

BANCA D'ITALIA

RESEARCH DEPARTMENT
PUBLIC FINANCE WORKSHOP

**Indicators of
structural budget balances**

1999

BANCA D'ITALIA

**Indicators of Structural
Budget Balances**

Essays presented at the Bank of Italy workshop held in
Perugia, 26-28 November, 1998

Earlier versions of the essays in this volume were presented at the Banca d'Italia workshop on Indicators of structural budget balances held in Perugia, SADIBA, on the 26-28 November 1998. We wish to thank the staff of SADIBA for the excellent assistance given in all aspects of the organisation of the workshop.

Renzo Pin patiently and competently dealt with every stage of the realization of this volume; Clara Cozzani scrupulously helped in giving the texts common editorial standards. Giuseppe Rodomontini conscientiously contributed to preparing the final manuscript. Their efforts have greatly improved the quality of the book.

The contents of this book do not commit the Bank of Italy and their responsibility rests with the authors of the individual essays.

Copyright 1999 Banca d'Italia.

CONTENTS

Foreword

Daniele Franco
(Banca d'Italia)..... p. 5

Introduction

Sandro Momigliano
(Banca d'Italia)..... p. 9

I THE METHODS ADOPTED BY THE EUROPEAN COMMISSION, THE IMF AND THE OECD

1. The Commission Services' Cyclical Adjustment Method

Werner Röger and Hedwig Ongena
(European Commission)..... p. 17

2. The Structural Budget Balance: The IMF's Methodology

Robert Hagemann
(IMF)..... p. 53

3. Structural Budget Balances: The Method Applied by the OECD

Wim Suyker
(OECD)..... p. 71

II THE EFFECTS OF CHANGES IN THE COMPOSITION OF GDP

4. The NBB's Work on Structural or Cyclically-Adjusted Fiscal Indicators

Geert Langenus

(Nationale Bank van België - Banque Nationale du Belgique) p. 97

5. A New Method of Assessing the Structural Budget Balance: Results for the Years 1995-2000

Sandro Momigliano and Alessandra Staderini

(Banca d'Italia)..... p. 119

6. Cyclicity of the Danish Government Budget

Niels Lynggård Hansen

(Danmarks Nationalbank)..... p. 159

7. Fiscal Policy in Sweden: An Analysis of the Budget over the Business Cycle

Bengt Assarsson, Robert Gidehag and Göran Zettergren

(Sveriges Riksbank) p. 183

III STRUCTURAL SHOCKS AND SPECIAL FEATURES OF THE ECONOMY

8. Indicators of the Cyclically Adjusted Budget Balance

Anne Brunila and Mika Tujula

(Suomen Pankki - Finlands Bank) p. 217

9. Measuring Structural Budget Balances in a Fast-Growing Economy: The Case of Ireland

David Cronin and Daniel McCoy

(Central Bank of Ireland) p. 251

- 10. The Use of Cyclically Adjusted Balances at Banco do Portugal**
Luis Sarmiento
(*Banco do Portugal*) p. 273

IV REVIEWS OF ISSUES, DIRECT FILTERING AND THE USE OF VAR

- 11. Monitoring Budget Discipline: Some Simple Indicators**
José Marin
(*European Central Bank*) p. 285
- 12. The Relevance of Cyclically-Adjusted Public Balance Indicators - The French Case**
Alain Quinet and Karin Bouthevillain
(*Banque de France*) p. 325
- 13. The Budget Balance in the Medium Term and the Hodrick-Prescott Filter**
Gerrit van den Dool
(*De Nederlandsche Bank*) p. 353
- 14. Some Considerations Regarding the Calculation of Cyclically Adjusted Public Balances**
Pablo Hernandez de Cos
(*Banco de España*) p. 369

List of contributors

Bengt Assarsson (Sveriges Riksbank)
Karin Bouthevillain (Banque de France)
Anne Brunila (Suomen Pankki - Finlands Bank)
David Cronin (Central Bank of Ireland)
Robert Gidehag (Sveriges Riksbank)
Robert Hagemann (IMF)
Pablo Hernandez de Cos (Banco de España)
Geert Langenus (Nationale Bank van België - Banque Nationale du
Belgique)
Niels Lynggård Hansen (Danmarks Nationalbank)
José Marin (European Central Bank)
Daniel McCoy (Central Bank of Ireland)
Sandro Momigliano (Banca d'Italia)
Hedwig Ongena (European Commission)
Alain Quinet (Banque de France)
Werner Röger (European Commission)
Luis Sarmiento (Banco do Portugal)
Alessandra Staderini (Banca d'Italia)
Wim Suyker(OECD)
Mika Tujula (Suomen Pankki - Finlands Bank)
Gerrit van den Dool (De Nederlandsche Bank)
Göran Zettergren (Sveriges Riksbank)

STRUCTURAL BUDGET BALANCES IN THE STABILITY AND GROWTH PACT FRAMEWORK

Daniele Franco*

European Monetary Union has changed the fiscal policy framework for EU Member States. Fiscal policy has become more important, since national policy-makers can no longer rely on a monetary policy tailored on national needs nor on exchange rate adjustments. Moreover, stabilisation policies are to be carried out without breaching the 3 per cent of GDP limit set for the deficit and taking the level and dynamics of the debt into account. There is a need to combine budgetary discipline and fiscal flexibility. The Resolution of the European Council on the Pact indicates a solution: the *“adherence to the objective of sound budgetary positions close to balance or in surplus will allow all Member States to deal with normal cyclical fluctuations while keeping the government deficit within the value of 3% of GDP.”* In other words, to have adequate room for manoeuvre during recessions, governments should aim for surpluses or nearly balanced budgets in other periods.

The new EMU framework enhances the importance of structural budget balances, which assess the budgetary position net of the cyclical component and provide an indication of the available room for manoeuvre. Structural balance estimates are essential for the effectiveness of the multilateral surveillance mechanism introduced by the Maastricht Treaty and completed by the Stability and Growth Pact. Past experience indicates that policy-makers often let the structural deficit increase in periods of relatively high economic growth. In other words, part of the improvement of budgetary balances stemming from the cycle was used to carry out expansionary discretionary policies. Thus the success of monetary union

* Banca d'Italia, Research Department.

appears to require substantial changes in the policies implemented in good times. This requires, *inter alia*, also instruments allowing an accurate monitoring of budgetary situations.

Figure 1, in which the overall budget balance and its cyclical and discretionary components are pictured against the output gap, stylises the fiscal policy framework underlying the Pact and highlights the role of structural balance budgets. The figure is drawn by assuming that the government maintains a balanced budget position when the output gap is zero, a neutral discretionary policy and a cyclical sensitivity of the budget of 0.5, which is the average for the EMU countries. If we split the budget balance in two parts, the structural and the cyclical component, the Pact calls for a balanced (or nearly balanced) structural budget. The cyclical component of the balance moves up and down with the output gap, that is with the gap between the actual level of GDP and the level consistent with trend GDP growth. The structural balance is stable. In good times there is an overall surplus. In recessions there is a deficit. The comparison of

Fig. 1

Budget balance through the cycle

**No discretionary policy
Balanced budget as medium-term target**

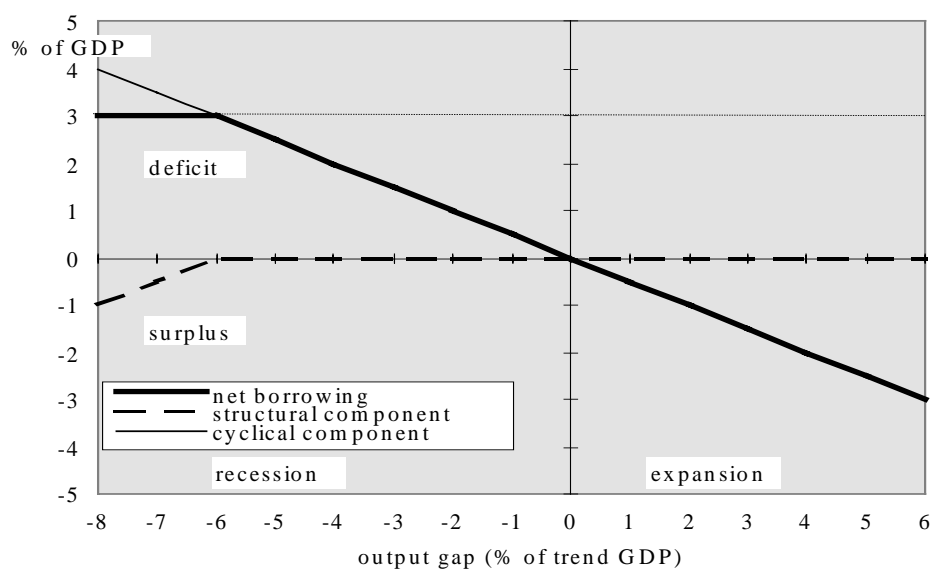


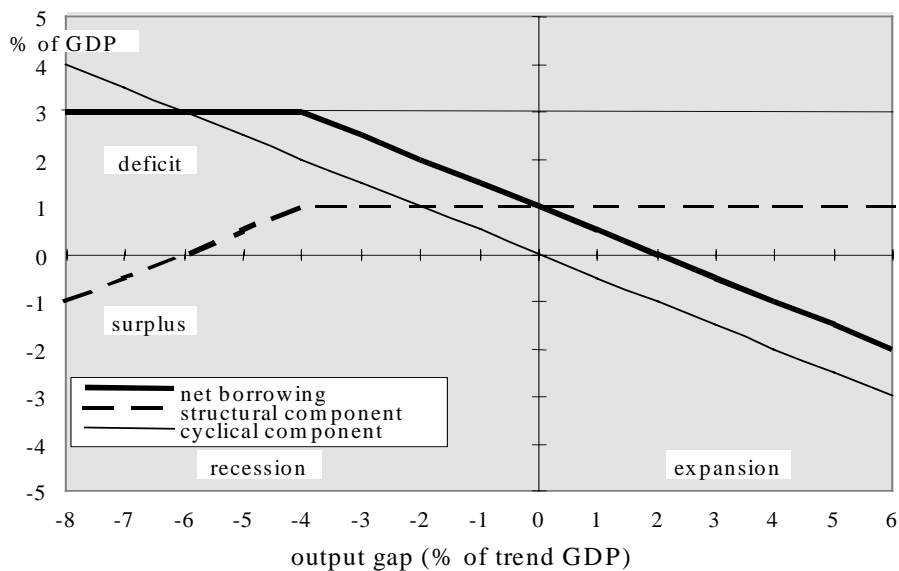
Figure 1 and Figure 2, the latter assuming a 1 per cent structural deficit, points to a clear trade-off: the higher the structural deficit the more likely it is that the 3% limit is reached and the country has to decide whether to implement pro-cyclical policies or be sanctioned.

Underlying the Pact there is a rational policy design that, in principle, allows to combine stabilisation policies with fiscal restraint. The evaluation of the structural balance is at the core of this design. This is clearly stated in the Opinion by the Monetary Committee on the *Content and format of Stability and Convergence Programmes*, which was endorsed by the European Council on October 12, 1998: “It is therefore clear that the assessment of the appropriateness of Member States’ medium-term objectives and the examination of their fulfilment has to take explicit account of the cyclical position and its effect on the budget. The time frame for interpreting the medium-term would be the length of the business cycle.”

Fig. 2

Budget balance through the cycle

No discretionary policy
1% deficit as a medium-term target



The adjustment of budget balances to cyclical conditions is a widely used technique that allows to evaluate the structural budget situation. The automatic effects of economic fluctuations on expenditure and revenues are filtered out in order to assess whether the government is taking action towards consolidation or has an expansionary discretionary policy. A number of methodological and empirical problems, which pertain both to the evaluation of the output gap and the elasticity of the budget to the cycle, suggest a great deal of caution in interpreting structural balances. They also point to the need for further analysis of the issue.

The present volume contributes to the debate on structural budget indicators with a set of essays produced by experts from the European System of Central Banks, the European Commission, IMF and OECD. The preliminary drafts of the papers were presented at a workshop organised by the Bank of Italy on November 28-29, 1998, in Perugia. The workshop allowed ESCB and international organisation experts to review the main methodological issues, to discuss the advantages and disadvantages of alternative indicators, to highlight the problems and the possible solutions.

INTRODUCTION

Sandro Momigliano

In the last two decades there has been a significant change in the way public finances are assessed. There has been a shift from short-term to medium- and long-term considerations, with a resultant change in the attention paid to the different analytical tools. While long-term analysis has been overhauled by the introduction of generational accounting, medium-term studies have usually relied on indicators of the *structural or cyclically-adjusted budget balances*. Owing to the Stability and Growth Pact, these indicators have gained further relevance for the assessment and planning of budgetary policies in the European Union, as extensively examined in the foreword to this volume.

As confirmed by the papers prepared by the experts from the European Commission, the IMF and the OECD, these developments are inducing the international organisations that regularly publish estimates of national cyclically-adjusted balances to review their methods and assessing the merits of alternative techniques. Judging on the basis of the contributions to this volume, the impact of these developments may, however, prove to be more significant at the national level. After a long period of relative neglect, in which most European governments and central banks did not regularly publish estimates of the cyclically-adjusted budget, the greater role of this indicator has fostered research, led to innovative approaches and induced a more critical attitude towards the concepts and methodological details on which the available measures of structural budget balances are based.

1. Two important intertwined issues addressed in this volume are the definition and the role of the structural budget balances. The traditional definition, adopted by the European Commission, the IMF and the OECD, is relatively restrictive. In the definition, the term “structural” is

synonymous with cyclically-adjusted; moreover, the budget is adjusted only for the automatic (i.e. determined by pre-existing legislation) effects of real fluctuations in GDP¹.

Most papers in this volume point out that such a narrow definition is satisfactory only if the use and interpretation of the indicator are clearly restricted. In particular, it is maintained that changes in the structural budget balance should not be used to measure discretionary fiscal policies, as they also reflect factors not directly related to government actions. It is also pointed out that the structural budget is a poor indicator of the sustainability of public finances. Assessing sustainability calls for a projection of future structural budget balances or, at least, taking into account all temporary measures and factors that affect the budget. Finally, it is stressed that this indicator should not be interpreted as a measure of the effect of fiscal policy on the economy, since this evaluation must be based on an explicit model of private sector behaviour.

Despite these limitations, a large majority of the papers tend to support the view that, interpreted with caution, the cyclically-adjusted budget balance can play an important role in assessing and formulating fiscal policy in a medium-term perspective and in the context of the Stability and Growth Pact. This judgement, however, does not prevent the authors from proposing complementary tools of analysis, as the estimates of this indicator may be subject to considerable uncertainty, and from suggesting a few limited extensions to the definition adopted by the international organisations, together with some refinements to their methods.

A dissenting view concerning the role of the cyclically-adjusted budget balance in the context of the Stability and Growth Pact is put forward in the paper by Marin. The author proposes, among others, a simpler indicator, which adjusts the budget balance for the impact of a change in economic activity from the current growth rate to a decline corresponding to a less than severe recession. The aim of the indicator is to help assess the risk of the budget deficit increasing above 3% of GDP in case of adverse cyclical developments. The main advantage of the

¹ In the case of Norway, the IMF and the OECD also adjust the budget for oil revenues.

indicators proposed by Marin is that they do not require an assessment of the cyclical position of the economy, which is often subject to considerable uncertainty.

2. With respect to the choice of methods, most approaches presented in the papers belong to the “gap + elasticity” category. Such methods compute the structural balance using the following two-stage procedure: a) a trend (or potential) value for GDP is estimated; b) the transitory component of the budget is computed, multiplying the GDP elasticity of the various budget items by the difference between trend and actual GDP. The structural balance is then obtained by subtracting the transitory component from the actual balance².

Within the “gap + elasticity” category, however, there are a number of differences between the methods discussed in this volume. An important issue concerns the measurement of the output gap (the difference between trend and actual GDP).

The standard methods to calculate the output gap fall into two categories: those based on a production function and those relying on statistical filters. Which approach is preferable represents a highly controversial issue. The former methodologies seek to assess the level of the potential GDP on the basis of an aggregate production function and the “normal” levels of production factors. This requires making a number of methodological choices in a setting of significant theoretical and empirical uncertainty: in particular, on the functional form of the production function and on the normal utilisation rate of production factors. The main advantage of the production function approach is that it allows for an economic interpretation and discussion of the results, which can be linked to the movements in the determinants of GDP. The methods based on statistical filters usually compute a trend GDP by smoothing the actual GDP series (in the widely used Hodrick-Prescott filter the trend is calculated by applying a symmetric weighted moving average to the GDP

² The methodology proposed in the works by Momigliano and Staderini and by Langenus (see par. 4) is not conceptually different, as it simply substitutes GDP with other macroeconomic variables.

series). Advantages of the statistical methods are their simplicity and limited data requirements. However, they also require making difficult assumptions, either on the relative variability of trend and actual GDP series or on the length of cyclical fluctuations. Moreover, the reliability of their estimates of trend GDP for the years close to the end of actual data depends on the quality of medium-term forecasts for GDP, used to extend the actual series.

A general discussion of the relative advantages and problems of the two approaches is included in many of the papers (see, in particular, the studies by Hernandez de Cos, by Ongena and Röger and by Brunila and Tujula). The study by van den Dool largely focuses on the different problems in using the Hodrick-Prescott (HP) filter. The analysis, also based on simulations, concludes that, while it is important to be aware of the different kinds of uncertainty related to the HP filter, these uncertainties can be quantified and should not be exaggerated.

While the majority of the papers in this volume rely primarily on purely statistical methods to estimate the output gap, but not necessarily the HP filter, this point should not be overemphasized. In fact, in most papers a significant role is also assigned to the method based on the production function. This tendency to rely on both methodologies is also present in the procedures followed by the international organisations. Ongena and Röger stress that output gap estimates obtained via the Commission's QUEST production function are used to check the plausibility of the results obtained via the HP filter. Hagemann, describing the IMF's methodology, shows that no standardised methodology is imposed for all countries, though the production function approach tends to dominate. For some countries, the estimates of the IMF are based on direct HP filtering. The HP filter is also used at various stages in the OECD's method, based on a production function;³ this tends to reduce the differences with the results obtained by direct application of the filter.

Brunila and Tujula suggest, however, that estimating output gaps using a production function may be preferable in the presence of large structural breaks in the economy. In the Finnish experience, they show that

³ This applies also to the production function methods used for some countries by the IMF.

the qualitative conclusions are not overly sensitive to the choice of method (HP filter or production function approach) until the early 1990s. As major structural breaks occurred in the Finnish economy in the late 1980s and early 1990s, the divergences between the results of the two methods became large. The authors tend to support the indications provided by the production function approach, suggesting that it can more readily incorporate auxiliary information concerning structural change. A similar comparison is presented for Portugal by Sarmiento. In this case, however, notwithstanding the presence of a significant structural break in 1974, the results obtained using the HP filter and those based on a production function are sufficiently similar.

Other specific features of the economy may account for large differences in the results of the two approaches and hinder accurate estimates of the output gaps, as highlighted in the paper on the Irish experience by Cronin and McCoy. Both statistical filter and production function approaches are complicated by the large variability in Irish output growth and the existence of a highly-elastic labour supply and highly-mobile capital. These features of the Irish economy may explain the disparity of several percentage points that exists between the estimated potential growth rates considered applicable to Ireland at present. Such variation can, in general, weaken the use of structural budget balance as an indicator of a Member State's performance with respect to the Stability and Growth Pact.

3. Alongside the discussions in this volume of the issues relating to the output gap methodology, attention is also given to how best the cyclical sensitivity of budget categories should be assessed. Several of the collected papers present new estimates of the cyclical sensitivity of the national budgets. Estimates are in many cases based on econometric analysis, while in others they are derived from the legal rules concerning the most relevant taxes and benefits, included the timing of their collection or payment. Various problems related to the econometric approach are discussed in the papers by Hernandez de Cos and by Cronin and McCoy.

Hernandez de Cos points out that changes in the structure of public sector, which were particularly large in Spain since the late seventies, could lead to significant errors in estimates of elasticities calculated on long reference periods; if only annual data are available this may greatly

hinder econometric analysis. He also stresses the need to re-estimate the elasticities whenever there is a significant change in the law, especially when it is intended to analyse future cyclically-adjusted deficits. Cronin and McCoy point out in particular that systematic discretionary policy may result in elasticities not being constant over time, making standard estimates less reliable.

Changes in the structure of the public sector also affect the legal-based approach, if the aim is to analyse past developments. In this case, it becomes necessary to retrieve the legal and administrative rules which existed in the past. In the paper by Momigliano and Staderini it is pointed out that the method based on the legal rules is the more reliable the closer the tax base is to the macroeconomic variable used to compute the gap. This implies that such an approach is particularly useful when the analysis of the cyclical position is not restricted to GDP (see the following paragraph).

4. Some papers in this collection discuss the possibility of extensions to the traditional definition of cyclically-adjusted budget balance. Four studies point out the importance of considering not just the budgetary effects of fluctuations in GDP but also those of fluctuations in the composition of output and the distribution of income. They show that the latter fluctuations may have a significant impact on the budget, leading to large differences, with respect to the methods based only on GDP, in the estimates of the overall effect of the cycle on the budget.

Two of the four papers (by Langenus and by Momigliano and Staderini) present a similar approach. Both studies, instead of using only GDP as a reference, compute the trends and the cyclical components for a limited number of macroeconomic variables whose impact on public finances is particularly large (e.g. private consumption, employees' gross earnings, operating surplus, employment in the private sector). The cyclical-adjusted balance is then computed adjusting the budget for the effects of those cyclical components.

The other two papers (by Assarsson, Gidehag and Zettergren and by Hansen) are partly devoted to analysing the responses of public finances to an unbalanced growth using model simulation. Their results, according to which the cyclical sensitivity of the budget balance is strongly dependent

on the underlying shocks that cause the cyclical change, are used to complement the assessment provided by a cyclically-adjusted budget indicator which takes into account the fluctuations in GDP.

In the traditional method used by the Belgian central bank (see the paper by Langenus) the budget balance is also adjusted for the effects of fluctuations in relative prices (more precisely, of differences between movements in the consumer price index and those in the GDP deflator). These effects are significant for Belgium, since a large part of government expenditure is explicitly indexed to consumer prices. Relative price effects could also be important in those countries where explicit or implicit indexation plays an important role and consumer prices are not highly correlated with the GDP deflator. However, accurately measuring relative price effects may prove to be a complex task, as typically: a) some indexation mechanisms are based on past inflation while others rely on expected inflation; b) not all mechanisms refer to the same price basket.

Bouthevillain and Quinet discuss the adjustment for the effects of fluctuations in the inflation rate. The paper points out the problems that arise in the measurement of these effects, especially because the impact of price changes may considerably differ according to whether they are expected or unexpected. It should also be considered that it is difficult to define and measure price fluctuations, given the existence of a *continuum* of possible levels of equilibrium for inflation.

Finally, a few papers (among which, that by Sarmento) point out that fluctuations in interest rates may have a significant impact on the deficit; to signal that such factor is not taken into account when adjusting the budget it is proposed to explicitly limit cyclical-adjustment analysis to the primary balance.

5. A number of contributions discuss alternative procedures to the “gaps + elasticity” approach for estimating structural budget balances. In addition to the model simulation approach (used in Assarsson, Gidehag and Zettergren and in Hansen) and to the proposal put forward by Marin, there are two methods which do not belong to the “gap + elasticity” category.

Bouthevillain and Quinet present, together with a method belonging to the “gap + elasticity” category, an application of VARs which,

following the approach developed in Blanchard and Quah⁴, decomposes the fluctuations in the deficit-to-GDP ratio into those arising from output and those arising from the deficit itself. The cyclical component of the deficit is defined as the accumulation of output shocks over the period. The authors assign to the VAR-based-method the role of complementing the more traditional approach.

The paper by van den Dool proposes to accompany a cyclically-adjusted balance, computed using a standard “gap + elasticity” approach, with a “structural balance”, calculated as a moving weighted average of the actual balance (using the Hodrick-Prescott filter). The structural balance, in this case, does not aim to adjust the balance only for the effects of economic fluctuations but for all other temporary factors.

6. The papers included in this volume offer a valuable contribution to the assessment of public finances and a useful support to fiscal policy decisions in Europe. They also provide a wide range of insights into the problems encountered in estimating cyclically-adjusted balances. Moreover, the arrays of methods developed in the papers represents an important starting point for future research in the area.⁵ Research and fiscal policy analysis will also benefit from the many new or updated estimates of budget elasticities and of cyclically-adjusted budgets which are included in the book.

⁴ Blanchard, O.J. and Quah, D. (1989), *The Dynamic Effect of Aggregate Demand and Supply Disturbances*, *The American Economic Review*, 79, pp. 655-73.

⁵ It should be noted that many of the papers represent intermediate products of ongoing researches.