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Abstract

Trend (potential) GDP estimates, and consequently output gaps, a key variable for calculating cyclically adjusted balances (CABs), are unobservable and depend on past and projected observations. Thus, revisions to output forecasts lead to changes in CAB estimates, even if no additional discretionary measures have been taken. This paper presents an analysis of the impact of revisions to economic growth projections on the levels of and changes in structural balances when the Hodrick-Prescott filter is used to estimate the output gap. Two main conclusions are obtained. Firstly, economic growth revisions affect both the output trend and output gap, and thus CABs, to a degree that depends on whether the revisions have a temporary or permanent effect on the GDP level. Transitory changes in the level of output are mainly allocated to the cyclical component and CAB levels are little affected. If, however, the revision implies a permanent change in GDP level, CABs will be affected to a larger extent. Secondly, it is also shown that the impact of economic growth revisions on CAB changes is much more limited than on CAB levels. Given that the change in structural balances due to GDP revisions cannot be attributed to fiscal policy actions and that it can be easily calculated, we argue that this factor should be recognised when judging the ex-post compliance of EU countries with the rules of the Stability Pact.

1. Introduction

Observed budget balances are an imperfect indicator of the fiscal policy stance. Among other factors, this is due to the endogeneity of the budget balance in relation to the economy's cyclical position. That is to say, at times of economic expansion (recession), public revenue tends to grow (diminish) and public spending fall (increase) merely as a result of the workings of the built-in stabilisers. The budget balance is therefore affected, without the government necessarily having taken any discretionary action. This prevents any *a priori* assessment of whether a change in the actual government balance can be ascribed to economic conditions or to discretionary measures undertaken by fiscal authorities.

Thus there is a need for instruments to distinguish between the respective impacts of both the economic cycle and discretionary actions on observed balances. Currently, various indicators quantify this cyclically-adjusted balance (CAB), subtracting from the budget balance the portion thereof which is estimated to be due to cyclical factors. The basis of all these indicators is the choice of a theoretical reference framework given by potential or trend GDP. The indicators estimate the cyclical component of the budgetary balance by applying the output gap elasticities of public revenue and spending.

Cyclically adjusted budget balances are routinely used by the OECD, the European Commission and the IMF in their fiscal analyses. However, their relevance and necessity has been reinforced within the EU boundaries by the multilateral surveillance procedures in force since the Stability and Growth Pact (SGP) became effective. The SGP establishes a medium-term objective of budgetary positions close-to-balance or in surplus (CTBS). This medium-term goal aims at allowing Member States to deal with normal cyclical fluctuations while keeping the government deficit below the 3% of GDP ceiling established by the Treaty of Maastricht. In this regard, CAB levels constitute the main tool for monitoring and assessing compliance with the CTBS medium-term goal, since this clause is interpreted as a requirement to approximately balance either observed budget outcomes on average over the full length of the business cycle or, alternatively, cyclically-adjusted balances (CABs) every period. In addition, changes in CABs also now feature more prominently in the monitoring of fiscal developments, since the 2003 Broad Economic Policy Guidelines (BEPG) required those Member States failing to comply with the CTBS clause to improve their CABs by at least 0.5% of GDP each year.

Despite their usefulness, the calculation of CABs is not problem-free and, in fact, there is a considerable debate about the reliability of real-time CAB estimates and their relevance for policy decision-making and the assessment of medium-term fiscal objectives of EU Member States. These problems have been highlighted by the current economic conditions.

Specifically, the economic performance in most euro area countries has recently been characterised by sluggish economic growth, which has repeatedly fallen short of expectations, leading to several successive downward revisions of GDP growth projections for the current and coming years. General government budget balances are also experiencing a considerable deterioration in some euro area countries and, as a result, some Member States might fail to comply with the recommendations in the 2003 BEPG. In this context, downward revisions to GDP growth in different European countries are usually interpreted as a purely cyclical phenomenon. If this were the case, in the absence of discretionary policies, the deterioration of nominal budget balances would reflect cyclical factors, while structural balances or CABs should not be affected. However, the opposite seems to be the case; revisions to economic growth projections seem to have an impact on estimated structural balances leading to deviations of budget balances, in cyclically-adjusted terms, from those planned (or forecasted).

The problem mainly lies in the uncertainty of real-time output gap estimates. Trend (potential) GDP estimates, and consequently output gaps, a key variable for calculating CABs, are unobservable and depend on past and projected GDP observations. A revision to GDP forecasts will consequently lead to a change in CAB estimates, even if no additional discretionary measures have been taken. This problem seems to be shared by the alternative methodologies for estimating output gaps, since it is the arrival of new information that creates the problem.

The aim of this paper is to analyse and discuss the relevance of this issue in the context of the regular assessment of public finances in the euro area countries. To do so, the next section illustrates the impact of revisions to economic growth projections on CAB levels and changes when the Hodrick-Prescott filter is used to estimate the output gap. In Section 3 we estimate the impact of GDP revisions on structural balances in the euro area countries using the last revisions of GDP data and projections from the European Commission. Finally, Section 4 concludes.

2. Impact of revisions to economic growth projections on structural public balances (CABs)

2.1. A methodology for calculating CABs

The structural balance (or cyclically-adjusted balance, CAB) at time t (b_t^*) is the difference between the observed budget balance (b_t) and its cyclical component (b_t^c):

$$b_t^* = b_t - b_t^c = b_t - \sigma(y_t - y_t^*) \qquad (1)$$

where b_t, b_t^*, b_t^c are expressed as a proportion of nominal GDP and the cyclical component (b_t^c) is calculated as the product of the overall cyclical sensitivity of the budget balance (σ) and the output gap or deviation of real GDP (in logs), y_t, from its trend y_t^*[1].

There are many approaches for estimating the output gap which might lead to very different results [see Canova (1998)] and whose various advantages have been debated at length in the economic literature. For the purpose of calculating CABs, the European Commission (EC) follows a production function[2] approach for most countries, although the Hodrick-Prescott filter is also employed as an additional reference[3]. In order to facilitate the country comparisons and to make the problem more tractable we only use the Hodrick-Prescott filter (HP filter, hereafter). The discussion of the alternative methodologies, although relevant, is beyond the scope of this paper.

The HP filter, originally proposed by Hodrick and Prescott (1980), decomposes the observed real output, $y=(y_1, \ldots, y_T)'$ into a trend $y^*=(y_1^*, \ldots, y_T^*)'$ and a cyclical component $c=(c_1, \ldots, c_T)'$:

$$y_t = y_t^* + c_t \qquad \text{for } t=1, 2, \ldots, T \qquad (2)$$

by minimizing the loss function:

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[1] There are alternative approaches for calculating CABs. For instance, cyclical components could be calculated separately for the different expenditure and revenue categories and then added [see for example Bouthevillain *et al* (2001) or Larch and Salto (2003)].

[2] See Denis *et al.* (2002) for a description.

[3] In particular, for those countries in which the production function approach provides not yet very reliable results (Spain, Germany and Austria), the HP filter is employed in the Commission's assessment of fiscal policy developments. In the case of Luxembourg no CABs are calculated by the Commission.

$$\sum_{t=1}^{T} c_t^2 + \lambda \sum_{t=3}^{T} \left(\nabla^2 y_t^*\right)^2 \qquad (3)$$

where the first term in (3) penalizes large cyclical components (i.e., poor fit), while the second term penalizes lack of smoothness in the trend. The parameter λ, chosen a priori, regulates the trade-off between the two criteria so that the larger the value of λ the smoother the trend. The solution is given by the expression:

$$y^* = C\,y \qquad (4)$$

where $C = [I + \lambda KK']^{-1}$, and K is a $(T\text{-}2)xT$ matrix with elements $K_{ij}=1$ if $i=j$ or $i=j+2$, $K_{ij}=-2$ if $i=j+1$, and $K_{ij}=0$ otherwise. Therefore, the trend series y_t^* is a moving average of all elements in the original GDP series y_t. The TxT matrix of weights, C, depends on the sample size T and on the parameter λ. In the calculation of y_t^* for any given t, the largest weight is assigned to the contemporaneous observation of y_t, with the weights for y_{t-i} and y_{t+i} declining when i increases.

The HP filter is a widely used method for estimating output gaps. It only requires the specification of the λ parameter, which, as mentioned above, tunes the smoothness of the trend. Its a priori choice should depend on the frequency of the data and on the main period of the cycle of interest to the analyst. However, the HP filter has also received substantial criticism, among other reasons, due to its poor performance at the end of the sample. This drawback is mainly a problem of limited information, because the estimation of real-time output gaps requires assumptions on current and future economic performance, and hence, it is the uncertainty of these projections that mainly drives the revisions to CABs. Alternative estimation approaches tend to share a similar problem [see, for example Orphanides and van Norden (2002)] although the size and duration of the revision might differ across them. In fact Rünstler (2002) estimates the output gap for euro area countries and shows that the uncertainty is sharply reduced in multivariate models.

At the end of the sample a proper estimation of y_t^* with the HP filter requires future observations to preserve the two-sided feature of the filter. Since these observations are not available, in practice the application of the filter is sometimes truncated. Then as new observations arise for period *T+1*, *T+2*,… the estimation of y_T^* is subsequently revised. Kaiser and Maravall (2001) analyse this empirical problem of the HP filter and show that the end-point problem could be partly solved by extending the time series with ARIMA forecasts. Moreover, they show that only four forecasts are needed to reproduce exactly the effect of the infinite forecast extension. Then any revision to the estimation of y_T^* will not be the result of an incomplete application or truncation of the filter, but of the revision to the forecasts. Hence, the choice as to how to extend the series is a key decision for minimising the forecast errors in the estimation of the trend component near the end of the sample.

2.2. Impact of revisions to economic growth projections on structural public balances with the HP filter

Let us define ∇ as the revision operator, i.e. the difference in the value of a variable for a particular period at two different points in time (let us say for example between two projection exercises). Then, from (1), the revision to the structural fiscal balance for period t can be expressed as:

$$\nabla b_t^* = \nabla b_t - \nabla b_t^c = \nabla b_t - \sigma\left(\nabla y_t - \nabla y_t^*\right) \quad (5)$$

If there is no change in the trend GDP (y^*) when the new GDP projections are available, then the revision to the output gap will be exactly the same as that to GDP $\left(\nabla y_t - \nabla y_t^*\right) = \nabla y_t$ and the revision to the structural balance will be zero (∇b_t^* =0), if no new discretionary measures are in place. If, on the contrary, the revision to GDP leads to a change in both the trend GDP and the output gap, there will be a revision to the CAB which is due to the revision to trend GDP and not to discretionary measures. Thus, the term $\sigma \nabla y^*$ can be seen as the part of the change in the CAB due to the revision to trend GDP and will be referred as the *Data Revision Component* (*DRC* hereafter). The change in the CAB not explained by the data revision can then be obtained by the difference $\nabla b - \sigma \nabla y$ and will include the effect of discretionary measures or temporary effects (explained or unexplained).

By definition, the *DRC* will arise when new GDP projections are released, independently of any endogenous or exogenous force affecting the budget balance projections. In addition, even if the GDP change only affects a single year, its impact will show up on the whole trend GDP series and, consequently, on the whole CAB series (even if its size will tend to be negligible for years far away from the one for which the revision takes place).

Let us assume that at a given point in time during year T_0, the whole y_t annual series is known up to $T_0 -1$. We also assume that economic forecasts are available for T_0, T_0+1, T_0+2. This is the type of information available, for instance, for the Autumn Forecasts of the European Commission carried out in year T_0. Moreover we assume that the series is extended until the period T_0+6. We will denote this available set of information by the superscript *'a'*. And from (4), we can express each element of y^* as a moving average of past and future elements of y:

$$y_t^{*a} = \sum_{j=1}^{T} c_{t,j} \cdot y_j^a \tag{6}$$

During the year T_0, new GDP forecasts become available (for instance, the Autumn Forecasts of the EC). We assume that the revision only affects the values of y_t in T_0, $T_0+1, \ldots or\ T_0+6$, that is, past values of the series are not revised, but only the current year value, the forecasts for the next couple of years and, possibly, even the extended values. Denoting the new set of information by *'b'*, new estimates of the output trend are obtained:

$$y_t^{*b} = \sum_{j=1}^{T} c_{t,j} \cdot y_j^b \tag{7}$$

Subtracting (6) from (7), the revision (in percentage points) to the trend level in t is:

$$y_t^{*b} - y_t^{*a} = \sum_{j=1}^{T} c_{t,j} \cdot \left(y_j^b - y_j^a\right) \tag{8}$$

And taking into account that $y_t^b = y_t^a$ *for t=1, 2 ..., T_0-1*, then

$$y_t^{*b} - y_t^{*a} = \sum_{j=T_0}^{T} c_{t,j} \cdot \left(y_j^b - y_j^a\right) \tag{9}$$

which provides the percentage change in the level of the output trend for each period as a function of the percentage change in observed GDP from T_0 to T. Then, applying the cyclical sensitivity of the budget balance to (9) one obtains the *DRC* at time *t*.

$$DRC_t = \sigma(y_t^{*b} - y_t^{*a}) = \sigma \sum_{j=T_0}^{T} c_{t,j} \cdot \left(y_j^b - y_j^a\right)$$

In order to illustrate the practical implications, let us consider an example where the new forecast revises downwards the GDP growth for year T_0 by 1%. We consider two cases. In the first case, the growth rates for the subsequent periods remain unchanged, that is to say the revision implies a permanent change in the level of GDP.

In the second, the growth rate for T_0+1 is also revised –in this case, upwards– by the same amount of 1%, which means that the whole effect of the revision is of a temporary nature. As will be discussed later, comparing these two cases is meant to shed some light on the implications of the revision to the GDP trend series associated with the revision to the original series.

CASE 1: PERMANENT REVISION TO GDP LEVEL

Let us assume that $g_{T_0}^{b} = g_{T_0}^{a} - 0.01$ and $g_t^b = g_t^a$ for $t=T_0+1,\ T_0+2,...,T,$ where g_t^i denotes the observed GDP growth rate for year t in forecasting exercise i.

This revision of the series implies a permanent change in the level of the original GDP series, y_t, from $t=T_0$ onwards. More formally, the level of GDP at T_0 under each forecasting exercise can be related to the level of GDP in the preceding year as follows:

$$Y_{T_0}^{b} = Y_{T_0-1}\left(1 + g_{T_0}{}^{b}\right) \tag{10}$$

$$Y_{T_0}^{a} = Y_{T_0-1}\left(1 + g_{T_0}{}^{a}\right) \tag{11}$$

where $g_{T_0}^{b} = g_{T_0}^{a} - 0.01$. Thus

$$y_{T_0}^{b} - y_{T_0}^{a} = \frac{Y_{T_0}^{b}}{Y_{T_0}^{a}} - 1 = \frac{1 + g_{T_0}^{b}}{1 + g_{T_0}^{a}} - 1 = \frac{g_{T_0}^{b} - g_{T_0}^{a}}{1 + g_{T_0}^{a}} \approx g_{T_0}^{b} - g_{T_0}^{a} = 0.01 \tag{12}$$

It can be easily seen that, for the following periods, the percentage change in the level of GDP has the same magnitude:

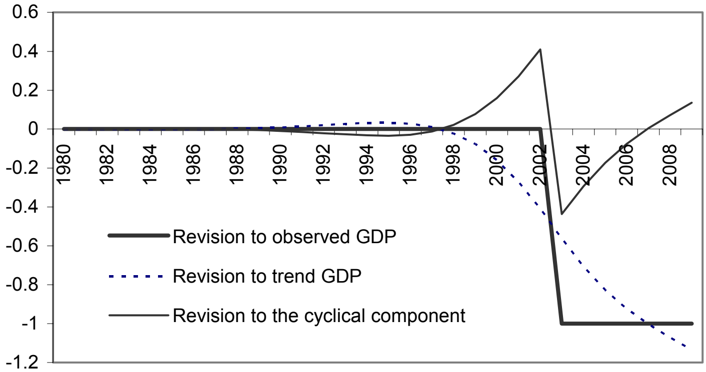
$$y_t^b - y_t^a \approx 0.01 \ \text{ for } \quad t = T_0 + 1,\ T_0 + 2,\ \dots,\ T \tag{13}$$

Substituting (12) and (13) into (9):

$$y_t^{*b} - y_t^{*a} = \sum_{j=T_0}^{T} c_{t,j} \cdot 0.01 \tag{14}$$

As mentioned earlier, the precise form of the coefficients $c_{i,j}$ is dependent on the sample size T and the HP filter parameter λ. In order to make the example operational we assume T=30 (which could correspond, for instance, to the period from 1980 to 2009), λ=30 and T_o=24 (corresponding to year 2003, given the previous choice for T)[4]. For these baseline values, Chart 1 shows the revision to observed GDP and the implied revisions to the trend and cyclical components of GDP.

CHART 1. Revisions to actual GDP, trend GDP and cyclical component. Case 1 with baseline values: T=30, λ=30 and T_o=24.



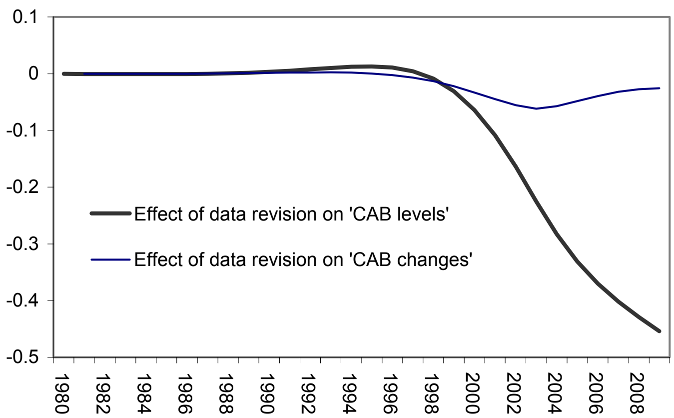
The downward revision of GDP growth by 1% for 2003, implies a permanent change in the level of the GDP series, maintained until 2009 (T=30), if all other growth rates are unchanged. This permanent change in GDP is transmitted to the trend in a smooth way. The contemporaneous revision to the trend and cyclical components are, respectively, 0.54% and 0.46%. But, for future periods, the revision to the trend becomes larger until the full effect is captured only in the trend. In fact, the revision to the trend overshoots the revision to observed GDP towards the end of the sample due to the truncation of the data. If, given T_0, T were larger, the long term revision to the trend would converge with the total revision of observed GDP. In the end, the level of trend GDP converges with the new (lower) level of observed GDP. The strange pattern

[4] To be more precise, our assumption for T would correspond to having an observed GDP sample from 1980 to 2002, projections for 2003 to 2005 and forecasts up to 2009 to avoid the end-sample problem. As far as λ is concerned, a value of 30 is initially used, as proposed by Bouthevillain *et al* (2001) but alternative values, such as that employed by the European Commission (λ=100), are also considered for a sensitivity analysis.

of the revision to the cyclical component, as a result of the jump in the revision of GDP and the smooth revision to the trend component, is remarkable.

The *DRC* or the adjustment to the CAB due to the revision to data, is the result of multiplying the revision to the trend by the cyclical sensitivity of the budget balance which is assumed to take the value 0.4[5]. As can be seen in Chart 2, this revision to the trend is negligible until around 1999 (that is, T_0 - 4) and increases from then onwards to reach -0.2 and -0.5 percentage points by 2003 (T_0) and 2009 (T= T_0+6), respectively. Consequently, after a fairly small assumed revision to observed GDP for a single year (1% less growth at T_0=2003), the estimated CAB changes by several tenths of a percentage point in that and the following years. This might give rise, for example, to the possibility that a given country which under the previous set of forecasts was deemed to be on a "close-to-balance" position, no longer being so after the revision to the forecasts.

CHART 2. Effect of data revisions on 'CAB level' and 'CAB changes'. Case 1 with baseline values: T=30, λ=30 and T_o=24.



From a policy point of view, it is relevant to analyse not only the size of the revision to the level of the CAB, but also to its change, given the 0.5% of GDP adjustment for countries not in CTBS position required by the 2003 BEPGs. Chart 2 shows the revisions to the levels of the CAB (*Data Revision Component, DRC*) and to

[5] The European Commission (2002) provides estimates of budgetary sensitivity to the output gap. They range from 0.3 in Austria to 0.7 in Finland. The value 0.4 corresponds to that of Greece, Spain and France.

the changes in the CAB (change in the *DRC*) for the given set of assumptions. As can be seen the revision to the change in the CAB is smaller and reaches a maximum at T_o = 2003 (whose rounded size would be one tenth of a percentage point). The explanation is that, since revisions to GDP growth introduce a change in the level of trend GDP in all periods around the revision date, the impact of the new information on CAB changes is much smaller than that on CAB levels.

TABLE 1. Revisions to the level of CABs (DRC): sensitivity analysis

Year	(1) Baseline	(2) λ=100	(3) T_0=26	(4) T=40	(5) Downward revision of GDP growth by 2% in T_o	(6) Downward revision of GDP growth by 1% in T_0 and T_0+1
1980-86	0.00	0.00	0.00	0.00	0.00	0.00
1987	0.00	0.01	0.00	0.00	0.00	0.00
1988	0.00	0.01	0.00	0.00	0.00	0.00
1989	0.00	0.01	0.00	0.00	0.00	0.00
1990	0.00	0.01	0.00	0.00	0.01	0.01
1991	0.01	0.01	0.01	0.00	0.01	0.01
1992	0.01	0.01	0.01	0.00	0.02	0.01
1993	0.01	0.01	0.01	0.00	0.02	0.02
1994	0.01	0.01	0.01	0.00	0.02	0.02
1995	0.01	0.01	0.01	0.01	0.03	0.03
1996	0.01	0.00	0.01	0.02	0.02	0.02
1997	0.00	-0.01	0.01	0.03	0.01	0.02
1998	-0.01	-0.03	0.00	0.04	-0.02	0.00
1999	-0.03	-0.06	-0.03	-0.01	-0.06	-0.04
2000	-0.06	-0.09	-0.06	-0.06	-0.13	-0.09
2001	-0.11	-0.12	-0.10	-0.11	-0.22	-0.17
2002	-0.16	-0.17	-0.16	-0.17	-0.33	-0.27
2003	**-0.23**	**-0.22**	**-0.22**	**-0.24**	**-0.45**	**-0.39**
2004	-0.28	-0.26	-0.29	-0.29	-0.56	-0.51
2005	-0.33	-0.31	-0.35	-0.34	-0.66	-0.61
2006	-0.37	-0.35	-0.40	-0.38	-0.74	-0.71
2007	-0.40	-0.39	-0.46	-0.41	-0.80	-0.78
2008	-0.43	-0.43		-0.43	-0.86	-0.85
2009	-0.45	-0.47		-0.45	-0.91	-0.92

Note: Scenario 3 includes only four periods after T_0. However, since T=30, this means that the sample starts two years earlier. Scenario 4 includes ten new observations at the beginning of the sample.

Finally, the sensitivity of the results to the baseline values of the assumptions is presented in Table 1. The baseline (column 1) assumes: T=30, T_0=24, λ=30, $g_{T_0}^b - g_{T_0}^a = -1\%$. Columns 2, 3 and 4 show, alternatively, the results when λ=100, T_0=26 *and* T=40, everything else being kept equal to the baseline. As can be seen, the effect of relaxing the original assumptions one at a time is rather small. Column 5 replaces the baseline hypothesis for the revision to GDP by $g_{T_0}^b - g_{T_0}^a = -2\%$: doubling the size of the revision to GDP doubles the impact on the CAB, which follows from the linearity of the revisions to the HP filter. Very similar results are obtained under the hypothesis that the revision to observed GDP is such that $g_{T_0}^b - g_{T_0}^a = -1\%$ and $g_{T_0+1}^b - g_{T_0+1}^a = -1\%$ (column 6).

CASE 2: TRANSITORY REVISION TO GDP LEVEL

We now consider a downward revision by 1% in the GDP growth rate for period T_0 and an upward revision by the same amount in the GDP growth rate for T_0+1. That is to say, the GDP series returns to its original level:

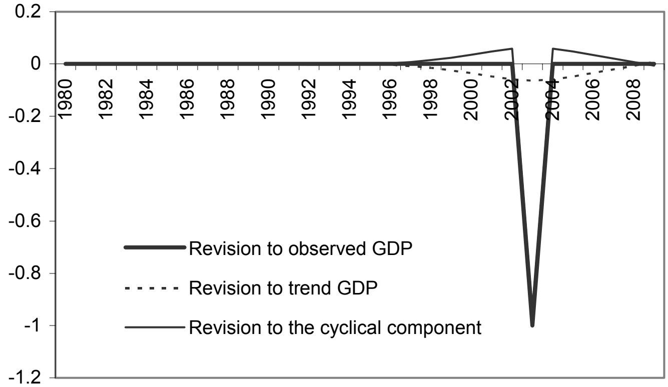
$$g_{T_0}^b = g_{T_0}^a - 0.01, \qquad g_{T_0+1}^b = g_{T_0+1}^a + 0.01 \quad and \quad g_t^b = g_t^a \text{ for } t=T_0+2, T_0+3, \dots, T$$

Following the same reasoning as in Case 1, it can be seen that:

$$y_t^{*b} - y_t^{*a} = c_{t,T_0} \, . \; 0.01 \tag{15}$$

Chart 3 reports the results for the same baseline assumptions as in Case 1 (i.e., $T=30$, $T_0=24$, $\lambda=30$). In this case, the size of the revision to trend GDP is much smaller and, what is more relevant, has a transitory nature, as expected. As a result of the small size of the revision to trend GDP, the adjustment to CABs due to data revision is nearly negligible, being even more so as far as CAB changes are concerned.

CHART 3. Revisions to actual GDP, trend GDP and the cyclical component. Case 2 with baseline values: T=30, λ=30 and T_o=24.



3. Estimating the effect of the latest GDP revisions for the euro area countries

3.1. The Spanish case: 2002 Spanish Stability Programme versus European Commission Spring 2003 forecast

To illustrate this problem, let us compare first the figures of the 2002 Spanish Stability Programme update with those of the European Commission Spring 2003 forecast (see Table 2). This case is of particular interest due to its similarities with the previous Case 1, given that the growth rate for 2004 was only marginally revised.

On the one hand, the updated Stability Programme includes a balanced budget target for 2003, based on the assumption of 3% real GDP growth. Trend GDP growth calculations, based on the application of the HP filter with λ=30, show a slight deceleration to 2.9% in 2003 and a fall in the output gap to 0.4%. This implies that the CAB would improve by 0.05 pp of GDP to -0.07% of GDP (see Table 2, first scenario).

On the other hand, the European Commission assumed in its Spring forecast a less favourable macroeconomic scenario for 2003 (2% real GDP growth, 1 pp lower than projected in the Spanish updated programme) and a deficit 0.4% of GDP higher than planned by the Government (see Table 2, second scenario).

No new discretionary measures were introduced between the presentation of the Stability Programme and the Commission Spring forecasts. Intuitively, given the estimate of the elasticity of the budget balance (as a percentage of GDP) to the cycle in Spain of 0.4, one might expect that this larger deficit would be fully explained by the more pessimistic growth scenario, while the CAB would remain unchanged from the SGP scenario. However, this is not the case. The revision of the GDP growth forecast generates a change in trend growth not only in the current year but also in previous and subsequent years and, consequently, in the output gap calculations. In particular, on the EC projections, trend GDP growth decreases by 0.1 pp on average during the 1990's relative to the SGP projections. The output gap would, under this scenario, become negative in 2003 (and 0.43 pp lower than in the SGP scenario). This implies that the CAB is now 0.23% of GDP lower than estimated under the SGP, while the cyclical component deteriorates by only 0.17 pp of GDP. Thus, following the methodology described in Section 2, in this case the revision of the CAB is exclusively due to the revision of the GDP forecast and its impact on trend GDP (i.e. the DRC, measured by $\sigma\nabla y^{*}$).

TABLE 2. Impact of Forecast Revisions on Cyclically Adjusted Balances. Case Study: Spain

	Scenario 1. 2002 Stability Programme						
	GDP Growth	Trend GDP Growth	Output Gap (% of trend GDP)	Budget Balance (B) % of GDP	Cyclical comp. B % of GDP	CAB % of GDP	Change in CAB % of GDP
1999	4.20	3.26	0.81	-1.17	0.33	-1.50	
2000	4.18	3.24	1.68	-0.78	0.68	-1.45	0.05
2001	2.67	3.14	1.17	-0.14	0.47	-0.62	0.83
2002	2.01	3.02	0.14	-0.07	0.06	-0.12	0.49
2003	2.95	2.93	0.12	-0.03	0.05	-0.07	0.05
	Scenario 2. European Commission Spring 2003 Forecast						
	GDP Growth	Trend GDP Growth	Output Gap (% of trend GDP)	Budget Balance (B) % of GDP	Cyclical comp. B % of GDP	CAB % of GDP	Change in CAB % of GDP
1999	4.20	3.20	0.89	-1.17	0.36	-1.53	
2000	4.18	3.16	1.83	-0.78	0.74	-1.51	0.02
2001	2.67	3.03	1.44	-0.14	0.58	-0.72	0.79
2002	2.01	2.89	0.54	-0.07	0.22	-0.28	0.44
2003	1.95	2.78	-0.31	-0.43	-0.12	-0.30	-0.02
	Scenario 2 - Scenario 1						
	GDP Growth	Trend GDP Growth	Output Gap (% of trend GDP)	Budget Balance (B) % of GDP	Cyclical comp. B % of GDP	CAB % of GDP	Change in CAB % of GDP
1999	0.00	-0.05	**0.07**	0.00	**0.03**	**-0.03**	
2000	0.00	-0.08	**0.16**	0.00	**0.06**	**-0.06**	**-0.03**
2001	0.00	-0.11	**0.26**	0.00	**0.11**	**-0.11**	**-0.04**
2002	0.00	-0.14	**0.40**	0.00	**0.16**	**-0.16**	**-0.05**
2003	**-1.00**	-0.15	**-0.43**	**-0.40**	**-0.17**	**-0.23**	**-0.07**

3.2. The effect of growth revisions between different forecast exercises by the European Commission

We now estimate the impact of the more recent economic growth revisions on structural public balances in the euro area countries. In particular, we consider the last three forecast releases made by the European Commission (Autumn 2002, Spring 2003 and Autumn 2003). In both the Autumn 2002 and the Spring 2003 releases the EC provides GDP projections for 2003 and 2004. In Autumn 2003 the projection period includes the year 2005.

We use the methodology explained in this paper. The output gap is estimated using the HP filter (λ=30) and GDP series are extended up to 2009. When comparing the Autumn 2002 and Spring 2003 releases we assume that, during the period 2005-2009, GDP will grow at the same annual growth rate as potential output did in 2004, according to the Autumn 2003 release. Using the same growth rates in the extension period for both releases we reduce the impact derived from the method employed to extend the time series. When comparing the last two EC releases, Spring and Autumn 2003, we use the growth rate of potential GDP in the last available year (2004 in the Spring release and 2005 in the Autumn one) to extend the time series. It is important to note that in the Spring 2003 release there are also important revisions to the historical GDP growth rates for some countries.

The upper panel in Table 3 shows the comparison of the Autumn 2002 and Spring 2003 releases, while the bottom panel presents the comparison between the Spring 2003 and Autumn 2003 releases. In both panels, the first set of columns shows the magnitude of the revisions to GDP growth between the two forecasting exercises. The next column presents the value of the assumed sensitivity of the cyclical budget balance to the output gap for each country [see European Commission (2002)][6]. The third and fourth sets of columns show the implied revisions to CABs and to CAB annual changes due to the revision of the GDP trend.

The revisions to GDP growth rates in the euro area countries in the Spring 2003 EC forecasts with respect to the previous Autumn 2002 release involve an average deterioration in structural deficits of 0.23%, 0.30% and 0.36% of GDP in 2003, 2004 and 2005, respectively. The *DRC* is quite large in Finland (above 1% of GDP) and larger than 0.5% of GDP for some years in Germany, Belgium and Luxembourg. In terms of the changes in CABs the revisions are, however, much more limited in all countries, being below 0.12% of GDP and around 0.06% of GDP, on average, for the period 2003-2005.

As far as the comparison between the Spring and Autumn 2003 releases is concerned, structural deficits increase, on average, by around 0.08%, 0.15% and 0.24% of GDP in 2003, 2004 and 2005, respectively, in the euro area countries due to GDP revisions. It should be taken into account that, in this case, historical data has also been revised significantly with a non-negligible impact on CABs. GDP revisions improve structural deficits in some countries (Greece, Spain, Luxembourg and Austria), while the *DRC* is negative in the rest of the countries and particularly large in the Netherlands (above 1% of GDP between 2002 and 2005) and in Ireland, Italy and Portugal (above 0.5% of GDP in some years). In terms of CAB changes, the revisions are, again, much more limited (around 0.07% of GDP on average), although, in some countries (see Ireland, the Netherlands and Portugal), revisions to CAB changes are quite large (between 0.2 and 0.3% of GDP, approximately).

[6] Alternative values for budget sensitivity are provided in Bouthevillain (2001) and OECD (1999).

TABLE 3. Impact of GDP revisions: Autumn and Spring EC forecasts

Autumn 2002 vs Spring 2003 EC releases

	Revision to GDP growth rates (percentage points)					Implied revision to the LEVEL of CABs (in precentage points)					Implied revision to the CHANGES in CABs			
year	2001	2002	2003	2004	σ (a)	2001	2002	2003	2004	2005	2002	2003	2004	2005
Belgium	0.0	-0.1	-0.9	-0.5	0.60	-0.20	-0.32	-0.44	-0.57	-0.68	-0.11	-0.13	-0.13	-0.11
Germany	0.0	-0.2	-1.0	-0.3	0.50	-0.19	-0.29	-0.40	-0.50	-0.59	-0.10	-0.11	-0.10	-0.09
Greece	0.0	0.5	-0.3	0.1	0.40	0.05	0.07	0.08	0.09	0.10	0.02	0.01	0.01	0.01
Spain	0.0	0.1	-0.6	-0.2	0.40	-0.05	-0.09	-0.13	-0.16	-0.20	-0.03	-0.04	-0.04	-0.03
France	0.0	0.2	-0.9	-0.4	0.40	-0.08	-0.14	-0.20	-0.27	-0.32	-0.05	-0.06	-0.06	-0.06
Ireland	0.0	2.7	-0.9	-0.7	0.35	0.26	0.34	0.39	0.41	0.42	0.07	0.05	0.03	0.01
Italy	0.0	-0.1	-0.8	-0.3	0.45	-0.01	-0.06	-0.12	-0.19	-0.25	-0.05	-0.06	-0.07	-0.06
Luxembourg	0.0	0.2	-0.9	-0.7	0.60	-0.14	-0.24	-0.36	-0.48	-0.59	-0.10	-0.12	-0.12	-0.11
The Netherlands	0.0	0.1	-0.5	-0.5	0.65	-0.09	-0.16	-0.23	-0.32	-0.39	-0.06	-0.08	-0.08	-0.08
Austria	0.0	0.3	-0.6	-0.3	0.30	-0.03	-0.05	-0.07	-0.10	-0.13	-0.02	-0.03	-0.03	-0.03
Portugal	0.0	-0.3	-0.7	-0.5	0.35	0.01	-0.03	-0.10	-0.16	-0.22	-0.05	-0.06	-0.06	-0.06
Finland	0.0	0.2	-0.6	-0.6	0.70	-0.82	-1.00	-1.17	-1.32	-1.44	-0.18	-0.17	-0.15	-0.12
average	0.0	0.3	-0.7	-0.4	0.48	-0.11	-0.16	-0.23	-0.30	-0.36	-0.06	-0.07	-0.07	-0.06

Note: the output gap is estimated using the HP-filter (λ=30). GDP projections by the European Commission in Autumn 2002 are available up to 2004. We extend them up to 2009 using the growth of potential GDP in 2004 (trend GDP for Luxembourg). For the Spring 2003 projections we use the same growth rates as in the Autum 2002 exercise for the extension period (2005-2009).

Spring 2003 vs Autumn 2003 EC releases

	Revision to GDP growth rates (percentage points)					Implied revision to the LEVEL of CABs (in precentage points)					Implied revision to the CHANGES in CABs			
year	2001	2002	2003	2004	σ (a)	2001	2002	2003	2004	2005	2002	2003	2004	2005
Belgium	-0.1	0.0	-0.4	-0.5	0.60	-0.16	-0.20	-0.24	-0.26	-0.26	-0.04	-0.04	-0.02	0.00
Germany	0.3	0.0	-0.4	-0.4	0.50	0.00	-0.02	-0.04	-0.07	-0.08	-0.02	-0.03	-0.02	-0.02
Greece	0.0	-0.2	0.4	0.4	0.40	0.04	0.08	0.13	0.18	0.23	0.04	0.05	0.05	0.05
Spain	0.2	0.0	0.3	-0.2	0.40	0.08	0.13	0.18	0.25	0.32	0.04	0.06	0.07	0.08
France	0.3	0.1	-1.1	-0.6	0.40	-0.08	-0.15	-0.23	-0.31	-0.39	-0.07	-0.08	-0.08	-0.07
Ireland	0.5	0.9	-1.8	-0.8	0.35	0.06	-0.06	-0.24	-0.49	-0.78	-0.12	-0.18	-0.24	-0.29
Italy	0.0	0.0	-0.6	-0.6	0.45	-0.11	-0.19	-0.29	-0.40	-0.53	-0.08	-0.10	-0.12	-0.12
Luxembourg	0.1	0.9	0.1	-0.8	0.60	0.95	1.08	1.15	1.18	1.16	0.13	0.08	0.02	-0.02
The Netherlands	0.0	-0.1	-1.4	-1.1	0.65	-0.31	-0.52	-0.78	-1.06	-1.33	-0.21	-0.26	-0.28	-0.27
Austria	0.1	0.3	-0.2	-0.1	0.30	0.00	0.02	0.05	0.08	0.12	0.02	0.03	0.03	0.04
Portugal	0.0	0.0	-1.3	-1.1	0.35	-0.18	-0.31	-0.48	-0.66	-0.85	-0.13	-0.16	-0.18	-0.19
Finland	0.6	0.6	-0.8	-0.4	0.70	-0.04	-0.09	-0.17	-0.29	-0.45	-0.04	-0.08	-0.12	-0.15
average	0.1	0.2	-0.6	-0.5	0.48	0.02	-0.02	-0.08	-0.15	-0.24	-0.04	-0.06	-0.07	-0.08

Note: the output gap is estimated using the HP-filter (λ=30). GDP projections by the European Commission in Spring 2003 are available up to 2004. The Autumn 2003 projections include 2005. In both cases we extend GDP up to 2009 using the growth of potential GDP (trend GDP for Luxembourg) for the last available year.

(a) European Commission (2002)

4. Conclusions

The sluggish economic performance in most euro area countries has recently led to several successive downward revisions of GDP growth projections. At the same time, general government budget balances are also experiencing a considerable deterioration in both nominal and structural terms. Since these downward revisions to GDP growth projections across European countries should in principle be considered as a purely cyclical phenomenon, doubts emerge as to whether structural balances or CABs are being affected by a larger amount than can be explained on the basis of discretionary policies. This, in turn, is questioning the reliability of CAB estimates and their usefulness for policy decision-making and for the assessment of the medium-term fiscal objectives of EU Member States.

This document presents a simple analysis, based on the estimation of structural balances using the Hodrick-Prescott filter, that leads to two main conclusions. Firstly, real GDP growth revisions affect both the GDP trend and output gap, and thus CABs, to a degree that depends on whether the revisions have a temporary or permanent effect on the GDP level. Transitory changes in the level of GDP are mainly allocated in the cyclical component and CAB levels are little affected. If, however, the revision implies a permanent change in the GDP level, CABs will be affected to a larger extent. Secondly, it is also shown that the impact of economic growth revisions on CAB changes is much more limited than on CAB levels.

This implies that interpreting the results of cyclical adjustment is inherently not entirely free from ambiguity. There is some uncertainty surrounding these calculations which cannot be eliminated and which arises simply because the future itself is uncertain. Analysing what we have called the *DRC*, or the revision to CABs due to GDP revisions, is therefore a matter of interest, given the possibility that this factor could give rise to changing assessments of the public finance situation.

When comparing the latest available data and projections of GDP up to 2004 by the European Commission we estimate that the increase in structural deficits in 2003 due to the GDP revision between the Autumn 2002 and Spring 2003 and between the Spring and Autumn 2003 forecasting exercises amounts, respectively, to 0.23% and 0.08% of GDP on average for the euro area countries. The impact on CAB changes is much smaller but not negligible and averages 0.07% of GDP in both cases in 2003. Consequently, in the current context, the impact of downward revisions to economic growth is making the achievement of the CTBS fiscal position more difficult. However, these considerations are not so relevant to the achievement of the 0.5% annual improvement in CABs required of those countries failing to comply with the CTBS clause.

The instability of CAB estimates when new information arrives is thus an argument justifying a certain degree of caution when compliance with the CTBS clause is being evaluated. Moreover, the uncertainty surrounding output gaps and CAB estimates should be recognised when ex-post compliance with the rules of the Stability Pact is being judged. This means that the part of the deterioration of CABs that is due to GDP revisions which, as this paper shows, can be easily calculated, should not be attributed to loosening fiscal policy actions, since the lack of compliance is the result of forces beyond the control of the government. This, however, does not mean that the effect of economic growth revisions on CABs should be ignored when fiscal policy actions are judged. It should be admitted that the underlying situation of public finances has indeed worsened and, consequently, even if it seems, in principle, that governments should not be blamed for an outcome which is not under their control, at some point the worsening in the CAB must be internalised by them when they draw up their fiscal plans. Failure to do so, after several successive rounds of downward revisions to growth, could give rise to a dangerous drift in the underlying fiscal position.

A further important consideration relates to the fact that the incentives for governments to base the assessment of CAB developments on the CAB adjusted by the DRC are asymmetric over the business cycle. So far, our focus has been on an economic context of sluggish growth and downward revisions to economic prospects. In such a context, governments may have an incentive to push for an interpretation of CAB developments in which the DRC is disregarded (arguing that it is to be imputed to the cycle and not to discretionary actions). However, in a context in which GDP growth is revised upwards, the DRC will operate in the reverse direction, showing an improvement in CABs. In such circumstances, governments have an incentive to claim that this improvement is the result of their discretionary actions (instead of a consequence of the improvement in economic prospects, given the way in which the methodology for cyclical adjustment operates). This is basically what happened during 1999-2000, the period of positive growth surprises that preceded the current slowdown. At the time, governments were interpreting improvements in CABs as if they were entirely the result of discretionary action instead of being also partly the result of cyclical developments. Such an interpretation provided those governments with a seemingly large margin of manoeuvre to undertake tax cuts. Eventually, however, such margin proved not to be so large.

This paper uses the Hodrick-Prescott filter as the methodology for analysing the effect of GDP growth revisions on trend output and CABs. However, this choice should not be used as an argument for rejecting this method of cyclical adjustment in favour of other alternatives. Indeed, any methodology for splitting economic series into their cyclical and trend components is subject to similar problems. Consequently, the use of alternative procedures to analyse CAB developments is also bound to involve shortcomings.

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