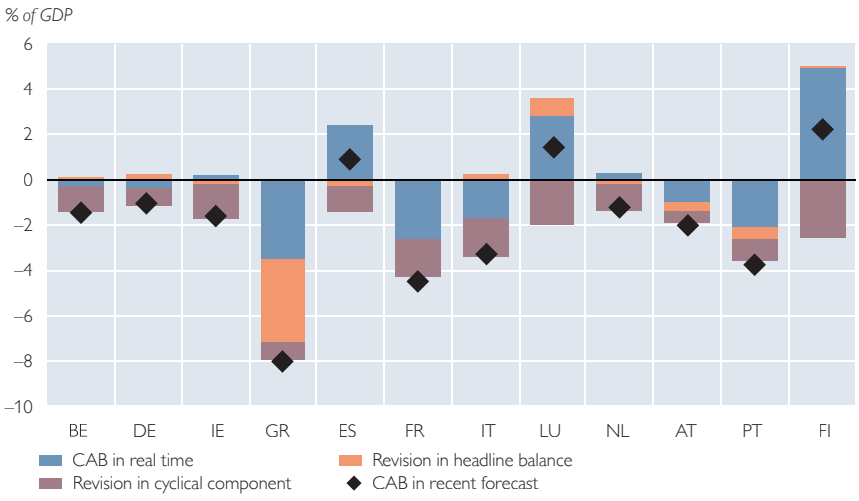
2000s, the structural balance was above –1% of GDP in 2003 and 2004, and the contribution of the cycle was negative due to low growth and in 2004 there was moreover a negative one-off effect.[4] Then the structural balance worsened significantly in 2005 and 2006 mainly due to cuts in income tax rates. At the same time cyclical conditions improved, which led to a decrease of the headline budget deficit to about 1% of GDP in 2007 and 2008. The strong downturn in 2009 was accompanied by a deterioration of the headline deficit by more than 3 percentage points, which according to the European Commission's method was mainly due to cyclical factors (the output gap worsened by almost 5 percentage points; see chart 1), with structural factors (like the cut in the personal income tax and several smaller stimulus measures) playing a secondary role. After a slight structural deterioration in 2010 there was a strong improvement in the headline deficit in 2011, which was partly due to a return of the cyclical component to close to zero and to several consolidation measures.

1.5 Example: Subnational Cyclical Components in Austria

The recently implemented rule on the structural balance in the Austrian Stability Pact applies to all levels of government. Therefore it does not suffice to consider estimates of the cyclical component of the general and the federal/central government balance; corresponding estimates also need be performed for states and municipalities. In Austria, this is simplified by the fact that taxes are primarily collected by the federal government (and then shared with states and municipalities) and that the federal government is also responsible for unemployment insurance. Therefore, regional business cycles play only a very limited role for the cyclicality of budget balances. Allocating the fiscal variables in table 2 either to the federal government (in-

Chart 3

Changes in Cyclically Adjusted Balances of 2007



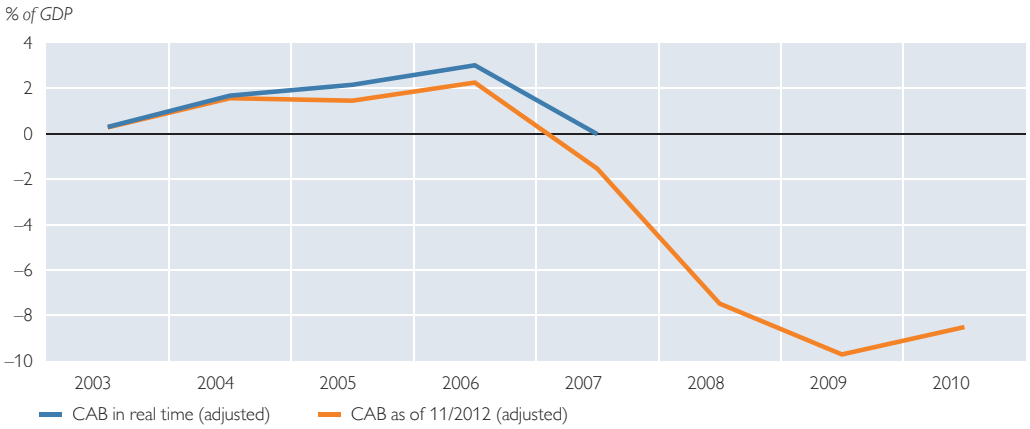
Real time = European Commission spring forecast 2008. Recent = European Commission autumn forecast 2012.

Source: European Commission.

[4] *The figure starts only in 2003 as the European Commission does not report one-off effects for previous years.*

Chart 4

Cyclically Adjusted Budget Balance of Ireland



Real time = European Commission spring forecast t+1 (adjusted for later revisions of headline balance)
11/2012 = European Commission autumn forecast 2012 (adjusted for impact of support to banks)

Source: OeNB, Eurostat, European Commission.

cluding social security funds) or to the states and municipalities produces a rough picture of the composition of the cyclical component under the Austrian Stability Pact: the federal government (including social security funds) accounts for seven-ninths of the cyclical component and the states and municipalities for two-ninths.

2 Problems in Estimating Structural Balances

Charts 3 and 4 indicate two major problems of the concept of cyclically adjusted budget balances:

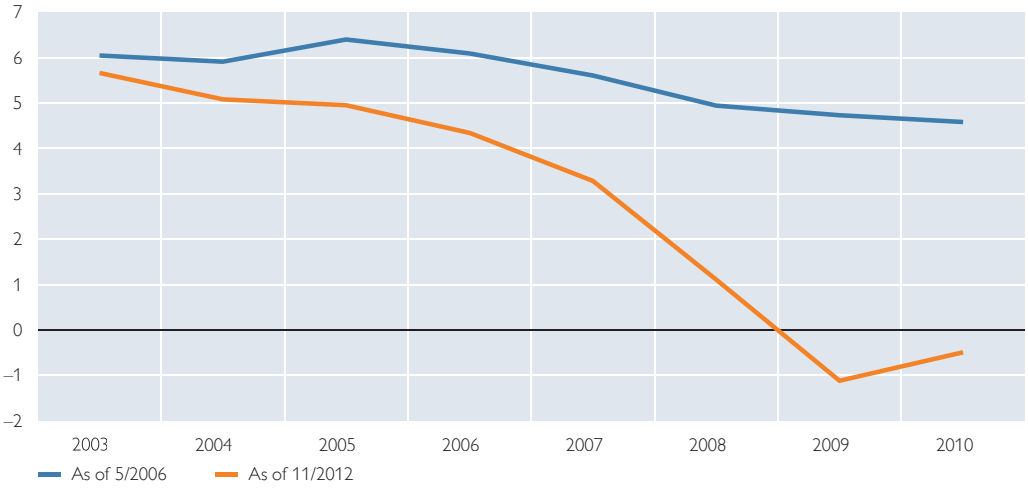
1. Estimates of the cyclically adjusted balance are subject to sizeable revisions, as is evident from the range of measures published for the pre-crisis year 2007 for the original 12 euro area countries (chart 3). While some of the changes are due to revisions of the headline budget balances (yellow bars), the major changes relate to revisions of the cyclical component (red bars). These revisions have been above 1% of GDP in most euro area-12 countries.[5]
2. Cyclically adjusted balances can worsen significantly within relatively short periods of time without the implementation of much fiscal stimulus or consolidation (see chart 4 with figures for Ireland). After having originally estimated Ireland to report a cyclically adjusted balance of roughly 0 in 2007, the European Commission has since revised this figure to –1.5% of GDP and it even assumes this figure to have deteriorated to –10% of GDP until 2009. This is somehow counterintuitive as there were some tax increases in this time span and as primary expenditure growth was much lower than before 2007.

[5] *Hughes Hallett et al. (2012) analyze revisions in output gap and CAB estimates for OECD countries since the mid-1990s. They do not directly show revisions in cyclical components, but these components can be (roughly) estimated by multiplying the revisions in the output gap with the respective budgetary sensitivity. Assuming a budgetary sensitivity of 0.44 (the OECD average in Girouard and André, 2005), this would yield a mean RMSE (root mean squared error) of somewhat more than ½% of GDP when comparing the estimate from t+1 to later ex post data.*

Chart 5

Estimates of Potential GDP in Ireland

Annual change in %



Source: European Commission.

Table 3

Potential Output Estimates of European Commission and OECD

	Output gap				Average potential growth				NAWRU / NAIRU			
	2007		2011		2000–2007		2007–2014		2007		2014	
	EC	OECD	EC	OECD	EC	OECD	EC	OECD	EC	OECD	EC	OECD
BE	2.4	2.8	–0.2	–0.1	1.9	1.8	1.1	1.4	7.7	8.0	7.5	7.9
DE	2.1	2.4	0.3	–0.5	1.3	1.3	1.3	1.5	8.6	8.0	5.1	6.7
IE	3.6	8.5	–2.8	–7.6	5.4	5.3	–0.1	1.7	5.8	7.6	15.2	10.6
GR	3.4	7.4	–10.0	–9.0	3.8	3.0	–1.4	–0.1	10.2	9.9	16.2	12.3
ES	2.1	2.7	–4.2	–6.1	3.5	3.4	–0.0	1.4	11.9	12.6	25.7	16.5
FR	2.9	3.2	–1.6	–2.0	1.8	1.7	1.1	1.4	8.8	8.5	10.3	9.0
IT	3.1	3.3	–1.8	–2.8	1.1	1.2	–0.1	0.4	7.3	7.4	10.5	7.6
NL	2.3	3.3	–1.8	–1.0	2.0	1.9	1.0	1.2	3.5	3.8	5.0	3.8
AT	2.3	3.7	–0.1	–1.3	2.2	2.1	1.2	1.8	4.3	4.3	4.2	4.3
PT	0.9	1.4	–2.6	–3.5	1.5	1.6	–0.3	0.4	9.1	8.1	15.1	11.0
FI	5.1	6.7	–1.5	–0.4	3.0	2.6	0.8	1.2	7.0	8.2	7.4	8.4

Source: European Commission, OECD (autumn forecasts 2012).

2.1 Uncertainty about and Volatility of Potential Output

Typically the largest problem in estimating structural balances is the estimation of the output gap, which is an unobservable variable. These uncertainties can lead to substantial ex post revisions of output gaps and implausibly large swings in potential growth rates. Both problems are exemplified by chart 5 for Ireland: The European Commission's estimates and projections of potential growth were revised downward substantially from May 2006 to November 2012. Lower potential growth in past years implies relatively higher output gaps and therefore ex post downward revisions of structural balances (chart 3). Furthermore, downward revisions of potential growth

forecasts mean that (for a given legislation on revenue) lower real expenditure growth is necessary to keep the structural balance constant. Taking the recent estimate of the European Commission for Ireland at face value (and again assuming no structural changes on the revenue side), from 2000 to 2007 an average real expenditure growth of 5.4% per year would have been sufficient to prevent the structural balance from deteriorating, while measures to keep real expenditure constant would lead to a slight worsening over 2007 to 2014 (table 3). While it cannot be neglected that potential growth can and does change over time (due to innovations, structural reforms, demographic changes, …), variations in potential growth rates of such a magnitude make it difficult to interpret the levels of, and the changes in, structural balances.

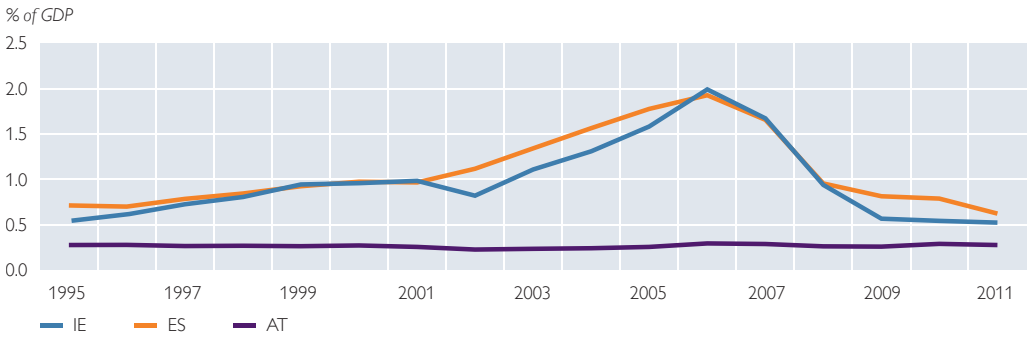
The uncertainty about potential output is also indicated by table 3, which gives an overview of the European Commission's and the OECD's recent estimates of output gaps for 2007 and 2011 and average potential pre- and post-crisis growth rates in the 11 largest euro area economies. It shows that potential growth is estimated to have declined substantially over time in several countries, especially in Ireland, Greece, Spain and Portugal. Furthermore, the estimates of the European Commission and the OECD differ remarkably. For example, while projecting similar unemployment rates for Spain in 2014, the estimates for the nonaccelerating inflation rate of unemployment differ by almost 10 percentage points for that year.[6]

2.2 Nonlinear Reactions of Tax Revenue to Sharp Changes in GDP Growth

The previous assumption of no structural changes on the revenue side (i.e. of "standard" reactions of tax revenue components to changes in GDP) is not as innocent as it may sound. While the revenue elasticities used by the European Commission (Mourre et al., 2013) would imply that tax ratios are roughly constant over the business cycle without any policy measures, the experience of the last years has shown that de-

Chart 6

Revenue from Taxes on Transactions in Property and Financial Assets[1]



Source: Eurostat.

[1] Stamp taxes (D.214B) and taxes on financial and capital transactions (D.214C)

[6] *Another issue in this context is raised by Kempkes (2012), who shows that there is a negative real-time bias in the estimation of output gaps (and therefore cyclical components) by international institutions, implying a systematic overestimation of structural balances in real time.*

pending on several factors (which will be explained below) tax revenue can vary much more or much less than GDP. For example, while from 2007 to 2009 the tax ratio plummeted in countries like Ireland and Spain, it actually rose in Austria despite a sizeable cut in personal income tax rates (with some minor tax increases and decreases roughly cancelling each other out).

One of the main reasons for this development was the asset price bubble in Ireland and Spain. Chart 5 shows the revenue from taxes on property and financial transactions in Ireland, Spain and Austria (in all three countries this revenue is coming primarily from property transactions). These are indirect taxes and therefore the GDP ratio should – given the elasticity of 1 used by the European Commission – remain constant over the cycle (unless there are changes in tax rates and/or bases). However, this was obviously not the case: While tax revenues remained stable at roughly ¼% of GDP in Austria, they increased in Ireland and Spain from 1% of GDP in 2001 to 2% of GDP in 2006, only to decrease to less than 1% of GDP in 2008. Due to the elasticity of 1 both these changes were identified as structural. The effect of the build-up and burst of the property bubbles in these two countries becomes also visible when looking at other taxes related to immovable property (like VAT and capital gains taxes). For example, in Ireland taxes on capital gains made up 1.6% of GDP in 2007 and 0.3% of GDP in 2009 (amidst a decrease in nominal GDP of around 15%).

Two less severe examples for nonlinear reactions of tax revenue to sharp cyclical changes could be observed in Austria in 2009, when GDP decreased by 3.5% in real terms. That year revenue from corporate income tax (which made up 2.2% of GDP in 2008) decreased by 34%, while according to the elasticities employed by the European Commission it should have only decreased by roughly 6%.[7] At the same time, compensation of employees and therefore wage-related taxes and social contributions developed much better than what would have been predicted by the semi-elasticity of the European Commission. However, these two nonlinear effects roughly cancelled out in 2009.

2.3 Some Crudeness in Assessing the Cyclicality of Tax Revenue

At least in theory, structural balances play an important role for fiscal governance in Europe. Therefore, a harmonized treatment of different countries can be argued to be very important. However, this can come at the cost of accuracy. Three examples will be provided in the following, namely the elasticity of personal income tax, the problem of noncyclical tax revenue and the elasticities used for indirect taxes.

Girouard and André (2005) themselves point out that the elasticity of the (typically) progressive personal income tax might be overestimated as they assume in their calculation of the tax elasticity that all fluctuations in the wage bill are in wages per person (and that there are none in employment). For example, when assuming that half of the fluctuations in the Austrian wage bill are driven by fluctuations in employment in persons, the budgetary semi-elasticity would be overestimated by roughly 0.04.

[7] *There were no major changes in the rate or base of corporate income tax in 2009; the only stimulus measure affecting corporate income tax was a temporary acceleration of depreciation which was projected by the government to dampen revenue only from 2010 on.*

Chart 7

Revenue from VAT

Source: Eurostat.

Furthermore, not all current tax revenue can be considered as cyclical. This is particularly the case with taxes on public pensions. Pension payments by the government are assumed to be noncyclical (section 1.2) in the OECD/European Commission method and therefore taxes on these pensions should be noncyclical too.[8] However, this revenue is included in the calculation of the budgetary semi-elasticity. In 2011, income tax on pensions made up roughly 1.8% of GDP and social contributions on pensions 0.8% of GDP (according to the statistics on wage income tax). Summing up, this implies that the inclusion of taxes on pensions leads to an overestimation of the budgetary semi-elasticity by roughly 0.03.

As indirect taxes are typically not progressive and as there were problems with the estimation of the elasticity of consumption with regard to the output gap, the elasticity of indirect taxes to the output gap is set to 1 for all EU/OECD countries in European Commission (Mourre et al., 2013) and Girouard and André (2005). This is somewhat problematic as the relative volatility of indirect taxes (compared to GDP) differs significantly across EU countries, reflecting among other things the different composition of indirect taxes. Another example apart from indirect taxes on property transactions (section 2.2) is that in France, Sweden and Austria a significant share of indirect taxes is based on wages (Austria in 2011: 2.6% of GDP or 18% of indirect taxes), which should be less cyclical than taxes on consumption according to the OECD calculations (as the elasticity of the wage bill to the output gap is typically below 1; see table 2 for Austria). Furthermore, there seem to be substantial differences in the relative volatility of the VAT base (compared to GDP) across EU countries, when looking at how VAT revenue reacted to the downturn in 2009 (chart 7).

In alternative approaches to cyclical adjustment, Bouthevillain et al. (2001) and Morris and Schuknecht (2007) try to account for some of these problems in sections 2.2 and 2.3. In the European System of Central Banks' method of cyclical adjustment (described in Bouthevillain et al., 2001), different macro bases (similar to the ones in table 2) are decomposed into trend and cycle using an HP filter. The resulting cyclical parts are multiplied with tax elasticities and shares of tax categories in GDP (similar to columns A and B in

[8] *Taxes and social contributions on public wages are another example for taxes which are by definition noncyclical. However, not adjusting for them is less problematic as public wages are a part of GDP. It is already implicit in the calculation of the budgetary semi-elasticity that a change in the output gap (wage bill) by 1 percentage point implies a change in private GDP (private wages) by more than 1%.*

table 2) to compute the cyclical component of the budget balance.[9] This method accounts for situations where relative growth of tax bases (compared to GDP) is different from what is implied by the elasticities used by the OECD and the European Commission (column C in table 2). This can make a significant difference in estimated cyclical components as implicit tax rates on wages and consumption are typically much higher than on profits and net exports. Morris and Schuknecht (2007) use a similar method to look at the role of asset prices (in addition to the traditional tax bases in table 2). They calculate the cyclical contribution of asset prices to the budget balance by combining "asset price gaps" (computed by an HP filter) with estimated semi-elasticities of the budget balance to asset prices.[10] However, this alternative approach suffers from two significant problems: While wage-related taxes (i.e. income taxes and social contributions on wages, payroll taxes) typically move roughly in line with the tax base (Morris et al., 2009), the relationship of corporate taxes and "consumption taxes" (VAT, excise duties, insurance taxes) to national account aggregates like (gross or net) operating surplus or private consumption is much looser; for example, the shortfall in corporate taxes in Austria in 2009 (section 2.2) could not be explained by movements in the net operating surplus. Furthermore, cyclical components calculated by the HP filter trend to be more prone to revisions than the ones based on production functions.

2.4 Adjustment for Cyclicality in Other Expenditure Items Is Theoretically Possible, But Effect Should Be Rather Small

Even when accepting that discretionary fiscal policy action is not to be included in the cyclical component, it might seem restrictive to include only unemployment-related payments when calculating the cyclical component of expenditure. For example, one might argue that other social payments and/or interest expenditure also show cyclical patterns.

More people might retire in economically bad times, leading to an above-average increase in pension payments. However, unless these (early) retirees resume employment when the economy recovers, the increase in pension spending is persistent. Another cyclical factor in pension payments is that in some countries public pensions are indexed to wage developments (in Austria they are indexed to the CPI), which makes them mildly procyclical (with some time lag). Adjusting for this factor (which is done neither by European Commission, nor by Girouard and André, 2005) would actually decrease the estimated budgetary semi-elasticity. Parts of social transfers other than pensions and unemployment benefits might be argued to be cyclical due to means-testing. However, one then has to filter out how cyclical the number of recipients really is; noncyclical factors like poverty due to needs for long-term care can play a large role there (as for example in Austria).

[9] *Grossmann and Prammer (2005) apply this method to Austria.*

[10] *Morris et al. (2009) suggest using residential investment as an alternative tax base for taxes on property transactions and as an additional base for VAT.*

Net interest expenditure[11] can be argued to be cyclical for the following two reasons: When the output gap is negative, borrowing requirements will be higher, which should increase interest payments. At the same time, interest rates are typically lower in economically bad times. In practice it might be a reasonable approximation for many countries to assume that these two factors roughly cancel each other out (see also Bornhorst et al., 2011). Note, however, that this does not fully apply for euro area countries as the risk-free rate should reflect the economic state of the euro area as a whole while output gaps may differ substantially across the euro area.

2.5 Delimiting One-Off Effects is Trickier than One Might Think

Bornhorst et al. (2011, page 30) state in their guideline for calculating structural fiscal balances that, "While seemingly straightforward, there are no universally accepted criteria for identifying one-off or temporary fiscal measures." When quantifying temporary measures, one often faces a trade-off between the following three potential aims:

- getting a meaningful level of the structural balance,
- getting meaningful changes in the structural balances, and
- being on the prudent side in the analysis of structural balances.

Almost any possible treatment of transitory factors is bound to fail on at least one of these targets. For example, the current practice of the European Commission (section 1.3) seems to focus on getting a prudent estimate of the level of the structural balance. Therefore, it deducts temporary tax increases from the structural balance, but does not account for temporary tax cuts (section 1.3 and European Commission, 2006). So in cases of temporary tax increases the change in the structural balance (especially if one wants to assess discretionary policy action) and the level of (past) structural balances would be distorted (the latter might be relevant when having a control account; see section 3.3). On the other hand, however, when not deducting temporary tax increases from the structural balance, one may underestimate the need for consolidation measures when looking at the structural balance.

Problems might also arise in the context of transactions with state-owned companies which are statistically classified outside general government, especially when pension funds are transferred from them to the government or when they are dependent on transfers from government. Examples for the latter include "lost" capital injections to nationalized banks or subsidies, investment grants and debt assumptions for public railway companies. These can contribute to significant variations in the headline deficit which cannot be interpreted as consolidation (or expansion). In most cases these measures are self-reversing in the sense that higher expenditure in one year leads to lower expenditure in other years. Removing these transfers completely would distort the (average) level of the structural budget balance and adjusting for only the self-reversing effect may not be practically possible.

Joumard et al. (2008) analyze one-off factors in the OECD and find that they are to a large extent recorded under what they call net capital trans-

[11] *In 2011 Finland was the only euro area-12 country where interest payments were lower than interest receipts (i.e. net interest expenditure being negative).*

fers[12], which are typically relatively small in size compared to overall expenditure or revenue. They suggest applying an HP filter to these items to account for one-off factors. This would not distort the (average) level of the structural balance; however, it might still distort the change in the structural balance in case of extremely high capital transfers in single years (as in Ireland in 2010).

Even when accounting for all possible one-off factors, one cannot simply assume that the yielded structural (primary) balance will remain unchanged under a no-policy-change assumption (i.e. without further discretionary action of governments). Factors like bracket creep, devaluation of nominally fixed transfers (or taxes), changes in potential growth or strong upward trends in entitlement spending (pensions, health, long-term care) can have a significant impact on structural deficits even in the short run.

3 Implications for the Implementation of Rules on Structural Balances

The methodological limitations mentioned in the previous section are especially severe for countries in a deep economic crisis. When estimates of the size of potential growth and the output gap differ as much as they currently do for countries like Spain or Greece (table 3), then a strong reliance on structural balances is hardly justifiable. This explains why the current EFSF/IMF programs also rely on nominal targets and the estimated effect of single consolidation measures.

Table 4

Potential Growth 1999–2013

	Annual growth			10-year average[1]	
	Mean	Min	Max	Min	Max
BE	1.6	0.9	2.4	1.1	2.2
DE	1.3	0.7	1.6	1.2	1.6
IE	3.6	–1.1	9.2	0.6	7.8
GR	1.8	–2.8	4.9	–1.4	3.8
ES	2.2	–1.3	3.8	0.2	3.4
FR	1.5	0.9	2.0	1.1	1.9
IT	0.7	–0.9	1.8	0.0	1.5
NL	1.8	0.6	3.4	1.0	3.0
AT	1.9	0.9	2.7	1.2	2.5
PT	1.0	–1.3	3.3	0.0	2.6
FI	2.3	0.6	4.1	0.8	3.4

Source: European Commission (autumn forecast 2012).

[1] *Constructed as in SGP expenditure rule (t–5 to t+4).*

3.1 Uncertainty about Potential Growth is Problematic for Fiscal Policymaking also in the Absence of Structural Balance Rules

However, uncertainties about potential output and fluctuations in potential growth are significantly smaller in many other European countries which do/did not face protracted recessions (tables 3 and 4). Furthermore, macroeconomic policies are generally marked by uncertainties and the most problematic uncertainty in computing structural balances, namely that about potential growth and the output gap, is not only relevant when handling structural balances.[13] In order to avoid defaults on public debt as well as highly procyclical policies, fiscal policymakers need to have the following things in mind:

They need to have at least a very crude idea about whether the economy is operating below or above the long-

[12] *Capital transfers (paid minus received) + net acquisition of nonproduced nonfinancial assets + changes in inventories + net acquisition of valuables.*

[13] *For example, Orphanides (2003) argues against using the Taylor rule for monetary policy due to real-time uncertainties about the output gap.*

term trend (i.e. how large the output gap could be). Above all, this is also necessary for avoiding procyclical fiscal policies (i.e. fiscal expansions when the output gap is high) and for assessing whether there are consolidation needs or not (e.g. a headline deficit of 3% implies lower consolidation needs when the output gap is low than when it is high).

Furthermore, when planning expenditure, the government needs to have some idea of the trend/potential growth rate of the economy; otherwise it does not know whether a certain growth of primary expenditure is contractionary or expansionary (i.e. real expenditure growth of 1.5% might be roughly neutral in Austria but rather contractionary in Slovakia).

3.2 Structural Balances Are a Useful Anchor for Fiscal Policy …

Due to the high degree of financial integration in the euro area, there can be substantial negative spillovers when some member states face severe fiscal problems. This might increase the probability of bailouts of countries in distress, which in turn would raise distributional and moral hazard issues. Therefore there has been a strong emphasis on numerical fiscal rules in the euro area. The headline balance, the debt ratio and the structural balance are all used in the SGP (Holler and Reiss, 2011) and structural balance rules need to be implemented in national legislation under the fiscal compact.

Both the headline balance and the debt ratio are observable variables and therefore less prone to revisions than the structural balance. However, while it cannot be neglected that the structural balance can also be procyclical (i.e. overestimated in good times, underestimated in bad times) to some extent, both the headline balance and the debt ratio are prone to much stronger cyclical patterns. Given its relatively lower procyclicality, the structural balance is more useful than the headline balance for assessing whether there are consolidation needs at all and (if so) how large they are.

This tradeoff between procyclicality and vulnerability to revisions may explain the coexistence of different numerical rules: Commitment to the *target values for the structural balance*[14] should in most cases automatically imply commitment to the *minimum requirement* of a headline deficit of no more than 3% (unless the output gap is highly negative).[15] At the same time, in case of breaches of the 3% rule on the headline deficit there is much less room for interpretation[16] and penalties are potentially much higher than when the target value for the structural balance is missed.

3.3 … But Should Not Be Taken Too Literally in Real Time

Due to the measurement problems described in section 2, fiscal policymakers should explicitly account for these uncertainties in implementing numerical fiscal rules to avoid procyclical policies; this could be done by complementing a target value for the structural balance with an expenditure rule and a control account. These uncer-

[14] *These are at least –1% of GDP for euro area countries in both the SGP and the fiscal compact.*

[15] *Due to cyclical adjustment (Holler and Reiss, 2011), the debt rule of the SGP would typically also be fulfilled in case of a structural balance of –1% or better.*

[16] *Excessive deficit procedures are almost always launched when the headline deficit is above 3% of GDP in one country.*

tainties can also be argued to call for setting targets cautiously (i.e. rather high) as in the SGP and the fiscal compact.

The reformed preventive arm of the SGP contains an expenditure rule: Real growth in primary expenditure (accounting, among other things, for discretionary measures on the revenue side) shall not exceed a certain benchmark, which is determined by the size of consolidation needs and a 10-year rolling average of potential growth. Budgeting discretionary expenditure and planning discretionary measures on entitlement spending and taxes could be done based on the mechanics of this rule. This would ensure much smoother expenditure developments than directly targeting a certain measured structural balance "at any cost"[17], as the 10-year rolling average of potential growth is much less volatile than potential growth in single years (table 4) and measurement errors on the revenue side can be substantial (sections 2.2 and 2.3).

If such a policy were pursued, point targets on the structural balance would be missed most of the time. However, deviations should not be systematic when estimates of potential growth and of the effect of revenue measures are plausible.[18] To ensure that deviations are not systematic, it is helpful to keep a control account (like for example in Austria or Germany) where ex post deviations from the target can be recorded (except in years where exceptionality clauses would apply). If deviations cancel each other out on average, then there is no problem for fiscal sustainability; if they are systematically negative, structural balance targets will have to be set higher in economically good times to make up for past slippages.

4 Conclusions

Structural balance estimates can be subject to significant measurement errors, which are mainly related to uncertainties about potential output and nonlinear reactions of tax revenue to sharp changes in GDP growth. The definition of temporary factors can also cause substantial problems. These problems make this concept difficult to apply in countries which are facing a deep economic crisis (and where the growth outlook is marked by extreme uncertainty).

However, fiscal policies are generally marked by uncertainties about potential growth as long as policymakers want to avoid both procyclicality and defaults. So for other countries these problems simply imply that deviations from structural balance targets are hard to avoid but that they are also not problematic as long as they are not too large and not systematically negative. This can be ensured by appropriately specified control accounts.

[17] *Targeting a certain value "at any cost" implies that there are last-minute tax increases or cuts in discretionary expenditure when revenue or entitlement spending deviate from plan (even if deviations were due to measurement errors).*

[18] *A strong downward (upward) trend in potential growth can lead to a systematic underachievement (overachievement) of structural balance targets for some time. However, the effect should not be too large when using a rolling average of past and future potential growth rates as in the expenditure rule of the SGP.*

References

D'Auria, F., C. Denis, K. Havik, K. Mc Morrow, C. Planas, R. Raciborski, W. Roger and A. Rossi. 2010. The production function methodology for calculating potential growth rates and output gaps. European Commission: European Economy – Economic Papers 420.

Bornhorst, F., G. Dobrescu, A. Fedelino, J. Gottschalk, and T. Nakata. 2011. When and How to Adjust Beyond the Business Cycle? A Guide to Structural Fiscal Balances. IMF Technical Notes and Manuals 11/02.

Bouthevillain, C., P. Cour-Thimann, G. van den Dool, P. Hernández de Cos, G. Langenus, M. Mohr, S. Momigliano and M. Tujula. 2001. Cyclically Adjusted Budget Balances: An Alternative Approach. ECB Working Paper 77.

European Commission. 2005. New and updated budgetary sensitivities for the EU budgetary surveillance.

European Commission. 2006. Public Finances in EMU.

European Commission. 2012. Code of conduct. Specifications on the implementation of the Stability and Growth Pact and guidelines on the format and content of Stability and Convergence Programmes.

Girouard, N. and C. André. 2005. Measuring Cyclically adjusted Budget Balances for OECD Countries. OECD Economics Department Working Papers 434.

Grossmann, B. and D. Prammer. 2005. A Disaggregated Approach to Analyzing Public Finances in Austria. In: Monetary Policy & the Economy Q4/05. 61–75.

Holler, J. and L. Reiss. 2011. What to Expect from the Latest Reform of the Stability and Growth Pact. In: Monetary Policy & the Economy Q4/11. 85–98.

Hughes Hallett, A., R. Kattai and J. Lewis. 2012. How Reliable Are Cyclically Adjusted Budget Balances In Real Time? In: Contemporary Economic Policy, Western Economic Association International 30(1). 75–92.

Joumard, I., M. Minegishi, C. André, C. Nicq and R. Price. 2008. Accounting for One-off Operations when Assessing Underlying Fiscal Positions. OECD Economics Department Working Papers 642.

Kempkes, G. 2012. Cyclical adjustment in fiscal rules: Some evidence on real-time bias for EU-15 countries. Deutsche Bundesbank Discussion Papers 15/2012.

Larch, M. and A. Turrini. 2009. The cyclically-adjusted budget balance in EU fiscal policy making: A love at first sight turned into a mature relationship. European Commission: European Economy – Economic Papers 374.

Morris, R., C. Rodrigues Braz, F. de Castro, S. Jonk, J. Kremer, S. Linehan, M. R. Marino, C. Schalck and O. Tkacevs. 2009. Explaining government revenue windfalls and shortfalls: an analysis for selected EU countries. ECB Working Paper 1114.

Morris, R. and L. Schuknecht. 2007. Structural balances and revenue windfalls – the role of asset prices revisited. ECB Working Paper 737.

Mourre, G., G.-M. Isbasoin, D. Paternoster and M. Salto. 2013. The cyclically-adjusted budget balance used in the EU fiscal framework: an update. European Commission: European Economy – Economic Papers 478.

Orphanides, A. 2003. Historical monetary policy analysis and the Taylor rule. In: Journal of Monetary Economics 50(5). 983–1022.