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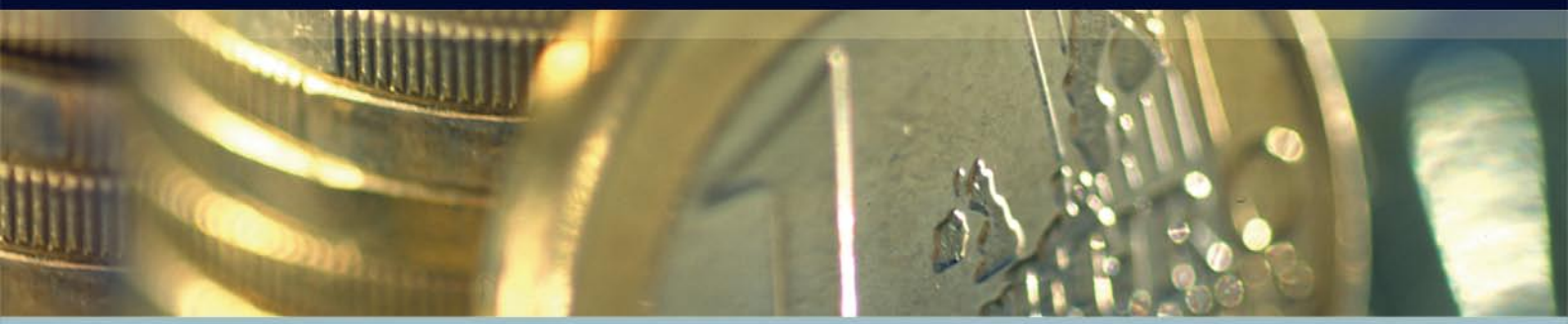

Achieving and safeguarding sound fiscal positions

Workshop organised by the Directorate-General for Economic and Financial Affairs

Brussels, 17 January 2008

Edited by Martin Larch

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Achieving and Safeguarding Sound Fiscal Positions

Proceedings of the workshop organised by the
Directorate-General for Economic and Financial Affairs
in Brussels on 17 January 2008

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List of Contributors

Christophe André, Organisation for Economic Co-operation and Development; christophe.andre@oecd.org.

Silvia Ardagna, Harvard University; sardagna@fas.harvard.edu.

Roel M.W.J. Beetsma, University of Amsterdam; r.m.w.j.Beetsma@uva.nl.

Mark De Broeck, International Monetary Fund, mdebroeck@imf.org.

Lorenzo Codogno, Italian Ministry of Finance; lorenzo.codogno@tesoro.it.

Stefania Fabrizio, International Monetary Fund; sfabrizio@imf.org.

Roberto Golinelli, University of Bologna; roberto.golinelli@unibo.it.

Stéphanie Guichard, Organisation for Economic Co-operation and Development; Stephanie.guichard@oecd.org.

Jürgen von Hagen, University of Bonn, Indiana University and CEPR; vonhagen@uni-bonn.de.

Mike Kennedy, Organisation for Economic Co-operation and Development; mike.kennedy@oecd.org.

Martin Larch, European Commission - Bureau of European Policy Advisers; martin.larch@ec.europa.eu.

Carlos Martinez Mongay, European Commission – Directorate General for Economic and Financial Affairs; carlos.martinez@ec.europa.eu.

Ashoka Mody, International Monetary Fund, European Department; amody@imf.org.

Matthias Mohr, European Central Bank; matthias.mohr@ecb.int.

Sandro Momigliano, Banca d'Italia; sandro.momigliano@bancaditalia.it.

Richard Morris, European Central Bank; richard.morris@ecb.int.

Paul J. van den Noord, European Commission – Directorate General for Economic and Financial Affairs; paul.vandennoord@ec.europa.eu.

Ludger Schuknecht, European Central Bank; Ludger.Schuknecht@ecb.int.

Steven A. Symansky, International Monetary Fund; ssymansky@imf.org.

Echkard Wurzel, Organisation for Economic Co-operation and Development; eckhard.wurzel@oecd.org.

1 Introduction

Martin Larch *

The contributions collected in this volume were presented at a workshop organised by the Directorate-General for Economic and Financial Affairs of the European Commission on 17 January 2008. As suggested by the title of the workshop, the main idea was to reflect upon ways to achieve and safeguard sound fiscal positions in the EU. Around ten years after the inception of the EU fiscal surveillance framework the event constituted an important opportunity to take stock of the successes and difficulties of the past and, on that basis, to examine and discuss ways to address evolving challenges.

In terms of the economic and fiscal background, the date of the workshop coincided with a moment of change. Although, in January 2008 it was too early to foresee the extent of the current financial and economic crisis in that would unfold a couple of months later, a slowdown was clearly on the cards and, link to it, the understanding that public finances in the EU would face more difficult times and that the commitment of EU fiscal policy makers to fiscal discipline would be tested.

Conversely, the years from 2004 to 2007 were a period of relative optimism. The economy had undergone a gradual recovery from the protracted slowdown of the early 2000s and the fiscal situation in most Member States had recorded marked improvements that went beyond the mere effect of the cycle. Overall, public finances in the EU and the euro area as a whole had been put on a relatively sound footing especially when compared with the early 1990s, when the formal foundations of the Economic and Monetary Union were laid in the Maastricht Treaty. In 2007, the budget balance net of cyclical factors recorded a deficit of close to 1% of GDP in the euro area as a whole, down from more than 5% in the early 1990s. In parallel, the government debt ratio had declined to around 66% of GDP in the euro area as opposed to the peak of more than 70% of GDP at the end of the 1990s.

Despite the impressive fiscal retrenchment programmes implemented in the run up to the EMU, plus the progress made between 2004 and 2007, the scope for further fiscal consolidation and for strengthening arrangements that help safeguard sound fiscal positions has not vanished.

In the short term there are the apparent challenges ensuing from the financial crisis. The ensuing economic slowdown has generated considerable political pressure in the EU, an beyond, to loosen the reigns of fiscal policy. Discretionary fiscal stabilisation, which had been largely banned from the tool-kit of fiscal policy making for decades, is experiencing a renaissance. Additional complications arise from the unfortunate decision taken in some EU countries towards the end of the last economic recovery to

* I am indebted to Laura Fernandez Vilaseca and Simona Cicognani for technical and editorial assistance. Without their help these proceedings would not have seen the light of day.

spend revenue windfalls instead of putting them aside for 'rainy days'. In the Member States concerned such decisions are going to amplify the budgetary shortfalls in the current and particularly deep downturn.

As regards the medium and long term, the main challenge remains the impending budgetary impact of ageing population. Member States need to create the necessary room in their budgets so as to address the increasing weight of age-related expenditures. In spite of the clear progress in the area of public finances mentioned above, in 2007 only 12 out of the 27 EU Member States recorded a budgetary position that was in line or in excess of the medium-term budgetary objective (MTO), that is the budget balance net of cyclical factors and one-off and other temporary measures which would ensure the long-term sustainability of public finances taking into account the budgetary costs of ageing. Based on the sustainability assessment carried out regularly by the Directorate-General of Economic and Financial Affairs, in 2007 five EU countries were classified in the high-risk group and another five in the medium-risk group (European Commission, 2007)

On the whole, both short and long-term considerations clearly underscore the importance of taking a closer look at the mechanics and dynamics of fiscal adjustment in a bid to better understand the factors that are conducive to the achievement and consolidation of sound fiscal positions. In an attempt to concentrate on issues, which, based on past experience, proved to be particularly relevant or problematic, the workshop focused attention on three distinct thematic areas: (i) the role played by fiscal governance; (ii) lessons from fiscal consolidation episodes; and (ii) the response of fiscal policy to swings in economic activity.

The rational for picking these areas is relatively straightforward. As regards fiscal governance, there is a fast expanding strand in the economic literature, reaching well beyond the realm of fiscal policy, highlighting the importance played by the quality of rules and institutions for economic outcomes. In particular, it has become increasingly evident that the specifics of the rules and institutions underpinning fiscal policy making have a measurable impact on key economic variables, including fiscal performance indicators. As a consequence, increasing attention has been paid to the question of what type of fiscal governance is supportive of sound fiscal policy and what type is not.

The second thematic area links up with a relatively established yet still very topical area of research. Since the early 1990s a considerable number of studies have been conducted in the attempt to pinpoint from the existing and vast pool of real-live fiscal adjustments *the* recipe for successful fiscal consolidation. While this branch of research has indeed identified a number of relatively robust key ingredients for success, the interest in the determinants of lasting fiscal corrections has not petered out. New factors are being explored and new adjustment episodes are being added to the sample.

The third thematic area deals with a particularly thorny issue related to the stabilisation function of fiscal policy. On a conceptual level there is general agreement that fiscal policy should *inter alia* aim at ironing out cyclical variations of economic activity. In practice, however, things turn out differently. Empirical evidence shows that fiscal policy in the EU has at best been a-cyclical and very often pro-cyclical especially in good times; the above mentioned spending of revenue windfalls in 2006/07 is the last example of such practice. Apart from having a de-stabilising effect on the economy, running pro-cyclical polices in good times can have has a non-negligible impact on the

sustainability of fiscal policy as debt is being accumulated (or not reduced) in periods when additional resources become available. Reflections on how to limit or avoid pro-cyclical policies are therefore important for achieving and safeguarding sound fiscal positions too.

At the workshop, each of the three thematic areas was explored on the basis of two invited contributions. The first contribution under the heading ***Fiscal Policy and Institutions*** was by Jürgen von Hagen, who examined the question of whether and how fiscal institutions have an impact on the track record of the fiscal plans of EU Member States. The paper presented the results of an empirical analysis of the Stability and Convergence Programmes, in which EU Member States, under the provisions of the so called preventive arm of the Stability and Growth Pact (SGP), are required to outline their fiscal plans for at least the next three years. More specifically, the aim of the analysis is to identify different elements that may shape or explain the difference between plans and outcomes and to quantify their impact. This type of analysis is not completely new as it links up with a number of existing works that also try to understand why some countries are better in sticking to budgetary plans than others. What is new and interesting in von Hagen's work, however, is the particular focus on the role played by institutions. The encouraging part of his findings is that strong fiscal rules are associated with more cautious economic growth projections underpinning fiscal plans as well as with more cautious projections for government revenues and expenditure. This is an additional and valuable piece of evidence in a progressively more conclusive mosaic suggesting that strong fiscal rules have a positive impact on various dimensions of fiscal policy making. It also backs one of the main objectives of the reformed SGP, notably to encourage Member States to strengthen fiscal rules and institutions.

The second contribution dealing with Fiscal Policy and Institutions approached the issue from a completely different and relatively innovative angle. Acknowledging the growing evidence that institutions make a difference for fiscal policy making, the two authors, Stefania Fabrizio and Ashoka Mody, set out to explore the factors that shape or strengthen such institutions. Their work enters relatively new territory in that there are very few empirical studies dealing with the issue of how institutions are formed and changed. The line of reasoning that Fabrizio and Mody chose from the body of existing theoretical studies is to think of changes in institutions as a 'war of attrition' where beneficial reforms are delayed because different interest groups would like to enjoy the benefits without bearing the costs. Based on data of 23 EU countries, the authors identify two major catalysts of institutional change: favourable fiscal conditions on the one hand and difficult economic times on the other. Hence, more government resources would seem to help resolve distributional conflicts associated with institutional reforms while economic hardship seems to increase the likelihood of compromises.

The session on ***Lessons from Fiscal Consolidation*** hosted two papers that aimed at (re)drawing the line between successful and unsuccessful fiscal corrections. The contribution by Stéphanie Guichard, Mike Kennedy, Eckhard Wurzel and Christophe André is a very comprehensive and detailed analysis exploring adjustment episodes in the OECD countries since 1970. What makes the analysis particularly interesting is its vast scope. On top of the traditional elements considered in the related literature, such as the composition and the size of the adjustment, the paper by Guichard et al. sheds light on a number of new aspects notably the role played by fiscal rules and institutions. Overall, the paper largely and reassuringly confirms established findings, such as the

importance of initial fiscal conditions in triggering fiscal adjustment or the need to focus on expenditure cuts rather than revenue increases to make a correction more lasting. However, and more importantly, the paper also provides evidence that fiscal rules can be beneficial in several respects. Specifically, fiscal rules are associated with larger, longer and more successful consolidation episodes.

While looking at the same set of countries and the same time span, the specificity of the second paper of the second session, authored by Silvia Ardagna, was to identify the conditions that make a consolidation both lasting and expansionary. The issue of whether and how fiscal consolidations can be made successful without harming or even supporting economic activity links up with the strand in the literature, which, starting in the early 1990s, explored the possibility of expansionary effects of fiscal contractions. Since then, evidence has been accumulated suggesting that consolidations centred on spending cuts on transfers, welfare programs and the government wage bill, rather than tax increases, increase both the likelihood of success and of having an expansionary impact on GDP growth. Ardagna's analysis contributes to this strand of the literature. Using a more involved econometric approach compared to other existing works, her findings underscore that the composition of a fiscal correction is important for growth notably thanks to the positive impact of the right measures on the labour market. She also finds some evidence that the right composition of fiscal adjustment can have a positive effect on growth via expectations of economic agents.

Turning to the third and last thematic area, the ***Response of Fiscal Policy to the Cycle***, the two contributions presented at the workshop may at first sight look somewhat technical, as they dig deep into specific issues related with the measurement of fiscal performance. However, it is precisely their specificity that makes them particularly valuable in an area which in the last few years has attracted increasing attention.

The paper by Roberto Golinelli and Sandro Momigliano takes a closer look at the whole range of econometric studies based on so called fiscal reaction functions or fiscal rules, which in the last two decades have become increasingly fashionable to analyse the behaviour of fiscal authorities. The main attraction of such econometric studies is that they aim at identifying the determinants of fiscal policy making, as measured by the level or the change of the budget balance, on the basis of a relative simple framework. At the same time, the large body of existing work also highlights a rather disturbing element, namely a great variation of results concerning the estimated response of fiscal policy to cyclical conditions: based on similar sets of countries and time span different studies reach contrasting conclusions including all possibilities: counter-cyclical, a-cyclical or pro-cyclical behaviour of fiscal policy. On the back of this, the authors took the trouble to run through alternative variations of a particularly frequent class of fiscal rules in order to account for the divergence of results. The conclusions they reach primarily call for caution when comparing results across alternative specifications as they can have different interpretations. They also do not find support for the frequently held notion that fiscal policies have been pro-cyclical in the EU. In particular, real time data indicate weakly counter-cyclical policies, while *ex post* data sources broadly suggest a-cyclicality.

The contribution by Matthias Mohr and Richard Morris concentrates on a specific practical difficulty in the implementation of the EU fiscal surveillance framework that has become particularly evident over the past several years. When the reformed Stability and Growth Pact entered into force in 2005 considerable hopes were attached

to one of the main innovations introduced into the revised set of rules, namely to monitor and assess the fiscal performance of the Member States on the basis of the budget balance net of cyclical factors. Although experts were aware of the measurement uncertainties surrounding the cyclically-adjusted budget, the idea prevailed that such uncertainties would compare favourably with the volatility of headline figures. While there are still forceful arguments in favour of using the cyclically-adjusted budget balance for the purpose of fiscal surveillance, the experience of the past several years has clarified the actual degree of uncertainty involved. In their paper Mohr and Morris present and analyse this evidence in a very comprehensive and insightful fashion. In addition, they outline possible improvements to existing methods for the measurement of the underlying budgetary position aimed at containing the degree of uncertainty.

Part I - Fiscal policy and Institutions

2 Sticking to Fiscal Plans: The Role of Fiscal Institutions

Jürgen von Hagen *

2.1 Introduction

The rules-based fiscal framework of EMU relies heavily on the development of medium-term fiscal plans of the member governments and their ability to stick to these plans. Since 1998, member countries of the EU submit reports of their medium-term fiscal plans every year as part of their Stability and Convergence Programs. This is based on Council Regulation 1466/97 and implements Article 99 of the Maastricht Treaty. Specifically, the programs include projections of key budgetary parameters and of real GDP growth.

A number of recent empirical studies have investigated the quality of such projections interpreting them as fiscal and economic forecasts (Strauch *et al.*, 2004; Annett, 2006; Brück and Stephan, 2006; Jonung and Larch, 2006; Pina and Venes, 2007) and testing for efficiency and unbiasedness. Interpreting the projections as forecasts assumes that they reflect the economic and fiscal outcomes governments expect given their economic medium-term economic forecasts and their current and expected fiscal policies. It is then natural to expect (and demand) that the projections should be unbiased and use all available information. This research has argues that there is considerable cross-country variation in the forecasting performance of the member state governments. Moreover, it has shown that the projections are often biased and inefficient. This casts doubt on either the governments' ability to produce good forecasts or their willingness to disclose all the information they have.

In this paper, we take a different perspective. We interpret the projections for economic growth as a strategic variable entering a government's fiscal plan, and the projections of budgetary parameters as fiscal *plans*, i.e., expressions of a government's fiscal *intentions* given its medium term economic forecasts.[1] This perspective takes into account that fiscal projections report what is intended by the policies a government foresees to adopt. Furthermore, it takes into account that fiscal projections are of an inherently political nature. For example, a government might have an internal forecast based on all available information and a no-policy change assumption indicating that its budget deficit two years ahead will exceed three percent of GDP. However, given that this would constitute a violation of the fiscal criteria of the Maastricht Treaty, it seems very unlikely that the government would report and publish such a forecast, since it would signal to the European Commission and the European public that it intends to break the rules. Instead, the government will devise a strategy for avoiding a breach of the deficit criterion and publish the budgetary parameters consistent with that strategy. The fiscal projections then signal what the government expects from that strategy. Finally, our interpretation allows for the possibility that fiscal projections are used

* This paper has benefited much from discussions with Mark Hallerberg and Rolf Strauch and draws extensively on our joint research summarized in *Fiscal Governance in Europe* forthcoming at Cambridge University Press. I thank Steven Symansky for helpful comments at the Workshop.

[1] Moulin and Wierts (2006) pursue a similar interpretation.

strategically, e.g., to reduce the likelihood of outcomes which are regarded as less desirable than others.

From this point of view, deviations of the actual outcomes from the fiscal projections may be intended ex ante, when the projections are made, and they may be the results of economic developments or of changes in political intentions unforeseen at the time when the predictions were made. In this paper, we explore all three sources of such deviations empirically. Obviously, deviations from the projections ought to be small, regardless of their source, for the Stability and Convergence Programs to provide an effective framework guiding fiscal policies and the public's expectations for such policies in the EU. In this paper, we try to separate these different sources and analyze the properties of the resulting deviations from fiscal projections empirically.

We are particularly interested in the effect of fiscal rules and budgetary institutions on these two components. Budgetary institutions affect a government's ability and willingness to stick to its medium term fiscal program. Regarding budgetary institutions, one may expect that a budgetary framework of fiscal contracts (Hallerberg and von Hagen, 1998) implies a stronger commitment to medium-term programs than a framework of delegation, as deviations from the program imply a need for renegotiation among the parties involved in the contract. This suggests that fiscal contracts lead to smaller deviations from such programs. At the same time, however, one may expect that governments operating under fiscal contracts are less able to react to unforeseen economic developments than governments operating under delegation, unless the former have fiscal rules for dealing with such developments, such as rainy day funds.

The remainder of this paper is structured as follows: In Section 2.2, we provide a review of some recent related literature. In Section 2.3, we turn to our own empirical estimates. We use a data set of deviations of main fiscal aggregates, i.e. the budget balance, total spending and total revenues, from the projections given in the annual Convergence and Stability and Growth Programs by EU member governments from 1998 to 2004. Data availability allows us to look at forecast horizons ranging from zero to two years. We first provide some descriptive statistics. Next, we estimate empirical models of the projection errors for real GDP growth and the main budgetary aggregates. Finally, we correct the fiscal projection errors for the impact of the real growth projection error to get a measure of the discretionary parts of the former and estimate empirical models for these parts. Finally, we analyze the volatility of the projection errors. Section 2.4 concludes.

2.2 Recent Literature

A very early study in this context is found in von Hagen and Harden (1994) who consider the bias and precision of government revenue and expenditure forecasts taken from the European Commission's bi-annual *Economic Forecasts*. Based on data from 1980 to 1991, the authors show that relatively high-debt countries and high-deficit countries in the EU tended to have overly optimistic and relatively imprecise revenue forecasts. The difference between high and low-debt and deficit countries was statistically significant. In contrast, expenditure forecasts did not vary systematically with the debt or deficit position of the countries. Furthermore, the authors show that countries with relatively good budget institutions had significantly more precise

expenditure and revenue forecasts. Brück and Stephan (2006) look at the budget balance forecasts published by the European Commission for 1995 to 2004. They argue that the introduction of the SGP led to the emergence of a *political forecasting cycle*: Euro area governments issue budget balance forecasts which are significantly upwards biased in periods closely before elections. Furthermore, they find that coalition governments and governments leaning to the political left make overly optimistic forecasts on the budget balance.

Pina and Venes (2007) use fiscal forecasts reported by all EU member countries bi-annually in the context of the Excessive Deficit Procedure. They show that budget balance forecast errors are systematically and positively affected by GDP growth forecast errors. They also find a negative impact of elections on the forecast error, but this effect is not significant in all specifications. In contrast, they find that errors are significantly negative when the outturn is reported by a government whose ruling parties were in opposition when the forecast was made. Finally, Pina and Veres show that budget balance forecasts made by governments operating under *commitment*- (or *contract-)* type budget institutions are systematically biased downwards.

Strauch *et al.* (2004) use data from all Stability and Convergence Programs in the 1990s and until 2002 to analyze the bias and efficiency of projections for real GDP growth and budget balance forecasts. They find that some countries systematically have overly optimistic forecasts, i.e., forecast errors are negative on average, with others have overly cautions forecasts. They also find that budget balance forecasts are affected by the cyclical position of the economy and the form of fiscal governance.[2] Specifically, governments operating under *contracts* arrangements, which focus on numerical targets, tend to have overly cautious projections for the budget balance. Strauch *et al.* also show that these projections are not efficient in the sense of using all available information. Specifically, they are systematically encompassed by the European Commission's forecasts. In a similar vein, Annett (2006) analyzes the properties of forecast errors for the general government budget balance in the EU-12 countries during 1999 to 2004. He, too, finds governments under *contracts* arrangements tend to underestimate the budget balance, i.e., their forecasts are overly cautious.

Jonung and Larch (2006) focus on the properties of the GDP growth forecasts governments use as an important input into their fiscal projections. They find that there is a tendency in European countries to overestimate growth. This tendency is particularly pronounced as elections approach. Jonung and Larch show that governments relying on independent forecasting agencies have a smaller bias in their growth forecasts and recommend that all governments in EMU should be asked to use forecasts from independent agencies.

Below, we use data from the annual Stability and Convergence programs to analyze the deviations between projected and actual outcomes for real GDP growth and the general government budget balance, revenues and expenditures relative to GDP. We thus extend the analysis presented by Strauch et al and, at the same time, focus on the EMU period starting in 1999.

[2] For studies of the forms of fiscal governance in Europe see Hallerberg and von Hagen (1999) and Hallerberg *et al.* (2007) and *forthcoming.*

2.3 An Analysis of Growth and Fiscal Projection Errors

2.3.1 Data and Descriptive Statistics

Our data is taken from the annual Stability and Convergence Programs of the EU-15 countries from December 1998 to 2004. It contains projections for real GDP growth as the key economic forecast, together with projections of the general government balance, general government revenues and general government spending as ratios of GDP. All data are annual. We use projection horizons of zero, one, and two years, where zero means that a projection is being made for the fiscal same fiscal year. Actual realizations are taken from the Statistical Annex of *European Economy* (2007). For the subsequent analysis, we have seven Programs for each country and, hence, 105 observations for all variables.[3]

Let x_t be a variable for which a projection is presented in a Stability and Growth or a Convergence Program, and x_t^P the projection presented. With some abuse of language, we call $u_t^x = x_t - x_t^P$ the projection error, keeping in mind that the deviation between the actual value and the projection is not necessarily an "error" in the sense of being due entirely to a lack of information. Note that a positive error means that the projection underestimated the actual realization, while a negative error implies an overestimation of the actual realization.

As argued above, a projection error for fiscal variables consists of two elements. One is the endogenous change in the variable projected due to unforeseen changes in the economic environment. The other is the change in this variable due to discretionary policy measures. Separating the two requires an identification of how the fiscal variable under consideration reacts to unforeseen changes in economic circumstances. Taking the projection error for real GDP growth as the main indicator of the latter, one might regress the fiscal projection error on the real GDP growth projection error and define the residual as a proxy for discretionary policy changes. This, however, amounts to assuming that discretionary policy does not or cannot react systematically to unforeseen changes in real GDP growth during the year. Since we do not want to make such a restrictive assumption, we use the budgetary elasticities calculated by the OECD to construct proxies for the discretionary part of the fiscal projection errors. Let $\beta_{x,y}$ be the elasticity of the fiscal variable x with respect to real GDP growth, y, as estimated by the OECD (van den Noord, 2000).[4] We define $\delta_t^x = u_t^x - \beta_{x,y} u_t^y$ as the discretionary part of a fiscal projection error, where u_t^y is the projection error for real GDP growth. Intuitively, the discretionary part of the projection error is the raw projection error, u_t^x, corrected for the impact of unforeseen changes in real GDP growth through the automatic stabilizers built into the revenue and expenditure side of the budget.

Note that this approach also corrects the fiscal projection error for any bias that the government might have introduced in the growth projection. For example, if $\beta_{x,y} > 0$ and the projections for the fiscal variable and real growth are both upwards biased, the average of the discretionary part of the fiscal projection error will be smaller than the

[3] We focus entirely on budgetary flows in this analysis. Discrepancies between the annual budget balance and the annual change in public debt, which might arise from stock-flow adjustments and other accounting practices to "hide" deficits outside the budget, therefore do not affect our analysis and are beyond the scope of this paper. For an empirical analysis of such practices in the context of the Stability and Growth Pact see von Hagen and Wolff (2006).

[4] The elasticities for Luxembourg are taken from Bouthaineville *et al.* (2001).

average of the raw projection error, indicating that the discretionary bias in the fiscal projection is smaller than the total bias.

Tables 2.1 and 2.2 report some descriptive statistics for the projection errors and the discretionary deviations. Real GDP projection errors are significantly positive on average for the current year (horizon of zero), close to zero for one year ahead and negative on average for two years ahead. This last observation is consistent with Jonung and Larch (2006). Average projection errors for the budget balance are significantly negative on average for all horizons, indicating that governments tend to show overly optimistic projections in their Stability and Convergence Programs. As Table 2.1 suggests, this tendency to be overly optimistic on average relates principally to a too optimistic projection for general government revenues for the current and the next year. Projection errors for general government expenditures are sizeable on average, but, due to the fairly large RMSE's, the averages are not statistically significant. RMSE's are indeed large for the fiscal variables. For example, the raw data for general government revenues indicate that the 95-percent confidence interval related to official projections amount to approximately +/- 5% of GDP. Confidence intervals for general government spending are of similar size. This suggests that the precision of the fiscal projections is rather limited.

Table 2.2 presents the descriptive statistics for the discretionary deviations contained in the projection errors. Again, we find that the mean deviations for general government balances and revenues are significantly negative and that the RMSE's are fairly large.

In the empirical analysis below, we are particularly interested in the impact of budgeting institutions on growth and fiscal projections. Specifically, we explore the effects of the mode of fiscal governance and of fiscal rules. Following Hallerberg and von Hagen (1999) and Hallerberg *et al.* (2007), we distinguish between two forms of fiscal governance. *Delegation* refers to an institutional setting that vests the finance minister with significant agenda setting powers over the other members of the executive branch of the government, and the executive with significant agenda setting powers over the legislature. In our sample, governments operating under this form of fiscal governance are those of Austria, Germany, Spain, France, Greece, Italy, and the UK. *Contracts* refers to an institutional setting focusing on numerical targets negotiated among all members of the executive branch of the government at the start of the annual budget process and often derived from or anchored in the coalition contract under which the government was formed. In our sample, the governments operating under *contracts* are those of Belgium, Denmark, Ireland, Luxembourg, the Netherlands, Portugal, Finland, and Sweden. Since all countries in our post-1998 sample belong one of these two groups, we test for the impact of the form of fiscal governance using a dummy variable which is one for delegation countries and zero otherwise.

With regard to fiscal rules, we use the classification proposed in von Hagen (2006) describing the stringency and enforcement of and the commitment to numerical rules in the budget process. According to the fiscal rules index constructed by von Hagen (2006), the countries with the strongest fiscal rules in our sample are Belgium, Luxembourg, the Netherlands, the UK, Portugal, and Ireland. Below, we use a "rules" dummy which is one for these countries and zero otherwise. Note that, where both the delegation and the rules dummies are used in the regressions below, the reference case are contract countries with relatively weak fiscal rules, Denmark, Finland, and Sweden.

The distinction between modes of fiscal governance and fiscal rules is still somewhat loose in the literature and deserves some clarification in our context.[5] As mentioned already, *fiscal contracts* typically focus on numerical targets for major budgetary aggregates such as the budget balance, total spending, and the total allocations for each spending ministry. As explained in Hallerberg and von Hagen (1999) and Hallerberg et al (2007), the decisive aspect of such *contracts* is that the annual targets are negotiated among the main actors in the budget process at the outset of the annual process. These negotiations serve to reveal and solve the common pool problem of the government budget, i.e., the fact that most government policies are not funded from taxes paid by those who benefit most directly from them. The numerical framework of such contracts is not necessarily rigid, but helps to organize the negotiations.

In contrast, we think of *fiscal rules* as a framework that puts emphasis on numerical targets set for multiple periods and often characterized by conditional provisions that clarify the steps to be taken to adjust the budget to unforeseen changes in economic circumstances during the fiscal year. While the *contracts* index used to quantify the strength of fiscal governance emphasizes the nature of the negotiations and the enforcement of the contract, the *fiscal rules* index emphasizes the degree of political commitment to the numerical targets, the length of the time horizon covered by the rule, and the nature of the conditional adjustment rules. In practice, it is true that there is some overlap between these two characterizations of budgetary institutions. As shown in von Hagen (2006), EU countries following a relatively strong *contracts* approach typically have stronger fiscal rules than others, too. Yet, the correlation is not perfect, and, as we will see below, the implications of the two types of budgetary institutions for the performance of fiscal projection errors are not the same. Our distinction between *contracts* and *rules* thus reveals the importance of the different elements of institutional design for the performance of budgetary projections.

We also test for the impact of elections on growth and fiscal projections. For this purpose, we use the national election dates in *National Elections*. Finally, we use the output gaps provided by the AMECO data base to control for the cyclical position of the economies at the time when the projections were made.

2.3.2 Explaining Projection Errors

In this section, we present some econometric estimates of panel models explaining the projection errors for real GDP growth, the general government budget balance, general government revenues, and spending. All panels use time fixed effects to account for the impact of common cyclical movements and economic shocks and an adjustment for heteroskedasticity in the cross section. We are particularly interested in the impact of budgeting institutions on the projection errors.

Table 2.3 presents the results for real GDP growth projection errors. For a projection horizon of zero, we find a systematic influence neither of the institutional dummies nor the electoral dummy on the projection error. The only significant effect is an interactive term between the output gap in the year when the projection was made and the delegation dummy. Accordingly, the current-year GDP projections of governments

[5] For example, European Commission (2005) uses the criteria developed in Hallerberg and von Hagen (1999) for characterizing fiscal contracts to evaluate the strength of "fiscal rules."

operating under delegation are biased downwards when the output gap is positive and upwards, when the output gap is negative.

For one-year ahead projections, we find that governments operating under delegation show significantly negative projection errors on average (model 4), while countries with relatively strong fiscal rules have significantly positive projection errors on average (model 3). Thus, governments operating under strong numerical rules have a tendency to bee overly cautious in the projection of economic growth, while governments operating under delegation have a tendency to be too optimistic regarding economic growth. Model (5) indicates that the projection bias is also closely related to the cyclical stance of the economy. This is consistent with the result in Strauch et al (2004). Governments systematically overpredict real GDP growth, if the output gap is positive in the year when the projection is made, and systematically underpredict real GDP growth when the output gap is negative.

With a projection horizon of two years, we find a similar impact of the output gap. Furthermore, delegation countries overpredict real GDP growth on average, while governments operating under contracts and strong rules (captured by the intercept) show significantly positive projection errors on average (model 7). Only at this horizon we find a tendency for growth projections to be too optimistic when they refer to election years (model 6), but this effect looses statistical significance when we control for the cyclical stance.

Next, we turn to the projections of general government budget balances. Results are reported in Table 2.4. At a horizon of zero, we find that countries operating under strong fiscal rules have significantly positive projection errors on average, while countries operating under delegation and weak rules (captured in the constant of model 2) have negative projection errors. Thus, again, there seems to be a tendency of strong fiscal rules to induce overly cautious projections, while delegation leads to overly optimistic projections.

In model 2, we also check for the effect of revenue and spending projection errors on the balance projection error. This tells us to what extent governments manage to counteract deviations from projections of one side of the budget by adjustments on the other side. In order to avoid problems with simultaneity, we use instrumental variables for revenue and spending projection errors in these regressions and employ lagged variables as instruments. Model 2 shows that revenue projection errors fully affect the balance while spending projection errors have a much larger effect. The interactive terms, however, show that governments operating under delegation manage to counteract revenue projection errors. For governments operating under strong rules, this does not seem to be the case. Using a Wald test, we cannot reject the hypothesis that revenue projection errors have no effect on the budget balance of governments operating under delegation at the ten-percent significance level. Governments operating under delegation also manage to counteract spending projection errors, and governments operating under strict fiscal rules achieve even stronger counteractions than these. We reject the hypothesis that spending projection errors do not affect the budget balance projection error for governments operating under strong fiscal rules at the one-percent level, and for governments operating under delegation at the six-percent level of significance.

With models 3 and 4, we turn to the one-year-ahead projection error. Here, we find, again, that governments operating under delegation exhibit significantly negative projection errors on average, while governments operating under strong fiscal rules on average have positive projection errors which, however, are not statistically significant. Revenue and spending projection errors do not affect the balance projection error significantly. However, for governments operating under delegation, growth projection errors affect the overall balance projection error negatively. This suggests that governments operating under delegation allow for more fiscal slippage in years when the economy is strong. It is consistent with the tendency of European governments to adopt pro-cyclical policies documented, e.g., by Brunila and Martinez-Mongay (2002) and von Hagen (2006). We also find that fiscal balance projections are overly optimistic if the year to which they refer is an election year.

For the two-year horizons, we find similar results. The coefficient on the delegation dummy is significantly negative, while the coefficient on the rules dummy is significantly positive. Different fiscal institutions thus induce significant differences in the projection bias. Revenue projection errors affect the overall balance projection error positively, but in governments operating under delegation this effect is overcompensated, suggesting that they allow for fiscal slippage when revenues are unexpectedly strong. Using a Wald test, we reject the hypothesis of no effect of revenue projection errors on the balance projection errors of governments operating under delegation at the 4.7 percent significance level. Spending projection errors affect the overall balance projection error negatively only in countries operating under strong fiscal rules. Delegation countries thus seem to be more effective in responding to such errors leaving the overall balance unaffected. Unexpectedly strong economic growth yields a positive balance projection error, but this effect is offset by governments operating under delegation and, less so, by governments operating under strong fiscal rules.

Tables 2.5 and 2.6 repeat these exercises for the revenue and the spending sides of the budget. As shown in Table 2.5, the revenue projections of governments operating under delegation are systematically upwards biased at all horizons, while the projections of governments operating strong fiscal rules and of governments operating under contracts and relatively weak rules (captured by the intercept) are systematically downwards biased. Revenue projection errors are positive for governments operating under strong rules if the previous year's spending projection error was positive. This suggests that fiscal rules induce governments to correct for unexpected spending by raising more revenues than originally foreseen.

Table 2.6 shows that spending projection errors are significantly negative at all horizons for governments operating under delegation and governments operating under strong rules. They are positive for governments operating under contracts and weak fiscal rules. Projection errors for real GDP growth affect spending projection errors negatively in the case of governments operating under delegation and those operating under strong rules. Revenue projection errors affect spending projection errors positively in the case of governments operating under strong fiscal rules and contract governments with weak rules. Such governments manage to cut back spending when revenues are weaker than projected, but they allow spending to increase beyond projected levels when revenues are stronger than projected. Governments under delegation, in contrast, do not allow spending to react to unforeseen changes in revenues.

2.3.3 Explaining Discretionary Deviations

In Table 2.7, we report estimates for the discretionary deviations of the overall balance and expenditures from their projected levels. As before, we find that governments operating under delegation have significantly negative deviations from projections for the budget balance on average, while governments operating under strong rules have significantly positive deviations on average. Thus, the tendency for excessive optimism in the former and excessive caution in the latter group is not entirely due to growth projection errors. Election years lead to weakly significant deteriorations of the discretionary part of balance projection errors and affect spending positively for projections two years ahead. Revenue projection errors affect the discretionary deviation of the budget balance positively in all countries, but governments operating under delegation partially offset this effect. Spending projection errors affect the discretionary deviation of the balance negatively, but their effects are partially offset by countries operating under strong fiscal rules and, even more so, by countries operating under delegation.

The reaction of discretionary spending deviations to revenue projection errors is positive in all countries at the two year horizon. Here, we find some interesting asymmetries in the reactions. Governments operating under strong fiscal rules respond positively to revenue projection errors, but more strongly to negative errors than to positive ones. Thus, when revenues are weaker than projected, spending adjusts strongly in this group. When revenues are stronger than projected, spending is allowed to exceed projections as well. Governments operating under delegation, in contrast, do not respond to revenues stronger than projected but, at the zero and one-year horizons, they cut back spending below projected levels when revenues are weaker than projected.

Within fiscal years, real GDP growth projection errors affect discretionary spending deviations positively, but the effect is offset by governments operating under delegation. At the two-year horizon, we find that discretionary spending deviations of governments operating under strong fiscal rules and under delegation respond negatively to negative real GDP projection errors. This may reflect the use of government spending to conduct anti-cyclical policies in economic downturns, but not during upswings.

2.3.4 Volatility of Projection Errors

In this section, we test whether the forms of fiscal governance and fiscal rules affect the volatility of the growth and fiscal projection errors. Since we know from the previous sections that these projection errors are biased for some governments, we cannot use the raw standard deviations for this purpose, since these are also affected by the bias. Therefore, we take the residuals from our models in Section 2.3.1 to compute the volatility of unexpected fiscal shocks to the balance and spending. Table 2.8 has the results. Here, we note that there is a consistent, positive association between strong fiscal rules and the volatility of real GDP growth projection errors. This may reflect the fact that, apart from the UK, these countries are small open economies, where growth tends to be more volatile due to external economic influences.

2.4 Conclusions

The fiscal framework of EMU, with its strong emphasis of numerical targets and medium-term fiscal plans, requires that governments produce consistent fiscal programs and are willing and able to stick to them. In this paper, we have analyzed the properties of the deviations from the governments' fiscal plans as given in the annual Stability and Convergence Programs, focusing especially on the impact of budgeting institutions.

We find, first, that the fiscal projections reported in the Stability and Growth and the Convergence Programs are not very informative as indicators of future fiscal outcomes. Second, we analyze the properties of real GDP projection errors and find that growth projections of governments operating under delegation are upwards biased, while growth projections of governments operating under strong fiscal rules are systematically downwards biased. We find a similar tendency regarding government revenue projections. These results are consistent with those reported by Jonung and Larch (2006). They suggest that governments operating under strong fiscal rules tend to be overly cautious in their growth forecasts, and, therefore, that it is easier to stick to strong fiscal rules when growth is unexpectedly strong than when it is expectedly weak. Governments operating under contracts and relatively weak fiscal rules do not seem to have that tendency. This suggests that weaker rules leave these governments more room to manage fiscal policy in times when growth is weaker than projected.

Governments operating under delegation, in contrast systematically deliver growth projections which are upwards biased. They thus base their fiscal plans on assumptions which are too optimistic in the underlying economic scenario. At the same time, governments operating under this form of governance should find it easier to adjust fiscal policies to changes in the economic environment since they do not have to negotiate fiscal adjustments among the partners of a coalition. Note, also, that several among these governments did not stick to the rules of the Stability and Growth Pact during the period under consideration. One interpretation of this result is, therefore, that such governments use overly optimistic growth projections in order to avoid explaining to their national and a European public how they intend to adjust their fiscal policies and return to the budgetary guidelines of the Stability and Growth Pact.

Third, we find that governments operating under delegation have a stronger tendency to offset the effects of revenue projection errors on the fiscal balance than governments operating under strong or weak fiscal rules. We also find that governments operating under contracts or strong rules deviate from their spending projections in the same direction as their revenues deviate from projected levels. For governments under delegation, such a pattern does not hold. These results suggest that fiscal rules limit the ability of government to respond to changes in economic circumstances that were unforeseen when the projection were made more than an institutional framework of delegation. The observed tendency of governments operating under strong rules to be overly cautious in projecting growth, revenues, and balances is consistent with that. Such a bias reduces the probability of having larger deficits than intended ex post, which is attractive given that the EMU framework penalizes deficits but not surpluses.

In sum, we find that differences in fiscal rules and fiscal governance explain a large part of the deviations of European governments from their fiscal projections. Our results suggest that, within the fiscal framework of EMU, a trade-off exists between delegation on the one hand and contracts and strong rules on the other. Governments operating

under contracts and strong rules use overly cautious projections to assure that they stay within the limits of the SGP. In contrast, governments operating under delegation have a strong tendency to be too optimistic in their growth and fiscal projections, which may be interpreted as a tendency to take these limits less serious. Neither group seems to regard the Stability and Convergence Programs as an opportunity to publish true (unbiased) forecasts. This underscores the point that these programs are used strategically. At the same time, the ability to manage fiscal flows after the projections have been made seems to be greater in the group of governments operating under delegation than in the group of governments operating under contracts and strong fiscal rules. Governments operating under delegation are, therefore, not necessarily more likely to go beyond the limits of the SGP, as they can react to unforeseen economic and fiscal developments. We conclude that, in the end, what matters most is the governments' performance relative to the target of deficits close to balance or in surplus, not relative to the targets spelled out in the annual Stability and Convergence Programs.

Appendix I: Complementary Tables

Table 2.1 Descriptive Statistics: Projection Errors

	Horizon	Mean	t-value	RMSE
Real GDP Growth	0	0.34	3.89***	0.91
Balance	0	- 0.32	- 2.64***	1.26
Revenues	0	- 0.68	- 3.02***	2.33
Expenditures	0	- 0.33	- 1.53	2.21
Real GDP Growth	1	0.05	0.34	1.45
Balance	1	- 0.39	- 2.24**	1.80
Revenues	1	- 0.46	- 1.86*	2.54
Expenditures	1	- 0.09	- 0.43	2.26
Real GDP Growth	2	- 0.19	- 1.20	1.50
Balance	2	- 0.59	- 2.62***	2.32
Revenues	2	- 0.20	- 0.74	2.76
Expenditures	2	0.39	1.54	2.57

Source: Author's calculations.

Table 2.2 Descriptive Statistics: Discretionary Deviations

	Horizon	Mean	t-ratio	RMSE
Balance	0	- 0.49	- 3.77***	1.33
Revenues	0	- 0.73	- 3.05***	2.45
Spending	0	- 0.24	- 1.11	2.23
Balance	1	- 0.40	- 2.52**	1.62
Revenues	1	- 0.46	- 1.84*	2.58
Spending	1	- 0.07	- 0.31	2.15
Balance	2	- 0.50	- 2.56**	2.01
Revenues	2	- 0.16	- 0.56	2.83
Spending	2	0.35	1.45	2.45

Note*:* *, **, and *** indicate statistical significance of levels of 10, 5, and 1 percent, respectively.
Source: Author's calculations.

Table 2.3 Real GDP Growth Projection Errors

Model	1	2	3	4	5	6	7
Horizon	0	1	1	1	1	2	2
Constant	0.25	0.11	- 0.16	0.27	0.26	0.16	0.29
(t-ratio)	(2.76)***	(0.56)	(- 1.43)	(1.85)*	(1.75)*	(0.72)	(2.00)**
Delegation	-0.04	- 0.29		- 0.48	-0.44	- 0.43	-0.51
(t-ratio)	(-0.42)	(- 0.96)		(2.23)**	(-1.87)*	(- 1.32)	(-1.91)*
Rules	0.28	0.38	0.52		0.52	- 0.22	
(t-ratio)	(1.02)	(1.65) *	(2.41)**		(2.35)**	(- 0.85)	
Election	- 0.17	- 0.30				- 0.23	-0.24
(t-ratio)	(- 1.50)	(1.20)				(- 1.81)*	(-1.38)
Output Gap					-0.33		-0.29
					(-2.23)**		(-2.69)**
Output gap*delegation	0.28						
	(2.89)***						
R^2	0.25	0.49	0.47	0.47	0.53	0.50	0.53

Note: *, **, and *** indicate statistical significance of levels of 10, 5, and 1 percent, respectively. All estimates include time fixed effects and are based on GLS correcting for cross-section heterogeneity.
Source: Author's calculations.

Table 2.4 Budget Balance Projection Errors

Model	1	2	3	4	5	6
Horizon	0	0	1	1	2	2
Constant	-0.71	-0.94	-0.06	-0.02	0.04	-0.26
(t-ratio)	(-2.87***)	(-8.12)***	(-0.03)	(-0.21)	(0.31)	(-1.19)
Delegation	-0.03		-0.66	-0.93	-1.11	-1.44
(t-ratio)	(-0.31)		(-3.63)***	(-3.27)***	(-4.87)***	(-4.96)***
Rules	0.62	1.11	0.36	0.56	0.24	0.89
(t-ratio)	(2.47)***	(4.94)***	(1.18)	(1.55)	(1.25)	(9.03)***
Election	-0.13		-0.77	-0.72	-0.60	-0.50
(t-ratio)	(-0.40)		(3.02)***	(-2.75)***	(-2.29)**	(-2.23)**
Revenues		1.33				0.97
(t-ratio)		(3.11)***				(6.77)***
Revenues*Delegation		-0.74				-1.88
(t-ratio)		(-2.05)**				(-3.62)***
Revenues*Rules		-0.33				
(t-ratio)		(-1.32)				
Spending		-3.60				
(t-ratio)		(-2.84)***				
Spending*Delegation		1.72				
(t-ratio)		(2.05)**				
Spending*Rules		2.32				-1.09
(t-ratio)		(2.07)**				(-7.65)***
Growth					0.38	0.64
(t-ratio)					(1.42)	(3.27)***
Growth*Delegation				-0.52		-0.65
(t-ratio)				(-2.02)**		(-4.11)***
Growth*Rules						-0.31
(t-ratio)						(-3.19)***
Lagged Growth	0.39	0.40	0.29			
(t-ratio)	(3.88)***	(3.27)***	(1.64)*			
R^2	0.25	0.33	0.35	0.36	0.45	0.48

Note: All estimates include time fixed effects and are based on GLS correcting for cross-section heterogeneity. *, **, and *** indicate statistical significance of levels of 10, 5, and 1 percent, respectively.
Source: Author's calculations.

Table 2.5 Revenue Projection Errors

Model	1	2	3	4	5	6
Horizon	0	0	1	1	2	2
Constant	0.14	0.47	0.83	1.21	1.28	1.27
(t-ratio)	(0.69)	(1.18)	(4.12)***	(6.70)**	(6.67)***	(5.66)***
Delegation	-1.09	-1.67	-1.68	-2.16	-2.20	-2.19
(t-ratio)	(-4.13)***	(-3.90)***	(-5.06)***	(-9.28)***	(-7.10)***	(-7.05)***
Rules	-0.81	-0.59	-1.23	-0.67	-1.19	-2.89
(t-ratio)	(-2.92)***	(-1.56)	(-6.62)**	(-2.70)***	(-6.31)***	(-5.22)***
Election				-0.89		
(t-ratio)				(-1.17)		
Spending*Rules		0.60[a]		2.89		3.43
(t-ratio)		(3.00)***		(8.35)***		(4.28)***
R^2	0.08	0.26	0.12	0.27	0.18	0.21

Table 2.6 Spending Projection Errors

Model	1	2	3	4	5	6
Horizon	0	0	1	1	2	2
Constant	1.39	1.48	0.76	0.16	0.82	1.23
(t-ratio)	(3.87)***	(4.33)***	(2.40)**	(1.64)*	(2.05)**	(2.71)***
Delegation	-1.97	-2.11	-0.86	-0.68	-0.67	-0.87
(t-ratio)	(-5.31)***	(-5.73)***	(-2.71)***	(-2.5)**	(-1.42)	(-1.48)
Rules	-2.15	-0.62	-1.34		-0.94	-0.66
(t-ratio)	(-4.88)***	(-1.20)	(-4.79)***		(-2.38)**	(-1.58)
Election	-0.00		0.36		1.08	
(t-ratio)	(-0.01)		(0.66)		(2.09)**	
Revenues				0.60[a]		0.67[a]
(t-ratio)				(6.42)***		(3.20)***
Revenues*Delegation				-0.65[a]		
(t-ratio)				(-3.12)***		
Revenues*Rules		1.62				0.47[a]
(t-ratio)		(4.86)***				(4.40)***
Growth				-0.50		
(t-ratio)				(-3.20)***		
Growth*Delegation		-0.52				-0.51
(t-ratio)		(-1.89)*				(-2.35)**
Growth*Rules		-0.69[a]		-0.26		-0.99
(t-ratio)		(-3.20)		(-1.98)**		(-3.13)***
R^2	0.26	0.51	0.16	0.51	0.20	0.52

Note: [a] first lag. All estimates include time fixed effects and are based on GLS correcting for cross-section heterogeneity. *, **, and *** indicate statistical significance of levels of 10, 5, and 1 percent, respectively

Source: Author's estimations.

Table 2.7 Discretionary Deviations

	Balance			Spending		
Horizon	0	1	2	0	1	2
Constant	-1.23	-0.03	-0.27	1.02	1.42	1.30
(t-ratio)	(-11.67)***	(-0.21)	(-1.52)	(3.21)***	(20.14)***	(10.92)***
Delegation	0.23	-0.80	-1.43		-0.87	
(t-ratio)	(1.15)	(-4.24)***	(-5.14)***		(-3.79)***	
Rules	0.98	0.51	1.00	-1.48		
(t-ratio)	(3.45)***	(3.02)***	(5.63)***	(-2.88)**		
Election	0.03	-0.56	-0.41			0.46
(t-ratio)	(0.09)	(-1.76)*	(-1.79)*			(1.63)*
Revenues	0.81		0.99			0.67
(t-ratio)	(3.11)***		(7.50)***			(1.77)*
Revenues*Delegation	-0.49		-1.94			
(t-ratio)	(-1.52)		(-3.72)***			
Revenues*rules		0.96			1.16	1.38
(t-ratio)		(2.78)***			(2.93)***	(6.59)***
Revenues*rules[c]				0.73	0.51	0.48
(t-ratio)				(4.11)***	(2.66)***	(4.33)***
Revenues*delegation[c]				0.83	0.52	
(t-ratio)				(8.23)***	(4.68)***	
Spending	-3.27					
(t-ratio)	(-4.67)***					
Spending*Delegation	1.86					
(t-ratio)	(4.07)***					
Spending*Rules	2.30	-1.18	-1.00			
(t-ratio)	(6.53)***	(-1.73)*	(-10.40)***			
Growth				0.44		
(t-ratio)				(4.31)***		
Growth*Delegation			-0.44	-0.67[b]		-1.26[c]
(t-ratio)			(-1.94)*	(1.56)		(3.20)***
Growth*Rules	0.58[a]	0.23[a]			-0.88[b]	-1.87[c]
(t-ratio)	(3.41)***	(2.19)**			(2.08)**	(6.83)***
R^2	0.29	0.26	0.40	0.63	0.59	0.62

Note: [a] first lag, [b] only positive terms, [c] only negative terms. All estimates include time fixed effects and are based on GLS correcting for cross-section heterogeneity. *, **, and *** indicate statistical significance of levels of 10, 5, and 1 percent, respectively.
Source: Author's estimations.

Table 2.8 Volatility Models

	Growth	Balance	Spending	Revenues
		Horizon=0		
Constant	0.69	1.10	-4.26	1.56
(t-ratio)	(6.90)***	(8.25)***	(-1.25)	(0.82)
Delegation	-0.33	0.31	9.66	3.99
(t-ratio)	(-3.65)***	(1.37)	(3.07)***	(1.53)
Rules	0.23	-0.23	9.55	1.31
(t-ratio)	(1.07)	(-1.10)	(2.62)***	(0.60)
R^2	0.08	0.08	0.18	0.08
		Horizon=1		
Constant	0.85	1.88	1.14	2.53
(t-ratio)	(6.80)***	(3.89)***	(1.52)	(5.89)***
Delegation	-0.12	0.36	1.14	2.80
(t-ratio)	(-0.43)	(0.65)	(1.47)	(2.97)***
Rules	0.78	0.47	1.66	2.46
(t-ratio)	(3.19)***	(0.47)	1.48	(3.39)***
R^2	0.12	0.04	0.08	0.06
		Horizon=2		
Constant	0.76	2.11	1.23	3.52
(t-ratio)	(1.82)*	(2.77)**	(1.28)	(1.87)*
Delegation	0.18	0.36	1.54	1.04
(t-ratio)	(0.71)	(0.41)	(1.39)	(0.48)
Rules	1.09	0.42	1.48	2.26
(t-ratio)	(2.05)**	(0.47)	(1.31)	(1.72)*
R^2	0.06	0.02	0.08	0.02

Note: All estimates include time fixed effects and are based on GLS correcting for cross-section heterogeneity. *, **, and *** indicate statistical significance of levels of 10, 5, and 1 percent, respectively.
Source: Author's estimations.

Discussion

Steven A. Symansky and Mark De Broeck

This paper makes a very valuable contribution to the important literature on the disciplining effects of fiscal rules and budgetary institutions. Specifically, the author examines projection errors in the medium-term fiscal plans prepared by EU governments. These plans figure prominently in EU fiscal surveillance, and have been the focus of attention in recent European Commission and ECB documents.[6] The paper uses a more recent sample than in earlier studies and considers both revenue and spending projection errors, in addition to deviations from growth and government balance projections.

The paper's main assumptions and results can be summarized as follows. Growth and fiscal projection errors can be decomposed into a discretionary element related to changes in policy intentions and an endogenous element reflecting unforeseen economic developments. Two key dimensions of budgetary institutions, the strength of fiscal rules and the mode of fiscal governance, are captured by 1,0 dummies.[7] The regression results show that countries which have both relatively strong rules and operate under contracts are overly cautious in their projections, which creates a safety margin under a fiscal rule. In contrast, countries with weak rules and a delegation framework tend to have overly optimistic forecasts, but also find it easier to adjust policies when projection errors materialize.

However, the econometric analysis raises some interpretation issues that merit further clarification. The specification of the various panel regressions presented in Tables 2.3-2.8, including the choice of regressors and the use of interaction terms, could be discussed in more detail. Did the author consider regressors not reported in the Tables, for instance transparency measures or a decentralization/fiscal federalism index? And how should the results reported in Table 2.7 be interpreted in cases where the growth projection error reflects a deliberate effort to conceal true fiscal policy intentions?[8]

To check the robustness of the econometric results, alternative indicators of fiscal institutions and rules could be considered. The paper uses dummies to distinguish strong from weak rules and delegation from contracts. The institutional data collected by the author and his collaborators in the *Fiscal Governance in Europe* project provide indices of the stringency of rules and indices of the form of governance.[9] The author should have tested these indices rather than relying on the 1,0 dummies. Using the same dataset

[6] See, for example, Part III of the *Public Finances in EMU 2007* report, June 2007, and ECB Working Paper No. 843, December 2007.

[7] The "rules" dummy is one for the countries with stronger fiscal rules; the "governance" dummy is one for so-called delegation countries. The two dummies are correlated in the sample in that fiscal rules tend to be weaker for governments operating under delegation (0,1 dummy combination). In fact, the UK is the only country combining strong rules and delegation.

[8] As explained in the text, the discretionary fiscal projection error is corrected for a component attributed to the growth projection manipulation. But this still leaves open the question as to how to interpret the coefficient of the growth variable in the regressions reported in Table 2.7.

[9] A fiscal rule index is included in Table 8 of von Hagen (2006), and an index of the degree of delegation in the budget process can be constructed from the data annex to Hallerberg *et al.* (2007) following the methodology described in that paper's section 4.1.

collected for the project, robustness to alternative weighting schemes for the individual components of the two indices—for instance, more weight could be placed on components with a macro-fiscal dimension—and time-variation in the indices could be checked.[10] As illustrated in the Table 2.9 below, the ranking of rules according to their stringency in this paper in some cases differs from that in related work from the author and co-authors.[11] A final robustness check could involve employing the European Commission's indices of fiscal rules and institutions collected for the *Public Finances in EMU–2006* report. As also shown in the Table 2.9 below we found a few cases of differences between the author's ranking of the strength of rules and that in the Commission's data.

In addition to robustness to alternative fiscal institutional indices, some other econometric issues could be addressed. In particular, the paper could add and discuss the results of conventional specification tests for the reported regressions. It also could clarify in more detail how the GLS econometric methodology can handle sampling error in the dependent variable due to either measurement error (Tables 2.3-2.6, where the dependent variable is a projection error, which is a constructed variable) or sampling error in an auxiliary regression used to generate the dependent variable (Table 2.8, where the dependent variable is a series of residuals from another regression). Although the author acknowledges simultaneity problems (when discussing the results in Table 2.4), an explanation would be welcome as to why only revenue and spending projection errors and not growth projection errors are instrumented as regressors. One could easily think of situations where the growth projection error also is endogenous. Finally, the budget balance, revenue and expenditure are linked by an adding-up constraint. How has this constraint be taken into account when estimating the regressions reported in Tables 2.4-2.6?

In sum, this paper provides valuable new insights into an interesting and important research question. Its contribution could be further enhanced by additional efforts to clarify the interpretation of the econometric results, check their robustness, and address some econometric issues.

[10] It appears that the dummies used in the paper refer to the institutional situation as of 2001 while the macroeconomic and fiscal data cover the period 1999–2006. Use of time-invariant dummies assumes that there has been no change in the sample period. Institutional data for the *Fiscal Governance in Europe* project were collected in three rounds, 1991, 2001, and 2004, and they suggest that rules and forms of governance have been evolving over the sample period, in some cases very significantly so.

[11] The ranking according to mode of governance also can differ: the data annex to Hallerberg *et al.* (2007) shows Ireland and Sweden as countries with a relatively high value of the delegation index in 2004, but they are classified as contract countries in this paper. The difference appears to relate to the significant increase in the value of the delegation index for these two countries between 1991 and 2004.

Table 2.9 Rules Indices 2004/05

	EC	EC rank	von Hagen '04 [1]	04 rank	Current paper [2]
LU	2.23	1	1.0	1	1
GB	2.12	2	**0.8**	**8**	1
NL	2.12	2	0.9	3	1
DN	**2.01**	**4**	0.8	8	
FI	**1.93**	**5**	**0.9**	**3**	
ES	**1.86**	**6**	0.8	8	
SW	**1.60**	**7**	**0.9**	**3**	
GE	**1.30**	**8**	**0.9**	**3**	
BE	**0.49**	**9**	1.0	1	1
FR	0.34	10	0.8	8	
IT	0.30	11	0.8	8	
AU	0.27	12	0.8	8	
PR	**-0.46**	**13**	0.9	3	1
IR	**-0.55**	**14**	**0.8**	**8**	1
GR	-0.84	15	0.8	8	

Implies that rules ranking from EC 05 is different than rank for current paper
Implies that rules ranking from von Hagen 04 is different than rank for current paper

Notes:
[1] Data from von Hagen *et al.* 2007 paper but the data are for '04.
[2] Data from von Hagen's 2006 paper but the data are for '01.

3 Breaking the Impediments to Budgetary Reforms: Evidence from Europe

Stefania Fabrizio and Ashoka Mody[*]

3.1. Introduction

A substantial literature shows that a strengthened institutional framework for the budget process can help improve fiscal discipline and performance. Contributions include Alt and Lowry (1994), Poterba (1994), von Hagen and Harden (1995), Hallerberg and von Hagen (1999), and Alesina *et. al* (1999). These authors find that checks and balances in the formulation and implementation of the budget are not a "veil" but have real effects on budget outcomes. However, because these findings relied on cross-sectional evidence, they were open to the criticism that omitted determinants of fiscal outcomes may be correlated with budget institutions (rules and procedures of the budget process). Revisiting recently this subject, we have, in a series of demanding tests, examined the variation within countries over time and considered the influence of a wide variety of variables representing alternative hypotheses regarding the mechanisms contributing to budget deficits (Fabrizio and Mody, 2006). We continue to find that strong budget institutions are associated with greater fiscal discipline even when the politics is unfavorable to such discipline.

If strong budget institutions are so potent in determining fiscal outcomes, then the factors that lead to their strengthening are of obvious interest. Surprisingly, this enquiry has received little empirical attention. The principal contribution of this paper is that it conducts, to our knowledge, the first statistical examination of the determinants of budget reform, using time-series measures of the quality of budget institutions for 23 European economies during 1991-2004. We use this setting also to conduct a broader investigation of the political economy of reform.

A ready body of theory guides the empirical work reported in this paper. Three themes in the literature are relevant. First, reforms occur infrequently. For a variety of reasons, the political process tends to maintain the status quo in policies. The central source of this inertia is conflict among interest groups, a conflict that results in inaction. In the specific context of politics and budgets, the problem arises in allocating rights to the so-called common pool (Shepsle and Weingast, 1981; and Weingast et al. 1981). A strong incentive exists for public spending in favor of select interest groups that bear only a fraction of the taxes needed to finance the expenditures that benefit them. When the

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[*] The views expressed in this Working Paper are those of the author(s) and do not necessarily represent those of the IMF or IMF policy. We are grateful to Mark Hallerberg, Rolf Strauch, and Jurgen von Hagen for sharing their measures of fiscal institutions, to several colleagues in the IMF's European Department for helping update these measures, and to government authorities for directly responding to our queries. Michael Laver and Ken Benoit generously shared their ideology data. Preliminary results were discussed at the 9th Banca d'Italia Workshop on Public Finance, 'Fiscal Policy: Current Issues and Challenges', Perugia, March 29-31 2007, the European Central Bank, and the European Commission's Workshop, 'Achieving and Safeguarding Sound Fiscal Positions', Brussels, January 17 2008. Comments from Roel Beetsma, Jurgen von Hagen, and Dennis Quinn were most helpful.

common pool-problem is severe, and is, hence, the source of budget indiscipline, Alesina and Drazen (1991) conclude that no group will be willing to forgo their benefits or bear the necessary tax burden, and fiscal consolidation will be delayed. In their words, a "war of attrition" will arise. While Alesina and Drazen (1991) emphasize the inertia on account of a distributional conflict, implicit in their analysis—and explicit in Fernandez and Rodrik (1991)—is the possibility of an impasse even when the size of the pie is known to grow once the reforms have been undertaken. Fernandez and Rodrik (1991) argue that the uncertainty surrounding the distribution of the gains—and the possibility that some may lose—hinders formation of the necessary consensus.

When public finances are healthy, the cost of "conceding" is relatively small. In other words, even if a group were to find its demands on the common pool to be restrained by stronger checks in the budget system, there remains enough scope in the budget to accommodate the group's reasonable and legitimate demands. All groups will, therefore, acquiesce in an earlier agreement to budgetary reform. This will be the case all the more so when the costs of conceding are equitably shared. Where a particular group is likely to bear a heavier burden, there may be a greater tendency to "hold out." As Alesina and Drazen note, reforms will be accelerated by "a conservative government with a solid majority" (pp. 1174) and delayed by "weak and divided coalition governments" (pp. 1173). Thus, healthier finances can be expected to aid budgetary reform, but this advantage may be compromised in a fractionalized government, implying interplay of the state of public finances and political divisions in the decision-making process.

Where the internal dynamics continue to result in a deadlock, the status quo may nevertheless become untenable following an economic shock or a "crisis." For some groups, the costs of continuing with the existing system may become too large. This forms the second strand in the literature. Indeed, as Rodrik (1996, pp. 26) notes: "...if there is one single theme that runs through the length of the political economy literature it is the idea that crisis is the instigator of reform." In a crisis, the old distributional certainties dissolve. The war of attrition, for example, ceases when at least one interest group finds it superior to pay the price necessary for stabilization rather than continue to be hurt by the unresolved circumstances.

Rodrik himself is skeptical of the analytic content of the crisis hypothesis. It is not surprising, he says, that things must get bad before the perception sinks in that they must be changed. Drazen and Easterly (2001) argue that there remains an interesting empirical question of what is the threshold of pain at which reform becomes imperative. Alesina et al. (2006) also pursue the empirical relevance of crises in escaping from a war of attrition and instigating reform. They respond, moreover, to Rodrik's challenge to explain why the same crisis in different countries may elicit different reactions. Strong governments—those relatively unconstrained by internal or external opposition—they conclude, are more likely to undertake the necessary measures in the midst of a crisis.

This brings us to the third major theme on the political economy of reform: spurred by crises or otherwise, are governments in a position to take decisive actions? This depends, first, on the ability of governments to take the necessary measures, as Alesina et al. (2006) point out. This ability is, in turn, a function of veto points in the government structure. While the notion that strong governments can ram through necessary reforms is well-entrenched, it raises troubling issues. At one extreme, it

implies that authoritarian systems are best suited to forcing the pace of reform. Even in a democratic setting, the implication is that governments must go against legitimate opposition, which is assumed to be misinformed or opportunistically obstructive. Accordingly, a second, avenue is for democratic governments to establish their credibility and, hence, persuade the relevant constituents on the value of reform. In this regard, Cukierman and Tommasi (1998) offer the intriguing hypothesis that credibility is sometimes achieved by taking policy positions that go against the known ideological positions of policymakers. This they refer to as the "Nixon going to China" phenomenon.

In our empirical analysis, the dependent variable is the *change* in budget institutional quality two years ahead. Because the changes take discrete values, we categorize them into four groups: a large improvement, an improvement, no change, and a setback. Using ordered logit regressions, we have four main findings:

- The gap between the highest possible institutional quality and the country's state of fiscal institutions determines the scope of the subsequent improvements in the fiscal institutions' quality. Not surprisingly, the larger is this gap at the beginning of the period, the greater is the scope (and possibly the incentive) for further improvements in institutional quality.

- We find strong evidence for the "war of attrition." The reform of budget institutions becomes less likely just when it is most needed, i.e., when fiscal outcomes are poor. In other words, when the common-pool problem is severe, budget deficits will be large and the appetite to constrain them will be small. The implication is that countries will, all else equal, tend to move to two outcomes: small fiscal deficits and good institutions or large deficits and weak institutions.

- Hence, the crucial question is, How can a country exit from a vicious cycle of bad fiscal performance and delays in needed budget institutions reforms? The findings do suggest that domestic and external economic shocks (if they are large enough) can help focus the minds of those competing for scarce budgetary resources and, hence, help build a constituency for improving budget institutions. However, to the extent that markets are forgiving and accommodate these economic shocks, even this form of external pressure may be insufficient. Forward-looking and strongly unified leadership appears to be a necessary ingredient of the solution.

- Finally, government ideology tends to matter when the economic situation is difficult. In that setting, "leftist" coalitions tend to be more proactive in reforming the budget institutions than "rightist" coalitions. In line with Cukierman and Tommasi (1998), the "unlikely" party carries greater credibility in breaking the logjam, particularly if its constituents are hurt in the short run.

Though the interest in the political economy of reform is long-standing, the empirical literature remains dominated by case studies. Krueger (1993) and Williamson (1994) bring together several country case studies on the determinants of macroeconomic stabilization. In contrast, statistical testing of the rich set of available hypotheses has been more limited (see Drazen, 2000). Even within the statistically oriented literature, papers relying on direct measures of reform are few. Thus, Drazen and Easterly (2001) test the hypothesis that crises contribute to economic reforms; however, unable to measure reform directly, they acknowledge (pp. 149) that their approach requires the

same variable to measure "crisis (when it indicates extremely poor performance) and reform (when there is a significant improvement)." This is also true for Alesina et al. (2006), who examine the determinants of deficit and inflation reduction in response to a crisis, where the crisis itself is measured by extreme outcomes of deficits and inflation. Our paper is related to Alesina et al. (2006) in the focus on the political economy of reform. We differ from them in analyzing the reform of the underlying budget processes rather than the fiscal outcome itself. Moreover, we define a crisis as an extreme macroeconomic outcome rather than as fiscal distress. Methodologically, we draw on Abiad and Mody (2005), who study the determinants of financial sector liberalization.

The rest of this paper is organized as follows. Section 3.2 describes the construction of the index of budget institutions' quality and the basic empirical approach. Section 3.3 provides the main evidence for a reform process that is consistent with the war of attrition. Section 3.4 assesses how economic shocks—including a crisis—can shake the status quo that arises from the war of attrition. Section 3.5 examines how economic shocks interact with political ideology and whether this interaction provides evidence of unexpected political actions in times of economic stress. A final section draws lessons for the political economy of reform.

3.2. Data and Empirical Approach

Effective budget institutions create mechanisms for fiscal self-discipline. From the initiation of budget design to its implementation, several decisions are necessary. At each point, various economic and political interests are represented. As such, budget priorities can be influenced, and, indeed, the budget can be hijacked as it makes its way through the complex approval and implementation process. Discipline is, therefore, crucial for ensuring the integrity of the process. This discipline may be generated in two ways, which, in practice, are typically combined (Hallerberg and von Hagen 1999). The "delegation," or hierarchical decision making, approach creates clear authority and accountability by assigning budgetary powers to a strong central player (and is regarded as more suitable for single-party governments or governments where coalition parties are closely aligned). The contrasting "contract" approach allows for a cooperative process, buttressed by transparent rules, to balances tendencies to indiscipline (more suitable for multi-party coalition governments). There is, however, a minimum level of required centralization that fiscal institutions provide in all countries (Hallerberg and others, 2008). Our index is built from these core institutions that all countries need and draws on the desirable elements of both approaches.

The index applies the principles of effective budget institutions to three stages of the budgetary process: preparation, authorization, and implementation, as described in Table 3.1 of Appendix I. For the preparation stage, the following features are considered as contributing to discipline: (1) fiscal rules that limit deficit spending; (2) budget parameters and norms; and (3) the relative dominance of the finance/prime minister in the budget negotiation process. The authorization phase requires (1) limiting on the scope of amendments; (2) setting an appropriate sequence of decision making in the legislative budget process; and (3) balancing the power of the executive and parliament. In the implementation stage, firmness in the execution of the budget is needed, together with the procedures governing adjustments to unforeseen shortfalls or unexpected overspending.

We first construct a quantitative index of the quality of budget institutions over the period 1994-2004 for 23 European countries.[12] We follow closely our own recent paper (Fabrizio and Mody, 2006), which, in turn, drew on Gleich (2003) and Yläoutinen (2004). Expanding the data to a broader set of European countries was made possible by the reporting in Hallerberg et al. (2007). To confirm and update the status of budgetary practices, we have consulted annual fiscal budget laws and the Fiscal Transparency Module of the International Monetary Fund's Reports on the Observance of Standards and Codes (ROSC). Where ambiguities persisted, we were in direct contact with the country authorities.

As constructed, the index can vary from zero to four. Table 3.1 in Appendix I reports the weights used to aggregate the various characteristics. Table 3.2 reports the changes over time to the individual features in the different countries. On this basis, an index representing the overall quality of budget institutions for each country is constructed for each year in our sample. Table 3.3 reports the index for two years, 1994 and either 2003 or 2004. As is clear, budget institutions have tended to improve over time in almost all countries. Figure 3.1 aggregates the indices for two groups of countries. The more advanced economies have gradually reached a plateau of improvement along the dimensions we examine. Countries in emerging Europe have made progress to varying degrees, with some suffering occasional setbacks. Figure 3.2 confirms that richer economies tend to have better institutions. Figure 3.3 shows that, because there is more scope for improvement when institutions are relatively backward, countries at the lower end of the spectrum tend to make more progress.

The dependent variable is the *change* in budget institutions two years ahead. The two-year gap is an empirical compromise. Often, the exact timing of a reform is not known with precision and, hence, fixing it in a particular year is difficult and potentially incorrect. Considering a longer spell would, however, have further shortened an already short time series. The change in institutional quality is categorized into four groups. Most (78 of the 102) observations are associated with no change in institutional quality. Twelve observations are associated with strengthening of up to 0.7 point (on the scale from zero to four), designated "an improvement," and a strengthening larger than 0.7 (associated with six observations) is referred to as "a large improvement." Finally, for six observations, there is an institutional setback. We check our results for robustness to these categorizations (both by combining the two improvement categories and by further dividing them).

The natural approach to analyzing these changes is through an ordered regression technique. Notice, it may appear in principle that we have over 200 observations, for 23 countries and 10 years. However, that is not strictly true. Because we project reforms two years from the date of assessment, taking into account intervening years would lead to counting the same reform more than once. While there are statistical approaches to dealing with overlapping samples, we have chosen to put our analysis to a stringent test by dropping the intervening years. Taking account of missing values, we are left with about 100 observations for the analysis. Also, throughout, we report robust standard

[12] Austria, Belgium, Bulgaria, the Czech Republic, Denmark, Estonia, Finland, Germany, Greece, Hungary, Italy, Latvia, Lithuania, Luxemburg, the Netherlands, Poland, Portugal, Romania, the Slovak Republic, Slovenia, Spain, Sweden, and the United Kingdom. The index is also available for France and Ireland; however, these two countries are not included in the study as data for some of the political variables used in the analysis are not available for them.

errors. Though there is no evidence that the residuals "misbehave," there is the risk that the standard errors may not be consistent. However, in all cases, the results are manifestly stronger with the conventional standard errors.

3.3. The Setting: War of Attrition

Table 3.4 presents the basic results to illustrate the presumption of a "war of attrition." A few preliminaries are in order, however. First, we include throughout the gap between the highest possible institutional quality (taking the value four) and the country's state of fiscal institutions. This "institutional gap" variable serves several purposes. First, the gap determines the scope of the subsequent improvements in quality of the fiscal institutions. Not surprisingly, the larger the gap in the quality of fiscal institutions at the beginning of the period, the greater the scope (and possibly the incentive) for further improvements in their quality. This is just a statistical validation of Figure 3.3. Second, as Figure 3.2 showed, per capita income is correlated with institutional quality. When we add per capita income as an additional explanatory variable, it is insignificant, while the institutional gap variable remains robustly significant. Finally, the strongly statistical positive sign on the institutional gap variable also captures the secular tendency for improvement in budget institutions.

Year dummy variables that are included throughout pick up additional common influences in any particular year across all countries. Also, country dummy variables are also included throughout to minimize the risk of omitted country variables. These dummies allow for the possibility that influences unobserved by us, the econometricians, contribute to the likelihood of reform. We find that, in some cases, these fixed effects are of considerable importance. In other words, historical country features create inertia in institutions. While we have not attempted to identify the sources of this inertia, the implications are clear: overcoming it will require the country's leadership to make a special effort to undertake reforms. Thus, the strongly negative coefficient on the Hungary dummy, for example, puts the onus on that country's leadership to break through the historical constraints against reform.

We use two variables to focus on the war of attrition. First, we use the lagged balance as defining the bargaining context within the existing resource constraints (for definitions and sources of all variables, see Appendix II). The use of the lag reduces the risk of reverse causality from budget institutions to budgetary outcomes. The result is that a larger primary budget surplus increases the probability of budgetary reforms (a deficit delays reforms). Thus, a worse fiscal balance at time t-1 is associated with a smaller likelihood of improvements in fiscal institutions' quality between t and (t+2). This finding is consistent with a more intense war of attrition among policymakers when the budget situation is adverse and, by implication, the claims on the budget are large. Thus, a country experiencing large fiscal deficits will find it difficult to embark on reforms of fiscal institutions before the deficit itself is brought under greater control.

The implication also is that countries may move in "virtuous" and "vicious" circles. Stronger budget balances help strengthen budget institutions, which, in turn feeds back to further improving budget balances. In contrast, deficits are likely to persist as countries are unable to impose rules and procedures that impose self-discipline. This finding may, at first sight, seem to contrast with the conventional finding that a large

deficit is associated with an adjustment. Thus, Alesina et al. (2006), among others, report that a deficit "crisis" (defined as crisis outcomes in the top quartile of their sample) is associated with a subsequent decline in the deficit. The implication of our finding is that the forces of the war of attrition tend to move countries to the corners: small deficits (surpluses)/strong institutions and large deficits/weak institutions. Clearly, a country in a large deficit/weak institutions outcome, reaches a crisis point, which forces a deficit reduction: it is only when the deficit is under control that the process of strengthening institutions can start.[13]

Our second variable, a more fragmented government coalition, is the conventional channel through which attrition is thought to act. The negative sign on this variable implies that more fragmentation is, indeed, less supportive of reforms, although this direct effect is not statistically significant. An indirect effect, however, is important. This is seen in the negative sign on the interaction between primary balance and fragmentation. The negative sign can be read two ways. First, fragmentation exercises a stronger negative influence when a larger primary balance provides the resource latitude for undertaking reforms. In other words, fragmentation is more powerful when the likelihood of reforms exists. When that likelihood is low, then fragmentation matters less, if at all. Second, as fragmentation increases, the positive influence of a larger primary balance is mitigated. These interpretations are pursued in Figure 3.4, following Franzese and Kam (2007).

As Franzese and Kam (2007) have emphasized, when interpreting interaction terms, it is important to recognize that the effective coefficient on one of the two variables varies with the changes in the other variable—but so also does the standard error of that effective coefficient. Using the STATA code that they have generously posted, we generated Figure 3.4, which plots the effective coefficient and the upper and lower bands giving the 95 percent confidence interval within which the coefficient lies. The first panel shows that the effective coefficient on fractionalization has a point estimate close to zero in the lower ranges of the primary balance. In this range, the upper confidence band lies above the zero line and the lower confidence band lies below this line, implying that the effective coefficient is statistically not different from zero when the fiscal balance is in deficit. When the fiscal balance is about 3 percent of GDP, both the upper and lower bands are below the zero line: fractionalization, at that point begins to exercise a statistically significant negative effective on budgetary reforms. We will see below in a more fully specified model that fractionalization may exert its negative influence even earlier, before the primary balance reaches 2 percent of GDP.

The second panel of Figure 3.4 shows that that the primary balance always has a positive and statistically significant value; thus, a larger primary balance aids reforms. However, as fractionalization increases, a given primary balance has a smaller stimulative effect. In other words, while a comfortable primary balance reduces the fight over scarce resources and, hence, creates the conditions for forward-looking discipline, a more fractionalized government interferes with achieving this discipline. This indirect effect of fractionalization, our data suggests, can be potent.

Since the political process is complex, the possibility of omitted variables is always a serious one. In Table 3.5, we discuss a number of extensions of the basic model in Table

[13] Tracing this dynamic fully requires longer time series on institutions. Preliminary efforts within the context of our data did not produce helpful results.

3.4. In particular, we examine if other variables commonly considered in the literature have a bearing on budgetary reforms. For example, fiscal discipline often weakens in an election year. Also, where the checks and balances through veto points are substantial, the risks of poor decisions are minimized. Finally, ideology is thought to influence reform decisions. Our results suggest that these variables apparently do not have an influence on budgetary reforms. It is possible, however, that there are more subtle influences that these variables exert. We explore one of these—that related to ideology—in Section 3.5. Importantly, the basic findings of this section—a direct influence of a larger primary balance and the erosion of this effect as fractionalization increases— remain intact when these additional variables are included in the regression specification.

3.4. Economic Shocks and Crises

Thus, clearly, political influences matter. The question that arises whether economic shocks or a crisis can mitigate the tendency to the status quo arising from a war of attrition to encourage reform—or even, following from our analysis above, what forces are likely to halt and reverse the possibly unfortunate dynamic of a worsening budget situation and weakening controls. We explore these considerations in this section.

In column 1 of Table 3.6, we add, as proxies to the so-called misery index, the unemployment rate and log of the inflation rate. The evidence is that a worsening domestic economic situation raises the likelihood of reforms. The unemployment rate is significant at the 10 percent level and the inflation rate is significant at the 1 percent level. The inference is that as domestic "misery" increases, political alliances cannot proceed with business as usual and are called on tighten the grip over public finances. In column 2, we add the current account surplus. The negative sign implies that a larger surplus reduces the likelihood of reform—an increasing deficit raises external vulnerability and with it the pressure to reform. Though, once again, the coefficient is significant only at the 10 percent confidence level, the combined sense of the exploration thus far is that internal and external economic distress does generate the expected tendency toward reforms.

Before proceeding to examine this possibility in somewhat greater depth, two observations are in order. First, the core "war of attrition model" comprising the primary balance and government fractionalization performs well with the introduction of the additional variables; in fact, the point estimate on fractionalization is increased and the statistical significance of the interaction variable is stronger than before. Second, we also evaluated the influence of other plausible variables. We find, for example, that a country under the European Union's watch through the Excessive Deficit Procedure does not do any better on reform proclivity than a country not subject to this discipline. There is some suggestion that countries that have adopted the euro, all else equal, tend to create more checks and balances in their budgetary process; however, this coefficient falls just short of being significant, even at the 10 percent level. Similarly, a country's trade openness appears to favour reform but the statistical significance does not pass the relevant thresholds.

With that, we return to the trio of unemployment, log of inflation, and the current account deficit. It seems reasonable to presume that the effects of these variables are not

linear. In other words, an increase in the current account deficit from a low level likely has a smaller effect than an equivalent increase when the deficit is already large. It is beyond some benchmark that a country's perception of itself as in a crisis forces political forces into needed action.

As a first step, we construct two principal components of these three variables. The first principal component has an interesting interpretation. It is highly correlated with the inflation rate and with the current account deficit. We refer to this variable as "overheating" since unsustainable domestic demand is likely to be reflected in a combination of high inflation rates and large current account deficits. Our labelling of the second principal component as "stagflation" is more of a stretch: it has a tight correlation with the unemployment rate and more modest correlations with inflation and the current account deficit. In the rest of the analysis, we use these two principal components as our economic variables.

In the first column of Table 3.7, we add the "overheating" variable. It has the expected positive sign but is not statistically significant. This we would expect since, at low levels of inflation and the current account deficit, there would be little pressure to respond. We test for a nonlinear response in two ways. First, in column 2, we allow for the possibility that the response to overheating changes once that variable crosses the 75^{th} percentile of all the observations in our data set. Thus, our "overheating, nonlinearity" variable takes the value zero for all values of overheating below the 75^{th} percentile and then takes the overheating values thereafter. The positive sign with strong statistical significance points to a sharp nonlinearity. In column 3, we add the stagflation variable, which has a positive sign, but one that is not statistically significant. Thus, stagflation does improve the prospect of reform, and efforts to identify nonlinearities lead to findings similar to that for overheating. Once we add the stagflation variable, the sum of the "overheating" and "overheating, nonlinearity" coefficients is positive and statistically significant at the 5 percent level.

A second approach is to create a "crisis" dummy, which takes the value one when the overheating variable is over its 75^{th} percentile and zero otherwise. The coefficient on this variable is positive and significant; this is so with our without the stagflation variable (which is positive and statistically significant in this specification). Thus, the evidence once again is that, when overheating crosses a threshold, it significantly improves the likelihood of reform.

3.5. Credibility: Does It Take Nixon To Go To China?

The evidence that reforms become more likely in a crisis raises a further intriguing possibility. In such exceptional conditions, Cukierman and Tommasi (1998) propose that desirable policy reforms could be undertaken by the less likely political party. Just as Richard Nixon, a Republican U.S. president, took the initiative to build ties with communist China, a leftist government may be better positioned to persuade voters that belt-tightening reforms are needed. The premise is that leftist governments are not otherwise disposed to tightening the fiscal belt (see, among others, Fabrizio and Mody, 2006) and are, therefore, when they push reforms in that direction, likely to be taken seriously and not penalized by voters in subsequent elections.

Our framework allows us to test this proposition. In Table 3.8, we first reestablish, as in Table 3.5, that the political ideology variable is not significant by itself (column 1). In the second column, we interact overheating with ideology. Now, the overheating variable by itself is positive and significant, implying that more overheating raises the possibility of reform. But the interaction variable is negative and also significant. This says that the response to overheating is smaller the more "right wing" the ruling government. Stated alternatively, a "leftist" government is more likely to respond to overheating. At its median value of the "rightist ideology" index, 11, the effective coefficient on overheating is almost zero and, at the 75th percentile, 13.5, the response is negative (as if strongly rightist governments find it difficult to respond to overheating).

In column 3, we interact the "rightist ideology" variable with our crisis dummy (which first appeared above in Table 3.7). We obtain a similar result. The crisis dummy itself is positive and significant, as above. And the interaction between this dummy variable and "rightist ideology" is negative and also highly significant. In this specification, the "rightist ideology" variable is positive and with a higher *t*-value than before. In the absence of a crisis, a rightist government will be more prone to reform. However, in a crisis, there is a reversal: the more leftist a government, the more likely it is to reform. Similarly, the force of response to a crisis depends on government ideology. Using once again the techniques of Franzese and Kam (2007), we show the effective coefficient on the crisis dummy as a function of the ideology variable. The response to a crisis is strongest under leftist governments. This response falls as the ideology moves rightward until it becomes insignificant, just beyond the 75th percentile of the ideology variable.

Figure 3.5 also repeats the interactions between the primary balance and fractionalization for the fuller model of column 3, Table 3.8. These basic findings are reinforced. The effective coefficient on the fractionalization variable now becomes negative and statistically significant for a lower value of the primary deficit (just under 2 percent of GDP). The effective coefficient on the primary balance variable is now generally higher than in the simpler model.

Table 3.9 shows that the actual changes and those predicted by the model match rather well. We tested the results by dropping one country at a time to assess if one country was driving the findings. This was not the case (results can be obtained from the authors). Also, we collapsed the institutional improvements into one category rather than dividing them into "an improvement" and "a large improvement." Going in the other direction, we divided the improvements into three rather than two categories. Once again, our results held up well.

3.6. Conclusions

As the process of globalization continues its inevitable march, some policy changes are increasingly being thrust on governments. This is especially the case for financial sector reforms. In Abiad and Mody (2005), we show that regional competition for reforms spurs all countries ahead. A research agenda that examines the relative influence of domestic and international factors on reform efforts still needs to be undertaken. But we have proceeded in this paper on the premise that fiscal policy is deeply influenced by domestic politics. There is evidence, even in the context of this paper, that external vulnerability (reflected in current account deficits) helps the reform process.

Nevertheless, the basic setting of the war of attrition is strongly based in domestic politics.

Our findings suggest that a country can enter a fiscally "virtuous" or vicious" cycle. In "favorable fiscal times," when fiscal performance is good, reforms are easier to undertake. The compromises necessary for the reforms apparently bite less. In "bad fiscal times," when reforms have significant distributional implications (e.g., when imposing stronger checks and controls to reduce a large budget deficit by containing expenditures hurts particular constituencies), needed reforms are delayed. These findings are in line with Alesina and Drazen (1991), who argue that, when budgetary resources are limited and there are many claimants, a war of attrition ensues. No political interest group wants to give in, so the reform process stalls.

How, then, does a country shake the status quo and, in particular, emerge from a vicious into a virtuous cycle? The answer is that economic pain helps. When economic conditions deteriorate, intractable opposing political positions are weakened, interest groups are unable to hold onto their claims, and compromises become feasible. We found, in particular, that an "overheating" crisis raises reform probabilities. Such a crisis is a combination of high inflation and large current account deficits, reflecting unsustainable domestic demand. Fiscal probity to withdraw stimulus from the economy—not just on a cyclical but on a structural basis as well—is a key policy requirement in this context. The results suggest that, indeed, such a response is forthcoming.

Our finding on the importance of a crisis as a pressure for reform raised the question of whether the response to a crisis depended on the ruling government's political ideology. We found, in line with Cukierman and Tommasi (1998), that needed credibility in a democratic context generates the conditions for the "unlikely" ideology to lead the response to a crisis. Thus, we find evidence that while in a non-crisis situation, rightist parties may well lead the reform process, in a crisis, leftist parties acquire credibility for reform because such action goes against their mandate. This is a hopeful finding since it points to a mechanism through which democracies can to deal with crisis. Reforms based on a government's credibility are likely to be more inclusive, and, hence, possibly more sustainable than those based on "strong" democratic leaders. Political leadership is necessary in breaking the logjam, especially where long-standing historical forces create inertia in the reform of institutions. However, such leadership can derive from persuasion rather than force.

Appendix I: Quality of Budget Institutions

Following Fabrizio and Mody (2006) and Hallerberg et al. (2007), we constructed a quantitative index of the overall quality of budget institutions for 23 European countries: Austria, Belgium, Bulgaria, the Czech Republic, Denmark, Estonia, Finland, Germany, Greece, Hungary, Italy, Latvia, Lithuania, Luxembourg, the Netherlands, Poland, Portugal, Romania, the Slovak Republic, Slovenia, Spain, Sweden, and the United Kingdom.

The index is intended to consolidate the objective features of the budget process, such that a larger value implies more checks and balances. Values were assigned to the three phases of the budget process: (1) the preparation stage, when the budget is drafted; (2) the authorization stage, in which the draft budget is approved and formalized; and (3) the implementation phase, when the budget is executed and may be modified or amended.

Data sources include annual fiscal budget laws, Reports on the Observance of Standards and Codes (ROSC) Fiscal Transparency Module, produced by the International Monetary Fund, and direct contact with the countries' authorities.

The tables in this appendix provide: (1) the components of this index (3.1); (2) the changes over time (3.2); and (3) two snapshots (1994 and 2003 or 2004) of the budgetary quality for the countries in our sample (3.3).

Table 3.1 Construction of the Index: Fiscal Institutions and Their Index Parameters

	Weighting factors		
	Index	Sub-index	Numerical coding
Preparation	0.33		
General constraint		0.33	
Spending and debt as share of GDP			4.00
Spending as share of GDP or golden rule or limit on public			3.00
Balance and debt as share of GDP			2.00
Balance as share of GDP			1.00
None			0.00
Agenda setting		0.33	
MF or PM determines budget parameters to be observed by spending			4.00
MF proposes budget norms to be voted on by cabinet			3.00
Cabinet decides on budget norms first			2.00
MF or cabinet collects bids subject to the pre-agreed ministry			1.00
MF or cabinet collects bids from spending ministers			0.00
Structure of negotiations		0.33	
Finance ministry holds bilateral negotiations with each spending			4.00
Finance ministry holds multilateral negotiations			2.00
All cabinet members are involved in the negotiations at the same time			0.00
Legislation			
Parliamentary amendments of the budget		0.33	
Are not allowed, or required to be offsetting			4.00
Do not required to be offsetting			0.00
Sequence of votes		0.33	
Initial vote on total budget size aggregates			4.00
Final vote on budget size or aggregates			0.00
Relative power of the executive vis-à-vis the parliament; can cause fall		0.33	
Yes			4.00
No			0.00
Implementation	0.33		
Changes in the budget law during execution		0.25	
Only new budgetary law to be passed under the same regulations as			4.00
Requires parliament consent			2.00
At total or large discretion of government			0.00
Transfers of expenditures between chapters (i.e. ministries' budgets)		0.25	
Not allowed			4.00
Only possible with departments with MF consent			3.20
Only possible with departments			2.56
Require approval of parliament			1.92
Only if provided for in initial budget or with MF approval			1.28
Limited			0.64
Unlimited			0.00
Carryover of unused funds to next fiscal year		0.25	
Not permitted			4.00
Limited and required authorization by the MF or parliament			2.67
Limited			1.33
Unlimited			0.00
Procedure to react to a deterioration of the budget deficit (due to		0.25	
MF can block expenditures			4.00
MF cannot block expenditures			0.00

Sources: Fabrizio and Mody (2006) and Hallerberg et al. (2008).

Table 3.2 Index of Quality of Budget Institutions

	A. Preparation stage					B. Authorization stage					C. Implementation stage						Overall quality index	
	Variable			1994	2003/04	Variable			1994	2003/04	Variable				1994	2003/04	1994	2003/04
	1	2	3	Score	Score	4	5	6	Score	Score	7	8	9	10	Score	Score	Score	Score
Austria	2	4	4	1.98	3.30	0	2	0	0.66	0.66	2	4	2.66	4	2.49	3.17	1.69	2.35
	0(1)	2(1)										1.28(1)						
Belgium	4	2	2	2.64	2.64	4	4	4	2.64	3.96	0	0	0	4	1.00	1.00	2.07	2.51
	0(12)	1(12)	0(12)			0(4)	0(12)				4(12)	2.56(12)		0(12)				
Bulgaria	0	3	4	1.32	2.31	0	0	4	1.32	1.32	0	1.28	4	4	3.32	2.32	1.97	1.96
		0(1)									4(2)							
Czech Republic	0	3	4	1.32	2.31	0	4	4	2.64	2.64	4	1.28	1.33	0	2.32	1.65	2.07	2.18
		0(1)											4(2)					
Denmark	4	4	2	3.63	3.30	0	4	0	1.32	1.32	2	0	0	4	1.48	1.50	2.12	2.02
		3(1)	4(1)				0(1)	4(1)			4(1)	1.92(1)		0(1)				
Estonia	3	3	4	3.30	3.30	4	0	4	1.32	2.64	4	1.92	2.67	4	3.15	3.15	2.56	3.00
								0(4)										
Finland	4	2	2	1.65	2.64	0	0	4	1.32	1.32	0	4	4	0	2.00	2.00	1.64	1.97
	1(7)																	
Germany	3	2	2	2.64	2.31	0	4	4	1.32	2.64	0	0.64	2.66	4	2.49	1.83	2.13	2.24
		1(1)	4(1)				0(1)				2(1)	1.28(1)						
Greece	2	4	4	0.33	3.30	4	4	4	1.32	3.96	0	1.28	0	4	2.32	1.32	1.31	2.83
	0(1)	1(1)	0(1)			0(1)	0(1)	0(1)					4(1)					
Hungary	0	3	4	2.31	2.31	0	0	0	0.00	0.00	0	0.64	1.33	0	0.49	0.49	0.92	0.92
Italy	2	1	4	1.65	2.31	0	4	4	1.32	2.64	0	0	1.33	4	0.00	1.33	0.98	2.07
	2(7) 4(2)		2(9)			4(9)	0(9)	0(9)					0(5)	0(9)				
Latvia	3	3	2	2.64	2.64	0	0	4	1.32	1.32	4	1.92	2.67	4	3.15	3.15	2.35	2.35
Lithuania	0	1	4	1.32	1.65	4	0	0	1.32	1.32	4	1.28	1.33	4	3.32	2.65	1.97	1.86
		0(6)											4(2)					
Luxemburg	4	4	0	2.31	2.64	4	0	4	2.64	2.64	4	4	4	4	3.00	4.00	2.62	3.06
	3(8)											0(1)						
Netherlands	3	2	4	2.64	2.97	0	4	4	2.64	2.64	0	1.92	**1.33**	0	0.33	0.81	1.85	2.12
	1(1)	3 1/										0(10)						
Poland	3	1	4	1.32	2.64	4	0	4	1.32	2.64	4	1.28	2.67	0	1.99	1.99	1.53	2.40
	0(1)	0(6)				0(1)												
Portugal	2	2	2	2.31	1.98	0	0	4	1.32	1.32	0	0	1.33	4	1.67	1.33	1.75	1.53
	1(1)		4(1)								4(1)		2.66(1)	0(1)				
Romania	0	3	4	1.65	2.31	4	0	**4**	1.32	2.64	4	**1.28**	**4**	**0**	2.32	2.32	1.75	2.40
		1(4)				0 4/												
Slovak Republic	0	1	2	0.99	0.99	0	0	4	1.32	1.32	0	1.28	1.33	0	0.65	0.65	0.98	0.98
Slovenia	0	3	4	2.31	2.31	4	0	4	2.64	2.64	0	1.28	2.67	0	0.99	0.99	1.96	1.96
Spain	3	4	4	3.63	3.63	0	4	0	1.32	1.32	0	1.28	4	0	1.32	1.32	2.07	2.07
													1.33(11)					
Sweden	3	3	4	1.32	3.30	0	4	4	1.32	2.64	4	4	2.66	0	1.33	2.67	1.31	2.84
	0(9)	0(9)					0(9)					0(9)	1.33(9)					
United Kingdom	4	3	4	3.30	3.63	4	4	4	3.96	3.96	4	2.56	0	4	1.81	2.64	2.99	3.38
		2(1)										1.92(1)	1.33(1)	0(1)				

Notes:
(1) Before 1998
(2) Before 2001
(3) Before 2000
(4) Before 2003
(5) Before 2002
(6) Before 1999
(7) Before 1996
(8) Before 2004
(9) Before 1997
(10) Before 1995
(11) Before 1994
(12) Before 1993
(13) Before 1992

Source: Authors' calculations.

Table 3.3 Fiscal Institutions' Quality Index

	Rank[1]							
	1994				2003/2004[2]			
	Preparation	Authorization	Implementation	Overall	Preparation	Authorization	Implementation	Overall
Austria	11	3	17	8	18	2	22	8
Belgium	16	18	6	16	11	21	5	16
Bulgaria	3	4	22	13	4	3	15	13
Czech Republic	3	18	14	17	4	11	11	17
Denmark	22	4	9	18	22	3	10	18
Estonia	21	4	20	21	18	11	20	21
Finland	8	4	13	7	11	3	14	7
Germany	16	4	17	19	4	11	12	19
Greece	1	1	14	1	18	21	6	1
Hungary	12	1	3	2	4	1	1	1
Italy	8	4	1	4	4	11	8	4
Latvia	16	4	20	20	11	3	20	20
Lithuania	3	4	22	13	2	3	18	13
Luxemburg	12	18	19	22	11	11	23	22
Netherlands	16	18	2	11	16	11	3	11
Poland	3	4	12	6	11	11	13	6
Portugal	12	4	10	10	3	3	8	10
Romania	10	4	14	9	4	11	15	9
Slovak Republic	2	4	4	3	1	3	2	3
Slovenia	12	18	5	12	4	11	4	12
Spain	22	4	7	15	23	3	6	15
Sweden	3	4	8	5	18	11	19	5
United Kingdom	16	23	11	23	16	21	17	23

Notes:
(1) Higher rank indicates better quality (highest rank = 23)
(2) Data for the new Member States are available until 2003.
Sources: Fabrizio and Mody (2006); Hallerberg et al. (2008) and authors' calculations.

Appendix II: Definitions and Sources of Variables Used in Regression Analysis

Variable	Definition	Source
Institutional reform	The change in the quality of budget institutions two years ahead, i.e., between *t* and *t+2*.	Appendix I
Institutional gap	The difference between 4 (the maximum value of the quality index and the quality of budget institutions in the country at time *t*.	Appendix I
Primary balance	The primary budget balance/GDP in *t-1*.	IMF, *World Economic Outlook*
Fractionalization	Measure of the distribution of parties in the government's coalition, represented by the Herfindahl index, $[1-[\sum s_i]]$, where s_i is the share of party "*i*" in the coalition in year *t*.	Parties and Elections in Europe (www.parties-and-elections.de) and Elections Around the World (www.electionworld.org).
Election year	A dummy variable taking the value 1 if an election occurred at time *t*.	
Political constraints	The political constraint index (POLCON): measure of veto players at time *t*, a higher value representing more constraints.	www-management. wharton.upenn.edu/henisz/
"Rightist" ideology	An index of ideology at time *t*, taking values from [5 to 16], with higher values representing a more "rightist" world view.	Benoit and Laver, 2006, www.politics.tcd.ie /ppmd/
Unemployment	The country's unemployment rate at time *t*.	IMF, *World Economic Outlook*
Log (inflation)	The log of the country's [consumer price] inflation rate at time *t*.	IMF, *World Economic Outlook*
Current account surplus	The country's current account surplus at time *t*.	IMF, *World Economic Outlook*
Excessive deficit procedure dummy	A dummy taking the value 1 if the country was subject to the [European Union's] Excessive Deficit Procedure.	
Euro adoption dummy	A dummy taking the value 1 in the year the country adopted the euro and thereafter.	
Trade/GDP	[Exports+Imports]/GDP at time *t*.	IMF, *World Economic Outlook*
Overheating	First principal component of the unemployment rate, log (inflation), and the current account surplus. Larger values imply a combination of larger current account deficits and higher inflation; hence, the reference to "overheating."	Authors' construction.
Overheating nonlinearity	Takes the values of the overheating variable above the 75th percentile and zero below that. Is intended to allow for nonlinearity in policy response to overheating.	Authors' construction.
Crisis	Takes the value 1 if the overheating variable is above its 75th percentile and zero otherwise.	Authors' construction.
Stagflation	Second principal component of the unemployment rate, log (inflation), and the current account surplus. Strongly correlated with the unemployment rate and more modestly with inflation and the current account deficit.	Authors' construction.

Table 3.4 War of Attrition

	Dependent Variable: Institutional Reform			
	(1)	(2)	(3)	(4)
Institutional gap	4.61	6.23	6.34	7.35
	[4.02]***	[3.85]***	[3.92]***	[4.38]***
Primary balance		0.50	0.49	0.92
		[1.90]*	[1.76]*	[2.93]***
Fractionalization			-2.09	-0.80
(FRAC)			[1.00]	[0.42]
Primary				-0.97
balance*FRAC				[1.92]*
Observations	102	102	102	102
Pseudo *R*-squared	0.39	0.44	0.45	0.48

Notes:
Robust z statistics in brackets. * significant at 10 percent; ** significant at 5 percent; *** significant at 1 percent.
Coefficients for country and year dummies not reported.

Table 3.5 Political Constraints

	Dependent Variable: Institutional Reform		
	(1)	(2)	(3)
Institutional gap	7.33	7.36	7.30
	[4.25]***	[4.41]***	[4.53]***
Primary balance	0.92	0.92	0.91
	[2.98]***	[2.91]***	[3.05]***
Fractionalization	-0.76	-0.80	-0.62
(*FRAC*)	[0.42]	[0.42]	[0.29]
Primary	-0.99	-0.97	-0.98
balance**FRAC*	[1.99]**	[1.90]*	[1.95]*
Election year	-0.54		-0.54
	[0.54]		[0.54]
Political constraints		-0.23	-0.15
		[0.04]	[0.02]
"Rightist" ideology			-0.02
			[0.11]
Observations	102	102	102
Pseudo *R*-squared	0.48	0.48	0.48

Notes:
Robust *z* statistics in brackets, * significant at 10 percent; ** significant at 5 percent; *** significant at 1 percent; coefficients for country and year dummies not reported.

Table 3.6 Economic Shocks

	Dependent Variable: Institutional Reform			
	(1)	(2)	(3)	(4)
Institutional gap	10.99	11.68	11.76	14.20
	[2.75]***	[2.55]**	[2.67]***	[2.52]**
Primary balance	1.42	1.41	1.41	1.85
	[2.09]**	[2.00]**	[2.03]**	[2.07]**
Fractionalization	-0.17	-1.38	-1.41	-1.50
(*FRAC*)	[0.06]	[0.48]	[0.49]	[0.55]
Primary	-1.46	-1.34	-1.37	-2.02
balance**FRAC*	[2.00]**	[1.97]**	[2.01]**	[2.16]**
Unemployment	0.94	0.97	1.00	0.90
	[1.84]*	[1.80]*	[1.90]*	[2.26]**
Log (inflation)	4.66	5.25	5.32	3.16
	[2.91]***	[2.83]***	[2.92]***	[2.43]**
Current account		-0.30	-0.29	-0.24
surplus		[1.78]*	[1.78]*	[1.79]*
Excessive deficit			-2.55	-2.80
procedure dummy			[1.13]	[1.26]
Euro adoption				4.37
dummy				[1.60]
Trade/GDP				0.09
				[1.45]
Observations	102	100	100	100
Pseudo *R*-squared	0.54	0.56	0.56	0.60

Notes:
Robust *z* statistics in brackets, * significant at 10 percent; ** significant at 5 percent; *** significant at 1 percent. Coefficients for country and year dummies not reported.

Table 3.7 Crises and Reforms

	Dependent Variable: Institutional Reform				
	(1)	(2)	(3)	(4)	(5)
Institutional gap	7.27	8.00	14.45	8.22	12.38
	[4.01]***	[4.49]***	[2.05]**	[4.01]***	[3.13]***
Primary balance	0.86	0.96	1.61	0.97	1.57
	[2.52]**	[2.32]**	[2.09]**	[2.63]***	[2.53]**
Fractionalization	-1.00	-0.90	-1.07	-0.37	-0.45
(*FRAC*)	[0.42]	[0.32]	[0.43]	[0.16]	[0.21]
Primary	-0.95	-1.05	-1.25	-1.02	-1.31
balance**FRAC*	[1.87]*	[1.74]*	[2.02]**	[1.85]*	[2.06]**
Overheating	0.41	-0.46	0.00		
	[1.05]	[0.83]	[0.01]		
Overheating		1.33	2.36		
nonlinearity		[2.22]**	[2.77]***		
Crisis				4.71	6.91
				[2.05]**	[2.45]**
Stagflation			2.24		1.55
			[1.56]		[2.20]**
Observations	100	100	100	102	100
Pseudo *R*-squared	0.49	0.52	0.60	0.52	0.58

Notes:
Robust z statistics in brackets, * significant at 10 percent; ** significant at 5 percent; *** significant at 1 percent. Coefficients for country and year dummies not reported.

Table 3.8 Credibility

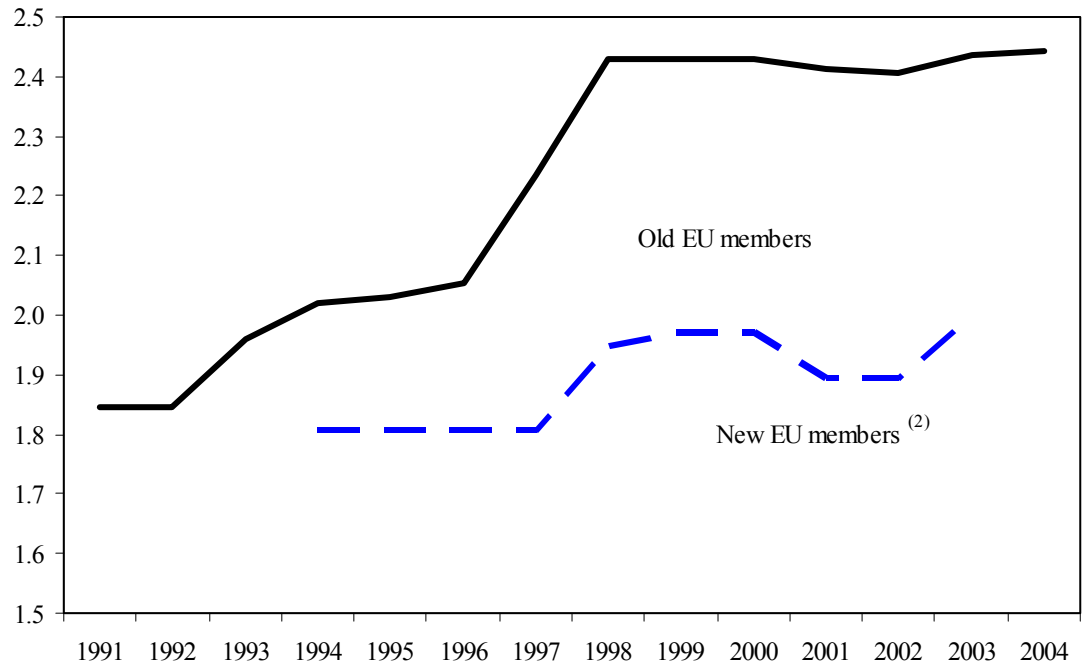
	Dependent Variable: Institutional Reform		
	(1)	(2)	(3)
Institutional gap	7.32	9.93	17.06
	[4.73]***	[3.10]***	[4.43]***
Primary balance	0.91	1.12	1.29
	[3.09]***	[2.16]**	[2.61]***
Fractionalization	-0.66	-4.43	-3.81
(*FRAC*)	[0.30]	[1.41]	[1.11]
Primary	-0.96	-1.27	-1.55
balance**FRAC*	[1.90]*	[1.87]*	[2.08]**
"Rightist" ideology	-0.02	0.32	0.41
	[0.11]	[1.11]	[1.81]*
Overheating		3.71	
		[2.36]**	
Overheating* "Rightist"		-0.31	
ideology		[1.97]**	
Crisis			45.79
			[3.67]***
Crisis* "Rightist"			-3.06
ideology			[3.75]***
Stagflation			
Observations	102	100	102
Pseudo *R*-squared	0.48	0.52	0.60

Notes: Robust *z* statistics in brackets, * significant at 10 percent; ** significant at 5 percent; *** significant at 1 percent; coefficients for country and year dummies not reported.

Table 3.9 Model Predictions

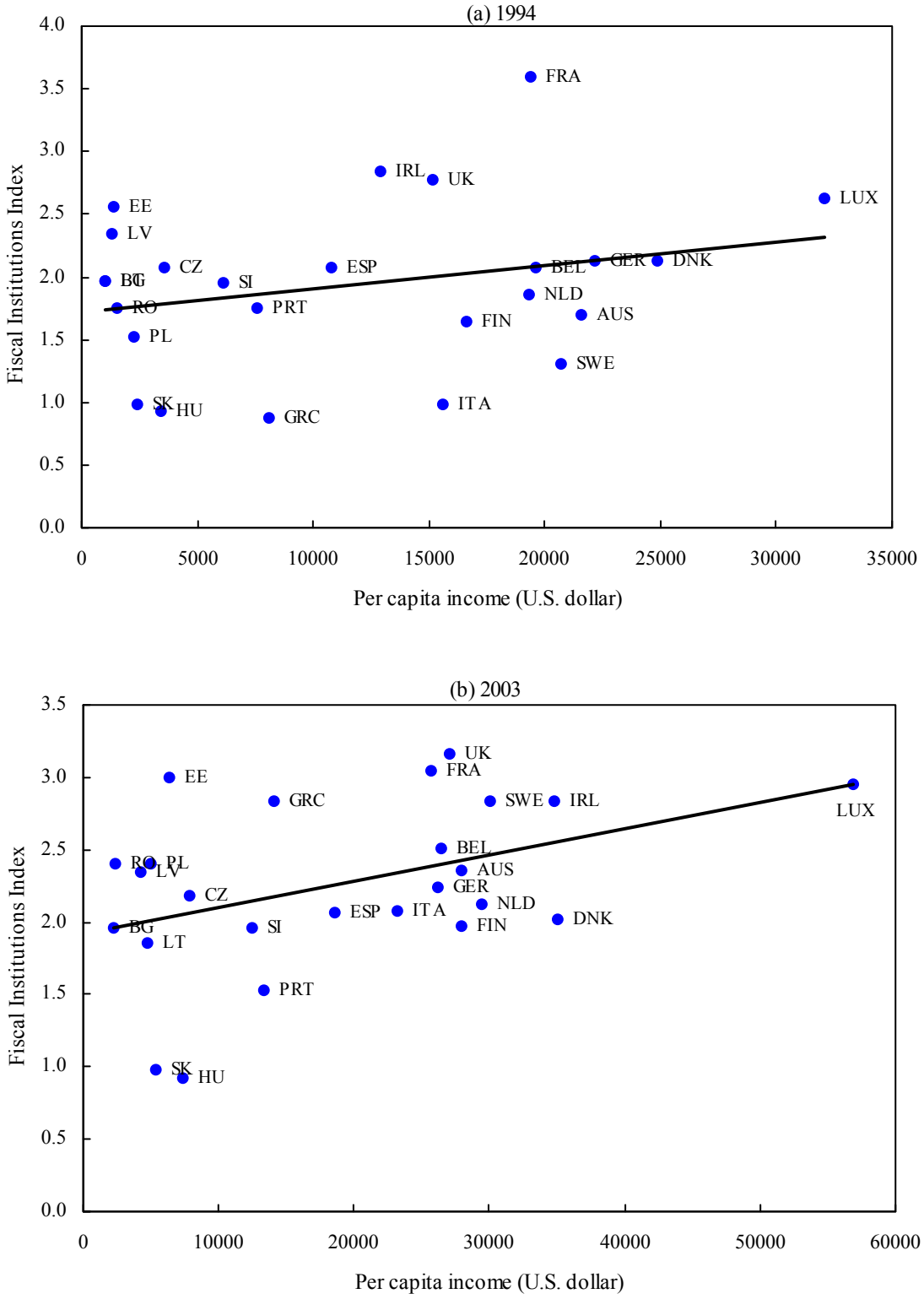
	Predicted Probability of Change			
Actual change	Reversal	No Change	Improvement	Large Improvement
Reversal	0.49	0.51	0.00	0.00
No change	0.04	0.89	0.06	0.01
Improvement	0.00	0.38	0.51	0.11
Large improvement	0.00	0.06	0.26	0.68
Total	0.06	0.76	0.12	0.06

Figure 3.1 Average Value of Fiscal Institutions' Index, 1991-2004 [1]



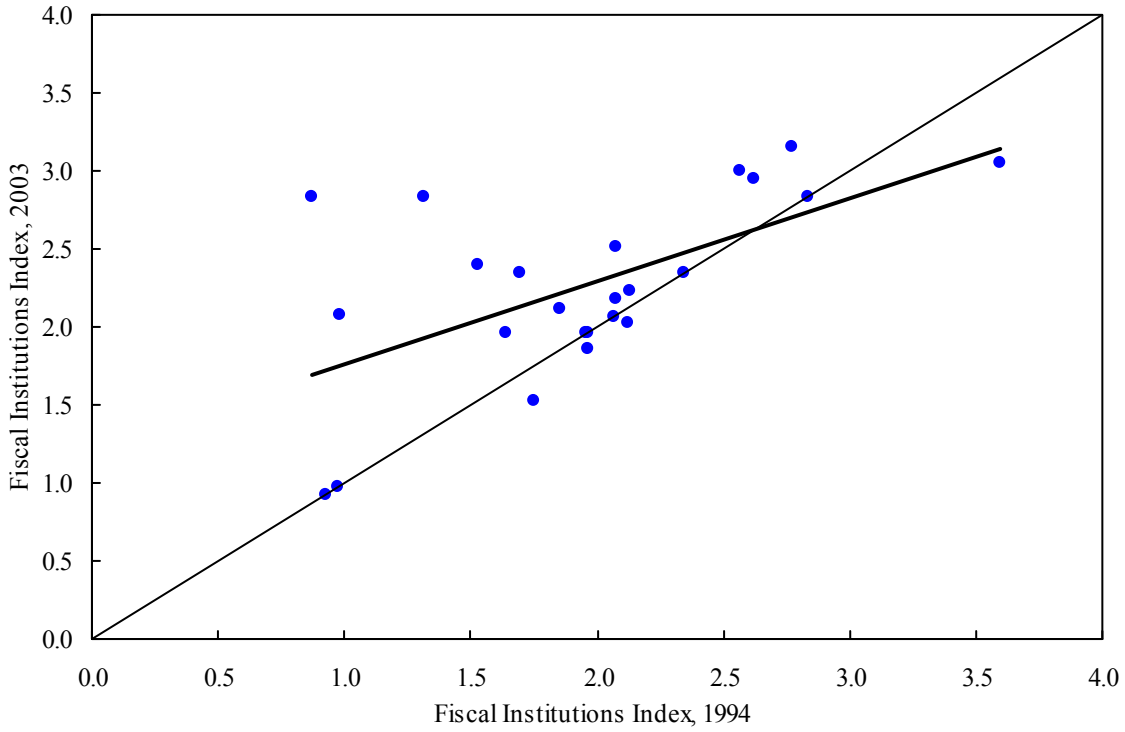
Notes:
[1] Higher rank indicates better quality (highest rank = 23)
[2] Data for the new Member States are available until 2003
Sources: Fabrizio and Mody (2006); Hallerberg et al. (2007) and authors' calculations.

Figure 3.2 Quality of Fiscal Institutions' Index and Per Capita Income [(1)]



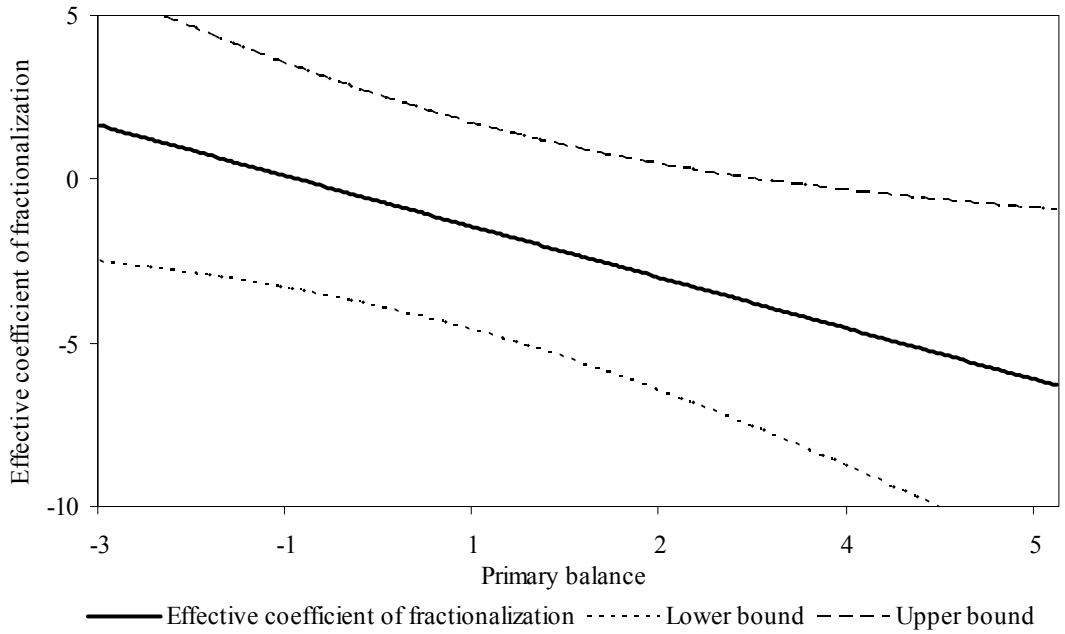
Note:
[(1)] Higher rank indicates better quality (highest rank = 23). Data for the new Member States are available until 2003.
Sources: Fabrizio and Mody (2006); Hallerberg et al. (2007) and authors' calculations.

Figure 3.3 Fiscal Institutions' Index, 1994-2003 [1]



Note:
[1] Higher rank indicates better quality (highest rank = 23). Data for the new Member States are available until 2003.
Sources: Fabrizio and Mody (2006); Hallerberg et al. (2007) and authors' calculations.

Figure 3.4 Interaction of Primary Balance and Fractionalization



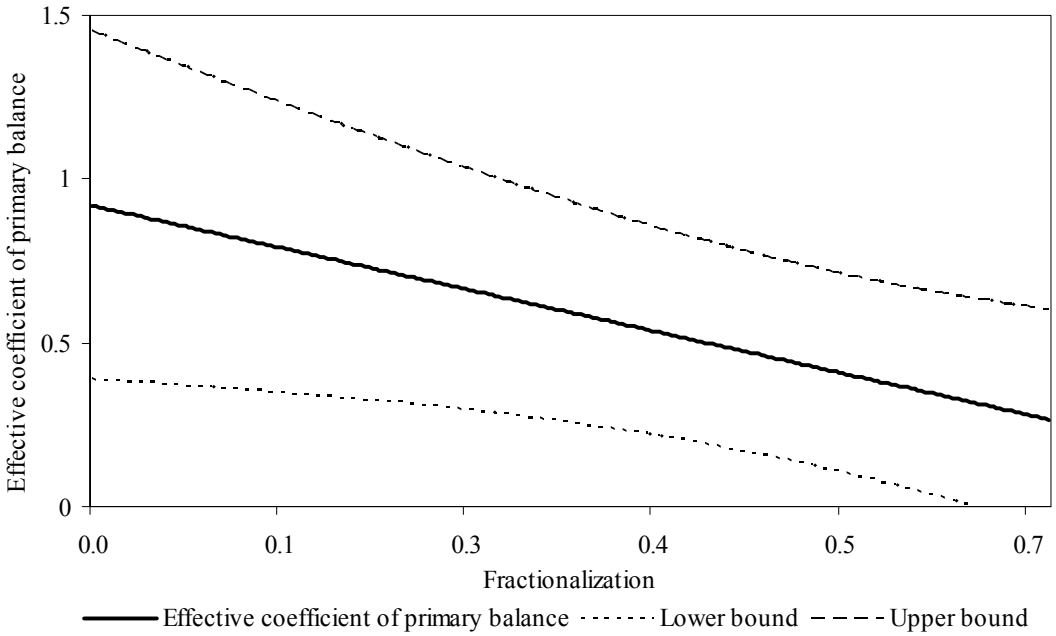
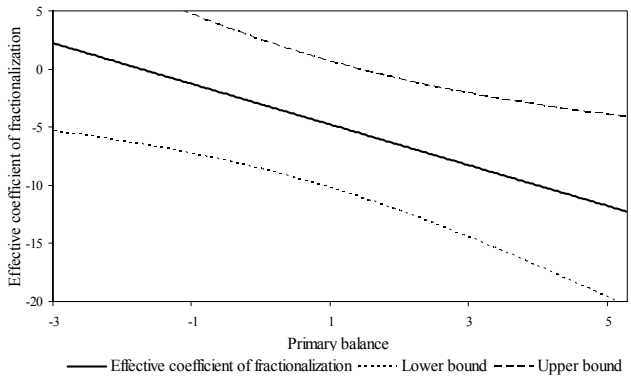
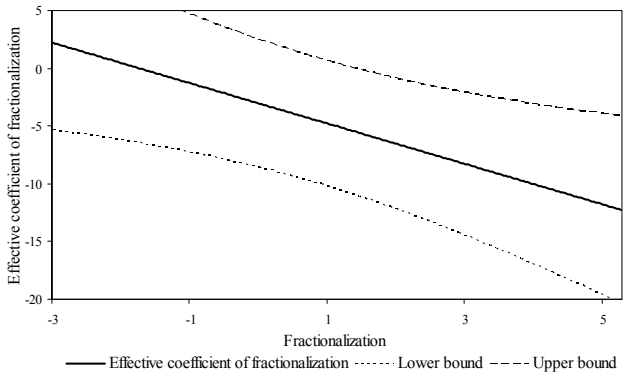


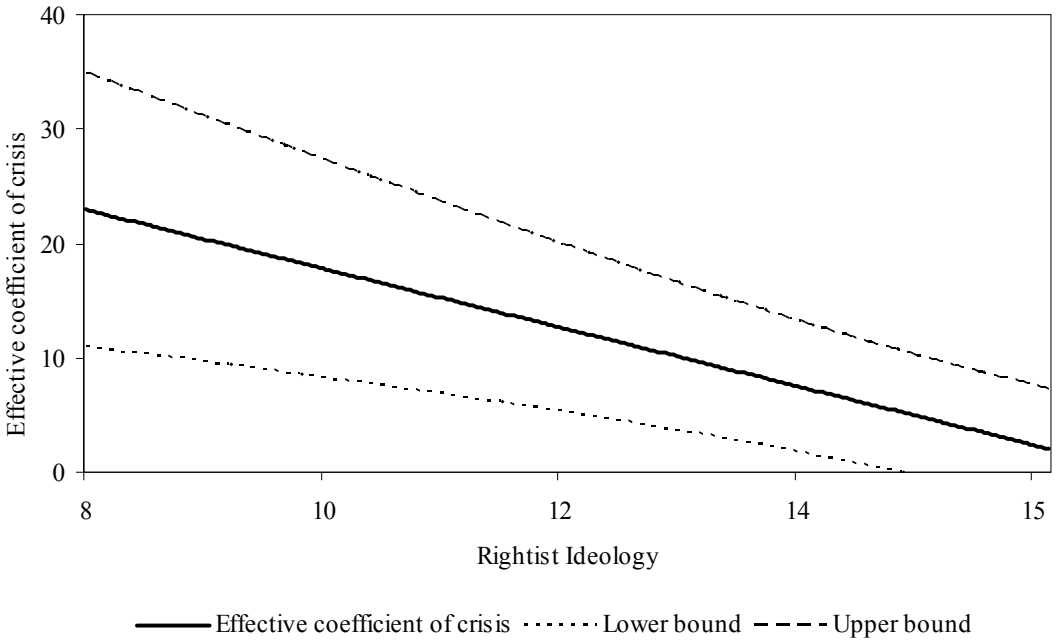
Figure 3.5 Nonlinear Effects in the Full Model

A. Interaction of Primary Balance and Fractionalization





B. Interaction of Economic Overheating and Political Ideology



Discussion

Roel Beetsma

This is a nice paper with interesting results. It provides a statistical investigation of the determinants of budget reform in a large panel of European countries over the period since the beginning of the nineties. In this regard, it pays specific attention to the state of the public finances, political divisions, economic crises and credibility aspects. In particular, the latter is interesting. The authors refer to the "Nixon goes to China phenomenon". Nixon was the president who on the basis of his political preferences was the least likely to reach out to China. The fact that he nevertheless did reach out added to the credibility and success of his policy. Similarly, one may expect left wing parties to be the least likely to conduct reform. If they do decide to reform, this will be signal of credibility and determination to succeed. The authors find that overall right-wing governments are indeed more likely to reform the budget in absence of crisis, but that during a crisis, the more leftist is the government, the more likely is reform.

In the sequel I will comment on some further findings of the authors, the interpretation of those findings and some aspects of the empirical approach taken by the authors.

What else do the authors find? First, they find that a worse budgetary position reduces the subsequent likelihood of reforms. They explain this as the result of an attrition war. Groups are fighting over who has to bear the cost of adjustment and each group waits for the other to give in. The authors thus implicitly claim that this effect becomes stronger and, hence, reform is postponed for longer, when there are fewer public resources. I am not convinced that this is the most plausible explanation. Another simple explanation that is easy to test is that economic recession may act as a third factor worsening the public budget and at the same time giving rise to social unrest, which makes it harder to implement a reform.

Second, the authors find that a more fragmented government coalition is an impediment to reform, a finding that can reasonably be ascribed to a war-of attrition effect. Third, there is also an interaction effect between the primary budget balance and political fragmentation, implying that more fractionalisation reduces the effect of the primary balance on the likelihood of reform or that a higher primary balance makes the effect of fractionalisation on the reform likelihood more negative. In my view, this indirect effect goes against attrition war hypothesis. Under an attrition war, a low budget should be particularly bad for reform likelihood when fractionalisation is bigger. However, the opposite is the case: the estimates show that for high deficits the effect of fractionalization on reform is positive!

The authors further find that higher inflation, higher unemployment and a higher current account deficit all make reform more likely. In other words, economic pain may shake the country out of the status quo of no reform. Being under the Excessive Deficit Procedure has no effect. Of course, here the question is whether there are enough observations during which the EDP was active to draw strong conclusions in this regard.

The authors define an "overheating variable", which is measured as a combination of current account deficit and high inflation. This variable is entered the budget reform regression in relative terms. That is the authors define a "crisis" to be present if the overheating variable exceeds its 75th percentile. However, in my view it is more appropriate to define a crisis in absolute terms, because the current definition of crisis is immune to a European-wide improvement in current accounts and a European-wide fall in inflation.

I am somewhat surprised that GDP (growth) nowhere appears as an explanatory variable of reform. Low growth increases the need for reform. Also I would think that growth would be a better measure of "crisis" than the variable that is now supposed to capture a crisis. After all, situations of "overheating" could simply be situations of rapid catching up: inflation is high for Balassa-Samuelson reasons, while the current account is negative because there is high capital inflow to finance investment and higher consumption (in anticipation of higher future income).

On the basis of their results, the authors suggest two possible "long-run" outcomes. One is a long run with low deficits and good institutions. The other is one with high deficits and weak institutions which is the result of a vicious cycle in which high deficits prevent budgetary reform, which in turn leads to persistence of high deficits. However, in my view this really remains to be shown. First, can one indeed detect any tendency in the deficits over time that confirms the hypothesis? Second, one would also need to show that a higher index of the quality of budgetary institutions produces better budgetary outcomes. In fact, it would be interesting to set up a vector auto-regression (VAR) model that includes as endogenous variables institutional quality and primary balances and see what are the dynamic responses to exogenous shocks to, for example, economic growth or other variables that have been used to measure "crisis".

That being said, I believe that overall this paper is a very useful contribution to the literature. It produces some intriguing results that merit further investigation.

Part II - Lessons from Fiscal Consolidation

4 What promotes fiscal consolidation: OECD country experiences

Stéphanie Guichard, Mike Kennedy, Eckhard Wurzel and Christophe André[*]

4.1. Introduction

Fiscal consolidation is required in most OECD countries. This is especially so in view of medium- and long-term spending pressures on public finances, related, *inter alia,* to ageing. Countries that are successful in consolidating will then face the challenge of locking in the gains achieved. Against that background, in this paper we present evidence on the factors that in the past were associated with successful consolidation and with the preservation of those gains.

Based on a dataset covering a large number of OECD fiscal consolidation episodes starting in the late 1970s, we first present descriptive evidence on the features of these experiences and factors that may have affected the way they unfolded. Subsequently, regression analysis is used to identify a set of macroeconomic conditions and policy set-ups that have been effective in triggering and sustaining these efforts.

4.2. Stylised features of fiscal consolidation episodes

Using the definition presented in Box 1, since 1978, there were 85 fiscal consolidation episodes in the 24 countries under review. These episodes include only those that, once started, resulted in a noticeable improvement in the cyclically adjusted primary balance (CAPB). A number of stylised patterns emerge from these episodes, as discussed below.

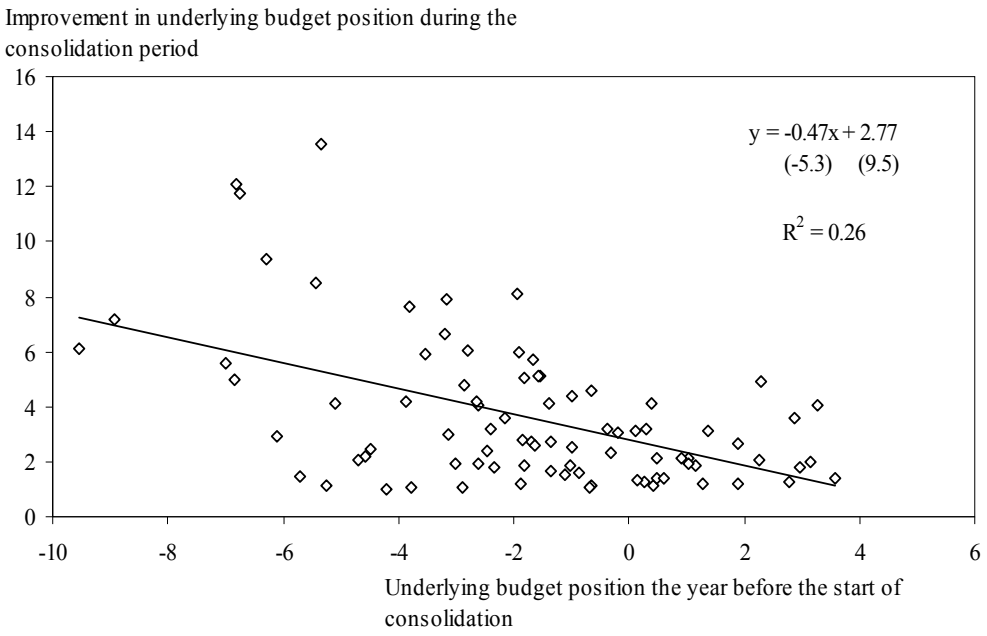
Initial conditions, size and duration

In line with findings from earlier analysis (Ahrend *et al.*, 2006a and references cited therein), fiscal conditions prevailing just before the beginning of a consolidation episode seem to have had an impact on the size of subsequent efforts (Figure 4.1). The

[*] The authors were economists in the General Economic Assessment Division of the OECD's Economics Department at time this paper was prepared. They wish to thank, without implicating, Jørgen Elmeskov, Mike Feiner, Vincent Koen, Peter Jarrett, Bob Price, Paul van den Noord, Boris Cournède, Romain Duval, Rudiger Ahrend, Chantal Nicq as well as the OECD Country Experts for helpful comments and drafting suggestions on earlier versions of the paper. Special thanks go to Anne Eggimann for the preparation of the document.

more negative was the CAPB (*i.e.*, the larger the cyclically adjusted deficit), the larger was the size of ensuing fiscal consolidation. This may reflect that large deficits made it more necessary to consolidate and, at the same time, raised public awareness of the extent of the problem, making it easier to act.

Figure 4.1 Initial Fiscal Positions and Subsequent Adjustment



Note: The budget concept referred to is the cyclically-adjusted primary budget balance. The total change during the episode is defined as the value in the last year of the episode minus the value in the year before the start of the episode.
Source: OECD calculations.

Most of the consolidation episodes were of short duration and involved only modest gains (Figure 4.2). The median improvement of the CAPB was 2.8% of GDP and the median duration was two years. There were, however, a number of large efforts, amounting to improvements of more than 8% of GDP, as well as a few episodes lasting from six to eight years. [14]

In general, sizeable consolidation episodes also lasted for long periods, and vice versa (Figure 4.3, upper panel). On the other hand, long consolidation episodes tended to involve a lower "intensity" of effort, measured as total size of the consolidation per year (Figure 4.3, lower panel). Intense efforts are likely difficult to maintain over time either because of adjustment fatigue or because large, easy-to-implement measures ("the low hanging fruit") tend to be done first. At the same time, large improvements obviously reduce the need for continued consolidation.

14 Among large consolidation outcomes (improvements in cyclically adjusted balances in terms of per cent of potential GDP) were: Canada in the 1990s (8.1%); Portugal in the 1980s (8.5%); Sweden in the 1980s (9.4%) and in the 1990s (11.7%); Greece in the 1990s (12.1%); and Denmark in the 1990s (13.5%). As to duration, fiscal consolidation was sustained for six years in Australia in the second half of the 1990s as well as in Belgium in the 1980s and 1990s; and in the United Kingdom and the United States in the 1990s. Consolidation lasted for seven years in Sweden in the 1980s and 1990s and for eight years in Japan in the 1980s.

Box 1. Defining consolidation episodes

The sample comprises all episodes of fiscal consolidation -- as defined below -- among 24 OECD member countries since 1978 for which reliable data on key fiscal variables are available.[1] To identify episodes the same definitions were applied as in Ahrend *et al.* (2006). According to this definition, a fiscal consolidation episode:

- *Starts* if the cyclically adjusted primary balance (CAPB) improves by at least one percentage point of potential GDP in one year or in two consecutive years with at least ½ percentage point improvement occurring in the first of the two years.[2]
- *Continues* as long as the CAPB improves. An interruption is allowed without terminating the episode as long at the deterioration of the CAPB does not exceed 0.3% of GDP and is more than offset in the following year (by an improvement of at least 0.5 % of GDP).
- *Terminates* if the CAPB stops increasing or if the CAPB improves by less than 0.2% of GDP in one year and then deteriorates.

The results of this mechanical definition were checked with OECD country experts and minor adjustments were made. The size of fiscal consolidation is measured by the change in the cyclically adjusted primary balance as a percentage of potential GDP over the episode (last year of the episode minus the year before it starts) and the intensity is measured as the size divided by the length of the episode. Overall, the sample covers 85 consolidation episodes (see Appendix II).

1. Australia, Austria, Belgium, Canada, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Japan, Korea, Luxembourg, Netherlands, New Zealand, Norway, Portugal, Spain, Sweden, Switzerland, the United Kingdom and the United States.
2. The cyclically adjusted primary balance, which here is based on the method outlined in Girouard and André (2005), is an imperfect measure of discretionary policy actions. It can be affected for instance by asset price cycles (Girouard and Price, 2004; and Morris and Schuknecht, 2007) and one-off measures (Dafflon and Rossi 1999; von Hagen and Wolff, 2004; Koen and van den Noord, 2005) that do not reflect the policy stance. It is also affected by the measurement issues surrounding the output gap. However, given that only large changes qualify as consolidation spells, this problem is reduced. Debt-interest payments (as well as interest incomes) are excluded as they are largely outside the control of the fiscal authorities and thereby do not reflect directly the policy stance.

Quality of the adjustment and successful consolidation

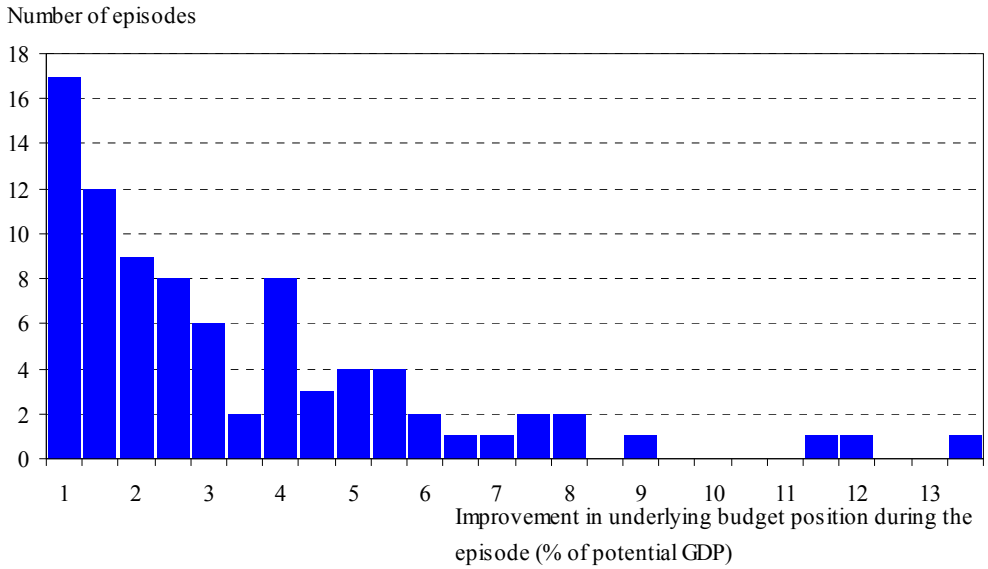
A number of arguments and empirical studies suggest that spending restraint (notably with respect to government consumption and transfers) is more likely to generate lasting fiscal consolidation and better economic performance.[15] Indeed, related research suggests that both policy and long-term interest rates are more likely to fall when

15 Alesina and Perotti (1996); Alesina and Ardagna (1998); and Alesina and Bayoumi (1996). Von Hagen *et al.* (2002) also find that the likelihood of sustaining consolidation efforts seems to rise when governments tackle politically sensitive items on the budget such as transfers, subsidies and government wages.

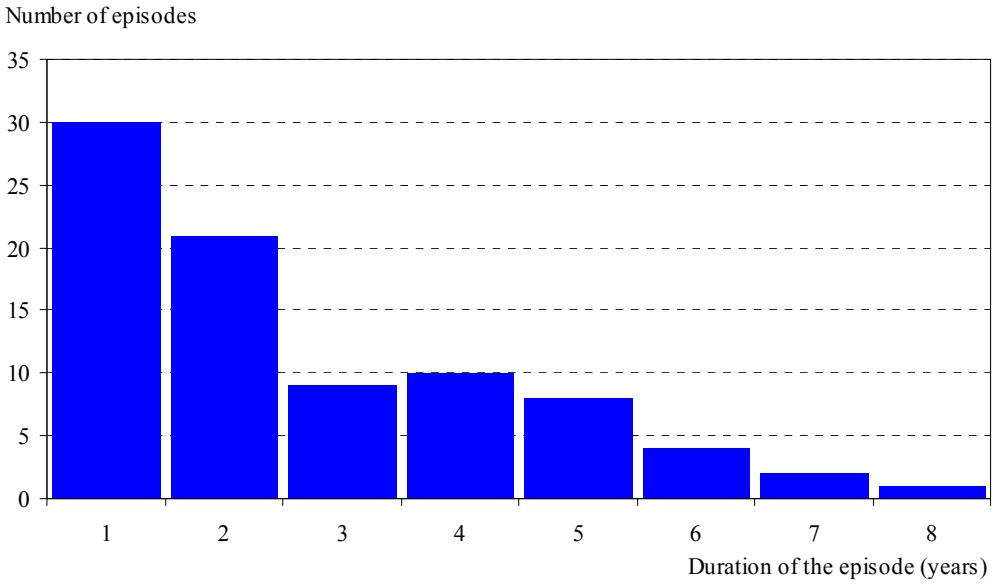
consolidation relies on current expenditure cuts rather than on tax increases, possibly reflecting the effects of the latter on costs and prices (Ahrend *et al*., 2006a). Moreover, there is evidence that the composition of fiscal consolidation is important for saving and growth, with spending based consolidation resulting in lower household saving and higher GDP growth.[16]

Figure 4.2 Strength and duration of consolidation episodes

The distribution of episodes by the size of consolidation



The distribution of consolidation episodes by duration

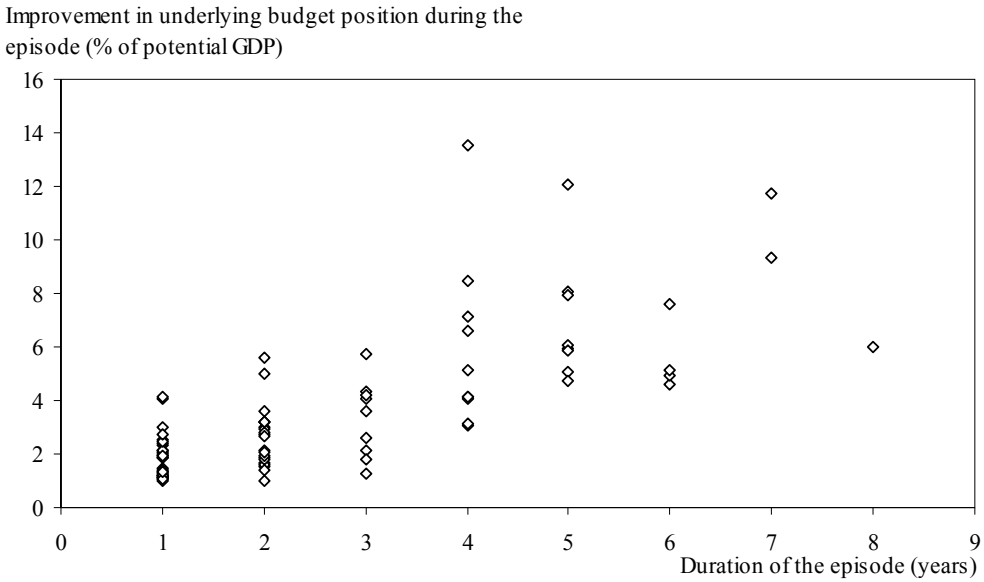


Note: The budget concept referred to is the cyclically-adjusted primary budget balance.
Source: OECD calculations.

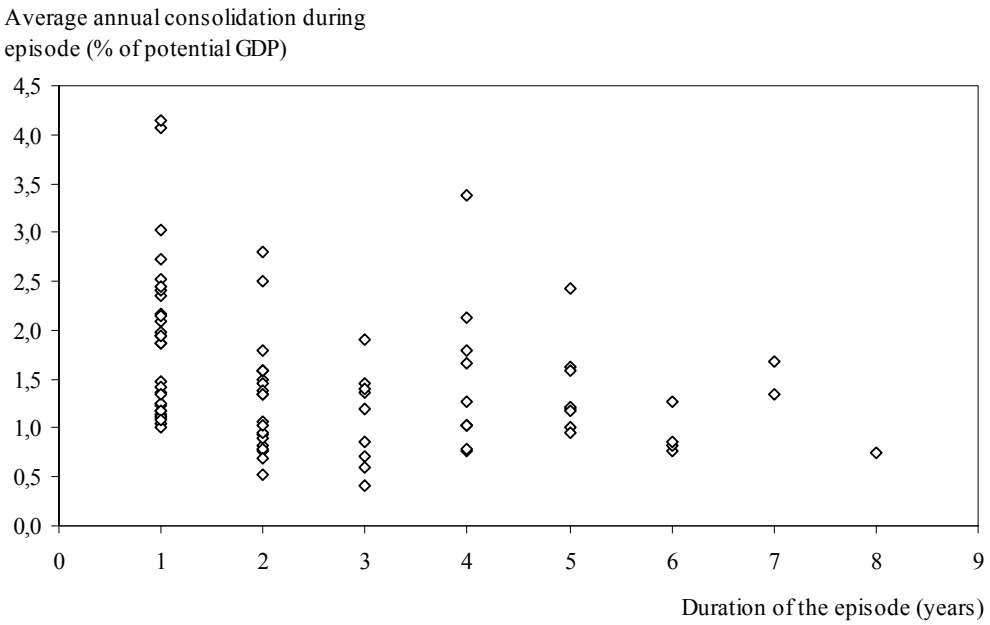
16 Bassanini *et al*. (2001), Ardagna (2004) and de Mello *et al*. (2004). Cournède and Gonand (2006), in the context of a dynamic general equilibrium model with overlapping generations, argue that tax increases are a much more costly way of achieving fiscal sustainability compared with spending restraint.

Figure 4.3 The relationship between duration, size and intensity of consolidation

Duration and size of consolidation



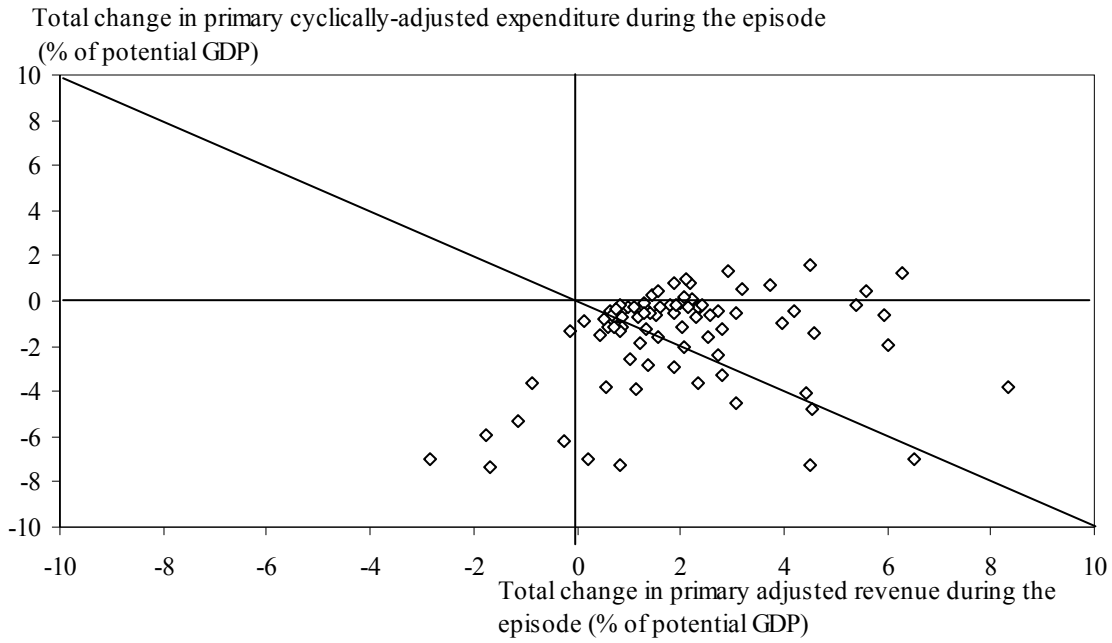
Duration and intensity of consolidation



Note: The budget concept referred to is the cyclically-adjusted primary budget balance.
Source: OECD calculations.

Despite the case in favour of spending-based efforts, on average across the consolidation episodes studied here, revenue increases accounted for a larger fraction of the total reduction in the CAPB. About three quarters of the episodes under review involved both expenditure cuts and revenue increases and almost two thirds of the episodes involved larger contributions from revenue increases than from expenditure cuts (Figure 4.4). Reductions in capital expenditures usually played a smaller role in the total spending adjustment but in some cases they compensated for increases in current spending.

Figure 4.4 The role of spending and revenue in consolidation episodes



Source: OECD calculations.

The success of consolidation policies might be judged according to whether fiscal adjustment is large enough to stabilise the debt-to-GDP ratio.[17] According to this criterion, slightly more than half of the consolidation episodes were successful. Moreover, in some 80% of these cases the sustainable position was maintained for at least two years. These successful episodes involved larger improvements in the CAPB (by almost ¾ percentage point of potential GDP compared with the median episode size) and lasted for longer (about twice as long as the median episode length of two years) than in the other cases.

On the other hand, half of the episodes under review were not successful in the sense that one third or more of the total reduction in the CAPB achieved during the

[17] Looking directly at the debt-to-GDP ratio has the disadvantage of including stock-flow adjustments that affect the level of debt but might be unrelated to discretionary consolidation policies and even reflect fiscal gimmickry designed to reduce debt levels in the short-term without improving the underlying government balance sheet. Considering the gap between the actual primary balance and what is necessary to stabilise the debt-to-GDP ratio during the episode and its immediate aftermath (typically in the following two years), as is done here, avoids this difficulty. This approach has been followed by Baldacci et al. (2004).

consolidation phase was unwound in the two following years. For one-fifth of all episodes, the CAPB deteriorated by more (as a per cent of potential GDP) than it improved during the consolidation phase. Perhaps not surprisingly, backtracking -- defined as the loss of a third of the consolidation gains or more within two years -- is more likely to occur when improvements in the CAPB during the preceding consolidation episode were small (Figure 4.5). In addition, backtracking is almost always associated with spending increases (Figure 4.5, lower panel).[18]

Over the past decade and a half, a large number of countries have introduced fiscal rules with the aim of containing the political economy mechanisms leading to excessive spending and deficits (often referred to as "deficit bias").[19] Rules can focus on spending, deficits or revenues and may, in part, be seen as a tool to better communicate to the public fiscal objectives and outcomes. Using simple bivariate analysis, however, there is no clear relationship across consolidation episodes between the existence of a fiscal rule and a number of fiscal indicators (the total change in the CAPB, the change in revenues or the amount of backtracking). This suggests that the relationship may be weak or that it can only be detected by controlling for the other aspects of the consolidation process already mentioned.

4.3. Identifying factors that support fiscal consolidation

The econometric evidence presented in this section is aimed at identifying the influence of various factors (notably macroeconomic and fiscal conditions, the composition of the fiscal adjustments and the existence of fiscal rules) along several dimensions of the consolidation process. These include: the initiation of a consolidation spell; the size of consolidation; the duration of consolidation; and success in reaching debt sustainability. The role fiscal rules have made to these various dimensions of consolidation is discussed separately.[20] The following sub-sections cover each of these four aspects in turn and Table 4.1, where the econometric results are synthesized, will be used as a guide to the discussion.[21]

Factors prompting and influencing the size and intensity of consolidations

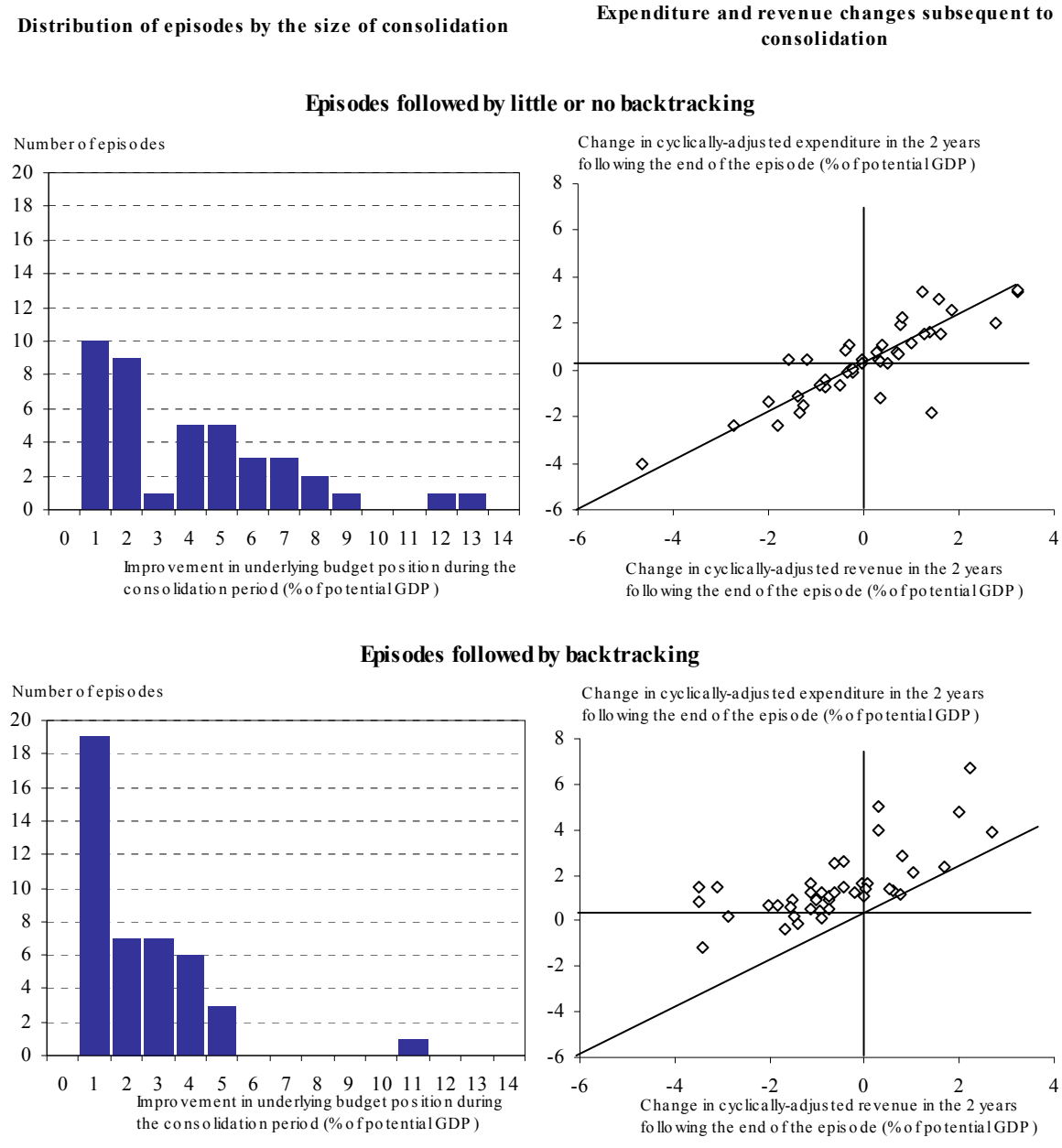
Econometric analysis confirms that the initial budget balance has played a significant role in kicking off consolidation (Table 4.1, column (1) marked "probability to start").[22] For example, a cyclically-adjusted primary deficit of 2% of (potential) GDP is

[18] Consolidation episodes relying on tax increases that were partially offset by higher spending during the episode were on average characterised by smaller improvements in the CAPB, shorter duration and more backtracking.
[19] For an overview on the sources of "deficit bias", see von Hagen (2002). Also relevant are Rogoff and Silbert (1988); Persson and Tabellini (2000); Shi and Svensson (2002); and Alesina and Tabellini (2005).
[20] In the estimated equations, fiscal rules are accounted for by four dummy variables, representing the existence of a budget rule supplemented by an expenditure rule; the existence of a budget rule not supplemented by an expenditure rule; euro area countries during the qualification phase to the euro; and euro area countries under the Stability and Growth Pact.
[21] The results presented in Table 4.1 represent the final specifications following a general to specific procedure to identify the relevant explanatory variables.
[22] However, high debt levels were not found to increase the likelihood of starting a fiscal consolidation exercise.

associated with a 13 percentage point higher probability of initiating consolidation than a balanced primary budget (Figure 4.6).[23]

There is weak econometric evidence that this effect can be compounded by higher long-term interest rates (relative to an international reference level). One interpretation is that when the potential gain in terms of falling interest rates is high, consolidation becomes more attractive. Indeed, the fall in interest spreads through the 1990s in a number of cases appears to have led to a more relaxed primary budget stance (see Appendix I).

Figure 4.51 Comparison of consolidation episodes with and without backtracking



Note: The budget concept referred to is the cyclically-adjusted primary budget balance. An episode is followed by backtracking if more than 30% of the improvement in the cyclically-adjusted primary budget balance during the episode is lost in the two years following the end of the episode.
Source: OECD calculations.

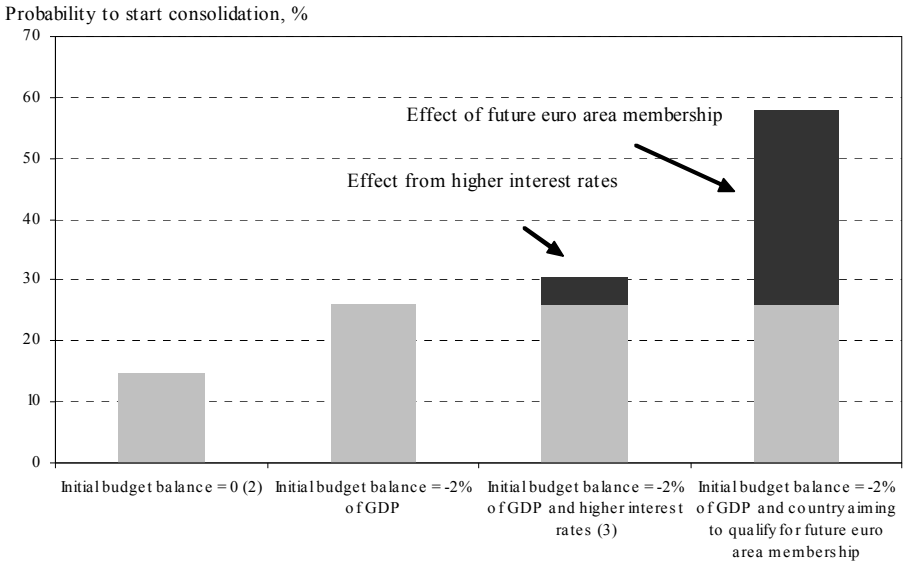
[23] All other variables are evaluated at their mean.

Table 4.1 Summary of the main results: parameter estimates

	(1)	(2)	(3)	(4)	(5)
	Probability to start	Size of the adjustment	Intensity of the adjustment	Probability to stop the episode	Probability to reach a primary balance that stabilises debt
Year before the episode started					
Cyclically adjusted primary balance	-0.046****	-0.567****	-0.594**	0.187****	
	(-6.54)	(-4.92)	(-1.78)	(4.14)	
Gap to primary balance sufficient to stabilise debt (actual-target)					0.195****
					(3.47)
Long term interest rates	0.010*	0.199**	0.078***		
(domestic rate - foreign reference)	(1.88)	(2.43)	(3.41)		
Output gap		-0.113*	0.061**	0.079*	-0.127**
(actual-potential)		(-1.66)	(2.54)	(1.89)	(-2.37)
Elections	0.140***				
(dummy taking the value 1 on election years)	(3.12)				
Composition of the adjustment[(1)]					
Share of primary current expenditure cuts		2.289****			
		(4.42)			
Share of social spending cuts					1.191***
					(3.09)
Share of public investment cuts			-0.919**	-0.758**	
			(-2.23)	(-2.56)	
Share of direct tax increases				-0.180**	
				(-2.27)	
Other					
Duration of the episode[(2)]				1.952****	0.261****
				(8.13)	(3.47)
Policy rules					
Expenditure rule and budget balance rule		1.493**		-1.001****	0.586**
		(2.07)		(-3.35)	(2.08)
Euro countries 1992-97	0.2556****				
	(3.57)				
Euro countries 1998-2005			0.979*		
			(1.84)		
Observations	372	73	73	225	64
R^2	0.192	0.487	0.267	..	0.560

Notes:
Pseudo R^2 for probit; adjusted R^2 for pooled regressions.
Reported coefficients for the probit equations (col 1 and 5) are the marginal effects (i.e., impact of the change of the explanatoty variable by one unit).
Numbers in brackets are the t-statistics. Significance levels: * 10%, ** 5%, *** 1%, **** 0.1%.
Constants are not reported. Coefficients of the inverse Mills ratio (used to account for the sample selection biais in the size and intensity regressions) are not reported.
(1) Share of each budget item in the improvement of the primary balance over the entire episode or time-varying with duration in the probability-to-stop regression.
(2) Elapsed time of consolidation in the probability-to-stop regression (a parameter value exceeding one indicates that the likelihood that the episode ends increases with its duration). Total length of the episode in the probability-to-reach regression.
Source: OECD calculations.

Figure 4.6 Factors affecting the probability of starting fiscal consolidation [(1)]



Notes:
(1) Based on pooled probit analysis across 24 OECD countries and over the period 1978-2003 (equation shown in the first column of Table 4.1). Probabilities are evaluated at sample means for all other variables entering the estimated equation.
(2) Measured by the cyclically-adjusted primary balance.
(3) Interest rate gap to international reference is 300 basis point higher.
Source: OECD calculations.

There is no evidence that the size of the output gap played a significant role in triggering consolidation episodes.[24] Elections, on the other hand, have played a significant role: the probability of undertaking consolidation rose just after a general election suggesting that governments are more ready to start consolidation once a full legislative term lies ahead. In addition, in contrast with earlier research (Buti and van den Noord, 2004) suggesting that upcoming elections produce slippage in European countries, no support for the traditional "political cycle" was found for this broader set of countries: the probability of entering a phase of fiscal consolidation did not significantly fall just before a general election.

Turning to the size of fiscal consolidation (column (2) labelled "size of adjustment" in Table 4.1), the analysis confirms again the significant role of initial budgetary conditions. The higher the initial primary deficit, the larger was the overall consolidation that was achieved over a consolidation episode. Similarly, the size of fiscal consolidation was also larger when interest rates were relatively high.[25] There is some suggestive evidence that this is also the case when initial activity was weak.

[24] However, running the same type of regressions on episodes of fiscal expansion (defined exactly as the opposite of fiscal consolidation), it turned out that the probability of starting a fiscal expansion increased when the output gap is positive (results not reported here). Intermediate results also showed, in line with Ahrend *et al*. (2006a) that a depreciation of the real effective exchange rate can contribute to triggering a fiscal consolidation episode (but data availability reduces the size of the sample by about half).
[25] Similar results were obtained using the unemployment gap (difference between the unemployment rate and the structural unemployment rate (NAIRU)) rather than the output gap. The gaps used are *ex post* due to limited availability of real time data.

More relevant for policy design are the respective roles played by expenditure- as against revenue-based consolidation. The size of the fiscal adjustment increased when episodes were driven by cuts in primary current expenditures. In alternative specifications (not shown), a heavy weight on individual current expenditure items (public consumption and social transfers) was also found to have a significant positive impact on the magnitude of the consolidation achieved[26].

The "intensity of the adjustment" (consolidation per year, column (3)) was also affected by various macroeconomic developments. A larger initial deficit and higher long-term interest rates were associated with an increased intensity of adjustment. Weak activity at the outset, while increasing the size of consolidation, seems to reduce the intensity of effort: intense efforts are difficult when the economy is weak, making the adjustment more drawn out. Consolidation efforts based on public investment cuts have also tended to be less intense.

Factors affecting the length of consolidation episodes

A larger initial deficit was associated with a longer consolidation period (column (4) labelled "probability to stop consolidation" in Table 4.1). As suggested above, the probability of ending a consolidation period was also lower if it was initiated at the time of a large negative output gap. Perhaps not surprisingly, the longer a period of consolidation has been underway, the more likely it was to come to an end. Long efforts are likely to lead to adjustment fatigue.[27] Another possible interpretation is that the longer an episode lasts the larger the likely cumulated adjustment and accordingly the chance that successful consolidation will have been achieved.

As concerns the instruments of consolidation, a large share of direct tax increases and public investment cuts raised the likelihood that a consolidation period would *continue*. These results are open to different interpretations. One such, suggested in previous research, is that it may reflect that some countries relied on "switching strategies" (von Hagen *et al.*, 2002a), meaning that the government starts fiscal consolidation by raising taxes and/or cutting investment and then, subsequently, moves on to a broader strategy which would involve reducing current spending (which is more politically sensitive and takes more time to implement).

Factors contributing to success in reaching debt sustainability

An episode of consolidation begun under weak economic activity had a higher probability of success in the sense of reaching debt sustainability (Table 4.1, column 5)). This may reflect the effect of weak initial conditions in terms of boosting the overall size of consolidation, as discussed above.

Turning to the composition of consolidation, a greater weight on cuts in social spending tended to increase the chances of success. A reason for this could be that governments more committed to achieving fiscal sustainability may also be more likely to reform politically sensitive areas. As a by-product of doing so, they may at the same time

[26] Kumar et al. (2006) also found a larger impact on primary balances of reductions in cyclically adjusted primary expenditure than revenues.

[27] This effect might be more pronounced than the estimates suggest, as uncontrolled sample heterogeneity tends to bias empirical hazards downwards (towards "negative duration dependence").

bolster the credibility of the consolidation strategy, thereby improving its chances of success.

The longer an episode lasted the higher was the probability that it would achieve success. Taken together with the previously discussed positive relationship between stopping consolidation and duration this is consistent with the interpretation that long episodes are frequently terminated because they have achieved success.

The econometric evidence on the role of fiscal rules

Fiscal rules, in particular those that have expenditures as a focus (Table 4.2), are estimated to have affected several dimensions of fiscal consolidation. Differentiating budget balance rules according to whether they are combined with expenditure rules or not, it appears that the former have a more favourable effect on consolidation outcomes. The size of fiscal consolidation was significantly larger and the consolidation efforts sustained for longer when such rules were present. The results also indicate that adoption of a spending rule on top of a budget balance rule helped in the achievement and maintenance of a primary balance that was sufficient to stabilise the debt-to-GDP ratio.[28]

The finding that expenditure rules were an important ingredient in the success of a consolidation episode has intuitive appeal given the fact that most backtrackings in the sample studied here occurred on the spending side. The estimates may, however, also just reflect that countries supplementing the objective to achieve fiscal balance with expenditure rules are in general more committed to pursuing fiscal consolidation, and in particular to addressing issues regarding spending control (Wierts, 2007).

Developments in the euro area illustrate a couple of important points about the rules and their relationship to the consolidation process. During the run up to the introduction of the euro (1992 to 1997), countries were found to have been much more likely to initiate consolidation (Table 4.1, first column). Indeed, our estimates suggest that the probability of undertaking a consolidation exercise more than doubled with the prospect of membership in Economic and Monetary Union (EMU) (see Figure 4.6 above).

[28] The European Commission has built some indicators of rules characteristics that focus on their "strength"; see European Commission (2006a) and Ayuso-i-Casals *et al.*, (2006). The strongest rules have a constitutional base with no margin for adjusting the objectives, are monitored and enforced by independent authorities, include automatic correction and sanction mechanisms in case of non compliance and are closely monitored by the media. This work shows that, in Europe at least, strong national rules are usually associated with better fiscal outcomes and the characteristics that seem to matter most are the statutory base of the rule, the body in charge of enforcement (independent authority, government, etc.) and the enforcement mechanism (including the role of sanctions). See also Kennedy *et al.* (2001) and Mills *et al.* (2001).

Table 4.2 Main fiscal rules currently applied in OECD countries

Country	Date and name	Characteristics of the set of rules			
		Budget target	Expenditure target	Rule to deal with windfall revenues	Golden rule
Australia	Charter of Budget Honesty (1998)	yes	no	no	no
Austria	Stability and Growth Pact (1997) Domestic Stability Pact (2000)	yes	no	no	no
Belgium	Stability and Growth Pact (1997) National budget rule (2000)	yes	no	yes	no
Canada	Debt repayment plan (1998)	yes	no	yes	no
Czech republic	Stability and Growth Pact (2004) Law on budgetary rules (2004)	yes	yes	no	no
Denmark	Medium term fiscal strategy (1998)	yes	yes	no	no
Finland	Stability and Growth Pact (1997) Spending limits (1991, revised in 1995	yes	yes	no	no
France	Stability and Growth Pact (1997) Central government expenditure ceiling	yes	yes	Since 2006	no
Germany	Stability and Growth Pact (1997) Domestic Stability Pact (2002)	yes	yes	no	yes
Greece	Stability and Growth Pact (1997)	yes	no	no	no
Hungary	Stability and Growth Pact (2004)	yes	no	no	no
Ireland	Stability and Growth Pact (1997)	yes	no	no	no
Italy	Stability and Growth Pact (1997) Nominal ceiling on expenditure growth	yes	yes	no	no
Japan	Cabinet decision on the Medium term fiscal perspective (2002)	yes	yes	no	no
Luxembourg	Stability and Growth Pact (1997) Coalition agreement on expenditure ceiling (1999, 2004)	yes	no	no	no
Mexico	Budget and fiscal responsibility law (2006)	yes	no	yes	no
Netherlands	Stability and Growth Pact (1997) Coalition agreement on multiyear expenditure targets (1994, revised in 2003)	yes	yes	yes	no
New Zealand	Fiscal responsibility act (1994)	yes	yes	no	no
Norway	Fiscal Stability guidelines (2001)	yes	no	yes	no
Poland	Stability and Growth Pact (2004) Act on Public Finance (1999)	yes	no	no	no
Portugal	Stability and Growth Pact (1997)	yes	no	no	no
Slovak Republic	Stability and Growth Pact (2004)	yes	no	no	no
Spain	Stability and Growth Pact (1997)	yes	no	no	no
Sweden	Fiscal Stability Law (2001, revised in Fiscal budget act (1996, revised in 1999)	yes	yes	no	no
Switzerland	Debt containment rule (2001, but in force since 2003)	yes	yes	yes	no
United Kingdom	Code for fiscal stability (1998)	yes	no	no	yes

Source: OECD calculations.

Source: OECD calculations

This finding is consistent with other work which shows that during the run-up phase to the introduction of the euro EU governments consolidated during election years (Buti and van den Noord, 2004; and von Hagen, 2006). The Maastricht Treaty's well-publicised requirements made very clear the need for fiscal consolidation at the same time as the benefits of adopting the euro were perceived to be very significant, both by policymakers and the public, as were the disadvantages in the case of failure. In the period since the introduction of the single currency, however, membership in the euro area has only had a weakly significant effect on intensity.

4.4. Experience regarding the design and implementation of fiscal rules

To pursue further the discussion of the extent to which key features of fiscal rules influence their effectiveness, this section reviews specific cases in which fiscal rules did -– or did not -– work. Particular attention is paid to issues of design, implementation, and the degree of flexibility to deal with shocks or changing macroeconomic conditions.

Issues in designing fiscal rules

On design, it is useful to start the discussion with a simple comparison between budget balance rules that are combined with expenditure rules and those which are not. Historical observation is consistent with the regression results in suggesting that in general budget-balance rules that are not combined with expenditure rules are less effective. A striking example of this is the United States experience: neither the Gramm-Rudman-Hollings (GRH) Act of 1985 nor its revised version in 1987 succeeded in significantly reducing the fiscal deficit.[29] A further example is the Stability and Growth Pact (SGP), which has not so far led to sustainable positions being attained, notably in large EU countries. On the other hand, when the United States turned to an expenditure-based rule, the Budget Enforcement Act (1990-2002),[30] a surplus was achieved and maintained for a time. Some EU countries (*e.g.* Netherlands, Spain, Sweden, Finland and Czech Republic) supplemented the SGP by national rules (in most cases including some expenditure ceilings) and also enjoyed success. There were, however, some failures. For instance, after France introduced multi-year objectives for real government expenditure in 1998, its structural fiscal position deteriorated continuously until 2003, at which time it came under the European excessive deficit procedure.[31]

There is no one-size-fits-all rule applicable to every country but there seems to be a consensus that, to be effective, rules should have several features. In particular, they should be simple to manage, understand and monitor, while flexible enough to respond to the cycle. Against this background, there are several features of expenditure rules that

[29] The GRH act was a budget balance rule (which targeted a balanced budget within six years). A key feature of GRH was that, in the absence of an agreement on how to reach the deficit targets, the rule was to be enforced by sequestration in spending programmes. It was abandoned in 1990 when the combination of the absence of *ex ante* consensus on spending cuts and overly optimistic budgetary projection resulted in sequestrations that were very large and politically not feasible.

[30] The Budget Enforcement Act consisted of caps on discretionary spending (in nominal terms) and pay-as-you-go rules stating that new discretionary spending, excluding social security or revenue laws had to be budget neutral.

[31] Most of the slippage came from the social security and government sectors (Moulin, 2004). France was subsequently able to reduce its deficit to below 3% in 2005 and the excessive deficit procedure against France was abrogated in January 2007.

can explain why they have often been associated with success: not only do they exclude cyclically volatile revenues but they can be (and often are) designed to let economic stabilisers work in a downturn and to save windfall gains during an upturn (Anderson and Minarik, 2006); they are typically more transparent than all but the simplest budget balance rule; they allow spending ministers/ministries to be held accountable (Atkinson and van den Noord, 2001); and they make the availability of financial resources predictable for policymakers and programme managers.

An important issue in designing fiscal rules is their possible impact on the quality of public expenditure. Both expenditure rules covering total spending and budget balance rules can potentially cause allocative inefficiencies by biasing spending towards items that are politically sensitive and difficult to cut (Sutherland *et al.*, 2005). Typically governments have responded by excluding some capital items from overall spending (as done notably by Golden rules as in the United Kingdom and Germany), but this may make the rule more difficult to monitor as well as easier to circumvent. Moreover, there is an element of arbitrariness in excluding physical investment from the rule but not current spending with investment attributes, such as spending on education.

The time period over which the target is to be met is also important, not least in providing flexibility to deal with cyclical fluctuations. Although enforcing the rule on a year-by-year basis appears strict, many countries do just that, with varying degrees of success. Switzerland is an example of a country combining year-by-year enforcement with cyclical flexibility by targeting a balanced budget in cyclically-adjusted terms. The United Kingdom pursues another approach: its budget-balance rule[32] holds over the business cycle. Such a procedure, however, provides less accurate short-term guidance. As well, rules defined over the cycle or embodying some kind of cyclical adjustment require a subjective[33] assessment to be made about the cycle's start and end dates and/or the size of the output gap, which (together with data revisions) creates a degree of uncertainty about whether or not the rule was (or will be) met. The same objections apply to rules such as the SGP that allow normal procedures to be waived in conditions of pronounced cyclical weakness.

National fiscal rules are, in most countries, complemented by a wide variety of rules at sub-national levels. Such rules have a long history in several countries. With the trend to greater decentralisation of fiscal responsibilities in most OECD countries, rules for sub-national government have been seen as an important mechanism to reap the efficiency gains accruing from local autonomy while maintaining or establishing fiscal rectitude. As a result, rules have been set or strengthened at sub-national levels in most countries.[34] In particular, several European countries have aligned domestic fiscal rules for sub-national governments with their supra-national commitments by setting up domestic stability pacts.

[32] There are two rules, one stating that government borrowing will fund only net fixed investment, not current expenditures; and one that requires that the ratio of net debt to GDP be held stable at a prudent level.

[33] While it would be possible to put in place an objective rule for dating the cycle, the method that the UK Treasury uses is a subjective "broad assessment of the available information". At present there is no requirement for the Treasury's assumptions about the timing of the economic cycle to be audited.

[34] Sutherland *et al.* (2005) provide a description of these rules and a discussion of the issues related to their design.

Implementing rules

To be effective rules must be enforced, but experience gives conflicting examples of the rigour with which rules should be implemented.[35] The Stability and Growth Pact, the 1997 fiscal consolidation programme in Japan, and the Gramm-Rudman-Hollings Act in the United States all reached a stage where the economic and political costs of following the rule rigidly were perceived as too high. However, Sweden, the Netherlands as well the United States (under the Budget Enforcement Act 1990-2002)[36] are cases where rigid rules were quite effective in supporting consolidation and without negative economic consequences. New Zealand, Canada and Australia, on the other hand, provide examples where governments achieved fiscal consolidations under quite flexible rules.[37]

In many successful cases, rules were reinforced by establishing a framework which had a strong reporting system and mechanisms that increased the political cost of breaching the rules (New Zealand, Australia and the United Kingdom, in particular). *Ex post* assessment is very important in the United Kingdom, Belgium,[38] Netherlands, Sweden, Australia and New Zealand. Most successful frameworks also stress the need to rely on prudent budget assumptions. As well, there are several cases in which successful rules followed the setup of new budgeting frameworks and changes to public-sector management that fostered increased accountability and efficiency (New Zealand, Australia, Sweden and the United Kingdom). More generally, and more difficult to influence, there seems to be differences across countries in the weight electorates give to the respect of rules and the extent of private-sector monitoring and discussion of fiscal performances.

Adapting rules to changing circumstances

Allowing rules to evolve in the light of progress in consolidation or a changing macroeconomic environment is often a necessary but tricky condition of success. For instance, in Canada (the only G7 country to have been able to keep net debt on a sustained downward trend), fiscal consolidation started in 1993 under legislation capping programme spending (self-financing programmes were excluded). As spending always remained below the ceilings, the rule was abandoned in 1995 and replaced by a contingency reserve within a prudent budget that could be used for debt reduction if not needed; this framework was replaced in 1998 by the "balanced or better budget policy" combined with a debt repayment plan: surpluses are used to pay down debt and

[35] The European Commission has built some indicators of rules characteristics that focus on their "strength"; see European Commission (2006a) and Ayuso-i-Casals *et al.* (2006). The strongest rules have a constitutional base with no margin for adjusting the objectives, are monitored and enforced by independent authorities, include automatic correction and sanction mechanisms in case of non compliance and are closely monitored by the media. This work shows that, in Europe at least, strong national rules are usually associated with better fiscal outcomes and the characteristics that seem to matter most are the statutory base of the rule, the body in charge of enforcement (independent authority, government, *etc*.) and the enforcement mechanism (including the role of sanctions).

[36] It included escape clauses, however, which were used extensively at the turn of the century.

[37] In New Zealand, for instance, principles of responsible fiscal management are legislated but not the targets; the government is required to set its short-term targets (usually revised from one year to the next) as well as its long-term intentions for a range of fiscal variables. In these countries there are no legislated mechanisms of sanction and correction in case of non compliance.

[38] The Federal Planning Bureau in Belgium has played a key role in fiscal consolidation by producing independent, politically neutral short-term macroeconomic projections (Bogaert *et al.* 2006).

associated reductions in interest payments to lower taxes. Switzerland was successful in improving its fiscal position from 1999 to 2001, using a budget balance rule. Later on, however, the framework was modified to include expenditure targets. In attempting to make the SGP more effective, the European Commission and the Council have focused on cyclically adjusted balances in order to permit more flexibility in the enforcement mechanisms;[39] the jury is still out on the outcomes. Spain has also recently reformed its Fiscal Stability Law to take into account the cyclical position of the economy.

Countries whose revenues are sensitive to terms-of-trade changes (not least oil producers like Mexico and Norway) have found it useful to establish stabilisation funds to deal with the windfall gains. These funds serve a number of purposes, including transmitting resource wealth to future generations, stabilising the exchange rate and shielding the economy from overheating due to excessive spending. Even countries that are less endowed with natural resources have found it helpful to set up similar mechanisms to deal with revenue windfalls such as "rainy day funds" or *ex-ante* rules establishing the share of revenue windfall to be used to reduce debt or saved (Belgium or more recently France). [40] Such mechanisms can usefully complement fiscal rules by securing surpluses that arise during good times (Mills and Quinet, 2001).

Transparency is a crucial feature of any successful rule. If the public understands why an action is being taken (and is convinced of its necessity), that greatly increases the likelihood of the associated rule being successful and sustained. As well, temporary departures from a rule need not be damaging if they can be explained convincingly (Hemming and Kell, 2001). This could be reinforced where rules are subject to independent verification.

4.5. Summary of the results

To summarise, major findings of this analysis are:

- Large initial deficits and high interest rates have been important in prompting fiscal adjustment and also boosting the overall size and duration of consolidation. These results may reflect that public awareness of fiscal problems and needs can help in overcoming resistance to consolidation, a hypothesis which is also supported by the observation that qualification for euro area membership significantly increased the probability of starting consolidation. The policy implication would be that consolidation may be helped by the provision of transparent information and analysis of the fiscal situation.

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[39] This provides flexibility to the excessive deficit procedure if the excess of the budget deficit over the threshold of 3% of GDP appears small and temporary. Account will then be taken of any factor deemed relevant, including cyclical conditions, debt sustainability and implementation of structural policies that enhance growth potential and long-term sustainability of public finance.

[40] In Belgium unexpected tax revenues or surplus from lower than expected spending have been used to pay down national debt. In France, since 2006, the government has been required to define how possible differences between actual and predicted revenues would be allocated in the annual budget law.

- An emphasis on cutting current expenditures has been associated with overall larger consolidation. This could be because expenditure cuts, as opposed to revenue increases, are more likely to trigger lower interest rates and a sympathetic response of private saving, helping to bolster activity. But it could also reflect that governments more determined to consolidate are more willing to cut current expenditures, possibly thereby also demonstrating a commitment that makes substantial consolidation more feasible.

- Fiscal rules with embedded expenditure targets tended to be associated with larger and longer adjustments, and higher success rates. This could in principle reflect that well designed fiscal rules are effective or, alternatively, that governments committed to prudent fiscal management are more likely to institute a rule.

- Fiscal rules need to be adapted to country specific institutions and political systems, but, based on experience across countries, certain common design features seem important for their effectiveness. These include the need to combine transparency with sufficient flexibility to face cyclical (and other) shocks, a wide coverage across various budget items and effective enforcement mechanisms.

Appendix I: The effect on debt of the fall in real interest rates

In most OECD countries interest rates have declined substantially since the first half of the 1990s. In the United States, Japan and the euro area, long-term bond rates dropped between 1991 and 2005 by 3.6, 5.0, and 6.7 percentage points, respectively, which is reflected in a similar decline in the implicit interest rate on general government financial liabilities. Major factors that are likely to have impacted on the fall in interest rates are (Ahrend *et al.*, 2006b):

- Inflation has remained low over several years and has also shown resistance to external shocks, most recently due to the large oil price hikes. Globalisation has also contributed to the low-inflation environment (Pain *et al*., 2006).

- Inflation expectations seem to have been better anchored. This likely reflects improved monetary policy credibility leading to lower term-premiums.

- For industrialised economies, notably the United States, aggregate domestic net dissaving appears to have been more than offset by high *ex ante* net saving from emerging market economies (notably those in Asia and, more recently, oil exporting countries).

- For euro area countries these factors have been reinforced by interest rate convergence towards the lower German level in the transition phase to Economic and Monetary Union (EMU).

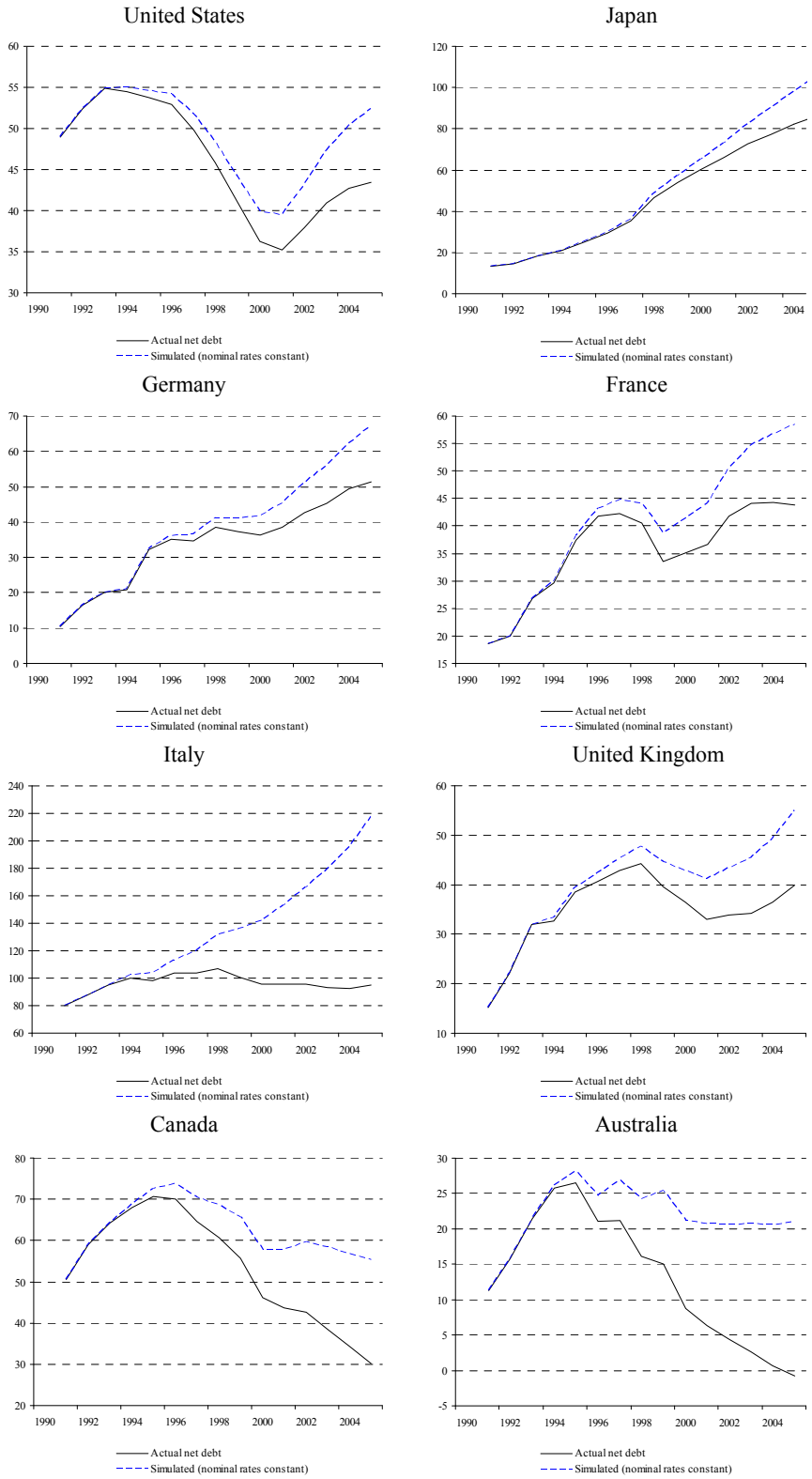
To illustrate the impact of the decline in the differential between interest rates and GDP growth rates, experienced over the past one and a half decades, on general government finances, Figure 4.7 shows the evolution of general government net financial liabilities that would have prevailed if effective interest rates on general government debt (implicit rates) had remained at the levels prevailing at the beginning of the 1990s (average rate over 1991 to 1993), leaving non-interest spending and nominal GDP on their observed paths. [41]

The outcome illustrates the substantial impact that the fall in debt servicing costs has exercised on fiscal consolidation. The impact might be even larger than illustrated taking into consideration the positive impact falling real interest rates have on real GDP growth.[42] For about 38% of the countries government net financial liabilities in terms of GDP would be higher by a third or more if interest rates had not fallen from their level at the beginning of the 1990s. Moreover, some 23% of the countries for which the net debt-to-GDP ratios declined over the last one and a half decades would have experienced rising debt ratios instead.

[41] Net financial liabilities are defined as gross financial liabilities net of financial assets. In the simulations it is assumed that both liabilities and assets are subject to the same interest rate. The latter is given by the implicit interest rate on government financial liabilities -- general government interest payments divided by general government gross financial liabilities -- averaged over the first three years under consideration. The size of stock-flow adjustments has also been left unchanged in the simulations.

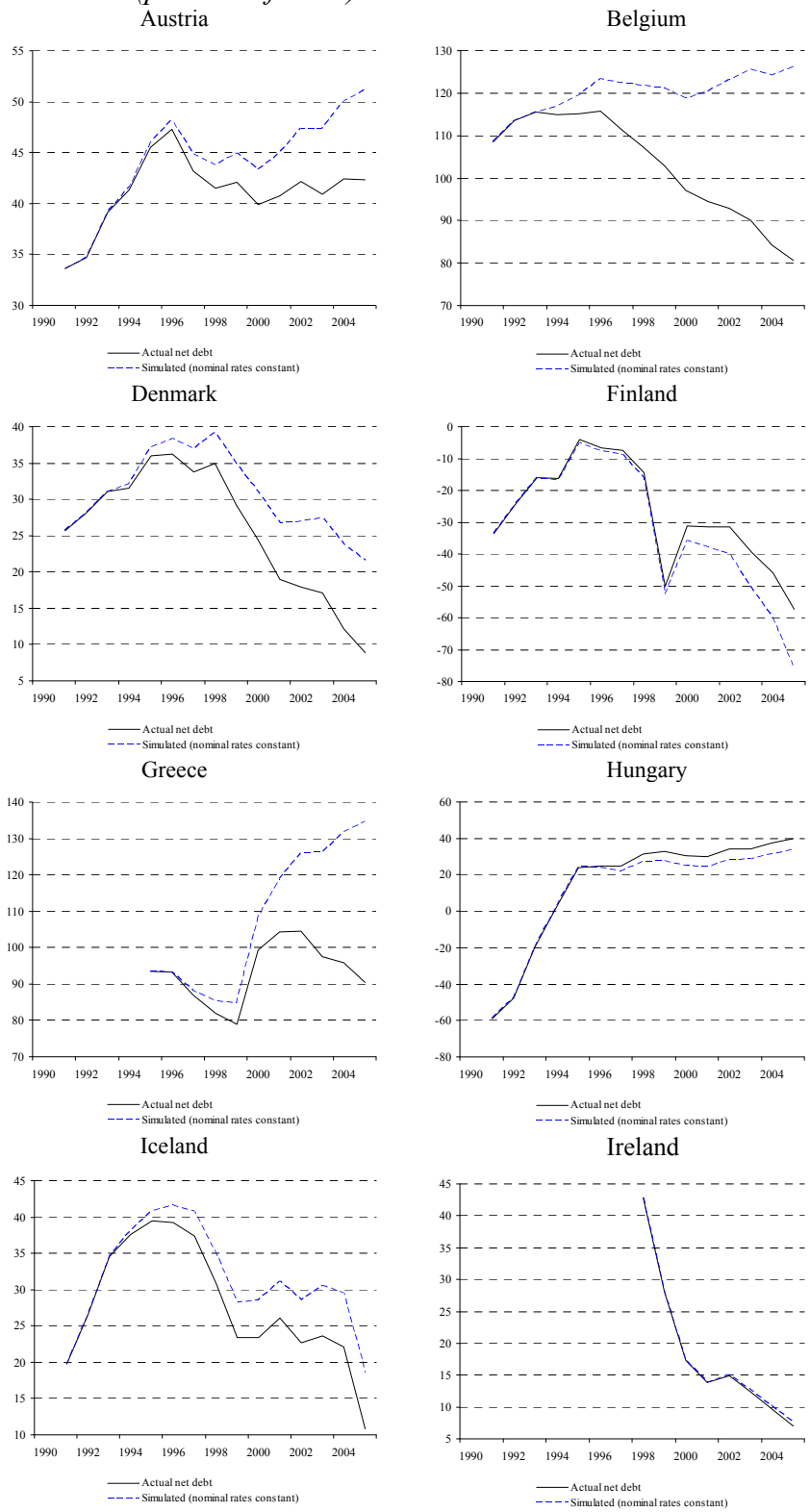
[42] On the other hand, one might argue that a counter-factual setting in which interest rates are assumed to remain constant would correspond to an environment with inflation exceeding observed inflation rates, which in turn would be reflected in higher nominal GDP growth.

Figure 4.7 The evolution of general government debt-to-GDP ratios (per cent of GDP)



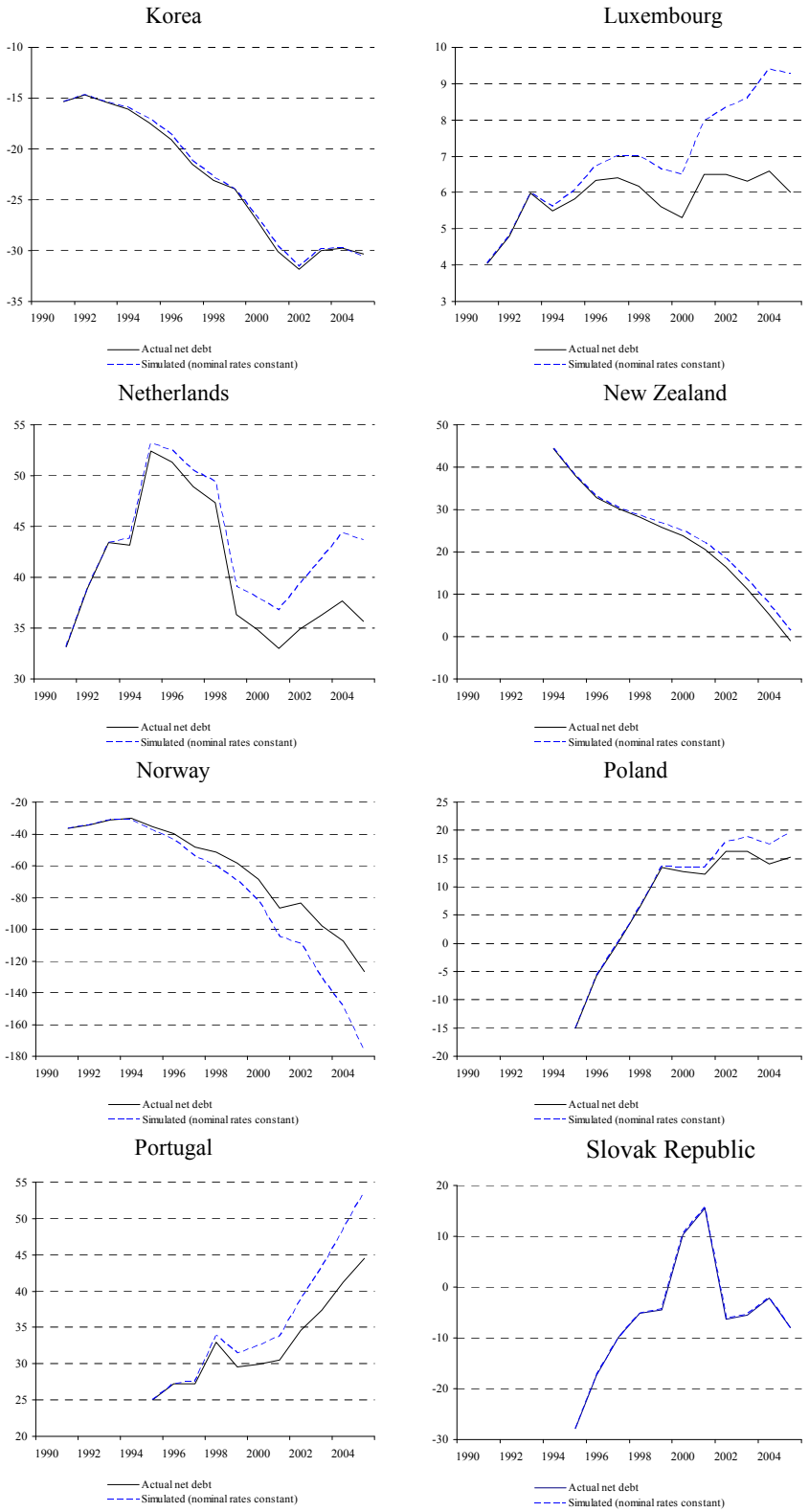
Note: Dynamic simulation of net debt on the assumption that both liabilities and assets are subject to the same interest rate. The latter is given by the implicit interest rate on government financial liabilities – general government interest payments divided by general government gross financial liabilities- averaged over the first three years under consideration. The size of stock-flow adjustments has also been left unchanged in the simulations.
Source: OECD

Figure 4.7 (cont.) *The evolution of general government debt-to-GDP ratios (per cent of GDP)*



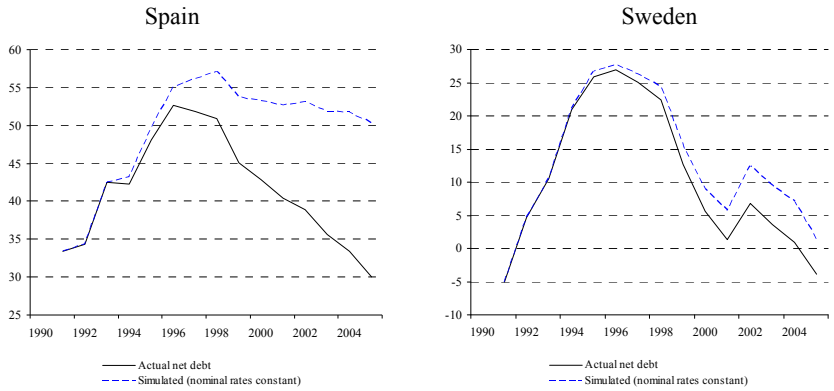
Note: Dynamic simulation of net debt on the assumption that both liabilities and assets are subject to the same interest rate. The latter is given by the implicit interest rate on government financial liabilities – general government interest payments divided by general government gross financial liabilities- averaged over the first three years under consideration. The size of stock-flow adjustments has also been left unchanged in the simulations.
Source: OECD.

Figure 4.7 (cont.) *The evolution of general government debt-to-GDP ratios (per cent of GDP)*



Note: Dynamic simulation of net debt on the assumption that both liabilities and assets are subject to the same interest rate. The latter is given by the implicit interest rate on government financial liabilities – general government interest payments divided by general government gross financial liabilities- averaged over the first three years under consideration. The size of stock-flow adjustments has also been left unchanged in the simulations.
Source: OECD.

Figure 4.7 (cont.) *The evolution of general government debt-to-GDP ratios (per cent of GDP)*



Note: Dynamic simulation of net debt on the assumption that both liabilities and assets are subject to the same interest rate. The latter is given by the implicit interest rate on government financial liabilities – general government interest payments divided by general government gross financial liabilities- averaged over the first three years under consideration. The size of stock-flow adjustments has also been left unchanged in the simulations.
Source: OECD.

Going forward, the opportunities for consolidation presented by the fall in inflation and interest rates over the past one and a half decades or so are unlikely to repeat themselves. This reinforces the need to step up consolidation efforts, against the background of upcoming fiscal challenges related to spending on health and retirement income.

Appendix II: Background information on methodology

Definition of the main variables

Macroeconomic and fiscal variables

Fiscal and macroeconomic variables all come from the OECD's Economic Outlook 80 database.[43] A fiscal consolidation episode is defined in Box 1 in the main text. The duration of a fiscal consolidation episode is measured by the number of years that elapses between the start (first year) and the end (last year) of an episode according to the criterion given in Box 1. According to this criterion the following consolidation episodes were extracted:

Australia	1979-80, 1986-88, 1994-99, 2002-03
Austria	1981, 1984-85, 1992, 1996-97, 2001
Belgium	1993-98
Canada	1981, 1986-88, 1993-97
Denmark	1983-86; 1996-99
Finland	1981, 1984, 1988-89, 1994-98, 2000
France	1979-80, 1983-84, 1987, 1994-97
Federal Rep. of Germany	1981-85, 1989
Germany	1992-94, 1997-1999
Greece	1979-80, 1982-83, 1986-87, 1990-94, 1996, 1998
Iceland	1990-92, 1995-99
Ireland	1981-84, 1987-89, 1993-94, 2003-04
Italy	1980, 1982-83, 1990-93, 1995-97
Japan	1980-87, 1997, 2001
Korea	1981-82, 1993-95, 1999-2000
Luxembourg	1993-97, 2000
Netherlands	1981-85, 1991, 1993, 1996
Norway	1983, 1985-86, 1993-97, 1999-2000
New Zealand	1987, 1989, 1991-94, 2000-03
Portugal	1981-84, 1986, 1988, 1992, 1995, 2002-03
Spain	1983, 1986-87, 1992, 1994-97
Sweden	1979, 1981-87, 1994-2000
Switzerland	1994-95, 1999-2000
United Kingdom	1979-82, 1988, 1994-99
United States	1981, 1987-1989, 1993-98

In addition, the following definitions apply:

- The size of fiscal consolidation is measured by the change in the cyclically adjusted primary balance as a percentage of potential GDP over the episode (final year of the episode minus the year before it starts) and the intensity is measured as the size divided by the length of the episode.

- The share of a budget expenditure item in the fiscal adjustment is defined as minus the difference of the relevant item as a percentage of GDP between the final year of the episode and the first year before the start of the episode

[43] See OECD Economic Outlook Database Inventory, http://www.oecd.org/dataoecd/47/9/36462096.pdf

divided by the difference in the primary balance as a percentage of GDP over the same period. For the duration analysis (the probability of stopping consolidation), the cumulative contribution of the relevant item is a time varying covariate over the duration of the episode.

- The share of a budget revenue item in the fiscal adjustment is defined as the difference of the relevant item as a percentage of GDP between the last year of the episode and the year before the start of the episode, all divided by the difference in the primary balance as a percentage of GDP over the same period. For the duration analysis, the cumulative contribution of the relevant item is a time varying covariate over the duration of the episode.

- For total and current primary expenditures and revenues, and for direct and indirect taxes, cyclically adjusted variables as a percentage of potential GDP (for both the numerator and the denominator) were used; for expenditure items where cyclically adjusted variables are not available the non-adjusted ones (both for the numerator and the denominator) were used.

- The primary balance (PB) that stabilises the debt to GDP ratio (PBO) is defined as:

  $$PBO(t)/GDP(t) = -Debt(t-1)/GDP(t-1)*[1-(1+i(t)) / (1+g(t))];$$

  where $g(t) = GDPt/GDP(t-1)-1$;

  and $i(t)$ is defined as a moving average of the implicit interest rates on debt, in particular:

  $$i = (1/3)*ggintp[t-2]/ggfl[t-3]+(1/3)*ggintp[t-1]/ggfl[t-2]+(1/3)*ggintp[t]/ggfl[t-1];$$

  with *ggfl* being general government gross financial liabilities and *ggintp* the gross government interest payments. The gap to the primary balance sufficient to stabilise debt is defined as:

  $$PB(t)/GDP(t)-PBO(t)/GDP(t).$$

- In defining the spread between the long-term interest rates and those in the reference country, Germany is used for European countries and the United States for the other countries.

Dummy variables to capture fiscal rules and elections

Two dummy variables were tested that reflect the existence, at least for some significant part of the general government sector, of *(i)* a budget balance rule defined as rules and targets for the fiscal deficit (cyclically adjusted or not) and *(ii)* a budget balance rule supplemented by an expenditure rule, defined as a rule and/or target that binds and controls expenditures in annual budgeting, such as expenditure ceilings and caps, and pay-as-you-go principles. These variables are rudimentary indicators as possible changes in the definition of the rule, obedience to the rule, or any characteristic of the

rule (such as its legal base, sanctions implied, etc.) are not taken into account. Hence, the fact that the modalities of rules vary from one country to the other and change over time is not accounted for. The dummies are based on the cross-checking of several sources,[44] as well as on OECD country analysts' expertise. When working on episodes, the dummies take the value 1 if the rule exists when the episode starts or is introduced very soon thereafter.

For the regressions, it is the presence or not of a rule in the first year of the episode or soon after the episode started that is taken into account. Finally, two dummies are used to account for respectively the euro qualification contest (1992-97)[45] and the SGP period.

Apart from the duration analysis, the election dummies are set to 1 if there is an election in the year preceding the start of the episode or after the start, respectively. In the duration analysis the dummy equals 1 if there is an election in the current year during the episode or, in an alternative regression, in the year following the current year. The information comes from national sites on elections results; the International Institute for Democracy and Electoral Assistance (IDEA); and *wikipedia.org.*

4.6. Econometric techniques

The aim is to analyse the key factors behind the different dimensions of fiscal consolidation episodes: the likelihood that such an episode occurs, the size and intensity of fiscal adjustment during an episode, the duration of the episode, and the probability of "success" of the episode in terms of the attainment of a primary balance sufficient to stabilize the debt-to-GDP ratio and maintaining it stable for at least two years. Within each dimension the number of observations in the respective sample varies, as for some explanatory variables observations for early years are not available. For all parts of the econometric analysis, repeated consolidation spells occurring in one and the same country are treated as stochastically independent observations. Using a general to specific approach, the variables that were not significant were excluded so as to keep a preferred equation for each dimension.

What factors trigger a consolidation episode?

The model applied to generate the results shown in column 1 of Table 4.1 is a probit. The model was estimated on a pooled sample of 24 countries. For each year of the pooled sample the information of whether or not a consolidation episode commenced -- according to the criterion for the variation in the cyclically adjusted primary balance (CAPB) as set out in Box 1 in the main text -- was utilised for the estimator. Observations (years by country) on ongoing consolidation episodes were dropped. A positive coefficient in column 1 of Table 4.1 indicates that the respective explanatory variable will raise the likelihood of a consolidation episode starting.

[44] Deroose *et al.* (2006); European Commission (2003 and 2006a) ; Fischer (2005); Gruen and Sayegh (2005); von Hagen (2006); IMF (2005); Janssen (2001); Joumard *et al.* (2004); Kennedy *et al.* (2001); Moulin (2004); Poterba (1997); and Tanaka (2005).
[45] For Greece since 1999.

What affects the size and "intensity" of consolidation achieved over a consolidation episode?

The model that generates the estimates of columns 2 and 3 of Table 4.1 is a linear regression model in which the change in the CAPB as a per cent of potential GDP over the consolidation episode (in column 3 it is the change per unit of time) is regressed on a set of explanatory variables. The sample consists of a maximum of 80 episodes that occurred among the 24 countries under consideration. "Censored" episodes that were not completed in the last year of the sample span (2005) were excluded. The within-sample probability distribution of the dependent variable is truncated from below as the observations on the CAPB are subject to the selection criterion defining the start of a consolidation period, as described in Box 1 in the main text. To arrive at unbiased parameter estimates a two step procedure has been applied that utilises the outcome from the probit model described in the preceding paragraph (first step) in a generalised least squares regression of the change in the CAPB on a set of explanatory variables and a correction term (second step).[46]

More specifically, the regression equation is given by:

$$C = Y\alpha + \hat{G}\delta + \varepsilon,$$

with

C = dependent variable

Y = explanatory variables

$\hat{G} = \dfrac{\varphi(X\hat{\beta})}{\phi(X\hat{\beta})}$

α, δ parameters to be estimated,

$\hat{\beta}$ parameter estimates from the probit model

ε error term

φ, ϕ density and distribution function of the normal distribution.

The parameters α, δ are estimated using generalised least squares as the approach generates heteroscedastic residuals.

What influences the duration of consolidation episodes?

The model that generates the estimates in column 4 of Table 4.1 is a hazard rate model, the hazard rate denoting the exit rate from a consolidation episode, conditional on the episode having not terminated earlier.[47] The model estimates the impact of a set of explanatory variables, Z, on the likelihood of terminating a consolidation episode. The sample comprises the duration of the consolidation episodes under consideration, measured in years. The estimated duration distribution is Weibull, with hazard

[46] For econometric details, see *e.g.* Maddala (1985).

[47] For econometric detail see *e.g.* Kalbfleisch and Prentice (1980). In the analysis at hand durations are measured in terms of discrete one-year intervals. For detail on grouping see Wurzel (1988). Earlier application of duration analysis to fiscal consolidation episodes can be found in von Hagen *et al.* (2002); Gupta *et al.* (2003); and Maroto-Illera and Mulas-Granados (2001).

$$h(d) = \nu\rho\, d^{\rho-1},$$

where d denotes duration, ρ,ν parameters and $\nu = \exp(Z\lambda)$ (proportional hazard specification), where λ measures the impact of the explanatory variables on the duration of the episodes. To the extent explanatory variables take on different values over the consolidation episode, the exit rate is conditional on the entire path of the explanatory variables over time, up to the period prior of exit. A positive λ coefficient indicates that a higher value of the explanatory variable increases the likelihood of terminating the episode (given its elapsed duration) or equivalently that the episode is likely to last shorter. For $\rho > 1$ the likelihood of terminating a consolidation episode increases with the duration of the episode.

What influences whether consolidation suffices to stabilise debt?

The model that generates the estimates depicted in column 5 of Table 4.1 is again a probit. For each consolidation episode in the sample, the information is used of whether or not a consolidation episode is "successful" in attaining a primary surplus that at least stabilises debt during the consolidation episode and maintaining it during the following two years.

Discussion

Ludger Schuknecht *

Some normative priors

I would like to start my comment on this impressive paper by pointing to some conceptual and normative priors on fiscal consolidation. There has been significant theoretical and empirical research in recent years by economists from international organisations and academia in the domain of fiscal consolidation and sustainability. This has forged a broad normative consensus on the appropriate course of fiscal policies and the way to achieve it.[48]

First, sound fiscal policies aim to attain sustainable public finances which are good for growth, stability and cohesion in Europe.

Second, if sound fiscal policies are achieved or an appropriate strategy towards such a position is in place, automatic stabilisers (rather than discretionary policies) should contribute to economic stabilisation.

Third, fiscal consolidation and reform towards sustainability are best conducted as part of a medium term-oriented, ambitious and comprehensive strategy that emphasizes expenditure restraint and supply-side incentives so as boost confidence and growth.

Fourth, consolidation should be accompanied by reforms of fiscal institutions that subject fiscal policies to spending and deficit constraints and a medium term budgetary framework.

These principles are also embedded in the EU's institutional framework, notably the Stability and Growth Pact and the Lisbon process. They have been reconfirmed in recent communication by the Eurogroup (spring 2007) and the ECOFIN Council (autumn 2007).

Coverage and findings of the study are convincing

When looking at Guichard, Kennedy, Wurzel and Andre (GKWA) from this perspective, the paper indeed covers an enormous ground. The paper defines consolidation episodes and assesses their contribution to fiscal sustainability, i.e., the stabilisation of the debt ratio. It analyses whether episodes were ambitious, over which time horizon they were undertaken and whether they were expenditure-based. It also looks at the role of fiscal rules and institutions.

The results strongly support the above-mentioned principles comprising the policy consensus. The study finds that sustainability risks (as measured by fiscal imbalances

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* The views expressed here are the author's and do not necessarily reflect those of the ECB.

[48] European Commission Public Finance Reports of all recent vintages and the recent sustainability report (European Commission, 2006b) provide an excellent overview of fiscal developments, analytical issues and policy implications in this debate. See also OECD (2006). The ECB Monthly Bulletin article from February 2007 provides a short overview (ECB, 2007). There are numerous authored studies which are quoted in these reports.

and interest rates) support the initiation of consolidation episodes, as well as their ambition and duration. Expenditure restraint and high-quality rules and institutions enhance the duration and ambition of consolidation. Especially the duration affects the "success" of consolidation in terms of supporting sustainability.

Some small "quibbles"

Given the overall very informative and convincing picture, I only want to add a few quibbles. First, the definition of consolidation episodes includes a large number of short episodes. They are identified on the basis of changes in the cyclically adjusted primary balance (CAPB) which is prone to significant measurement problems especially in the short run. Temporary measures and special factors are not excluded from this measure. Tax-rich/demand-based growth with significant revenue windfalls may result in an improved CAPB (or consolidation). This may lead to the identification of a consolidation episode when there was none or the omission of its identification when in fact consolidation was undertaken.

Short episodes can also only capture the "numerator" effect of consolidation. Non-supply-side effects of fiscal reform that improve deficit and debt ratios via the denominator only fully become effective over time.

Second, the study does not cover the whole dimension of complementarity and growth-friendliness of reforms. This is not a fair criticism as the coverage within the space of a paper (rather than a book) is already enormous. Nevertheless, it is worth pointing to this rather prevalent problem in the literature. A complement to the GKWA study in this regard is Hauptmeier et al. (2007). They undertake a number of case studies of medium-term oriented comprehensive reform packages that focus on the expenditure side of budgets.

My third point relates to the definition of sustainability. I wonder whether the criterion of "debt stabilisation" is strict enough, given significant implicit and contingent liabilities in most OECD countries.

Further research

The study also touches on a number of issues that warrant considerable additional research. First, the discussion on fiscal rules and institutions underlying fiscal policy making links up with the broader question in how far policies and activities in countries are on the whole more rule-based or whether policy discretion and rent-seeking abound and mutually reinforce each other. This question is very important in Europe with large public sectors and transfer systems. Tanzi and Schuknecht (2000) have argued that reform of the state including fiscal consolidation, expenditure restraint and reinvigorated growth have been most successful in countries that have altered their basic policy regime. Changing from a transfer-oriented to a more opportunity-oriented system is what has been underlying the most successful fiscal consolidation and reform episodes such as in New Zealand of the 1980s, Ireland of the late 1980s and 1990s and several other episodes over the last quarter century. It appears to me that we still know relatively little how other countries can effectively learn from these episodes.

Second, the study makes reference to the importance of simple and transparent rules and so does the revised Stability and Growth Pact. However, it seems to me that we know very little in how far simplicity and transparency in the rules help consolidation.

Finally, the importance of public support for fiscal soundness is frequently mentioned. But again, we do not know how important it really is. In Germany, the media regularly report on the Maastricht deficit limits and scrutiny has always been tight. Yet, the German fiscal performance has been very mediocre. I do not know Italy too well but the discrepancy seems stark there too. In the French public, by contrast, fiscal laxity seems much more tolerated and the SGP appears to be seen as much more of a "nuisance". Yet debt levels are similar to Germany's and only very recently does the fiscal performance seem to be diverging. In the US, much seems to depend on the political and academic fashion of the day (or year). This point is important from a normative perspective and from the perspective of cohesion in Europe: how can we strengthen the role of the public so as to attain fiscal sustainability?

5 Determinants and Consequences of Fiscal Consolidations in OECD Countries

Silvia Ardagna

5.1. Introduction

In the last forty years, periods of large fiscal expansions alternated with years of sharp fiscal contractions in all OECD countries. These episodes have been associated with a variety of outcomes: in some cases (but not in all) the fiscal tightening led to a reduction of the debt-to-GDP ratio (i.e.: successful fiscal adjustments); in several episodes (but not in all) private consumption, private investment, and GDP growth rates increased during the consolidation and in its immediate aftermath (i.e.: expansionary fiscal adjustments), contrary to the predictions of a standard Keynesian model.[49]

Cross-country differences in the consequences of fiscal consolidations have stimulated a lively debate on the determinants and effects of large changes in the fiscal stance. Theoretically, two non-mutually exclusive explanations have been proposed for expansionary and successful fiscal adjustments. One view is related to the impact that current fiscal policy has on the economy through its influence on agents' expectations about the stance of the future fiscal policy (the expectation view). This literature predicts that a fiscal contraction can be expansionary if agents perceive that the adjustment signals a change in regime that will lead to the stabilization of the debt-to-GDP ratio and solve the country's fiscal imbalance. For example, the fiscal contraction generates a positive wealth effect and aggregate demand can increase if, in response to an increase in current taxation, agents expect that fiscal policy in the future need not be tighter, or even anticipate a reduction in the tax burden. The other view stresses the effect of the composition of current fiscal policy (whether the deficit reduction is achieved through tax increases or through spending cuts) on the economy through the labor market and the cost side of the firms (the labor market view). This view suggests that stabilizations that result from cutting public spending, especially transfers and government wage bills, rather than increasing taxes are more likely to be successful and expansionary. They induce a moderation in the wage claims by unions, stimulating employment, capital accumulation, and growth.[50]

There is evidence of both channels in the literature and Ardagna (2004) provides an overall empirical assessment of their relative importance and shows that the composition of fiscal policy is a crucial element for growth and that the labor market is

[49] See, for example, Alesina and Ardagna (1998); Alesina and Perotti (1995); Alesina et al. (1998); Giavazzi and Pagano (1990) and (1996) and McDermot and Wescott (1996).

[50] See Blanchard (1990); Bertola and Drazen (1993); Miller et al. (1990); and Sutherland (1997) for models that explain expansionary fiscal contractions through the expectation channel, and Alesina et al. (2002); Alesina and Perotti (1997), and Daveri and Tabellini (2000) for contributions that explain expansionary fiscal contractions through the labor market channel.

[50] A non exhaustive list of papers includes: Alesina and Perotti (1995) and (1997); Alesina and Ardagna (1998); Ardagna (2004); Giavazzi and Pagano (1990); Giavazzi et al. (2000); McDermot and Wescott (1996); von Hagen and Strauch (2001) and von Hagen et al. (2002).

an important channel for the transmission of fiscal policy shocks. More generally, quite a large body of empirical evidence has accumulated on successful and expansionary fiscal stabilizations,[51] and the following ingredients seem to be important for a successful, long lasting and expansionary fiscal adjustment: a composition of the adjustment which emphasizes spending cuts on transfers, welfare programs and the government wage bill, rather than tax increases; a fiscal manoeuvre that consistently reduces the primary deficit-to-GDP ratio in a short period of time; and initial conditions signalling that a country's fiscal position is not on a sustainable course. Also, higher GDP growth due, for example, to other policy measures or to exogenous shocks, matters for successful fiscal adjustments, but the effects of fiscal policy characteristics do not vanish when one controls for the effect of GDP growth on the likelihood that governments achieve a permanent reduction of the debt-to-GDP ratio. Finally, the evidence shows that episodes of successful and expansionary fiscal contractions are not simply due to expansionary monetary policy and exchange rate devaluations implemented to offset the fiscal contraction, even though exchange rate devaluations immediately before the fiscal tightening contributed in many episodes to the stabilization of the debt-to-GDP ratio and to a boom of the economy.

This paper contributes to this strand of the literature by examining new evidence on fiscal adjustments in OECD countries from 1970 to today. The paper focuses on the medium-term response of the debt-to-GDP ratio and on GDP growth and examines both statistical and econometric evidence on the determinants and consequences that characterize fiscal stabilization programs. In particular, the paper investigates whether the size and composition of fiscal policy are crucial elements for successful and expansionary fiscal adjustments and whether the effects of fiscal consolidations depend on countries' initial fiscal and macroeconomic conditions. Finally, the role played by other economic policies (monetary policy and exchange rate devaluations) implemented at the time of the fiscal tightening is also considered.

The paper is very closely related to the work of Alesina and Ardagna (1998) and Ardagna (2004). As in Alesina and Ardagna (1998), the paper selects episodes of fiscal adjustments, summarizes some basic statistics on government budgets and on macroeconomic outcomes from a few years before to a few years after the episodes of fiscal tightening, and identifies some empirical regularities that distinguish different types of episodes. As in Ardagna (2004), the paper performs an econometric analysis to assess the importance of the factors and the channels through which fiscal policy induces a reduction in the debt-to-GDP ratio and an expansion in output. In doing so, the paper addresses the joint endogeneity of the likelihood that governments implement successful fiscal contractions and of GDP growth; it controls for the stance of monetary and exchange rate policies around the time of the adjustment; and it explicitly accounts for the fact that what matters for economic activity is not only the current discretionary reduction in the deficit, but also the resulting expectations about the stance of future fiscal policy.

Results are consistent with the existent empirical literature and adding ten more years of data and more evidence from episodes of fiscal consolidations occurred after 1994 does not really alter the conclusions reached so far. The most significant difference is on the role played by the composition of the fiscal manoeuvre in episodes of successful fiscal consolidations. In particular, while the existent literature finds that fiscal policy

composition is an important element in explaining fiscal adjustments that lead to a permanent reduction of the debt-to-GDP ratio, this paper does not. However, as the existent literature, this paper finds that a composition of the adjustment which emphasizes spending cuts on transfers, welfare programs and the government wage bill, rather than tax increases, is a critical factor in explaining fiscal adjustments associated with a boom in economic activity.

The rest of the paper is organized as follows. Section 5.2 presents the data and discusses the statistical evidence on fiscal adjustments. Section 5.3 describes the econometric issues and illustrates the specification for the benchmark model. Section 5.4 discusses the results. The last section concludes.

5.2. Data and statistical evidence

We use a panel of OECD countries for a maximum time period from 1970 to 2006. The countries included in the sample are: Australia, Austria, Belgium, Canada, Czech Republic, Denmark, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Japan, Netherlands, New Zealand, Norway, Poland, Portugal, Slovak Republic, Spain, Sweden, Switzerland, United Kingdom, and United States. All fiscal and macroeconomic data are from the OECD Economic Outlook Database no. 81. The political data are from the World Bank database DPI 2006.

We identify episodes of fiscal contractions following the literature on fiscal adjustments and using the same criteria as in Alesina and Ardagna (1998). Specifically, we use the following rule to define a period of fiscal adjustment.

Definition 1: An episode of large fiscal adjustment is a period in which the cyclically adjusted primary balance improves by at least 2 per cent of GDP or a period of two consecutive years in which the cyclically adjusted primary balance improves by at least 1.5 per cent of GDP per year, in both years.

This is a rather demanding criteria, which rules out small, but prolonged, adjustments. We choose it because we are particularly interested in adjustments which are very sharp and large and clearly indicate a change in the fiscal stance. Also, we use the primary deficit, rather than the total deficit, to avoid that episodes selected result from the effect that changes in interest rates have on government expenditures. Moreover, we cyclically adjust the primary deficit to leave aside variations of the fiscal variables induced by business cycle fluctuations[52]. Hence, episodes selected through this technique should not result from the automatic response of fiscal variables to economic growth or monetary policy changes, but they should reflect discretionary policy choices of fiscal authorities. Needless to say, there can still be an endogeneity issue related to the occurrence of fiscal contractions and expansions, because, in principle, discretionary policy choices of fiscal authorities can be affected by countries' macroeconomic conditions. However, note that the budget for the current year is approved during the second half of the previous year and, even though additional measures can be taken during the course of the year, they usually become effective with some delay, generally toward the end of the fiscal year. Hence, the assumption that the cyclically adjusted

[52] The cyclical adjustment is based on the method proposed by Blanchard (1993) and follows the application in Alesina and Perotti (1995).

primary deficit does not depend on GDP is likely to be a reasonable approximation to reality.

Definition 1 selects 86 periods of fiscal contractions listed in Table 5.1. The majority of the episodes are well known in the literature and several alternative definitions of fiscal episodes select them. The inclusion of other periods in the samples, instead, is sensitive to the rule used to identify the episodes.

We are interested in two outcomes of very tight fiscal policies: whether they are associated with an expansion during and in their immediate aftermath and whether they are successful in solving fiscal unbalances. Thus, a "tight episode" is defined expansionary according to definition 2 and successful according to definition 3 below.

Definition 2: A period of tight fiscal policy is expansionary if the average growth rate of GDP, in difference from the G7 average (weighted by GDP weights), in the period of the tight policy and in the two years after is greater than the average value of the same variable in all episodes of tight policy.

Definition 3: A period of tight fiscal policy is successful if three years after the tight period, the ratio of the debt-to-GDP is 5 percent of GDP below its level in the year of the tight period.

There is of course some degree of arbitrariness in these definitions. However, our results are not "knife hedge" and very sensitive to the exact criteria used. Definition 2 isolates 41 (39) episodes of expansionary (contractionary) fiscal adjustments, while definition 3 identifies 23 (37) episodes of successful (unsuccessful) fiscal episodes.[53]

5.2.1 Fiscal policy in expansionary and successful fiscal consolidations

We begin by investigating the characteristics of the fiscal manoeuvre in expansionary and successful fiscal adjustments. Results are in Tables 5.2 and 5.3 respectively. The period "before" the adjustment is the two year period preceding the adjustment year(s). The period "after" is the two year period following the last year of the adjustment. The period "during" is, of course, the year(s) of the adjustment. All the variables in the table are yearly averages.

Several interesting observations emerge from these tables. There does not seem to be much evidence that the expansionary episodes are those which occur when debt is high or more rapidly raising. Second, expansionary adjustments are not much larger than contractionary ones: during the expansionary adjustments, the primary deficit falls by 2.80 per cent of GDP, against 2.65 in contractionary cases and these numbers become equal to 2.59 and 2.67 respectively when we measure the size of the fiscal adjustment using the cyclically adjusted primary deficit-to-GDP ratio. This observation on the "size" is not consistent with econometric results by Giavazzi and Pagano (1996). In their work on private consumption, they argue that a large adjustment, by inducing a permanent change of fiscal regime, can be expansionary through an effect on expectations, which would not be present in a small adjustment. Third, larger

[53] Note that we are not able to classify all the 86 episodes of fiscal adjustments in expansionary/contractionary for two reasons: i) for some country-years data on the debt-to-GDP ratio is not available, ii) some episodes occur at the end of the sample period and, hence, we do not have evidence on the future dynamic of GDP growth and of the public debt.

adjustments are more expenditure based. As Figure 5.1 shows, spending are cut more during expansionary episodes and revenues are increased less. Specifically, more than 79% of the improvement in the primary balance-to-GDP ratio is due to expenditures cuts and less than 21% comes from increases in taxes. These numbers are equal to 59% and 41% respectively in contractionary fiscal adjustments. Third, when we consider the changes to the individual budget items, there is also a noticeable difference across the two types of episodes. For example, while in expansionary fiscal consolidations, the percentage of the reduction of the primary deficit-to-GDP ratio due to reductions in transfer payments, the government wage bills is of the same order of magnitude (between 22% and 26%), in contractionary episodes, almost 40% of the improvement in the primary deficit is due to cuts to public investment, only 10% comes from a reduction in the government wage bill and cyclically adjusted transfer payments actually increase. Similarly, on the revenue side of the budget, while we observe a reduction in income taxes and a modest increase in social security contributions in expansionary fiscal adjustments, the contribution of income taxes to the deficit reduction is equal to 17% in contractionary fiscal stabilizations.

Let's now analyze successful and unsuccessful fiscal adjustments (see Table 5.3 and Figure 5.2). Contrary to the evidence in Table 5.2, in successful fiscal episodes the fiscal situation is worse than in unsuccessful cases: the debt to GDP ratio is higher, although it is not growing faster, immediately before successful episodes. Second, the size of the adjustment much larger in successful fiscal adjustments than in unsuccessful ones as we observe an improvement of the primary cyclically adjusted deficit of 3.25 during successful adjustments, versus 2.17 during unsuccessful cases. Third, the composition of the adjustment is as much different as the one we observe when we contrast expansionary with contractionary episodes. Successful adjustments are almost exclusively expenditure based (i.e.: 75% of the improvement in the primary balance-to-GDP ratio is due to expenditures cuts and 25% comes from increases in taxes), unsuccessful adjustments are more evenly relying on a combination of spending cuts and tax increases ((i.e.: 54% of the improvement in the primary balance-to-GDP ratio is due to expenditures cuts and 46% comes from increases in taxes). Particularly sizeable are the differences in the behavior of transfers. In successful cases, the cyclically adjusted transfers-to-GDP ratio is cut for a total of 0.69 percentage points (from after to before). In unsuccessful cases, cyclically adjusted transfers increase by 0.26 percent of GDP.

5.2.2 Macroeconomic outcomes in expansionary and successful fiscal consolidations

Tables 5.4 and 5.5 show the evidence on the macroeconomic outcomes associated with expansionary/contractionary and successful/unsuccessful fiscal stabilizations. Macroeconomic variables also behave very differently across the different types of fiscal adjustments. The rate of growth relative to G7 increases during and after expansionary and successful episodes. It decreases during and after contractionary episodes and after unsuccessful ones. Note, however, that growth relative to G7 was higher immediately before successful cases, which can suggest that initial growth determines the success of the tight policy. Expansionary adjustments experience an investment boom during and immediately after, contrary to the contractionary cases. The differences in the growth rates of private consumption from before to after the expansionary/contractionary adjustment periods are not as remarkably different as the ones in private investment. Also, contrary to the statistical evidence shown in Alesina

and Ardagna (1998), private investment does not boom in successful episodes. Instead, in Table 5.5, unsuccessful fiscal adjustments are characterized by a larger increase in private investment than successful episodes. The trade balance improves in all types of fiscal adjustments.

Interestingly contractionary and unsuccessful fiscal stabilizations, experience larger nominal devaluations of the exchange rate in the two years before the fiscal tightening than expansionary and successful episodes. This observation casts doubt on the claim that fiscal stabilizations that "work" are those anticipated by episodes of sharp exchange rate depreciations and suggests that the stance of monetary policy alone is not a critical factor making the difference. However, the rate of devaluation is only one of the many possible indicator of the monetary stance, although particularly important in small open economies. The evidence on the behavior of inflation also does not indicate a particularly loose monetary stance in successful and expansionary versus unsuccessful and contractionary cases.

Finally, in line with the results in Ardagna et al. (2007), real long-term interest rates relative to the G7 average decrease more during expansionary and successful fiscal adjustments than in unsuccessful and contractionary ones, providing some evidence that fiscal discipline reduces the cost of serving the public debt.

5.3. Econometric analysis

In this section we describe the methodology applied for the econometric analysis, which follows the one in Ardagna (2004). We discuss the single equation approach, which we use to estimate the ability governments have to solve fiscal imbalances. We calculate agents' expectations that the fiscal contraction will lead, within a few years, to the stabilization of the debt-to-GDP ratio. Then, we use this variable as a regressor in the GDP growth equation to capture the effect of agents' expectations on the future course of fiscal policy. Next, we also present a simultaneous equations approach, which takes into account a potential problem of simultaneity between governments' ability to solve a fiscal imbalance and GDP growth.

5.3.1 Single equation approach

The ability/propensity of a government to solve a fiscal imbalance, s^*, is a latent variable not directly observed. We, instead, assume that we observe a discrete variable s. s indicates whether or not governments undertake discretionary cuts in the deficit-to-GDP ratio and obtain, within a few years, a reduction in the debt as a share of GDP.[54] Thus, we estimate the following probit model for s^*:

[54] As discussed in Ardagna (2004), there are two reasons one may want to follow this approach. First, the literature on the macroeconomic effects of fiscal adjustments is not concerned with small and continuous changes in the debt as a share of GDP. Rather, it looks at the impact of large and persistent reductions in the public debt-to-GDP ratio that result from discretionary improvements in the budget. Second, whether a fiscal adjustment has a positive effect on the economy may depend on agents' perception that the stabilization leads to a change in the fiscal regime. A small and continuous change in the debt-to-GDP ratio that does not result from any improvement in the budget can hardly be interpreted as a change in fiscal policy regime that eliminates the need for future tightening.

$$s_{it}^{*} = \vartheta_{1i} + \gamma_1 y_{it-1} + a_{11}\Delta G_{it} + a_{12}\Delta T_{it} + a_{13} DEF_{it-1} + a_{14} DEB_{it-1} + \\ + a_{15} Left_{it} + a_{16} Centre_{it} + a_{17} Major_{it} + u_{1it} + u_{1it} \equiv Z_{1it}\delta_1 + u_{1it} \quad [1]$$

$$s_{it} = \begin{cases} 1 \; if \;\; s_{it}^{*} > 0 \\ 0 \; otherwise \end{cases} \quad [2]$$

and

$$s_{it}^{e} = \mathrm{E}\,[\, s_{it}^{*} \mid It] = Z_{1it}\delta_1 \quad [3]$$

where $i=\{1,....,I\}$ indicates the countries in the sample; $t=\{1,....,T\}$ the annual observation; y measures the real per capita GDP growth rate; ΔG measures the change in the cyclically adjusted primary expenditure as a share of GDP; ΔT the change in cyclically adjusted tax revenue as a share of GDP; *DEF* and *DEB* are the ratios of government deficit and public debt to GDP respectively; *Left* and *Centre* are dummy variables equal to one if the government in office is left or centre oriented and zero otherwise; *Major* is a dummy variable equal to one if a single party has the majority in the Parliament and zero otherwise, and $u_{1it} \sim N(0,\delta^2)$. From equation (2), we observe a successful fiscal adjustment if $s_{it}^{*} > 0$. Equation (3) describes agents' expectations about s_{it}^{*} and assumes that the variables on the right-hand side of (1) belong to agents' information set at time t.

In the econometric analysis, a successful fiscal stabilization ($s_{it} = 1$) is defined as an episode in which the cyclically adjusted primary balance improves, and, two years after, the debt-to-GDP ratio is at least three percentage points lower than in the year of the fiscal tightening. This rule is less stringent than the one in definition 3 above. It allow us to conduct the econometric investigation in a larger sample and without loosing valuable information from country-years in which fiscal discipline is a problem, but governments do not undertake discretionary and substantial deficit cuts. Such information is likely to be valuable to consumers and investors because governments' inaction can also influence agents' expectations about the stance of future fiscal policy.

We expect agents' expectations about governments' ability to solve a country's fiscal imbalance to depend both on the size of the improvement in the primary deficit and on the way in which the improvement is obtained. In fact, the larger the cut in the deficit, the more people expect that the current fiscal package can stabilize the debt-to-GDP ratio and, hence, remove the need for further fiscal tightening in the future, (see Feldstein (1982)). Moreover, agents can believe that governments that reduce spending, especially the "untouchable" items of the budget (transfers, government wages, public employment), are more serious and committed to solve the fiscal imbalance than governments that increase taxation. They are willing to undertake unpopular policy measures, which, most likely, will have more permanent effects on the budget. This suggests that we should observe $a_{11} < 0$: for given changes in taxes, larger cuts in government spending increase the probability of a success implying both a tighter fiscal policy and a fiscal policy composition based on spending cuts. Instead, the sign of a_{12} (the coefficient of tax variable) is in theory ambiguous. Suppose, in fact, that the change in the primary balance is the only characteristic of fiscal policy that matters for governments' ability to obtain a reduction in the debt-to GDP ratio. In this case, the higher the increase in taxation, the higher the probability that the debt-to-GDP ratio

decreases. Hence, $a_{12} > 0$. If, instead, the composition of the fiscal manoeuvre, but not the size, matters, then, for given changes in government spending, larger increases in taxes should have a negative effect on s^*.

We also control for countries' initial conditions (the initial level of the deficit and debt to GDP ratios, and the lagged GDP growth rate), political variables describing the type and the ideology of the government in office, and country fixed effects. The literature on episodes of fiscal adjustments suggests that successful stabilizations are more likely to occur in "bad" rather than in "good" times (see, for example, Alesina et al. (2006), Obstfeld (1998), and Sutherland (1997)). Political characteristics of the government in office can also play a role beyond their effect on the size and composition of fiscal policy. For example, agents might believe that left-wing governments have more chances to stabilize the debt-to-GDP ratio than right-wing ones. Because of the left's support from unions and from pensioners, they can communicate the need for the adjustment and stick to their policy in the future more easily. Similarly, agents might think that single-party majority governments are less likely to abandon the program in the future than are coalition or minority cabinets.

Equation [4] describes the real per capita GDP growth regression:

$$y_{it} = \vartheta_{2i} + \gamma_2 s_{it}^e + a_{21}\Delta G_{it} + a_{22}\Delta T_{it} + a_{23}DEF_{it-1} + a_{24}DEB_{it-1} + \\ + a_{25}y_{it-1} + a_{26}y_{it-1}^{G7} + u_{2it} \equiv A_{2it}\delta_2 + u_{2it} \qquad [4]$$

where: s_{it}^e is generated using equation [3] and the estimates from equation [1]; y, s^e, ΔG, ΔT, DEF, and DEB are defined as in Section 3.1.1, y^{G7} measures the weighted average (with GDP weights) real per capita GDP growth rate of the G7 countries, and $u_{2it} \sim N(0,\sigma_2^2)$. Equation [4] is estimated by OLS.

A positive and statistically significant coefficient of the variable measuring agents' expectations (i.e.: γ_2) shows evidence in favour of the expectation view. The more agents perceive that the government is able to solve the fiscal imbalance, the more they expect that future fiscal policy does not need to be as tight as current fiscal policy, and both private current consumption and investment can increase, leading to higher GDP growth. As for effect of changes to primary spending and government revenues on GDP growth, once we control for the expectation channel including s^e among the regressors in [4], ΔG and ΔT can affect the macroeconomy through other channels. Decreases in taxes have a positive effect on the economy both according to the labor market view and in a standard Keynesian model. Decreases in public spending have negative effect on growth in a Keynesian model. Instead, according to the labor market view decreases to government spending and, especially to the government wage bill and welfare payments, boost growth. Similarly, decreases in public investment can lead to higher private investment and growth if public investment is a substitute for private investment and the former is less productive than the latter.

5.3.2 Simultaneous equations approach

The single equation approach assumes that GDP growth influences governments' ability to solve a fiscal imbalance only with a lag. If, instead, s^* depends also on current GDP

growth, then, there is a problem of simultaneity in the procedure described in section 5.3.1. In fact, if s^* and y are endogenous, estimates of the effects of s^e on GDP growth without controlling for the effect of current growth on s^* are biased. To address this issue, we also estimate the equation describing governments' ability to solve countries fiscal imbalances and the growth equation simultaneously. The basic model is described by equations [5] and [6]:

$$s^*_{it} = \vartheta_{1i} + \gamma_1 \gamma_{it} + a_{11}\Delta G_{it} + a_{12}\Delta T_{it} + a_{13} DEF_{it-1} + a_{14} DEB_{it-1} + \\ + a_{15} Left + a_{16} Centre_{it} + a_{17} Major_{it} + u_{1it} \quad [5]$$

$$y_{it} = \vartheta_{2i} + \gamma_2 s^e_{it} + a_{21}\Delta G_{it} + a_{22}\Delta T_{it} + a_{23} DEF_{it-1} + a_{24} DEB_{it-1} + \\ + a_{25} y_{it-1} + a_{26} y^{G7}_{it-1} + u_{2it} \quad [6]$$

where $[u_{1it}\ u_{2it}]' \sim N(0,\Omega)$ and s and s^e are defined respectively by equations [2] and [3] above.[55] The coefficients γ_1 and γ_2 now take into account the contemporaneous effect among s^*, s^e and y. $a_{11} - a_{17}$, and $a_{21} - a_{26}$ measure the impact of the exogenous variables described in Section 5.3.1. Because s^* is a latent variable, I estimate equations [5] and [6] applying Amemiya's (1978) generalized least square technique (AGLS). Newey (1987) shows that AGLS is asymptotically equivalent to the minimum χ^2 estimation procedure, and that, in overidentified systems, AGLS is efficient relative to 2IV estimators.[56]

To estimate [5] and [6], the system needs to be identified. The identification of the system requires that at least one exogenous variable in the equation for s* is not included in the equation for growth and vice-versa. In the benchmark model, political variables do not enter the growth equation directly. The literature on political business cycles shows that the type and the ideology of the government in office affect fiscal policy variables. Through the latter, political variables can influence the macroeconomy. Moreover, Section 5.3.1 argues that political characteristics of the government in office can also affect agents' expectations. Because the rhs of equation [5] already includes both fiscal policy variables and the variable capturing agents' expectations, it does not seem unreasonable to assume that *Left*, *Centre*, and *Major* do not influence GDP growth directly. The identification of the system also assumes that the lagged real per capita GDP growth rate and the lagged real per capita GDP-weighted growth rate of the G7 countries influence governments' ability to stabilize successfully only indirectly, through their effect on current GDP growth. The AGLS technique allows easily to test the overidentifying restrictions of the system and the empirical analysis will show that the model does not reject the overidentifying restrictions at conventional confidence levels.

[55] The specification assumes that agents know current growth when they form their expectations on governments' ability to stabilize the debt-to-GDP ratio. Alternatively, one can argue that agents do not know the contemporaneous growth rate but they use the forecast data on GDP growth. In this case, one introduces a forecast error in (6). The estimates are still consistent because the estimation method allows for cross-equations correlation between the errors in (5) and (6).

[56] See Ardagna (2004); Amemiya (1978); Newey (1987) and Londregan and Poole (1990) for details on the AGLS estimation procedure.

5.4. Empirical results

Table 5.6 shows the results from the single equation approach; Table 5.7 presents the results from the simultaneous equation approach. More specifically, in columns 1-2 of Table 5.6 we estimate the empirical models described in Section 5.3.1 and in columns 1-2 of Table 5.7 those described in Section 5.3.2; in columns 3-4 of both tables we present results for a reparametrized version of the equations estimated in the other columns. The reparametrization allows us to measure the effect of the size and that of the composition of the fiscal manoeuvre very easily and involves the following steps. Rather than including the terms ΔG and ΔT among the regressors, we add the terms $(\Delta G-\Delta T)$ and $(\Delta G+\Delta T)$, where the former term captures the effect of the size and the latter the effect of the composition of the fiscal adjustment. A negative value for the estimated coefficient of the term $(\Delta G-\Delta T)$ indicates that larger improvements in the primary balance increase the probability of a success or GDP growth. A negative value for the estimated coefficient of the term $(\Delta G+\Delta T)$ is evidence of a "right" fiscal policy composition. In fact, the variable $(\Delta G+\Delta T)$ assumes negative values when both government spending and taxes are cut (the "best" fiscal policy in terms of composition) and positive values when both variables increase (the "worst" fiscal policy in terms of composition).[57]

Let's now discuss the determinants of a successful fiscal stabilization, starting with column 1 of Table 5.6. First of all, both larger decreases in government spending and larger increases in taxes have a positive effect on governments' ability to implement a fiscal contraction and induce within a few years a decrease of the debt-to-GDP ratio. A one percentage point decrease in government spending as a share of GDP increases the likelihood of a success from 0.19 to 0.27 and a one percentage point increase in taxes raises the probability of a success from 0.19 to 0.30.[58] These effects are statistically significant at the 5% level. Second, the success of a fiscal adjustment depends on the size of the fiscal contraction and not on its composition (see column 3). On the one hand, the coefficient of the change in the primary deficit as a share of GDP, $(\Delta G-\Delta T)$, is statistically significant at the 5% level and its magnitude implies that, ceteris paribus, a one percentage point improvement in the primary balance-to-GDP ratio increases the probability of success from 0.19 to 0.28. On the other hand, the coefficient of the variable that measures the effect of the composition $(\Delta G+\Delta T)$ is not statistically significant. This result contrasts with the evidence from the existent literature that suggests that fiscal consolidations are also more likely to be successful if they rely sharply on spending cuts. Results in column 3, instead, show that increases in taxes have a stronger effect on s^* than decreases in government spending. Among the other regressors, past economic growth has a positive and statistically significant impact on s^*, but its effect is small: a one percentage point increase in lagged GDP growth

[57] See Ardagna (2004) for a more detailed analysis of the restrictions implied by the reparametrized models.

[58] To calculate the effect of a 1% change in a continuous variable on s*, we consider the difference between the average probability of success using the estimated coefficients and the data in the sample and the value of this same variable calculated assuming that the continuous variable is 1% higher (or lower) than in the actual data. The effect of a change of a dummy variable from 0 to 1 is measured as the difference between the average probability calculated if the dummy variable is equal to zero and the average probability calculated if the dummy variable is equal to one. We evaluate the average probability of success using the estimated coefficients and the data in the sample. We adopt this method throughout the paper. Alternatively, we could have measured the probability evaluating it at the average value of the explanatory variables.

increases the probability that the government is able to solve a fiscal imbalance from 0.19 to 0.21. Countries' initial fiscal conditions have, instead, an ambiguous effect. On the one hand, a higher level of the deficit-to-GDP ratio decreases governments' likelihood to stabilize public debt. On the other, a higher stock of public debt increases the chances of a success. Finally, left-wing and majoritarian governments are more likely to stabilize the debt than right-wing and coalition or minority governments.

Columns 2 and 4 of Table 5.6 show the results for the growth equation estimated with the single equation approach. Larger cuts to public spending increase GDP growth and the magnitude of the coefficient is such that if governments reduce the share of primary spending-to-GDP by one additional percentage point, GDP growth increases by 0.23 percentage point. This effect is, however, only significant at the 10% level. Tax reductions, instead, do not have a statistically significant effect on GDP growth, while agents' expectations about governments' ability to solve a fiscal imbalance are statistically significant at the 10% level, but the magnitude of the coefficient is such that the effect of expectations on growth is negligible. Results of the estimation of the reparametrized model suggest that the composition of fiscal policy is the only characteristic of the fiscal adjustment that matters for growth, while the change in the primary balance-to-GDP ratio has no effect, once we control for the effect that agents' expectations about governments' ability to solve countries' fiscal imbalances have on GDP growth.

Results from the simultaneous equations approach are in Table 5.7. They are very similar to the ones obtained in the single equation approach. The effect of current real GDP growth on s^* is larger than that of past economic growth. The probability that governments are able to solve a fiscal imbalance increases by 6 percentage points from 0.20 to 0.26 when real GDP growth is one percentage point higher. Previous studies have been criticized because they failed to take into account the feedback effects from GDP growth on the likelihood of a successful stabilization. Results in Table 5.7 show that the coefficient of current growth is significant but that high economic growth does not drive the success of a consolidation. In fact, controlling for current growth, fiscal policy variables have the same effect on s^* than in Table 5.6. Note, also, that the χ^2 tests of the overidentifying restrictions do not reject the estimated models at least at the 10% confidence level.

In summary, i) the probability that tight fiscal policies lead to a decrease in the debt-to-GDP ratio depends on the size of the improvement in the primary balance and not on its composition; ii) higher GDP growth favors the success of a fiscal contraction but it is not the only important determinant of governments' ability to solve countries' fiscal imbalances; iii) controlling for the impact that fiscal policy characteristics have on GDP growth through their effects on expectations, the paper finds that GDP growth is higher the larger the decrease in public spending. There is no evidence that the change in the primary balance per se affects economic activity. The size of a fiscal contraction has a positive effect on growth only through its effect on agents' expectations about future fiscal policy. In fact, agents' beliefs about governments' ability to solve a fiscal imbalance have a positive effect on growth, although the effect is very little and statistically significant only at the 10% level.

5.4.1 The role of monetary policy

Fiscal stabilizations rarely happen in isolation; they are often part of broader policy packages. Even in a standard IS-LM model, a fiscal contraction that is accompanied by an expansionary monetary policy can lead to a boom in the economy. The specifications in Tables 5.6 and 5.7 do not control for the stance of monetary policy. Suppose, for example, that the fiscal tightening is accompanied by a lax policy, or that exchange rate devaluations systematically anticipate the fiscal adjustments that turn out to be successful and expansionary. In this case, the coefficients of fiscal policy variables can be biased capturing the effect of monetary rather than fiscal policy. This paper explicitly controls for the stance of monetary and exchange rate policies providing a further check that the conclusions reached so far are sound. We reestimate the models in columns 3 and 4 of Table 5.7 including as regressors in the GDP growth equation lagged values of the change in the short-term nominal interest rate and of the rate of growth of the nominal exchange rate.[59] Results are in Table 5.8. While a decrease in the short-term nominal interest rate increase GDP growth, there is no evidence that changes in the nominal exchange rate have a statistical significant effect on economic activity. There is mixed evidence in the literature on the link between fiscal consolidations and exchange rate devaluations as well. Some studies present evidence that stronger devaluations anticipate some expansionary fiscal adjustments, some find the opposite result.[60] This paper is not concerned with whether or not monetary policy affects the economy. What matters here is that the coefficients of fiscal policy variables do not capture the impact of monetary rather than fiscal policy. Indeed, the coefficients of fiscal policy variables and of s_e and the t-statistics in Table 5.8 are very similar to those in Table 5.7.

5.5. Conclusions

Using a panel of OECD data from 1970 to today, this paper provides additional evidence on the determinants of the different macroeconomic outcomes observed during and a few years after many episodes of fiscal consolidations in the OECD countries. The paper finds that the probability that tight fiscal policies lead to a decrease in the debt-to-GDP ratio increases the larger the cut in the deficit. As for the effect of changes to fiscal policy on GDP growth, the paper, instead, suggests that the composition of fiscal policy is a crucial element for growth and that the labor market is an important channel for the transmission of fiscal policy shocks. In fact, controlling for the impact that fiscal policy changes have on GDP growth through their effects on expectations, GDP growth is higher the larger the decrease of public spending. Agents' expectations about governments' ability to solve countries' fiscal imbalances are statistically significant only at the 10% level and the magnitude of the coefficient is, in general, not economically significant. Hence, the evidence on the effect of fiscal policy on economic activity through its effect on agents' expectations about future fiscal policy is not strong.

[59] Data availability and comparability across countries constraints the choice of the indicators of the monetary policy's stance.

[60] Bradley and Whelan (1997), for example, claim that the increase in export due to the devaluation of the nominal exchange rate determined the boom during the Irish stabilization in 1987-1989. Lambertini and Tavares (2001) also find evidence that devaluations matter for the success of a fiscal contraction. Alesina and Ardagna (1998) show that devaluations are important elements of the policy package, but that devaluations alone are not sufficient to drive a boom in the economy.

Finally, the paper shows that successful and expansionary fiscal contractions are not the result of expansionary monetary policies or of exchange rate devaluations.

The paper does not address some interesting issues that a recent literature on fiscal adjustments as considered. For example, the paper does not investigate the determinants and consequences of fiscal adjustments of different duration or the effect of fiscal rules on the likelihood and success of fiscal adjustments programs. Moreover, the paper does not study the interaction between fiscal policies, income policies, structural reforms of the product and labor markets, and privatizations. These topics certainly deserve to be investigated in future research.

Appendix

Table 5.1 Episodes of fiscal adjustments

Austria	1996, 1997
Belgium	1982, 1984
Canada	1981, 1986, 1987, 1994, 1995, 1996, 1997
Czech Republic	1994, 1996, 1999, 2004
Denmark	1983, 1984, 1985, 1986, 2004, 2005
Finland	1976, 1988, 1994, 1996, 2000
Germany	1976, 2000
Greece	1986, 1991, 1994, 2005, 2006
Hungary	1995, 1996, 1999
Ireland	1976, 1987, 1988, 1989
Italy	1976, 1990, 1991, 1992, 1997
Japan	2006
Netherlands	1972, 1973, 1983, 1991, 1996
New Zealand	1987, 1989
Norway	1979, 1980, 1983, 2000, 2004, 2005
Portugal	1982, 1983, 1986, 2006
Slovak Republic	1995, 1997, 1998, 2001, 2003
Spain	1986, 1987
Sweden	1979, 1981, 1983, 1984, 1986, 1987, 1994, 1995, 1996, 1997
United Kingdom	1982, 1988, 1996, 1997, 1998, 2000

Source: OECD

Table 5.2 Expansionary and contractionary fiscal adjustments-size and composition

	Expansionary					Contractionary				
	Before	During	After	Diff	Diff	Before	During	After	Diff	Diff
	(a)	(b)	(c)	(b) - (a)	(c) - (a)	(a)	(b)	(c)	(b) - (a)	(c) - (a)
Debt	60.07	59.73	59.14	-0.34	-0.93	65.56	68.35	69.00	2.79	3.44
	3.86	*3.99*	*3.86*			*4.56*	*4.72*	*5.17*		
Change in debt	2.38	-0.29	-1.11	-2.67	-3.49	3.92	1.35	1.73	-2.57	-2.18
	0.99	*0.57*	*0.55*			*0.84*	*0.83*	*0.91*		
Primary deficit	2.94	0.14	-0.56	-2.80	-3.50	3.30	0.65	0.38	-2.65	-2.91
	0.56	*0.57*	*0.60*			*0.52*	*0.56*	*0.56*		
Primary expenditures	44.71	42.49	41.60	-2.22	-3.11	46.35	44.80	44.57	-1.55	-1.78
	1.28	*1.15*	*1.05*			*1.45*	*1.35*	*1.33*		
Transfers	18.60	17.99	17.57	-0.62	-1.03	18.97	19.09	19.16	0.12	0.19
	0.79	*0.71*	*0.62*			*0.76*	*0.69*	*0.66*		
Government wage expenditures	12.72	11.99	11.79	-0.74	-0.93	13.36	13.08	12.71	-0.28	-0.65
	0.45	*0.41*	*0.39*			*0.64*	*0.61*	*0.59*		
Government non wage expenditures	8.61	8.56	8.61	-0.04	0.00	8.66	8.51	8.56	-0.15	-0.10
	0.37	*0.37*	*0.37*			*0.43*	*0.40*	*0.39*		
Public investment	2.41	1.72	1.67	-0.69	-0.75	2.90	1.86	1.95	-1.04	-0.95
	0.26	*0.24*	*0.28*			*0.29*	*0.24*	*0.25*		
Total revenue	41.77	42.35	42.16	0.58	0.39	43.05	44.15	44.19	1.09	1.14
	1.13	*1.06*	*1.05*			*1.44*	*1.37*	*1.42*		
Income taxes	11.32	11.09	11.07	-0.23	-0.25	13.47	13.93	13.86	0.46	0.39
	0.72	*0.73*	*0.74*			*1.10*	*1.12*	*1.13*		
Social security contributions	10.23	10.34	10.27	0.11	0.04	11.49	11.46	11.38	-0.04	-0.11
	0.65	*0.62*	*0.61*			*0.84*	*0.87*	*0.86*		
Business taxes	3.01	3.67	3.85	0.66	0.84	2.49	2.62	2.61	0.13	0.12
	0.25	*0.33*	*0.34*			*0.18*	*0.16*	*0.15*		
Indirect taxes	13.72	13.71	13.57	-0.01	-0.14	12.97	13.33	13.43	0.37	0.47
	0.36	*0.30*	*0.31*			*0.38*	*0.39*	*0.38*		
Primary deficit adj.	2.78	0.19	-0.44	-2.59	-3.22	3.25	0.57	0.39	-2.67	-2.86
	0.51	*0.58*	*0.59*			*0.53*	*0.54*	*0.54*		
Primary expenditures adj.	44.60	42.65	41.86	-1.96	-2.74	46.35	44.77	44.62	-1.58	-1.73
	1.23	*1.15*	*1.06*			*1.47*	*1.33*	*1.34*		
Transfers adj.	18.50	18.14	17.84	-0.36	-0.66	18.95	19.06	19.20	0.11	0.25
	0.75	*0.72*	*0.65*			*0.77*	*0.68*	*0.68*		
Total revenue adj.	41.82	42.46	42.30	0.64	0.48	43.10	44.20	44.23	1.10	1.13
	1.13	*1.06*	*1.06*			*1.48*	*1.37*	*1.42*		

Notes:
Variables are in share of GDP. Primary deficit adj., Primary expenditures adj., Transfers adj., Total revenues adj., are cyclically adjusted variables. Standard deviation of the mean in italics.
Source: OECD.

Table 5.3 Successful and unsuccessful fiscal adjustments-size and composition

	Successful					Unsuccessful				
	Before	During	After	Diff	Diff	Before	During	After	Diff	Diff
	(a)	(b)	(c)	(b) - (a)	(c) - (a)	(a)	(b)	(c)	(b) - (a)	(c) - (a)
Debt	72.02	70.68	65.54	-1.34	-6.48	57.74	61.38	65.66	3.64	7.93
	4.08	*4.38*	*4.58*			*4.04*	*4.36*	*4.61*		
Change in debt	2.13	-1.67	-3.45	-3.80	-5.58	3.75	1.98	3.00	-1.78	-0.75
	0.85	*0.73*	*0.31*			*1.02*	*0.63*	*0.58*		
Primary deficit	2.11	-1.33	-2.70	-3.43	-4.81	3.41	1.13	1.12	-2.29	-2.29
	0.64	*0.64*	*0.60*			*0.60*	*0.65*	*0.56*		
Primary expenditures	47.18	44.62	43.70	-2.57	-3.48	46.61	45.37	45.38	-1.24	-1.22
	1.65	*1.57*	*1.51*			*1.46*	*1.39*	*1.26*		
Transfers	19.59	19.09	18.87	-0.50	-0.72	19.32	19.29	19.36	-0.03	0.04
	0.90	*0.83*	*0.79*			*0.84*	*0.80*	*0.70*		
Government wage expenditures	14.11	13.61	13.20	-0.50	-0.91	13.35	12.93	12.72	-0.42	-0.63
	0.71	*0.67*	*0.66*			*0.58*	*0.54*	*0.53*		
Government non wage expenditures	9.07	8.86	8.91	-0.20	-0.16	8.73	8.80	8.90	0.08	0.17
	0.33	*0.35*	*0.33*			*0.38*	*0.38*	*0.36*		
Public investment	2.11	0.97	0.79	-1.14	-1.32	2.73	1.95	2.16	-0.79	-0.57
	0.33	*0.21*	*0.22*			*0.22*	*0.26*	*0.25*		
Total revenue	45.08	45.94	46.40	0.87	1.33	43.19	44.24	44.27	1.05	1.07
	1.40	*1.51*	*1.59*			*1.24*	*1.16*	*1.15*		
Income taxes	14.12	14.39	14.65	0.27	0.53	12.74	12.80	12.74	0.06	0.00
	1.19	*1.25*	*1.36*			*0.73*	*0.76*	*0.75*		
Social security contributions	10.32	10.19	9.98	-0.13	-0.34	11.82	12.17	12.27	0.35	0.44
	1.01	*1.00*	*0.98*			*0.76*	*0.75*	*0.74*		
Business taxes	2.78	3.41	3.57	0.63	0.79	2.78	3.20	3.20	0.41	0.41
	0.16	*0.24*	*0.28*			*0.25*	*0.31*	*0.28*		
Indirect taxes	14.19	14.36	14.66	0.18	0.48	12.91	12.98	13.04	0.07	0.13
	0.41	*0.45*	*0.47*			*0.35*	*0.31*	*0.30*		
Primary deficit adj.	2.11	-1.14	-2.47	-3.25	-4.58	3.18	1.01	1.13	-2.17	-2.05
	0.65	*0.62*	*0.61*			*0.56*	*0.65*	*0.55*		
Primary expenditures adj.	47.53	44.92	44.04	-2.60	-3.49	46.36	45.27	45.37	-1.10	-0.99
	1.69	*1.57*	*1.54*			*1.39*	*1.38*	*1.27*		
Transfers adj.	19.90	19.39	19.21	-0.50	-0.69	19.08	19.19	19.34	0.12	0.26
	0.93	*0.84*	*0.84*			*0.78*	*0.80*	*0.72*		
Total revenue adj.	45.42	46.07	46.50	0.65	1.09	43.18	44.26	44.24	1.08	1.05
	1.43	*1.50*	*1.58*			*1.24*	*1.15*	*1.16*		

Notes: Variables are in share of GDP. Primary deficit adj., Primary expenditures adj., Transfers adj., Total revenues adj., are cyclically adjusted variables. Standard deviation of the mean in italics.
Source: OECD.

Table 5.4 Expansionary and contractionary fiscal adjustment-macroeconomic performance

	Expansionary					Contractionary				
	Before	During	After	Diff	Diff	Before	During	After	Diff	Diff
	(a)	(b)	(c)	(b) - (a)	(c) - (a)	(a)	(b)	(c)	(b) - (a)	(c) - (a)
GDP growth rate (G7)	-0.18	0.89	1.08	1.07	1.26	-0.24	-0.84	-1.21	-0.60	-0.97
	0.28	*0.19*	*0.22*			*0.28*	*0.25*	*0.26*		
Unemployment rate (G7)	3.09	2.98	2.40	-0.11	-0.69	0.05	0.09	0.50	0.04	0.45
	0.76	*0.74*	*0.69*			*0.46*	*0.46*	*0.52*		
Business Investment	3.09	8.54	7.64	5.45	4.55	10.66	4.34	7.26	-6.31	-3.40
	1.53	*1.18*	*1.24*			*5.03*	*3.13*	*1.72*		
Private Consumption	2.14	3.56	3.75	1.42	1.61	2.18	2.43	1.69	0.25	-0.49
	0.36	*0.31*	*0.27*			*0.34*	*0.45*	*0.34*		
Trade balance/GDP	1.36	2.42	2.18	1.07	0.82	-1.77	-1.22	-0.13	0.56	1.64
	0.63	*0.78*	*0.89*			*0.81*	*0.75*	*0.62*		
Long term real interest rates (G7)	0.19	-0.50	0.31	-0.69	0.12	0.43	0.23	0.49	-0.20	0.05
	0.36	*0.49*	*0.42*			*0.43*	*0.60*	*0.26*		
Inflation rate (G7)	2.99	3.25	2.09	0.26	-0.90	3.95	4.40	3.57	0.45	-0.38
	0.82	*0.77*	*0.53*			*0.90*	*1.06*	*0.92*		
Exchange rate	-0.92	-0.21	1.44	0.71	2.36	-1.40	-2.26	-1.76	-0.86	-0.37
	0.96	*0.88*	*0.62*			*0.74*	*1.18*	*0.84*		

Notes:
GDP growth rate (G7), Unemployment rate (G7), Long term real interest rates (G7), Inflation rate (G7) are in difference from the weighted average for the G7 countries. Exchange rate, Business investments, Private consumption are growth rates. Standard deviation of the mean in italics.
Source: OECD.

Table 5.5 Successful and unsuccessful fiscal adjustments-macroeconomic performance

	Successful					Unsuccessful				
	Before	During	After	Diff	Diff	Before	During	After	Diff	Diff
	(a)	(b)	(c)	(b) - (a)	(c) - (a)	(a)	(b)	(c)	(b) - (a)	(c) - (a)
GDP growth rate (G7)	0.21	0.33	0.41	0.12	0.20	-0.38	-0.01	-0.41	0.38	-0.03
	0.26	*0.28*	*0.35*			*0.30*	*0.26*	*0.22*		
Unemployment rate (G7)	1.66	1.29	0.63	-0.37	-1.03	0.81	1.12	1.34	0.31	0.52
	1.02	*1.00*	*0.93*			*0.52*	*0.54*	*0.60*		
Business Investment	7.93	9.16	8.67	1.23	0.74	3.72	6.58	5.70	2.85	1.98
	1.66	*1.80*	*1.14*			*2.26*	*1.27*	*1.50*		
Private Consumption	2.59	3.84	3.30	1.25	0.71	1.95	2.59	2.20	0.64	0.25
	0.32	*0.38*	*0.36*			*0.42*	*0.30*	*0.32*		
Trade balance/GDP	1.02	1.71	1.69	0.69	0.67	-0.03	0.73	1.28	0.77	1.31
	0.73	*0.78*	*0.76*			*0.64*	*0.84*	*0.83*		
Long term real interest rates (G7)	0.67	0.11	-0.47	-0.57	-1.14	0.46	0.36	1.03	-0.10	0.57
	0.26	*0.40*	*0.39*			*0.46*	*0.65*	*0.32*		
Inflation rate (G7)	2.22	1.49	1.71	-0.73	-0.51	1.92	2.42	1.44	0.50	-0.48
	0.71	*0.47*	*0.42*			*0.66*	*0.71*	*0.48*		
Exchange rate	-0.20	1.89	0.98	2.09	1.18	-1.04	-0.47	0.61	0.57	1.65
	1.15	*1.01*	*0.43*			*0.73*	*0.76*	*0.77*		

Notes:
GDP growth rate (G7), Unemployment rate (G7), Long term real interest rates (G7), Inflation rate (G7) are in difference from the weighted average for the G7 countries. Exchange rate, Business investments, Private consumption are growth rates. Standard deviation of the mean in italics.
Source: OECD.

Table 5.6 Success and growth – single equation approach

Dependent variables	S^*	Growth	S^*	Growth
	(1)	(2)	(3)	(4)
S^e		0.002		
		(1.79)		
Growth				0.002
				(1.79)
ΔG	-100.03	-0.23		
	(-7.58)**	(-1.88)**		
ΔT	104.9	-0.18		
	(7.05)**	(-1.36)		
(ΔG - ΔT)			-102.5	-0.027
			(8.12)**	(-0.22)
(ΔG + ΔT)			2.45	-0.203
			(0.39)	(-5.05)
Growth (t-1)	13.4	0.42	13.4	0.42
	(1.95)**	(8.17)	(1.95)**	(8.17)
Growth G7 (t-1)		0.001		0.001
		(0.002)		(0.002)
Deficit/GDP (t-1)	-26.04	0.047	-26.04	0.047
	(-5.32)**	(1.18)	(-5.32)**	(1.18)
Debt/GDP (t-1)	5.09	-0.004	5.09	-0.004
	(5.80)**	(-0.53)	(5.80)**	(-0.53)
Left government	1.45		1.45	
	(4.24)**		(4.24)**	
Centre government	-0.03		-0.03	
	(-0.05)		(-0.05)	
Majority government	0.75		0.75	
	(2.40)**		(2.40)**	
Number of observations	417	417	417	417

Notes:
Probit specification in columns 1 and 3. OLS regressions in columns 2 and 4. Dependent variables: Success (S^*) in columns 1, 3, and real per capita GDP growth rate (Growth) in columns 2, 4. S^e= variable measuring agents' expectations about S^*. ΔG = change in cyclically adjusted primary spending as a share of GDP. ΔT = change in cyclically adjusted government revenue as a share of GDP. Growth G7 = average real per capita GDP growth of the G7 countries. Deficit/GDP = government deficit as a share of GDP. Debt/GDP = public debt as a share of GDP. Left = 1 if government in office is left oriented, and zero otherwise. Centre = 1 if government in office is center oriented, and zero otherwise. Majority = 1 if a single party has the majority in the Parliament, and zero otherwise. Country fixed effects are included. t-statistics in parenthesis.

Table 5.7 Success and growth – simultaneous equation approach

Dependent variables	S^*	Growth	S^*	Growth
	(1)	(2)	(3)	(4)
S^e		0.002		0.002
		(1.86)*		(1.86)*
Growth	31.75		31.75	
	(1.98)**		(1.98)**	
ΔG	83.86	-0.23		
	(-5.96)**	(-1.86)*		
ΔT	103.05	-0.19		
	(6.62)**	(-1.34)		
(ΔG - ΔT)			-93.4	-0.022
			(-7.16)**	(-0.17)
(ΔG + ΔT)			9.6	-0.21
			(1.36)	(-4.99)**
Growth (t-1)		0.42		0.42
		(8.23)**		(8.23)**
Growth G7 (t-1)		-0.006		-0.006
		(-0.09)		(-0.09)
Deficit/GDP (t-1)	-24.59	0.04	24.59	0.04
	(-4.95)**	(1.04)	(4.95)**	(1.04)
Debt/GDP (t-1)	4.67	-0.003	4.67	-0.003
	(5.15)**	(-0.44)	(5.15)**	(-0.44)
Left government	1.32		1.32	
	(3.84)**		(3.84)**	
Centre government	-0.06		-0.06	
	(-0.10)		(-0.10)	
Majority government	0.69		0.69	
	(2.22)**		(2.22)**	
Number of observations	417		417	
χ^2 test of over. restrictions	7.29		7.29	

Notes:

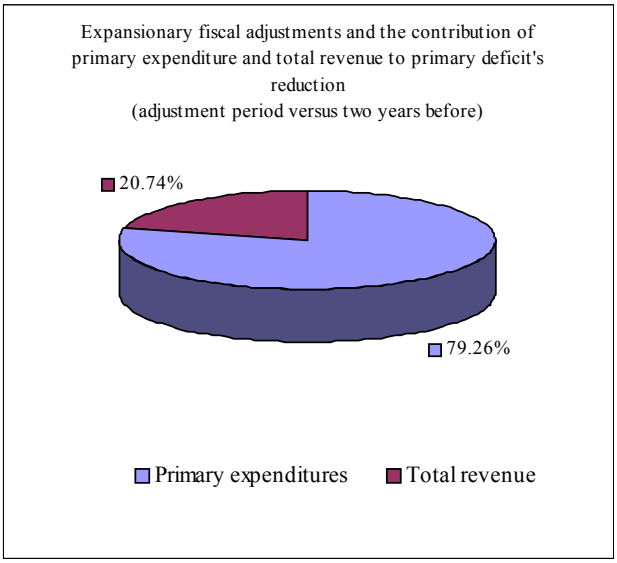
Simultaneous equations approach. Estimation by AGLS technique. Dependent variables: Success (S^*) and real per capita GDP growth rate (Growth). S^e variable measuring agents' expectations about S^*. ΔG = change in cyclically adjusted primary spending as a share of GDP. ΔT = change in cyclically adjusted government revenue as a share of GDP. Growth G7 = average real per capita GDP growth of the G7 countries. Deficit/GDP = government deficit as a share of GDP. Debt/GDP = public debt as a share of GDP. Left = 1 if government in office is left oriented, and zero otherwise. Centre = 1 if government in office is center oriented, and zero otherwise. Majority = 1 if a single party has the majority in the Parliament, and zero otherwise. Country fixed effects are included. t-statistics in parenthesis.

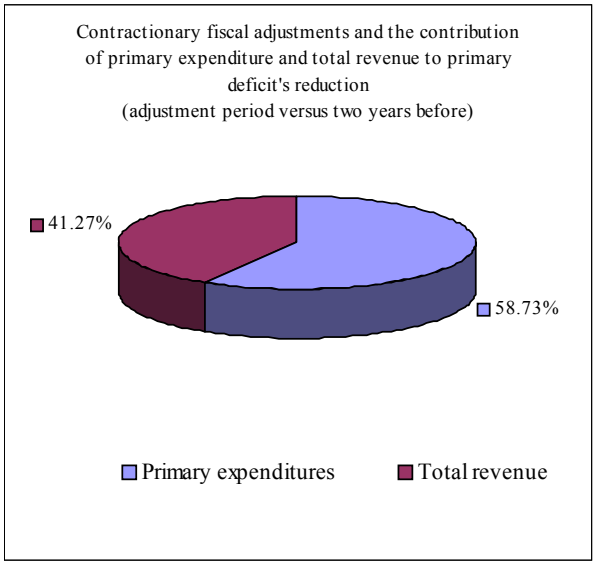
Table 5.8 Success, growth and monetary policy – simultaneous equation approach

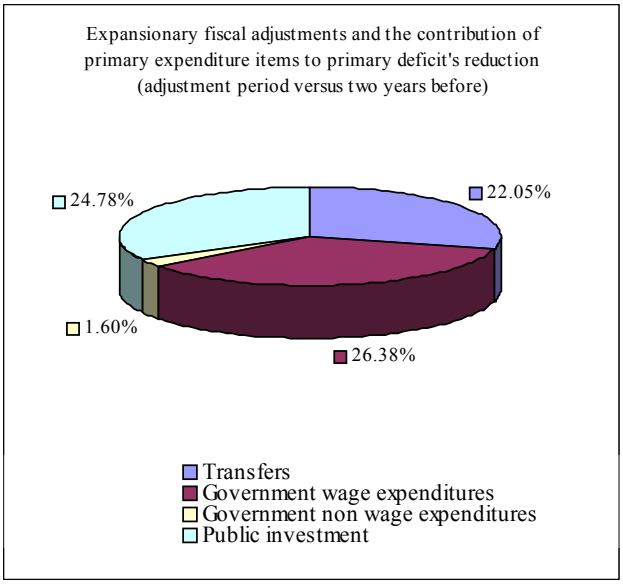
Dependent variables	S^*	Growth	S^*	Growth
	(1)	(2)	(3)	(4)
S^e		0.002		0.002
		(2.04)**		(1.86)**
Growth	29.7		31.84	
	(1.81)*		(2.57)**	
(ΔG - ΔT)	-90.8	-0.03	-96.15	-0.03
	(-6.74)**	(-0.23)	(-7.16)**	(-0.29)
(ΔG + ΔT)	8.98	-0.21	11.03	-0.17
	(1.22)	(-4.91)**	(1.48)	(-4.28)**
Growth (t-1)		0.42		0.47
		(8.28)**		(10.3)**
Growth G7 (t-1)		-0.01		0.04
		(-0.17)		(0.56)
Deficit/GDP (t-1)	-23.5	0.04	-24.9	0.02
	(-4.52)**	(1.03)	(-4.97)	(0.67)
Debt/GDP (t-1)	4.54	-0.003	4.66	-0.006
	(4.62)**	(-0.44)	(4.89)**	(-0.95)
Left government	1.27		1.32	
	(3.53)**		(3.76)**	
Centre government	-0.05		-0.28	
	(-0.08)		(-0.44)	
Majority government	0.66		0.77	
	(2.05)**		(2.18)**	
ΔEXCH (t-1)		-0.003		
		(-0.22)		
ΔRIRS (t-1)				-0.37
				(-9.01)**
Number of observations	417		402	
χ_2 test of over. restrictions	15.77		12.13	

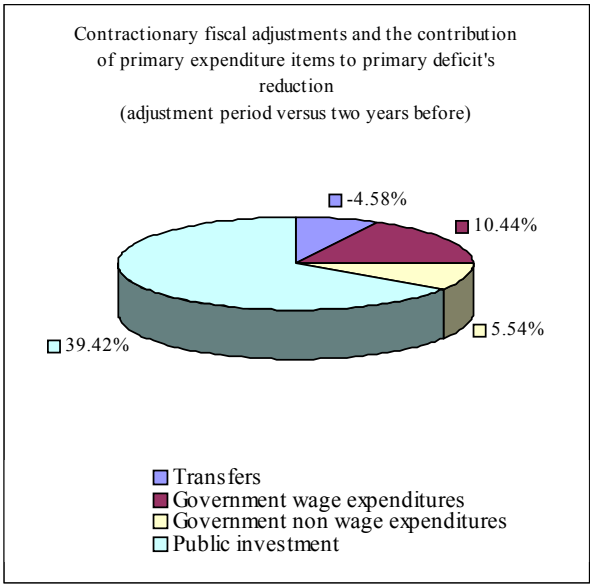
Notes:
Simultaneous equations approach. Estimation by AGLS technique. Dependent variables: Success (S^*) and real per capita GDP growth rate (Growth). S^e variable measuring agents' expectations about S^*. ΔG = change in cyclically adjusted primary spending as a share of GDP. ΔT = change in cyclically adjusted government revenue as a share of GDP. Growth G7 = average real per capita GDP growth of the G7 countries. Deficit/GDP = government deficit as a share of GDP. Debt/GDP = public debt as a share of GDP. Left = 1 if government in office is left oriented, and zero otherwise. Centre = 1 if government in office is centre oriented, and zero otherwise. Majority = 1 if a single party has the majority in the Parliament, and zero otherwise. Country fixed effects are included. t-statistics in parenthesis.

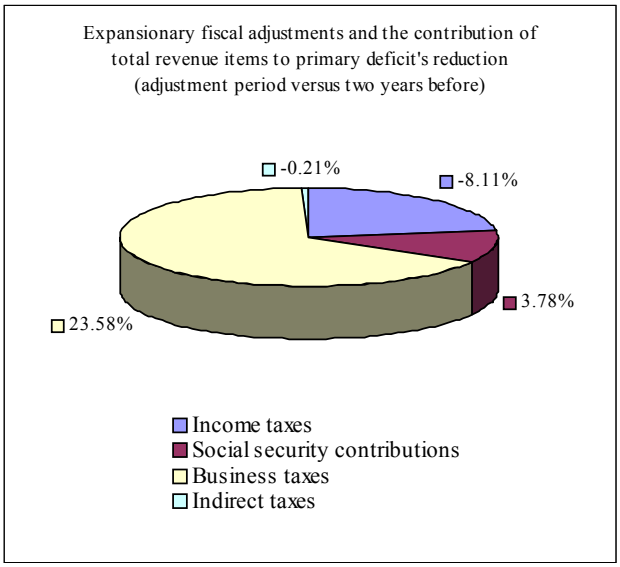
Figure 5.1


Expansionary fiscal adjustments and the contribution of primary expenditure and total revenue to primary deficit's reduction
(adjustment period versus two years before)
20.74%
79.26%
Primary expenditures
Total revenue


Contractionary fiscal adjustments and the contribution of primary expenditure and total revenue to primary deficit's reduction
(adjustment period versus two years before)
41.27%
58.73%
Primary expenditures
Total revenue


Expansionary fiscal adjustments and the contribution of primary expenditure items to primary deficit's reduction
(adjustment period versus two years before)
24.78%
22.05%
1.60%
26.38%
Transfers
Government wage expenditures
Government non wage expenditures
Public investment


Contractionary fiscal adjustments and the contribution of primary expenditure items to primary deficit's reduction
(adjustment period versus two years before)
-4.58%
10.44%
39.42%
5.54%
Transfers
Government wage expenditures
Government non wage expenditures
Public investment


Expansionary fiscal adjustments and the contribution of total revenue items to primary deficit's reduction
(adjustment period versus two years before)
-0.21%
-8.11%
3.78%
23.58%
Income taxes
Social security contributions
Business taxes
Indirect taxes

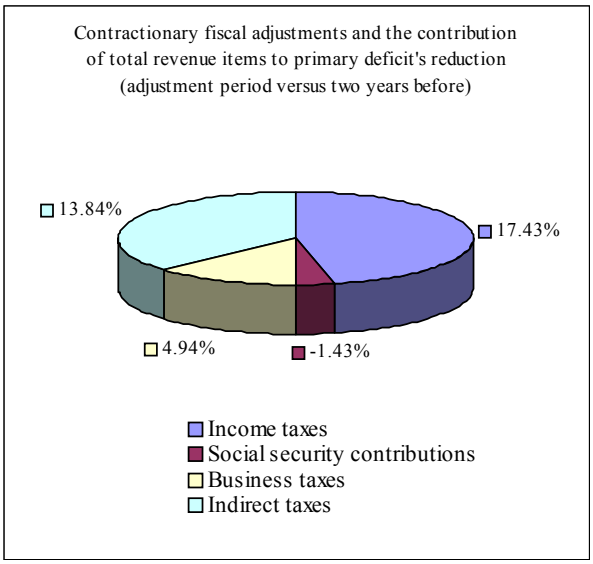
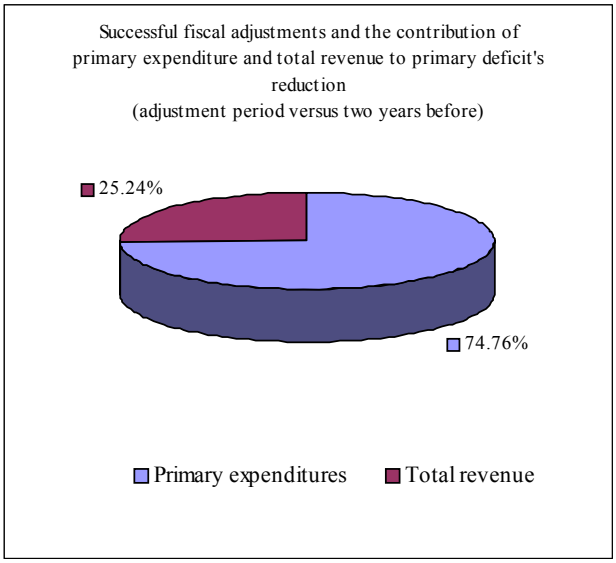
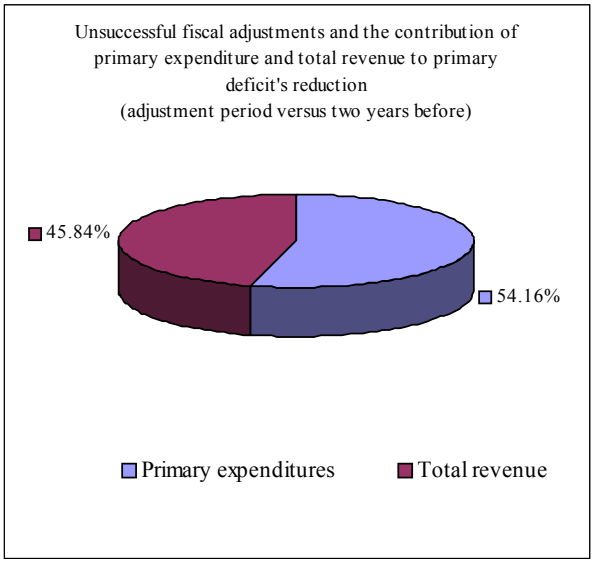
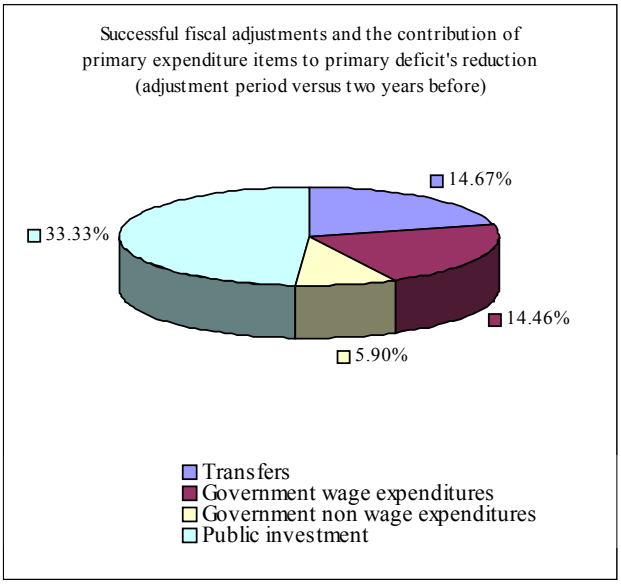
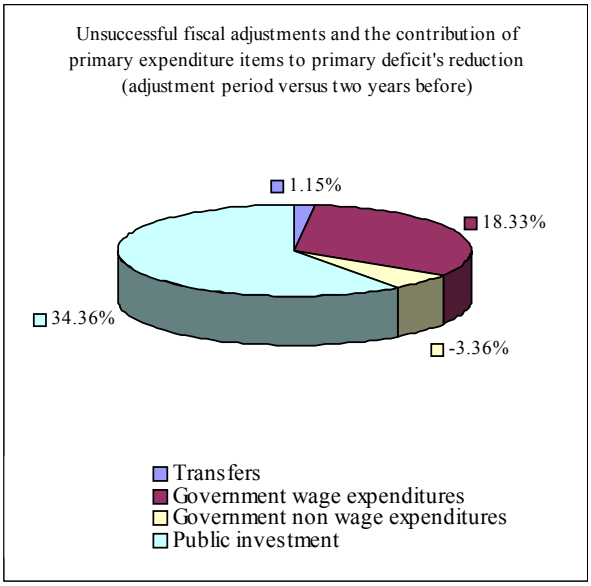

Contractionary fiscal adjustments and the contribution of total revenue items to primary deficit's reduction
(adjustment period versus two years before)
13.84%
17.43%
4.94%
-1.43%
Income taxes
Social security contributions
Business taxes
Indirect taxes

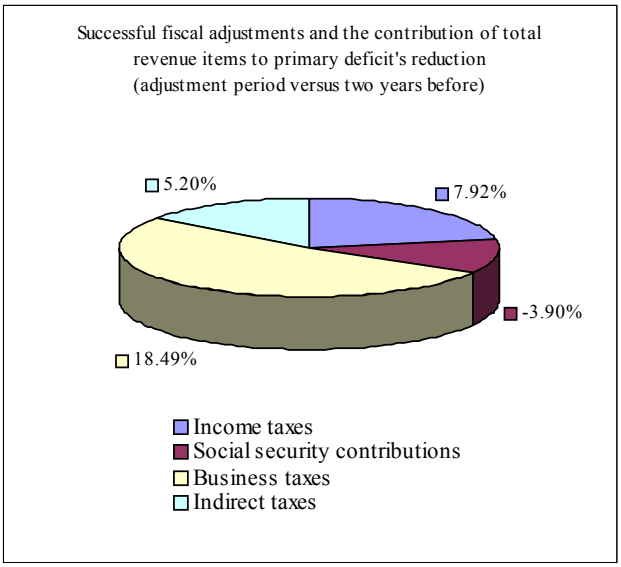
Figure 5.2

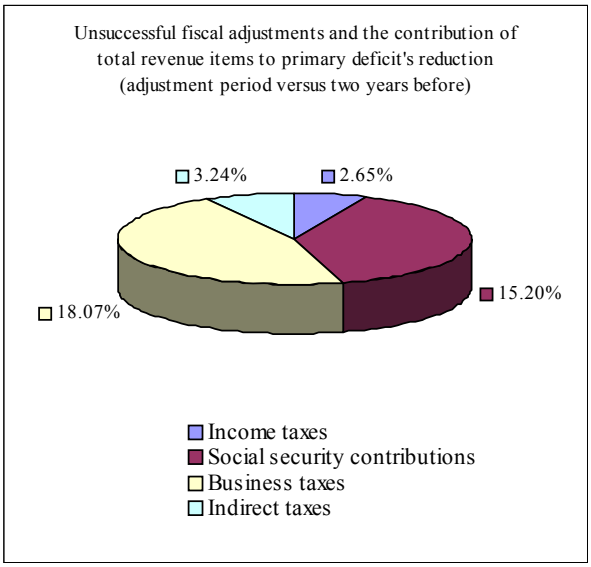

Successful fiscal adjustments and the contribution of primary expenditure and total revenue to primary deficit's reduction
(adjustment period versus two years before)
25.24%
74.76%
Primary expenditures
Total revenue


Unsuccessful fiscal adjustments and the contribution of primary expenditure and total revenue to primary deficit's reduction
(adjustment period versus two years before)
45.84%
54.16%
Primary expenditures
Total revenue


Successful fiscal adjustments and the contribution of primary expenditure items to primary deficit's reduction
(adjustment period versus two years before)
14.67%
33.33%
14.46%
5.90%
Transfers
Government wage expenditures
Government non wage expenditures
Public investment


Unsuccessful fiscal adjustments and the contribution of primary expenditure items to primary deficit's reduction
(adjustment period versus two years before)
1.15%
18.33%
34.36%
-3.36%
Transfers
Government wage expenditures
Government non wage expenditures
Public investment


Successful fiscal adjustments and the contribution of total revenue items to primary deficit's reduction
(adjustment period versus two years before)
5.20%
7.92%
-3.90%
18.49%
Income taxes
Social security contributions
Business taxes
Indirect taxes


Unsuccessful fiscal adjustments and the contribution of total revenue items to primary deficit's reduction
(adjustment period versus two years before)
3.24%
2.65%
18.07%
15.20%
Income taxes
Social security contributions
Business taxes
Indirect taxes

Discussion

Paul van den Noord

Since Silvia's presentation was very clear there is no point in summarising her paper in much detail. It may suffice to highlight the two main aspects of observed fiscal consolidations – their success in bringing down the public debt to GDP ratio on a durable basis and their degree of contraction or expansion of economic activity they entail – along with the two main channels that lead fiscal consolidations to be expansionary, which I dub here the 'bringing forward' effect and the ' quality of public finance' effect. The latter two terms are not used by Silvia, but I introduce them here in an attempt to make a bridge to other, parallel, strands of economic research.

The 'quality of public finance' effect refers to the capacity of fiscal consolidations to establish a better mix of expenditure and taxation and thereby improve the functioning of labour markets and boost economic growth. This is a policy orientation that is always useful to pursue, but the point could be made that it would be particularly useful in fiscal consolidation episodes to sweeten the bitter pill of deficit reduction and indeed make it beneficial for economic growth. The 'bringing forward effect' refers to the ability of economic agents to be forward looking and realise that successful fiscal consolidations will raise their permanent income and wealth and thereby contribute to the expansionary effect of fiscal consolidation.

The main findings of the paper – based on a thorough econometric analysis of a pooled time-series cross-country database – are that:

- The 'quality of public finance' effect is pretty powerful. Although consolidations per se have little effect on contemporary growth, those that are based on expenditure cuts (as opposed to tax increases) are clearly expansionary. The more fiscal consolidation is based on spending cuts, the more credible it is, the better labour markets perform, and hence the more money people have to spend.
- The 'bringing forward ' effect is pretty weak. A fiscal expansion that according to a probit regression model is 'successful' (i.e. producing a sustainable decline in the debt to GDP ratio in later years) is not necessarily accompanied by a contemporary expansion of economic activity. This is of course somewhat disappointing for those who believe in non-Keynesian (or counter-Keynesian) effects of fiscal consolidation.

The paper does not dwell extensively on the possible explanations for the lack of a 'bringing forward' effect. Is it because of the way in which expectations of future effects of fiscal consolidations is modelled? Perhaps so, but I do not have any alternative suggestion. Or is it because the assumption of uniformity in the response of growth to the 'bringing forward' effect across countries? I have a suspicion that this may indeed be the case and that the development of financial markets play a key role here. Financial markets, if well developed, are instrumental in transmitting information on the future functioning of the economy to the present. They render the whole economic system more forward looking and possibly also facilitate consumption smoothing and the alignment of consumption to permanent (as opposed to current)

income. As a result, a fiscal consolidation may produce powerful permanent income effects and as such be expansionary. However, in a country where financial markets are less well developed, financial markets are less instrumental in this regard, and the 'bringing forward' effect may not emerge.

I would therefore suggest that Silvia in a next paper interact her expectations variable with a variable that gauges the (country- and time-specific) degree of financial market development. I would expect statistically significant results, with the 'bringing forward' effect turning out powerful in countries where financial markets are well developed. My hope that this will be the case is rooted in our own research results (Buti *et al.*, 2008), which point to a strong analogous 'bringing forward' effect of structural policy if financial markets are well developed. The mechanisms behind it are similar: structural reform raises future income and if financial markets are well developed they 'bring forward' this information into, first, permanent income and, next, current consumption and possibly investment.

Part III - Response of Fiscal Policy to the Cycle

6 The cyclical response of fiscal policies in the euro area. Why do results of empirical research differ so strongly?

Roberto Golinelli and Sandro Momigliano [*]

6.1. Introduction

Whether discretionary fiscal policies in industrialized countries act counter- or pro-cyclically and whether their reaction is symmetric or asymmetric over the cycle are still largely unsettled questions. They are important for a variety of reasons. First, answering them would enhance our understanding of past developments and, more generally, of macroeconomic fluctuations, with potential implications on the debate concerning the right model to account for them. Second, clarifying the actual behaviour of governments would offer a useful reference point for the theoretical debate, which is on-going since at least the Thirties but has become intense in recent years, on the need and scope for counter-cyclical stabilization policies. Finally, these answers represent a necessary starting point for proposals concerning fiscal rules and institutional reforms. The latter point is particularly relevant in the European context, where fiscal policy remains the only instrument against asymmetric shocks, since national monetary and exchange rate policies are no longer available.

Over the last decades, several empirical works have analysed the behaviour of budgetary policies over the cycle in industrialized countries. Focusing on relatively recent works and excluding studies concerned with individual economies, we reviewed a group of 21 studies, all either assessing the fiscal behaviour of EMU countries or presenting results for a group of countries where EMU countries are prominent.[61] While many studies conclude that policies tended to be pro-cyclical, there are almost as many pointing to a-cyclicality and a few suggest that policies were counter-cyclical. Furthermore, little consensus seems to exist on whether the behaviour has been symmetrical over good and bad times.

We then restricted our analysis to a more homogeneous subset of 12 studies that share the following characteristics: they include the output gap *in levels* as indicator of cyclical conditions and they measure discretionary policies (implicitly or explicitly) on the basis of the change in the cyclically adjusted primary balance.

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[61] We restricted our attention to the studies that focus on industrialized countries. The prominent role of EMU countries in the sample is also a reflection of the availability of the data. The identification of these studies is just a starting point for our analysis. While we have not intentionally excluded any relevant research, it is likely that we have overlooked some, given the vastness of the literature. We apologise to the authors for these unintentional omissions. Still, we do not think it likely that a more comprehensive survey would modify our analysis and conclusions.

On the basis of the first condition, we excluded from our analysis 7 studies[62] that include growth or similar measures (change in the output gap, difference between growth and trend growth) as indicators of cyclical conditions. The choice of the output gap *in levels* focuses on whether the position of the economy is above or below its trend (potential) level and on its distance from it, while the reference to growth or similar measures focuses on whether the economy is in an upturn or in a downturn and its intensity. It is outside the scope of this paper to judge which cyclical indicator is preferable.[63] We restricted our attention to the first group of studies as they represent the majority view in the literature on this issue.[64] On the basis of the second condition we excluded two studies,[65] which rely on a different concept of discretionary action.

Even this set of 12 studies shows results that fully span the range of positions expressed in the whole literature. Table 6.1 reports, for each of these 12 studies, the indication concerning the sign and the symmetry of the reaction of discretionary policies to cyclical conditions and some characteristics of the specific regression we refer to.

There are many factors that could plausibly explain the differences in the results. The studies differ in several respects: the model of used policy decisions, the estimation procedures, the countries included in the sample, the analyzed periods of time, the sources of data (including different vintages of data from the same source).

In this paper we try to disentangle the relative role of these factors. However, we do not examine the role of slight variations in the specific countries included in the different samples. We base our analysis on data for a group of 11 EMU countries (only Luxembourg and Slovenia are excluded for lack of data).[66]

In Section 6.2 we assess the impact of the different choices in modelling fiscal behaviour. Abstracting from a number of specific characteristics pertaining to the individual analyses, in the 12 studies we find three basic specifications of the fiscal policy reaction function. We show that these three fiscal rules – which include among regressors only the initial conditions of public finances (debt and deficit) and the output gap – embody different notions of fiscal policy cyclicality and may lead to different interpretations of the policy behaviour. In our opinion, there is often insufficient

[62] Fatás and Mihov, 2002; von Hagen et al., 2002; Hallerberg and Strauch, 2002; Lane, 2003; Melitz, 2000; Mink and De Haan, 2006 and OECD, 2003.
[63] Both indicators carry useful information. In our opinion, they largely complement each other.
[64] The literature on the cyclicality of US budgetary policies generally focuses on the output gaps in levels or on similar indicators (Auerbach, 2002; Bohn, 1998; Cohen and Follette, 2003; Taylor, 2000).
[65] Buti and van den Noord (2004) construct an indicator for discretionary policies which aims to control for errors in forecasting. Giuliodori and Beetsma (2006), in a paper largely devoted to gauge the relevance of fiscal policy interdipendence in the European Union, estimate a fiscal rule that uses real-time data for the regressors. Concerning the dependent variable, instead of focusing on the effects of actual policies (proxied by the change in the cyclically-adjusted primary balance, CAPB henceforth, measured *ex post*) the authors point out that the latter are "polluted" with the reactions to events that take place after the budget is finalized and focus on government plans (proxied by the OECD forecast one-year-ahead for the CAPB).
[66] In Golinelli and Momigliano (2006) we find that the fiscal behaviour over the cycle of the group of OECD countries outside EMU for which data of sufficient time length are available (US, Japan, Australia, Canada, New Zealand, UK, Sweden and Denmark) is significantly different from that of EMU countries.

awareness of these issues when the estimates of the output gap parameter of the different studies are used in the policy debate.[67]

In the following Sections 6.3-6.4 we focus on the first model, having shown that it is possible to approximately recover from its estimates those based on the other two models. In Section 6.3 we examine the impact of time period, source and type of data (real-time or *ex post*) on the estimates of the fiscal reaction to cyclical conditions. We estimate rolling regressions with a fixed 15-year window over the period 1978-2006 for four alternative datasets: three are based on *ex post* data sources (OECD, AMECO, OECD data for primary deficit and debt with Hodrick-Prescott filter estimates of the output gap) and the fourth largely on real-time data (taken from Golinelli and Momigliano, 2006), available only for the reduced 1988-2006 period. Results show that the different data sources, even within the *ex post* data sets, determine sizeable shifts in the estimates of the output gap parameter. Independently of the data source, a slight tendency towards a pro-cyclical (or a less counter-cyclical) behaviour emerges over time.

In Section 6.4 we examine the impact of the same factors (time period, source and type of data) on determining whether fiscal policies have been symmetrical or asymmetrical over the cycle. We find contrasting results, depending on both *ex post* data sources and sample periods. Results suggest that the asymmetric behaviour of the discretionary policy, when present, entails shifts in all the parameters of the rule and not only in the output gap parameter.

In Section 6.5 we extend the basic fiscal rule adding, when feasible, the additional variables found significant in the 12 studies we focus on. While there is a remarkable increase of the explanatory power of the model, the results broadly confirm the conclusions reached in Sections 6.3-6.4. The only important differences are the following: a) policy asymmetry is found for all data sources; b) the evidence of counter-cyclical behaviour with real-time data becomes clearer. Section 6.6 concludes.

6.2. Modelling choices

If we focus on the "core" components of the fiscal rule – the dependent variable and the initial conditions of public finances – in the restricted set of 12 studies, we find three basic specifications of fiscal behaviour. None of the three specifications do justice to the richness of the studies we review, which often devote large part of their attention to determinants different from cyclical conditions. Nevertheless the analysis of the three models contributes significantly, in our opinion, to understand why there is no consensus on this issue in the literature.

6.2.1 The three models

Most studies estimate what we call a "**CAPB Model**" fiscal rule, in which the discretionary fiscal action, measured by the change in the cyclically-adjusted primary balance (Δ CAPB),[68] is explained by the initial state of public finances (measured by

[67] The same modelling choices are also followed in other areas of the literature on fiscal policy behaviour, for example that focusing on developing countries.

[68] Some authors, among which Galí and Perotti (2003), use as dependent variable the level of the CAPB, instead of its change. This specification is equivalent to that of eq.[1], as it gives the same estimates for

the cyclically adjusted primary balance and the debt of general government) and the cyclical conditions (measured by the level of the output gap):

$$\Delta \text{CAPB}_{i\,t} = \phi^{C}_{capb}\,\text{CAPB}_{\,i\,t-1} + \phi^{C}_{debt}\,\text{DEBT}_{\,i\,t-1} + \phi^{C}_{gap}\,\text{GAP}_{i\,(t \text{ or } t-1)} + u_{i\,t} \qquad [1]$$

A positive value of ϕ^{C}_{gap} indicates a counter-cyclical policy, while a negative value points to pro-cyclicality. Some of the studies include the simultaneous output gap (*i.e.* at time *t*, the year in which budgetary actions have their effects); others include the lagged output gap (*i.e.* at time *t*–1, the year in which budgetary decisions are taken). The two variants of the CAPB Model (henceforth "**CAPB-s Model**" and "**CAPB-l Model**", respectively) lead to similar results (as we show in Section 3) since the values of the output gap are highly persistent.[69] Finally, the unobservable term $u_{i\,t} = \mu_i + \lambda_t + \varepsilon_{i\,t}$ may include (depending on the study) individual (μ_i), time (λ_t) and random ($\varepsilon_{i\,t}$) components.

In a few studies authors estimate a broadly similar model, but assume that policy-makers react with a lag to the primary balance ($\text{PB}_{\,t-1}$) rather than to the cyclically adjusted primary balance ($\text{CAPB}_{\,t-1}$), as in the CAPB Model. Henceforth, we call this fiscal rule "**CAPB/PB Model**":

$$\Delta \text{CAPB}_{\,i\,t} = \phi^{C/P}_{pb}\,\text{PB}_{\,i\,t-1} + \phi^{C/P}_{i\,debt}\,\text{DEBT}_{i\,t-1} + \phi^{C/P}_{gap}\,\text{GAP}_{\,i\,(t \text{ or } t-1)} + u_{i\,t} \qquad [2]$$

The CAPB Model and the CAPB/PB Model are probably equally plausible. The CAPB Model is consistent with a fiscal rule where automatic stabilizers are left to operate fully (as discretionary actions do not react with a lag to their impact on the balance). This policy indication is very common in policy documents at the European level, especially after 1997, when the Stability and Growth Pact was introduced. Furthermore, the CAPB Model can be explicitly derived by a fiscal rule which assumes a target value for the level of the CAPB and inertia in policy processes (Ballabriga and Martinez-Mongay, 2002). The CAPB/PB Model may be seen as more realistic, as policy-makers may be more concerned with headline figures; moreover, especially in the 1970s and 1980s, data on cyclically-adjusted balances were not available and even the concept of cyclical adjustment was not widespread.

Finally, other studies, which essentially focus on the issue of asymmetry in budgetary reactions, adopt a fiscal rule in which, compared with the CAPB/PB Model, the

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all coefficients except for that of the lagged dependent variable, for which its estimate is equal to 1 plus the estimate obtained with eq.[1]. It is largely a presentational issue, but we tend to prefer the specification in changes (eq. [1]) mainly because the explanatory power of the model and of the statistical significance of the coefficient of the lagged deficit are not artificially inflated by the component attributable to inertia (which, in turn, is largely an unexplained phenomenon). Note also that all the variables included in the models of this section are expressed in terms of ratios to potential and nominal GDP.

[69] The variable $\text{GAP}_{i\,t-1}$ is a plausible alternative to GAP_{it}, as policy-makers may react to current cyclical conditions or use them to forecast cyclical conditions in the following year. The inertia and complexity of the decision-making process may also justify the reference to the lagged output gap. A purely statistical reason for preferring $\text{GAP}_{\,i\,t-1}$ instead of $\text{GAP}_{\,i\,t}$ is that the latter requires recourse to instrumental variables, as the output gap is affected by fiscal policy, which opens up a number of equally acceptable alternatives with potential effects on the results.

dependent variable Δ CAPB$_{it-1}$ is substituted by Δ PB$_{it-1}$[70] Henceforth, we call this specification **"PB Model":**

$$\Delta PB_{i\,t} = \phi^{P}_{pb}\, PB_{i\,t-1} + \phi^{P}_{debt}\, \mathrm{DEBT}_{i\,t-1} + \phi^{P} gap\, \mathrm{GAP}_{i\,(t \text{ or } t-1)} + u_{i\,t} \qquad [3]$$

The PB Model assumes a behaviour of fiscal authorities significantly different from that of the other two models, as the policy decision (dependent variable) includes the effects of both the discretionary actions and the automatic stabilizers.[71] This is shown by identity [4], in which the primary balance is decomposed into the cyclically adjusted primary balance and in a cyclical component, equal to the product of the output gap and a coefficient $\omega_{i\,t}$ capturing the effects of automatic stabilizers.

$$\mathrm{PB}_{i\,t} \equiv \mathrm{CAPB}_{i\,t} + \omega_{i\,t}\, \mathrm{GAP}_{i\,t} \qquad [4]$$

The results in these studies have been used to identify the cyclical reaction of discretionary policies by subtracting from the estimated coefficient of the output gap (ϕ^{P}_{gap}) an average value (ω) of the individual coefficients $\omega_{i\,t}$ (which is generally assessed for the EMU countries at around 0.5; see Bouthevillain *et al.*, 2001).

$$\phi^{P(discr)}_{gap} \approx \phi^{P}_{gap} - \omega \qquad [5]$$

The use of an average value is justified by evidence of a limited variability across countries and time of the coefficients capturing the effects of the automatic stabilizers (see, e.g., Girouard and André, 2006).

6.2.2 Estimating the three models

In Table 6.2 we present estimates for a group of 11 EMU countries (only Luxembourg and Slovenia are excluded for lack of data) of the three models for the two variants (which include, respectively, the simultaneous and the lagged output gap). As most of the reviewed studies, we use *ex post* data. The source is OECD for all data except for public debt; for this variable, as OECD data are incomplete, the source is the AMECO database.[72] The full 1978-2006 sample is used.

Since all specifications are dynamic panels and embody fixed country effects (μ_i), their parameters are estimated by one-step GMM-sys (see Blundell and Bond, 1998), using only a subset of the potentially available instrument matrix: the *t*–2 and *t*–3 lags of the

[70] In the studies, the level of the PB, instead of its change, is used as dependent variable. As already mentioned in the case of the CAPB Model, this specification is equivalent to that of equation [3], as it gives the same estimates for all coefficients except for that of the lagged dependent variable, for which its estimate is equal to 1 plus the estimate obtained with equation [3].

[71] There is an important difference between CAPB and CAPB/PB Models on one side and the PB Model on the other concerning the dependent variable, which suggests more caution when interpreting the results of the PB Model in terms of behaviour of fiscal authorities when *ex post* data are used. In the CAPB and CAPB/PB Models it can be assumed that budget authorities are able to predict fairly accurately the effects of their discretionary actions, as the latter are in principle largely independent of cyclical conditions. In Model PB, instead, the change in the balance is not independent from the output gap.

[72] Primary borrowing and debt are expressed as ratios of potential GDP.

debt, of the output gap and of the primary balance.[73] The use of GMM-sys, compared to OLS, avoids estimation biases. Compared to other instrumental-variable estimators, such as the Arellano and Bond (1991) GMM-dif, GMM-sys is potentially less affected by the problem of weak instruments, *i.e.* scarcely correlated with the variables to be instrumented, as is typical with persistent data such as debt or the output gap (see Celasun and Kang, 2006, for a thorough discussion of alternative estimators in the context of fiscal reaction functions).[74] Our preference for GMM-sys is also supported by the results reported in the Appendix, where the performance of alternative estimators is reported.

Contrary to the most common practice of the reviewed studies, time effects (λ_t) are allowed (in all regressions presented in Table 6.2 they are found to be jointly significant). We include the time dummies (accounting for effects that are almost invariant to all countries and change over time) as, hopefully, they can reduce the omitted-variable bias stemming from the very simple specifications we are using.[75]

Four results stand out, which are largely independent of the sample used and the source of data:

(a) The estimates of the cyclical reaction using the CAPB/PB Model tend to indicate a more counter-cyclical behaviour than those of the CAPB Model.

(b) The estimates of the cyclical reaction based on the PB Model are relatively close to those of the other two models. This result is rather surprising. We would expect a large difference (close to 0.5) because the estimated coefficient of the PB Model should include, in principle, also the effects of automatic stabilizers.

(c) The estimates of the parameters of the initial fiscal conditions (debt and deficit) are largely constant across the three models, notwithstanding the fact that only in the CAPB Model the lagged deficit is cyclically adjusted.

(d) The estimates of almost all parameters are not significantly affected by the choice between the simultaneous and the lagged output gap (this emerges by comparing the coefficients in columns 1-3 with the corresponding ones in columns 4-6); the only (partial) exception is the estimate of the cyclical reaction measured by the PB Model.

[73] Omitting from the instruments the more distant lags does usually entail a limited loss of information. On the other side, it has been often pointed out that using too many instruments can significantly reduce the power of the Sargan test in finite samples (see, e.g., Bond, 2002).

[74] In Hayakawa (2007), it is analytically shown that in finite samples GMM-sys is less biased than GMM-dif, even though it uses more instruments. However, as shown by the simulations reported in Bun and Kiviet (2006), the ranking of the alternative estimators depends on the specific model and characteristics of data.

[75] Allowing time dummies determines a non-negligeable shift of all estimates of the cyclical reaction towards counter-cyclicality (Table 6.2 reports the results of the specifications without time dummies). We interpret this result, in line with the argument stated in the main text, as reflecting an omitted variable bias in the coefficient of the output gap. This interpretation is supported by the fact that broadly the same shift towards counter-cyclicality in the estimates of the cyclical reaction occurs when we add additional variables (see Section 6.5).

Result (d), as already mentioned, reflects the high persistence of the output gap. In the following two sections we explain the other results.

6.2.3 Comparing Model CAPB and Model CAPB/PB

Starting from the CAPB-l Model (*i.e.* equation [1], in the variant which includes the lagged output gap) we subtract and add $\phi^{C-l}_{capb}\ \omega_{i\ t-1}\ \mathrm{GAP}_{i\ t-1}$ on the right side of the expression. Using also identity [4], we obtain the following equation, in which the CAPB/PB-l Model is expressed in terms of the CAPB-l Model parameters:

$$\Delta\ \mathrm{CAPB}_{i\,t} = \phi^{C-l}_{capb}\ \mathrm{PB}_{\ i\,t-1} + \phi^{C-l}_{debt}\ \mathrm{DEBT}_{\ i\,t-1} + (\phi^{C-l}_{gap} - \phi^{C-l}_{capb} \times \omega_{i\,t-1})\ \mathrm{GAP}_{i\,t-1} + u_{i\,t} \qquad [6]$$

By comparing equation [6] with the CAPB/PB-l Model (*i.e.* equation [2], in the variant which includes the lagged output gap), we identify the following three relationships between the parameters:

$$\phi^{C/P-l}_{pb} = \phi^{C-l}_{capb} \qquad [7a]$$

$$\phi^{C/P-l}_{debt} = \phi^{C-l}_{debt} \qquad [7b]$$

and, using also eq. [7a]:

$$\phi^{C/P-l}_{gap} \approx \phi^{C-l}_{gap} - (\phi^{C-l}_{capb} \times \omega) = \phi^{C-l}_{gap} - (\phi^{C/P-l}_{pb} \times \omega) \qquad [7c]$$

The first two equivalences indicate that in the CAPB and CAPB/PB Models the effects of the initial fiscal conditions (notwithstanding the different choice regarding the balance) are measured by the same parameters. The third relationship, which is not exact because we substitute the time- and country-specific coefficients measuring the effects of the automatic stabilizers $\omega_{i\ t-1}$ with their average value ω, indicates that the reaction to cyclical conditions estimated in the CAPB/PB Model is approximately equal to ϕ^{C-l}_{gap} (which measures the estimate of the reaction in the CAPB Model) *minus* the product of ω and the coefficient for the lagged deficit.

This latter component is negative, since $\omega > 0$ (otherwise, the automatic budgetary reactions would be destabilizing) and $\phi^{C/P-l}_{pb} = \phi^{C-l}_{capb} < 0$ (otherwise, we would observe exploding deficits). Therefore, the estimates of the coefficient of the output gap in the CAPB/PB-l Model are systematically more counter-cyclical than those obtained using the CAPB-l Model. On the basis of the estimated parameters of the regression for the CAPB/PB-l Model in Table 6.2, the difference stemming from the modelling choice is 0.08, about twice the standard deviation of the estimate for the coefficient. A similar difference can be found when comparing the CAPB-s Model with the CAPB/PB-s Model.

The explanation of the result obtained above is rather intuitive. Compared to the CAPB Model, in the CAPB/PB Model discretionary policies react to the lagged effects of the automatic stabilizers on the budget (with the same coefficient of their reaction to the lagged cyclically-adjusted deficit). This additional reaction, which is stabilizing with respect to public finances, is pro-cyclical and determines (compared to the CAPB

Model) a corresponding shift towards counter-cyclicality in the estimate of the coefficient of the output gap.

Summing up, CAPB and CAPB/PB Models are basically a re-parameterization of one another (as such, data cannot discriminate between them) and lead to different estimates only for the parameter of the output gap. The differences in the latter can be attributed to a different notion of cyclicality (net or gross of the reaction to the lagged effects of automatic stabilizers). In the lower part of Table 6.2 we present the estimate of ϕ^{C-l}_{gap} obtained using the parameters estimated with the CAPB/PB Model and the approximated relationship [7c]. The results are almost identical to the estimates based on the CAPB Model, suggesting that actual data fail to reject that relationship.

6.2.4 Interpreting the cyclical reaction parameter in Model PB

We add to both sides of the CAPB/PB-s Model (*i.e.* eq. [2] in the variant that includes the simultaneous output gap) the effects of the automatic stabilizers ($\Delta\ [\omega_{i\,t}\ \mathrm{GAP}_{i\,t}]$). Using also identity [4], we obtain the following equation:

$$\Delta\ \mathrm{PB}_{i\,t} = \phi^{C/P}_{pb}\ \mathrm{PB}_{i\,t-1} + \phi^{C/P}_{i\,debt}\ \mathrm{DEBT}_{i\,t-1} + (\phi^{C/P}_{gap} + \omega_{i\,t})\ \mathrm{GAP}_{i\,t} - \omega_{i\,t-1}\ \mathrm{GAP}_{i\,t-1} + u_{i\,t} \qquad [8]$$

Eq. [8] differs from the PB-s Model by the presence of the last term ($-\ \omega_{i\,t-1}\ \mathrm{GAP}_{i\,t-1}$). It shows that if we could omit that term, directly estimating the discretionary cyclical reaction in the CAPB/PB-s Model would be approximately equivalent to subtracting ω from the estimate of the cyclical reaction in the PB-s Model (the two alternatives are not exactly equivalent because we treat ω as a constant).

We can disregard the last term of eq. [8] only if we can assume that it is uncorrelated with all the other regressors. However, the very notion of economic cycle implies the correlation over time of the output gap. If we assume the autocorrelation coefficient $\rho = 1$, so that $\mathrm{GAP}_{i\,t} = \mathrm{GAP}_{i\,t-1} + \mathrm{v}_{i\,t}$ and $\omega_{i\,t} = \omega_{i\,t-1}$, we obtain the following equation:

$$\Delta\ \mathrm{PB}_{i\,t} = \phi^{C/P}_{pb}\ \mathrm{PB}_{i\,t-1} + \phi^{C/P}_{i\,debt}\ \mathrm{DEBT}_{i\,t-1} + (\phi^{C/P}_{gap})\ \mathrm{GAP}_{i\,t} + u_{i\,t} + \omega_{i\,t}\ \mathrm{v}_{i\,t} \qquad [9]$$

Eq. [9] shows that under these assumptions the estimate of the output gap parameter of the CAPB/PB-s Model is identical to that of the PB-s Model.[76]

As noted, the output gap is highly persistent, with values of the autocorrelation coefficient ρ for the different data sources ranging between 0.8 and 0.9. This behaviour (a *quasi* random walk) intuitively explains our findings in Section 2.2 that the estimates of the cyclical reaction in the PB model are relatively close to those of the CAPB/PB Model.

Sustituting $\mathrm{GAP}_{i\,t}$ with $\rho\ \mathrm{GAP}_{i\,t-1}$, with a few simple manipulations we can obtain approximate relationships between the parameters of the PB Model and those of the CAPB Model. The effects of the initial fiscal conditions are measured by approximately the same parameters (an exact equivalence was found in Section 2.3 for the CAPB and CAPB/PB models). The approximate relationship between the coefficients measuring

[76] If the output gap behaves as a random walk, adding (or subtracting) the effects of the automatic stabilizers from the dependent variable has no impact on the estimates because in that case $\Delta\ (\omega_{i\,t}\ \mathrm{GAP}_{i\,t})$ collapses into the unpredictable noise $\omega_{i\,t}\ v_{it}$, which simply inflates the random component $u_{i\,t}$.

the reaction to cyclical conditions (for the variants which includes the lagged output gap) is the following:

$$\phi^{P-l}_{gap} \approx \phi^{C-l}_{gap} - (\phi^{P-l}_{pb} \times \omega) + ((1-\rho) \times \omega) \qquad [10]$$

In the lower part of Table 6.2 we present the estimate of ϕ^{C-l}_{gap} obtained using the parameters estimated with the PB Model and eq. [10]. As in the similar exercise described in Section 6.2.3, the results are very close to the estimate based on the CAPB Model, suggesting that eq. [10] is validated by actual data.

Summing up, if the output gap has low autocorrelation the estimate of the output gap parameter of the PB Model differs from that of the CAPB/PB Model by approximately the value of ω. The two estimates are therefore consistent, taking into account eq. [5]. If the output gap has high autocorrelation, which is our case, the two estimates are instead relatively close. In this case, using eq. [5] (*i.e.* subtracting ω from the PB Model estimate) leads to a large difference in the cyclical reaction attributed to discretionary policy, with the PB Model suggesting a much more pro-cyclical (or a much less counter-cyclical) policy than the CAPB/PB Model (or the CAPB Model). The difference can be as large as 0.5, or twelve times the standard deviation of the estimates.

It is hard to judge, and it is outside the scope of this paper, whether the PB model is a better description of policy choices than the other two. In particular, all the three models lack a fully satisfactory theoretical underpinning. Nevertheless, the first two models appear to be more direct solutions for the specific aim of gauging the cyclicality of discretionary policies and they are used in most of the works covered in our review of the literature. We therefore refer to them in assessing the cyclicality of fiscal policies in the rest of the paper.

6.3. Time periods and sources of data

In this section we assess to what extent the estimates of the fiscal rule depend on the source of data (OECD against European Commission, henceforth EC), on the data vintage (*ex post* against real-time), and on the estimation period. We focus on the CAPB Model. In the initial part of the analysis we provide additional evidence of the broad equivalence between the results based on the CAPB-s and CAPB-l Models. Henceforth, we present results mainly based on the CAPB-l Model. We include, when jointly significant, fixed time effects.

To avoid repetitions we do not estimate the CAPB/PB and PB Models. The results for these models are approximately equal to those of the CAPB Model for all parameters except for the one assessing the cyclical reaction. To recover the estimates of the output gap parameter of the CAPB/PB-l Model, (using the approximate relationship [7c]) those of the CAPB-l Model need to be shifted upward (toward counter-cyclicality) by approximately 0.1. As for the PB-l Model, the estimates of the coefficient (using the

approximate relationship [10]) tend to be in an intermediate position between those of the other two models.[77]

Figure 6.1 compares across different samples (obtained by rolling regressions with a fixed window of 15 years over 1978-2006) the GMM-sys estimated (see Section 6.2.2) parameters using the CAPB-s Model with those using the CAPB-l Model, obtained with OECD *ex post* data. In this figure, four graphs are reported. The two in the upper row and the one in the lower left-hand allow us to assess the estimates of the parameters of, respectively, the lagged deficit (upper-left), the lagged debt (upper-right), and the output gap (lower-left). The points of each graph are marked with labels indicating the model used in the estimation (CAPB-s or CAPB-l). Each point corresponds to an estimate obtained over the sub-sample ending in the year indicated on the horizontal axis and starting 15 years before. For each estimation period, the 95% confidence interval of the estimate obtained with the CAPB-s Model is plotted. The confidence interval shown in the lower right-hand graph is an average of the two confidence intervals based on the CAPB-s and CAPB-l Models; it is centred on zero: approximately, the ϕ^{A}_{gap} point estimates falling inside this zero-interval are not significantly different from zero.

As we found in Tables 6.2 and 6.3, the estimated parameters of both lagged deficit and debt, plotted, respectively, in the first row of graphs, are indistinguishable. The ϕ^{C}_{gap} point estimates of the CAPB-l Model (in the lower left-hand graph) are always relatively close to those of the CAPB-s Model and fall well inside their confidence interval. This supports the view (based on the high persistence of the output gap) that the two variants are interchangeable. Finally, in the lower right-hand graph, ϕ^{C}_{gap} estimates with the CAPB-s and CAPB-l Models both fall inside the average 95% confidence interval, indicating that by using *ex post* OECD data the hypothesis of an a-cyclical policy cannot be rejected for all periods.

Figures 6.2-6.4 compare the CAPB-l Model parameter estimates across different samples (again obtained by rolling regressions with a fixed 15 year window) for four different data sources: OECD *ex post* data (labelled OECD), OECD *ex post* data for fiscal variables and estimates of the output gap based on *ex post* GDP and the Hodrick-Prescott filter applied to GDP in log-levels (labelled HP), AMECO *ex post* data (labelled EC) and the real-time data computed in Golinelli and Momigliano (2006) on the basis of various issues of the OECD Economic Outlook (labelled RT).[78] Due to data unavailability, the starting point of the estimates based on real-time data is 1988, which corresponds to 2002 as final year. The structure of Figures 6.2-6.3 is the same as the one for Figure 6.1 Figure 6.4 focuses only on the parameter estimates of the cyclical reaction.

From Figures 6.2-6.3 it emerges that the ϕ_{capb} and ϕ_{debt} point estimates are not statistically different for all samples and across different data sources and vintages. Instead, differences emerge for ϕ^{C-s}_{gap} point estimates. As shown in Figure 6.4, OECD and HP based estimates suggest an a-cyclical behaviour; EC and RT estimates point to a weak, generally not significant, counter-cyclicality. To translate these results in terms of the notion of cyclicality embodied in the CAPB/PB Model, all ϕ^{C-s}_{gap} estimates would

[77] As for the variants with simultaneous output gap, there is approximately the same difference (0.1) between the coefficient of the CAPB Model and the CAPB/PB Model, while the estimate of the coefficient of the PB Model tend to be close to that of the CAPB/PB Model.
[78] As OECD data for public debt are incomplete, for this variable we always use AMECO data.

need to be shifted upwards (towards counter-cyclicality) by approximately 0.1. In this case, most EC and RT estimates would become significant.

Changes in the time span do not seem to significantly influence the estimates. As the sample moves forward over time, excluding the furthest years and including the most recent ones, the estimates shift slightly in the direction of pro-cyclicality. This result contrasts with other papers, which find a shift from pro-cyclicality to a-cyclicality after the Maastricht Treaty (Wyplosz, 2006; IMF, 2004; Galí and Perotti, 2003).

In Table 6.4 we report the estimation results of the CAPB-l Model over the fixed 1988-2006 period[79] for the four different data sources and vintages. In all cases, the usual over-identifying restrictions and residuals' autocorrelation tests are always largely not rejected, while the time effects are always significant. The results broadly confirm the indications emerging from Figures 6.1-6.4.

Summing up, the results included in this section suggest the following remarks.

The significance of the fixed time effects is a common feature in all cases under scrutiny. This fact highlights the need of always including them in order to prevent biased estimates due to the omission of relevant factors influencing all countries at the same time (e.g. fluctuations in the prices of stocks and oil).

Independently of model, sample period, data source and vintage, the initial fiscal conditions (lagged borrowing and debt) always matter. This evidence suggests caution when using inferences on the cyclical response of fiscal policies based on models omitting these two regressors.

Findings about cyclical conditions do not enjoy a comparable robustness. Point estimates of the cyclical reaction of discretionary policies tend to be influenced (and the sign reversed) by the use of alternative data sources and/or vintages. The sample selection is generally less important. The overall picture is that of a-cyclicality in *ex post* data and counter-cyclicality (significant with the CAPB/PB Model and not significant with the CAPB Model) with real-time data.

6.4. Policy asymmetries

Two approaches can be followed when testing for asymmetries in fiscal behaviour. The sample can be split into two sub-samples (corresponding to "good" and "bad" times) and two distinct sets of estimates for the parameters of the fiscal rule are obtained. Alternatively, only the ϕ_{gap} parameter can be allowed to vary across the two states of nature. In what follows, we refer to the practice of splitting the sample as the "two-sample approach" (2SA) and to that of splitting only the ϕ_{gap} parameter as the "two-parameter approach" (2PA).

The first approach (2SA) is more general. If all parameters change across states, 2SA leads to consistent and efficient estimates of all the parameter shifts, while 2PA estimates are biased and inconsistent. If only the parameter ϕ_{gap} shifts, 2SA leads to still consistent but inefficient estimates, while 2PA is consistent and efficient.

[79] The period 1988-2006 corresponds to the largest sample available for real-time data.

In order to conduct efficient inferences with a parsimonious model without imposing invalid symmetry restrictions to ϕ_{capb} and ϕ_{debt} parameters and to the deterministic components of the model, we follow two sequential steps. First, the sample is split, following 2SA, and the joint significance of the shifts between states of nature in all model parameters except ϕ_{gap} is assessed. Second, if the null (*i.e.* parameters are symmetrical) of the previous test is rejected, the symmetry of the policy reaction to the economic cycle is assessed with the same test but including all model parameters. If the null is not rejected, the more efficient 2PA is carried out, and the symmetry of the policy reaction to the economic cycle is assessed by testing for the significance of the ϕ_{gap} shift between "good" and "bad" times.

In Figure 6.5 we present the results for the CAPB-l Model[80] of these two sequential steps across data sources and vintages and sample periods. In the upper part, we show whether the null of symmetry of all model parameters except ϕ_{gap} is rejected (black boxes) or not (grey boxes). In the lower part we show whether the null of policy rule symmetry is rejected (black boxes) or not (grey boxes) by using the most appropriate approach (either 2SA or 2PA, depending on the outcome of the upper part). The two diagrams are identical, indicating that, if the first test is not rejected, asymmetry in the cyclical reaction is never found and, if the first test is rejected, asymmetry for all parameters, including ϕ_{gap}, is always found. In other terms, when asymmetry exists, it always depends on a general shift in parameters of the rule and not on a specific shift of ϕ_{gap}. Indeed, when we restrict our attention to the final ϕ_{gap} parameters, independently of the result of the first test, they are never significantly different. This is shown for the specific period 1988-2006 in Table 6.5. Another indication emerging from Figure 6.5 is that the answer to whether policies are symmetrical or asymmetrical varies, with *ex post* information, across data sources and time periods. With real-time data, the indication is of symmetrical behaviour.

Figure 6.6 plots the differences between the ϕ^{C}_{gap} parameter in good and bad times. Though not significant, such differences are always positive in all the samples ending later than 1995. A similar indication is also conveyed by the analysis of the constant term across states of nature. These results seem at odds the usual interpretation of asymmetry, *i.e.* that it arises because government action is pro-cyclical in good times.[81]

In order to give an insight into the level of the alternative ϕ^{C}_{gap} estimates, Figure 6.6 also reports two splines representing the yearly average of the ϕ^{C}_{gap} parameters in good and bad times for the three sources of *ex post* data (from 1992) and for real-time data (from 2002).

To integrate the analysis carried out in Figures 6.5 and 6.6, in Table 6.5 we report the GMM-sys estimates of the CAPB-l Model for four alternative data sources and vintages over the same 1988-2006 period. For each source the final outcome of the general-to-

[80] CAPB-l and CAPB/PB-l Models have the advantage, over CAPB-s and CAPB/PB-s Models, of avoiding the risk of biased parameter estimates linked to an endogenous selection of good and bad times. In fact, in order to split either the whole sample or only the gap parameter, a zero-one indicator variable $I_{i\,t}$ must be defined. When the cyclical indicator is the output gap in levels, the usual practice is to set $I_{i\,t} = 1$ if $GAP_{i\,t} > 0$ ("good times"), and $I_{i\,t} = 0$ if $GAP_{i\,t} \leq 0$ ("bad times"). However, this selection risks being endogenous, given the possible simultaneity between the idiosyncratic policy shock $\varepsilon_{i\,t}$ (see equations [1] to [3] of Section 6.2) and the actual $GAP_{i\,t}$ realisation that drives $I_{i\,t}$. If such endogeneity occurs, the selection based on the sign of the output gap at time t entails biased parameter estimates.

[81] See European Commission (2006a, Part IV).

specific procedure outlined above is reported. If 2SA is appropriate, the estimates are reported in two columns (for good and bad times), while if 2PA proves to be valid, a single column suffices.

The lower part of Table 6.5, at the "no-switch" row, reports the p-value of the test whose null admits the restriction from 2SA to 2PA. Results clearly reject the null with EC data and with HP data.[82] Results with OECD and RT, instead, do not reject 2PA as a valid reduction of 2SA. Alone, the shift in the output gap effect is never the main cause of symmetry rejection, as shown by high p-values of the "no-shift" hypothesis, never rejected in the last row of the table.

Results in the upper part of Table 6.5 confirm the findings of Section 6.3: the data source affects the estimates of the policy reaction to cyclical conditions. With OECD, HP and EC the policy is weakly a-cyclical, while with RT it is weakly counter-cyclical.

6.5. Extending the "core" model

In Sections 6.2-6.4 we abstracted from a number of specific variables included in our sample of 12 studies, in order to focus on what we called "core" components of the fiscal rule – the dependent variable and the initial conditions of public finances. In this Section we add, when feasible, the additional variables used and found significant in this group of studies. The aim is to understand, in a common framework, how important these variables are and to what extent they modify the conclusions reached in Sections 6.3-6.4.

In this version of the paper, we are able to include, in addition to the variables used in the regressions presented in Table 6.5, four groups of explanatory variables. First, in order to capture the impact of European fiscal rules on the behaviour of the countries in excessive deficit, we introduce a regressor, ϕ_m (referred to as the *Maastricht variable*) which defines a *benchmark* correction of the primary balance which is essentially a function of the excessive deficit and the number of years in which the latter needs to be eliminated.[83] Second, the relevance of the electoral cycle is assessed by using three dummy variables. They are equal to 1, respectively, in the year of regular elections (ϕ_{e1}), defined as those held at the end of a full term, in the year before (ϕ_{e2}), and in the year of unexpected (snap) elections (ϕ_{e3}).[84] Third, the *ex ante* real interest rate (measured by the nominal three-month interest rate minus the expected rate of inflation) is added in order to allow for the interaction of fiscal and monetary policies. In fact, this variable (labelled ϕ_{monpol}) can be considered as a simple proxy of the monetary conditions under the assumption that central banks control short-term interest rates (see,

[82] The lack of significance of time effects in good times and their significance in bad times may contribute to the no-switch rejection with EC and OECD-HP.

[83] The Maastricht variable is set equal to zero in the years before 1992 or if the deficit is below the 3% threshold. For the years 1992-96, it is equal to the difference between the deficit and 3% of GDP, divided by the number of years leading up to 1997 and then reduced by the expected change in interest expenditure in the following year. After 1996, the provisions of the Stability and Growth Pact (in principle, also of its 2005 version) require countries to correct an excessive deficit in the year after its official recognition, which usually occurs with a one-year lag. Therefore, in the first year that an excessive deficit occurs, the excess deficit is divided by the constant 2 and, in the following years, by one. See Golinelli and Momigliano (2006) for further details.

[84] Details concerning the election dummies are in Golinelli and Momigliano (2006).

e.g., Faini, 2006). Finally, two dummy variables, for "commitment states" and "delegation states" (ϕ_{com} and ϕ_{del}), refer to a well known classification of budgetary institutions (as set out in Hallerberg, 2004), and a synthetic indicator (ϕ_{rule}) captures the overall set of national-level numerical fiscal rules.[85]

Table 6.6 presents a set of estimates analogous to that of Table 6.5, but includes the additional variables mentioned above. The results broadly confirm the conclusions drawn on the basis of Table 6.5. The main differences are:

(a) The evidence of asymmetric fiscal behaviour becomes stronger; the null of policy symmetry is rejected for all data sources.

(b) We find large asymmetries (often individually significant) in the coefficients of many of the additional explanatory variables. This strengthens the conclusion, already reached on the basis of the "core" model, that the asymmetric cyclical effects operate through a general shift of the model parameters.

(c) The evidence of counter-cyclical behaviour with real-time data becomes clearer.

(d) The (stabilizing) reaction to the lagged debt with ex post data is weaker.

(e) Time effects are less significant (except for the results with real-time data).

Overall, though the inclusion of eight additional parameters in the splitted samples may entail some inefficient estimates, there is a remarkable increase of the explanatory power of the enriched rule, as documented by the increase of about 20-30% in all the measures of goodness-of-fit. In order to improve the readability of the results, Table 6.6 reports in bold the estimates that are 10% significantly different to zero. The increase to 10% of the significance level of the t-tests tries to take in account the loss of efficiency due to the inclusion in the model of a number of (possibly) irrelevant explanatory variables. We refrained from "fine-tuning" the model specifications to allow full comparability between the enlarged specification adopted in this section with the "core" model used above.

More in detail, the significance of the inclusion of the regular electoral dummies (prevalently affecting policies in good times) is warranted by the results of a joint test for the presence of an electoral cycle; this finding is independent from the data used. Snap elections seem to exert some relevant effects only using *ex post* data.

The *Maastricht variable* is significant only in case of bad times; however, the limited number of cases of excess deficit in good times does not allow for valid inferences.[86] Table 6.7 reports the detail about data availability in good and bad times. Note that negative estimates of the Maastricht variable parameter suggest that a country in excess of deficit further adjusts its finances with respect to what would be implied by the parameters of the fiscal initial conditions.

[85]We wish to thank Alessandro Turrini and Laurent Moulin for kindly supplying the data concerning the overall index used in the regression. For information concerning the original source and the aggregation methodology, see Ayuso-i-Casals *et al.* (2007).

[86] The same can be said for the snap elections. Note also that the shift towards counter-cyclicality would also emerge by simply adding the Maastricht variable, alone, to the "core" model.

The estimates of the parameter measuring the effect of the monetary policy stance vary in significance across different sources of data. The prevalently negative sign suggests (as in IMF, 2004 and in Galí and Perotti, 2003) that fiscal and monetary policies are substitutes: when monetary policy is tight, discretionary fiscal policy loosens with respect to what it would otherwise be. The small magnitude of the estimates implies that the fiscal policy is only a very slight substitute for monetary policy.

The results for the variables capturing the role exerted by budgetary institutions and fiscal rules seem to suggest that "commitment" strategies may be relatively more successful in solving the common pool problem inherent in budget preparation, but only in bad times.

6.6. Conclusions

Whether discretionary fiscal policies act counter- or pro-cyclically and whether their reaction is symmetric or asymmetric over the cycle are still largely unsettled questions. The different results obtained by the empirical literature may in principle depend on the model of policy decisions used, the estimation procedures adopted, the countries included in the sample, the periods of time analyzed, or the source of data selected (including different vintages of data from the same source).

In this paper we restrict our attention to a subset of relatively homogeneous papers presenting econometric evidence on the euro-area countries and assess the role of all the factors mentioned above in a common empirical context in order to disentangle their relevance.

In the first part of the paper we assess the impact of different choices in modelling fiscal behaviour. We focus on the "core" components of the fiscal rule – the dependent variable and the initial conditions of public finances – finding in the studies reviewed three basic specifications of fiscal behaviour. We show that these fiscal rules – whose regressors are only the initial conditions of public finances (debt and deficit) and the output gap – lead to significant differences in the estimates of the parameter measuring the reaction to cyclical conditions. In particular, comparing the first model (CAPB) – used in most empirical studies – with the second (CAPB/PB), the latter suggests a slightly more counter-cyclical behaviour. The difference can be ascribed to the different notions of fiscal policy cyclicality embodied in the fiscal rules (net or gross of the reaction to the lagged effects of automatic stabilizers).

For the third model (PB), the assessment of the cyclical reaction of discretionary policies based on eq. [5] reflects a third notion of cyclicality. The use of this specification, depending on the characteristics of the series of the output gap, may give results vastly different from those based on the first or second model.

This part of the paper shows the need for extreme caution in comparing empirical results based on different models. In our opinion, there is often insufficient awareness of these issues when the estimates of the output gap parameter of the different studies are used in the policy debate.

In the second part of the paper we focus on the first of the three models and examine the impact of time period and source of data on the estimates. In particular, we estimate

rolling regressions with a fixed window of 15 years over the period 1978-2006 for four alternative datasets: three of them are based on *ex post* data sources and the fourth largely on real-time data, available only for the reduced 1988-2006 period. The results suggest that:

(a) The different data sources have sizeable effects on the estimates of the reaction of fiscal policy to cyclical conditions. In particular, real time data indicate weakly counter-cyclical policies while *ex post* data sources broadly suggest a-cyclicality. Overall, we do not find support for the frequently upheld notion of pro-cyclical fiscal policies.[87]

(b) Independently of the data source, changes in the time span do not seem to significantly influence the estimates. This result contrasts with other papers, which find a shift from pro-cyclicality to a-cyclicality after the Maastricht Treaty (Wyplosz, 2006; IMF, 2004; Galí and Perotti, 2003).

(c) The effect of the fiscal initial conditions (lagged debt and deficit) on policies is strongly significant. This evidence suggests caution when using inferences on the cyclical response of fiscal policies based on models omitting these regressors.

(d) Testing for asymmetries in fiscal behaviour, we find contrasting results, depending on both *ex post* data sources and sample periods. We also find that the asymmetric behaviour of the discretionary policy, when present, entails shifts in all the parameters of the rule and not only in the output gap parameter.

In the final part of the paper we extend the basic model to include the additional variables found significant in the group of studies we reviewed. This was possible only for some regressors, due to data limitations. This extension determines a substantial increase in the explanatory power, but the conclusions reached on the basis of the "core" fiscal reaction function are generally confirmed. The only important differences are that policy asymmetry is now found for all data sources and that the evidence of weakly counter-cyclical behaviour with real time data is clearer.

[87] An example is the following statements, from OECD (2007): "Fiscal policy has not contributed to stabilising the cycle in the euro area. When the economy was above potential at the start of the decade several fiscal authorities did not allow the automatic stabilizers to operate fully as they used cyclical tax receipts to finance tax cuts and expenditure increases…[ ] More systematic investigations using longer time series confirm the observation that fiscal policy tends to act pro-cyclically in euro area countries".

Appendix

Results based on GMM-sys and alternative estimators

GMM estimators are typically used to obtain consistent parameter estimates in the context of dynamic single equations with panel data. However, GMM may be subject to large finite-sample biases when available instruments are weak (see e.g. Bond, 2002). Specifically, this problem occurs using GMM-dif when data are highly persistent.

All variables used in the core specifications of our study show relevant persistence: the autoregressive parameters of primary balance, output gap and debt are in the range 0.7-0.9 (details are available upon request). Therefore, we expect that pooled OLS, within-groups and GMM-dif estimates be biased. In particular, Blundell and Bond (1998) suggests that the lagged dependent variable parameter OLS estimate is likely to be upward biased, while the within group and GMM-dif estimates are likely to be downwards biased. As a consequence, also the other parameter estimates (*i.e.* those of the output gap and the debt) will be biased in a direction that depends on the covariances of model variables.

Table 6.8 reports the estimates of the CAPB-s Model using the following approaches: GMM-sys, pooled OLS, within group and GMM-dif.[88] Data used are *ex post* measures. All GMM estimates are one-step, which is a standard practice in the empirical literature in view of the very modest efficiency gains from two-step estimators and of the lower reliability of their asymptotic distribution approximations. Regarding the choice of the instruments, GMM estimates in the columns 5-8 use the subset spanned by lags from t–2 to t–3 (the same as that used in Tables 6.2 and 6.3), while columns 9-12 report estimates from the alternative subset spanned by lags from t–2 to t–4.

The validity of the additional moment conditions exploited by GMM-sys with respect to GMM-dif is subject to the condition that the means of the relevant series be constant within each country. This assumption is more acceptable in models with time effects, as their presence entails means that are constant once the series are expressed as deviations from period-specific averages, *i.e.* that the country-means evolve over time in a common way. This is another reason to add the time dummies in our models, beyond those given in the main text. Estimation results in Table 6.8 are in line with the main predictions found in the literature, see e.g. Blundell and Bond (1998) and Bond (2002). In fact, pooled OLS present the highest estimate of the autoregressive parameter (defined as $\phi_{capb}+1$, and equal to about 0.81), while the within group persistence estimate is lower (about 0.75). GMM-sys estimate stay in the middle (about 0.8) of the overestimating pooled OLS and underestimating within group. Such range is small, reflecting: the low individual-effects variability (only about 10% of the total unexplained heterogeneity)[89] and the relatively long time span. Indeed, our span of about 30 years is probably enough to prevent large negative biases, as the bias of the within groups estimates in dynamic panel models is inversely proportional to the number of time periods (see Nickell, 1981; Judson and Owen, 1999; and Attanasio *et*

[88] Qualitatively similar outcomes could be reported for all the other models used in this study.

[89] If the individual-effects variability had been high, we would have expected the pooled OLS residuals to be positively autocorrelated because of the individual effects omission, while here the autocorrelation tests never reject the hypothesis of white noise residuals (see the results in the first column of Table 6.8).

al., 2000).[90] Due to the data persistence noted above, GMM-dif estimates of the autoregressive parameter are heavily underestimated, because they rely on weak instruments.

Other parameter estimates are consistent with the assessment above: for example, GMM-dif debt parameter estimates seem unreasonably high and this fact may be related to their underestimation of the autoregressive parameter, which measures policy persistence.

The output gap parameter estimates in models without time dummies are always significantly pro-cyclical. As also shown in Tables 6.2 and 6.3, the introduction of time dummies shifts all the estimates towards counter-cyclicality (but does not involve significant changes in the other model estimates and in model diagnostics). We interpret this result as reflecting an omitted variable bias in the coefficient of the output gap. This interpretation is supported by the fact that the inclusion of additional regressors (see Section 6.5) weakens both the significance of time dummies and the policy pro-cyclicality.

The choice of instrument subsets does not affect estimates (the last four columns of Table 6.8 report estimates that are almost undistinguishable from those in the previous four columns) but it influences outcomes of the Sargan overidentification restriction test.[91] Therefore, the estimation results in Table 6.2 and 6.3 can be considered not largely affected by mild 5% (but almost never 1%) overidentifying restrictions rejections. In addition, note also that the differences Sargan statistics, testing for the validity of the additional moment conditions of the GMM-sys, accepts their validity with high p-values: lagged first-differences are informative instruments for the endogenous variables in levels.

Overall, main results in this appendix can be summarised as follows.

First, the estimation method matters for the parameter outcomes. Biases in the estimation of the autoregressive parameters (here, they are badly underestimated by GMM-dif) induce biases in the other model parameter estimates. Estimates in Table 6.8, interpreted in the light of the basic results of the literature, lead to the presumption that GMM-sys estimator is the best performing method.

Second, notwithstanding the mild rejection of overidentifying restriction tests, we find that the choice of instrument subsets does not affect estimates. Therefore, we set the lags from t–2 to t–3 as instruments for all the estimates in the present paper. In this

[90] We also use shorter samples (only 15 years). In these cases the bias of within group estimator may be larger.

[91] Therefore, the rejection of the Sargan test using lags t–2 and t–3 as instruments cannot be ascribed to lag t–2, as it enters both subsets of instruments. Instrumenting with only the subset t–3 and t–4, *i.e.* omitting lag t–2 as if it was not valid because of measurement errors (see Blundell and Bond, 1999), delivers results (not reported) that are very similar to those with instruments from t–2 to t–4.

regard, note that Sargan tests for shorter time spans or for more complex models (e.g. allowing for policy asymmetries or for more regressors) never reject the null of valid instruments.

Table 6.1 The Cyclical Reaction of Fiscal Policies in a Homogeneous Group of Recent Studies [1]

Studies	Countries	Period	Data	Additional variables	Asymmetry	Cyclicality
Annett (2006)	EMU-11	1980-2004 (272)	OECD	Fiscal governance & elections	n.a.	Pro-cyclical (ante-Maastricht) a-cyclical (post-Maas.) [2]
Debrun & Kumar (2006)	OCSE-13	1990-2004 (224)	OECD	Fiscal rules & political v.	n.a.	Pro-cyclical (some specifications) [3]
European Commission (2006)	EMU-11	1980-2005 (251)	EC (AMECO)	dummies: >91 e >98	asymmetry [4]	A-cyclical (o.gaps<0) pro-cyclical (o. gaps>0) [4]
Golinelli & Momigliano(2006)	EMU-11	1988-2006 (209)	real time	Maastricht var. & elections	symmetry	Counter-cyclical
Wyplosz (2006)	EMU-10	1980-2005	OECD	none [5]	n.a.	Pro-cyclical (ante-Maastricht) a-cyclical (post-Maast.)
CEPII (2005)	EMU-10	1981-2005	OECD	none	symmetry	Acyclical
Balassone & Francese (2004)	EU,USA,JAP	1970-2000	EC (AMECO)	none	symmetry [6]	Pro-cyclical
Forni & Momigliano (2004)	EMU-10	1993-2003 (110)	real time	Maastricht var.	asymmetry	Counter-cyclical (o.gaps<0) a-cyclical (o. gaps>0)
IMF (2004)	EMU-11	1982-2003 (242)	OECD	Monetary gaps [7]	symmetry	Pro-cyclical (ante-Maastricht) a-cyclical (post-Maast.)
Galí & Perotti (2003)	EMU-11	1980-2002 (238)	OECD	Monetary gaps	n.a.	Pro-cyclical (ante-Maastricht) a-cyclical (post-Maast.)
Ballabriga & Martinez-Mongay (2002)	individual EMU-10	1979-1998	EC (AMECO)	none	n.a.	A-cyclical (overall assessment of individual reg.)
Brunila & Martinez-Mongay (2002)	EU	1970-1997	EC (AMECO)	none [8]	n.a.	Pro-cyclical

[1] We refer to the 5 percent level of significance in our assessment of the reported results. [2] We refer to the specification which includes country dummies in Table 5 of the paper. [3] We refer to Table 3 of the paper; other results presented by the authors tend to indicate, for most specifications, a-cyclicality. [4] The evidence of asymmetric behaviour and the assessment concerning cyclicality, in line with the conclusions drawn in the paper, take into account both the estimates for the constant and for the coefficient of the output gap. The coefficient for the output gap has roughly the same value irrespective of cyclical conditions (good or bad) and would indicate a-cyclicality [5] We refer to column 3 of Table 2a of the paper. The specification does not include the lagged deficit. [6] Balassone and Francese (2004) conclude in favour of asymmetry on the basis of an equation with the overall balance as dependent variable. For the sake of comparability with the other studies we use the results of the equation with the primary balance (also reported by the authors), where the asymmetry is not significant. [7] We refer to the results of the upper part of Table 2.8 of the Appendix 2.4. The study examines the role of other regressors in separate analyses. [8] We refer to Figure 6.7 (also published in European Commission, 2001) which shows the results of a regression involving, as dependent variable, the changes in CAPB, and as regressors, a constant and the output gap. The analysis refer only to episodes where over at least three years the absolute values of the annual average output gap and of the annual average change in the cyclically-adjusted primary balance were bigger than 0.25% of trend GDP.

Table 6.2 Estimates of Alternative Fiscal Rules with Time Effects [1]

	Explanatory output gap in t			Explanatory output gap in t–1		
Model:	CAPB-s	CAPB/PB-s	PB-s	CAPB-l	CAPB/PB-l	PB-l
Dependent variable:	$\Delta CAPB_{it}$	$\Delta CAPB_{it}$	ΔPB_{it}	$\Delta CAPB_{it}$	$\Delta CAPB_{it}$	ΔPB_{it}
ϕ_{capb}	–0.203			–0.203		
	(0.035)			(0.035)		
	–5.81			*–5.73*		
ϕ_{pb}		–0.195	–0.206		–0.198	–0.191
		(0.036)	(0.037)		(0.036)	(0.037)
		–5.40	*–5.55*		*–5.52*	*–5.14*
ϕ_{debt}	0.009	0.009	0.010	0.009	0.009	0.009
	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)
	3.48	*3.35*	*3.60*	*3.47*	*3.45*	*3.32*
ϕ^{C}_{gap}	–0.042			–0.031		
	(0.040)			(0.039)		
	–1.06			*–0.79*		
$\phi^{C/P}_{gap}$		0.034			0.054	
		(0.040)			(0.039)	
		0.85			*1.39*	
ϕ^{P}_{gap}			0.093			–0.001
			(0.041)			(0.040)
			2.24			*–0.02*
average μ_i [2]	–0.145	–0.214	–0.092	–0.156	–0.179	–0.132
	(0.394)	(0.397)	(0.407)	(0.396)	(0.396)	(0.410)
	–0.37	*–0.54*	*–0.23*	*–0.39*	*–0.45*	*–0.32*
Observations = $N \times T$	300	300	300	300	300	300
$\overline{T}$	27.27	27.27	27.27	27.27	27.27	27.27
Sargan' test [3]	0.0127	0.0138	0.0055	0.0152	0.0117	0.0036
Autocorrelation [4]	0.3921	0.3726	0.4032	0.3765	0.3954	0.3996
R-squared [5]	0.2971	0.2817	0.1584	0.2906	0.2900	0.1659
Time effects significance [6]	0.0242	0.0347	0.0000	0.0136	0.0156	0.0000
Implicit ϕ^{C-1}_{gap} [7]					–0.042 [7]	–0.036 [8]
					(0.040)	(0.041)

[1] GMM-sys estimates, see Blundell and Bond (1998), over the 1978-2006 period. Below each point estimate, the corresponding standard error is in brackets and the Student's t is in italics. [2] Average of the 11 country-effects estimates. [3] Over-identifying restrictions test, p-values. [4] Residuals' 2nd order autocorrelation test, p-values. [5] Proxied by the squared correlation between actual and fitted values. [6] Test for the null hypothesis that all the 28 time dummies are jointly zero, p-values. [7] Obtained rearranging eq. (7c) using: $\phi^{C/P-1}_{gap}$ and $\phi^{C/P-1}_{pb}$ estimated above, and $\omega = 0.4825$, *i.e.* the sample average of ω_{it} (the semi-elasticity of primary balance w.r.t. the output gap stemming from automatic stabilizers; source, see Girouard and André, 2007). [8] Obtained rearranging eq. (10) using: ϕ^{P-1}_{gap} and ϕ^{P-1}_{pb} estimated above, and $\omega = 0.4825$, *i.e.* the sample average of ω_{it} (the semi-elasticity of primary balance w.r.t. the output gap stemming from automatic stabilizers; source, see Girouard and André, 2006).

Table 6.3 Estimates of Alternative Fiscal Rules without Time Effects [1]

	Explanatory output gap in *t*			Explanatory output gap in *t–1*		
Model:	CAPB-s	CAPB/PB-s	PB-s	CAPB-l	CAPB/PB-l	PB-l
Dependent variable:	$\Delta CAPB_{it}$	$\Delta CAPB_{it}$	ΔPB_{it}	$\Delta CAPB_{it}$	$\Delta CAPB_{it}$	ΔPB_{it}
ϕ_{capb}	–0.201			–0.217		
	(0.032)			(0.032)		
	–6.35			*–6.73*		
ϕ_{pb}		–0.207	–0.223		–0.219	–0.170
		(0.034)	(0.036)		(0.033)	(0.035)
		–6.17	*–6.11*		*–6.67*	*–4.83*
ϕ_{debt}	0.011	0.011	0.014	0.011	0.011	0.011
	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)
	4.24	*4.09*	*4.79*	*4.23*	*4.24*	*3.88*
ϕ^{C}_{gap}	–0.105			–0.096		
	(0.030)			(0.030)		
	–3.53			*–3.18*		
$\phi^{C/P}_{gap}$		–0.030			0.001	
		(0.033)			(0.032)	
		–0.93			*0.03*	
ϕ^{P}_{gap}			0.069			–0.073
			(0.036)			(0.034)
			1.95			*–2.15*
average μ_i [2]	–0.559	–0.550	–0.669	–0.547	–0.556	–0.626
	(0.173)	(0.175)	(0.190)	(0.176)	(0.176)	(0.188)
	–3.23	*–3.15*	*–3.53*	*–3.12*	*–3.16*	*–3.33*
Observations = $N \times T$	300	300	300	300	300	300
$\overline{T}$	27.27	27.27	27.27	27.27	27.27	27.27
Sargan' test [3]	0.0261	0.0288	0.0080	0.0391	0.0331	0.0048
Autocorrelation [4]	0.4293	0.3856	0.5207	0.3644	0.3737	0.5018
R-squared [5]	0.1969	0.1845	0.1395	0.1751	0.1766	0.1579
Implicit ϕ^{C-1}_{gap} [6]					–0.105 [6]	–0.085 [7]
					(0.031)	(0.032)

[1] GMM-sys estimates, see Blundell and Bond (1998), over the 1978-2006 period. Below each point estimate, the corresponding standard error is in brackets and the Student's *t* is in italics. [2] Average of the 11 country-effects estimates. [3] Over-identifying restrictions test, *p*-values. [4] Residuals' 2nd order autocorrelation test, *p*-values. [5] Proxied by the squared correlation between actual and fitted values. [6] See footnote 7 to Table 6.2. [7] See footnote 8 to Table 6.2.

Table 6.4 CAPB–l Model Estimates with Alternative Data Sources [1]

Source:	OECD	HP [2]	EC	RT [3]
ϕ_{capb}	–0.220	–0.205	–0.158	–0.167
	(0.045)	(0.045)	(0.042)	(0.047)
	–4.88	*–4.59*	*–3.75*	*–3.60*
ϕ_{debt}	0.011	0.011	0.009	0.010
	(0.003)	(0.003)	(0.003)	(0.003)
	3.51	*3.63*	*2.93*	*3.18*
ϕ^{C}_{gap}	–0.054	0.007	0.086	0.141
	(0.044)	(0.053)	(0.065)	(0.091)
	–1.22	*0.12*	*1.34*	*1.54*
avg. μ_i [4]	–0.555	–0.425	–0.384	–0.140
	(0.404)	(0.396)	(0.454)	(0.414)
	–1.37	*–1.07*	*–0.85*	*–0.34*
$N \times T$	209	209	200	209
$\overline{T}$	19.00	19.00	18.18	19.00
R-squared [5]	0.2832	0.2836	0.2653	0.2910

[1] GMM-sys estimates, see Blundell and Bond (1998), over the 1988-2006 period. Below each point estimate, we report the corresponding standard error (in brackets) and the Student's t. [2] Data for the initial conditions are from OECD; data for output gap are obtained using HP filtered GDP levels. [3] Real-time data based on OECD Economic Outlook, see Golinelli and Momigliano (2006). [4] Average of the 11 country-effects estimates. [5] Proxied by the squared correlation between actual and fitted values.

Table 6.5 CAPB–l Model Estimates in Good and Bad Times with Alternative Data Sources [1]

Source:	OECD *ex post*		EC *ex post*		OECD with HP-GDP		OECD real-time	
Times [2]:	bad	good	bad	good	bad	good	bad	good
ϕ_{capb}	–0.216		–0.161	–0.171	–0.238	–0.186	–0.169	
	(0.039)		(0.056)	(0.054)	(0.072)	(0.055)	(0.047)	
	–5.56		*–2.85*	*–3.16*	*–3.30*	*–3.38*	*–3.62*	
ϕ_{debt}	0.012		0.011	0.009	0.016	0.011	0.011	
	(0.003)		(0.004)	(0.005)	(0.005)	(0.005)	(0.003)	
	3.75		*2.49*	*1.67*	*3.43*	*2.07*	*3.17*	
$\phi^{C-l}{}_{gap}$	–0.062	0.036	0.037	0.142	–0.047	0.09	0.105	0.214
	(0.050)	(0.095)	(0.081)	(0.118)	(0.068)	(0.102)	(0.116)	(0.171)
	–1.24	*0.38*	*0.46*	*1.20*	*–0.70*	*0.88*	*0.90*	*1.25*
avg. μ_i [3]	–0.384		–0.107	1.016	–0.630	0.560	–0.222	
	(0.413)		(0.431)	(1.460)	(0.419)	(1.363)	(0.445)	
	–0.93		*–0.25*	*0.70*	*–1.50*	*0.41*	*–0.50*	
$N \times T$	209		110	90	113	96	209	
$\overline{T}$	19.00		10.00	8.18	10.27	8.73	19.00	
R-squared [4]	0.2856		0.3015	0.2767	0.3290	0.3046	0.2906	
Time eff. [5]	0.0372		0.0080	0.2447	0.0034	0.3650	0.0038	
No switch [6]	0.0985		0.0002		0.0236		0.0709	
No shift [7]	0.3953		0.4632		0.2638		0.8259	

[1] GMM-sys estimates, see Blundell and Bond (1998), over the 1988-2006 period. Below each point estimate, we report the corresponding standard error is (in brackets) and the Student's *t*. [2] Bad times: when GAP ≤ 0; good times: when GAP > 0. [3] Average of the 11 country-effects estimates. [4] Proxied by the squared correlation between actual and fitted values. [5] Test for the null hypothesis that all the 18 time dummies are jointly zero, *p*-values. [6] *P*-values of the test for parameters (excluding $\phi^{C\text{-}l}_{gap}$) being equal in the two sub-samples of good and bad times, *i.e.* for the restrictions collapsing 2SA to 2PA. ([7]) *P*-alues of the test for the difference in $\phi^{C\text{-}l}_{gap}$ between good and bad times being zero.

Table 6.6 CAPB–l Model with Additional Explanatory Variables [1]

Source:	OECD *ex post*		EC *ex post*		OECD with HP-GDP		OECD real-time	
Times [2]:	bad	good	bad	good	bad	good	bad	good
	Explanatory factors of the "core" model (initial fiscal conditions and output gap):							
ϕ_{capb}	**–0.158**	**–0.206**	**–0.165**	**–0.178**	**–0.176**	**–0.173**	**–0.217**	**–0.160**
	(0.053)	**(0.056)**	**(0.053)**	**(0.058)**	**(0.057)**	**(0.050)**	**(0.057)**	**(0.052)**
	–2.98	***–3.70***	***–3.11***	***–3.06***	***–3.08***	***–3.44***	***–3.83***	***–3.09***
ϕ_{debt}	**0.010**	0.002	**0.009**	0.004	**0.012**	0.008	**0.012**	**0.013**
	(0.004)	(0.005)	**(0.004)**	(0.005)	**(0.004)**	(0.005)	**(0.004)**	**(0.005)**
	2.48	*0.44*	***2.36***	*0.79*	***2.84***	*1.58*	***3.12***	***2.74***
ϕ^{C-1}_{gap}	–0.041	–0.084	0.065	0.037	–0.033	0.036	**0.169**	**0.315**
	(0.049)	(0.104)	(0.0790)	(0.122)	(0.063)	(0.099)	**(0.087)**	**(0.177)**
	–0.83	*–0.81*	*0.82*	*0.30*	*–0.52*	*0.37*	***1.94***	***1.78***
	The effect of the electoral cycle (regular and snap elections) [3]*:*							
ϕ_{e1}	**–0.479**	**–1.274**	**–0.465**	**–1.065**	–0.312	**–1.102**	–0.300	**–1.251**
	(0.232)	**(0.338)**	**(0.256)**	**(0.333)**	(0.258)	**(0.294)**	(0.227)	**(0.340)**
	–2.06	***–3.76***	***–1.82***	***–3.20***	*–1.21*	***–3.75***	*–1.32*	***–3.68***
ϕ_{e2}	–0.320	**–0.624**	–0.045	–0.509	–0.258	**–0.540**	–0.109	**–0.652**
	(0.229)	**(0.331)**	(0.252)	(0.327)	(0.241)	**(0.311)**	(0.221)	**(0.307)**
	–1.40	***–1.88***	*–0.18*	*–1.56*	*–1.07*	***–1.74***	*–0.49*	***–2.12***
ϕ_{e3}	–0.336	–0.519	**–0.453**	–0.416	–0.365	–0.378	–0.084	–0.339
	(0.277)	(0.487)	**(0.269)**	(0.560)	(0.277)	(0.417)	(0.273)	(0.441)
	–1.21	*–1.07*	***–1.68***	*–0.74*	*–1.32*	*–0.91*	*–0.31*	*–0.77*
	The effect of the "Maastricht variable" [4]*:*							
ϕ_{m}	**–0.652**	–1.153	**–0.611**	–0.717	**–0.658**	–0.456	**–0.574**	0.329
	(0.143)	(0.849)	**(0.143)**	(0.542)	**(0.139)**	(0.329)	**(0.140)**	(0.877)
	–4.54	*–1.36*	***–4.28***	*–1.32*	***–4.71***	*–1.39*	***–4.09***	*0.38*
	The effect of the monetary conditions [5]*:*							
ϕ_{monpol}	–0.050	–0.122	0.032	–0.014	–0.033	**–0.148**	**–0.112**	–0.048
	(0.054)	(0.077)	(0.060)	(0.104)	(0.053)	**(0.076)**	**(0.058)**	(0.066)
	–0.92	*–1.58*	*0.54*	*–0.13*	*–0.62*	***–1.94***	***–1.93***	*–0.72*

				The role of fiscal institutions [6]*:*				
ϕ_{com} [6]	**0.688**	–0.176	**0.582**	0.059	**0.639**	–0.128	0.300	–0.066
	(0.249)	(0.339)	**(0.290)**	(0.379)	**(0.253)**	(0.339)	(0.249)	(0.312)
	2.77	*–0.52*	***2.01***	*0.16*	***2.52***	*–0.38*	*1.20*	*–0.21*
ϕ_{del} [6]	0.110	**–0.760**	0.172	–0.579	0.169	**–0.570**	–0.137	–0.041
	(0.239)	**(0.331)**	(0.256)	(0.385)	(0.246)	**(0.339)**	(0.240)	(0.336)
	0.46	***–2.30***	*0.67*	*–1.50*	*0.69*	***–1.68***	*–0.57*	*–0.12*
ϕ_{rule} [6]	0.181	0.164	**0.257**	0.163	0.127	0.189	0.135	0.029
	(0.116)	(0.167)	**(0.119)**	(0.178)	(0.115)	(0.157)	(0.105)	(0.165)
	1.56	*0.98*	***2.16***	*0.92*	*1.11*	*1.20*	*1.29*	*0.18*
				Other statistics:				
avg. μ_i [7]	–0.769	0.643	–0.491	1.154	–0.852	0.654	–0.448	0.842
	(0.474)	(1.139)	(0.479)	(1.689)	(0.440)	(1.441)	(0.447)	(1.626)
	–1.62	*0.56*	*–1.02*	*0.68*	*–1.94*	*0.45*	*–1.00*	*0.52*
$N \times T$	127	82	110	90	113	96	108	101
$\overline{T}$	11.55	7.45	10.00	8.18	10.27	8.73	9.82	9.18
R-squared [8]	0.427	0.435	0.472	0.368	0.471	0.416	0.533	0.371
Time eff. [9]	0.109	0.186	0.017	0.453	0.086	0.199	0.001	0.081
				Asymmetry tests outcomes:				
No switch [10]	0.0112		0.0001		0.0115		0.0035	
Shift [11]	–0.043		–0.028		0.069		0.146	
	0.708		0.847		0.557		0.459	

[1] GMM-sys estimates, see Blundell and Bond (1998), over the 1988-2006 period. Below each point estimate, we report the corresponding standard error (in brackets) and the Student's *t*. In bold, estimates that are significantly different to zero at 10%. [2] Bad times: when GAP ≤ 0; good times: when GAP > 0. Details about data availability over the cycle are in Table 6.7. [3] Election explanatory dummy variables: $e1_{it} = 1$ occurred in *t*; $e2_{it} = 1$ in *t+1*; $e3_{it} = 1$ snap elections. [4] Explanatory Maastricht variable, see Golinelli and Momigliano (2006). [5] Explanatory real short-term *ex ante* interest rate. [6] Fiscal governance form dummy variables: $com_{it} = 1$ committment; $del_{it} = 1$ delegation. Overall Index of national-level fiscal rules (ϕ_{rule}), see Ayuso-i-Casals *et al.* (2007). [7] Average of the 11 country-effects estimates. [8] Proxied by the squared correlation between actual and fitted values. [9] Test for the null hypothesis that all the 18 time dummies are jointly zero, *p*-values. [10] *P*-values of the test for parameters (excluding $\phi_{\text{gap}}^{\text{C-l}}$) being equal in the two sub-samples of good and bad times, *i.e.* for the restrictions collapsing 2SA to 2PA. [11] First row: estimate of the difference ${}_{\text{g}}\phi_{\text{gap}}^{\text{C-l}} - {}_{\text{b}}\phi_{\text{gap}}^{\text{C-l}}$ in good and bad times; second row: *p*-values of the test for the coresponding difference being zero (*i.e.* for the "no-shift" hypothesis).

Table 6.7 Size of Sub-samples Across Data Sources (Full Sample: 1988-2006)

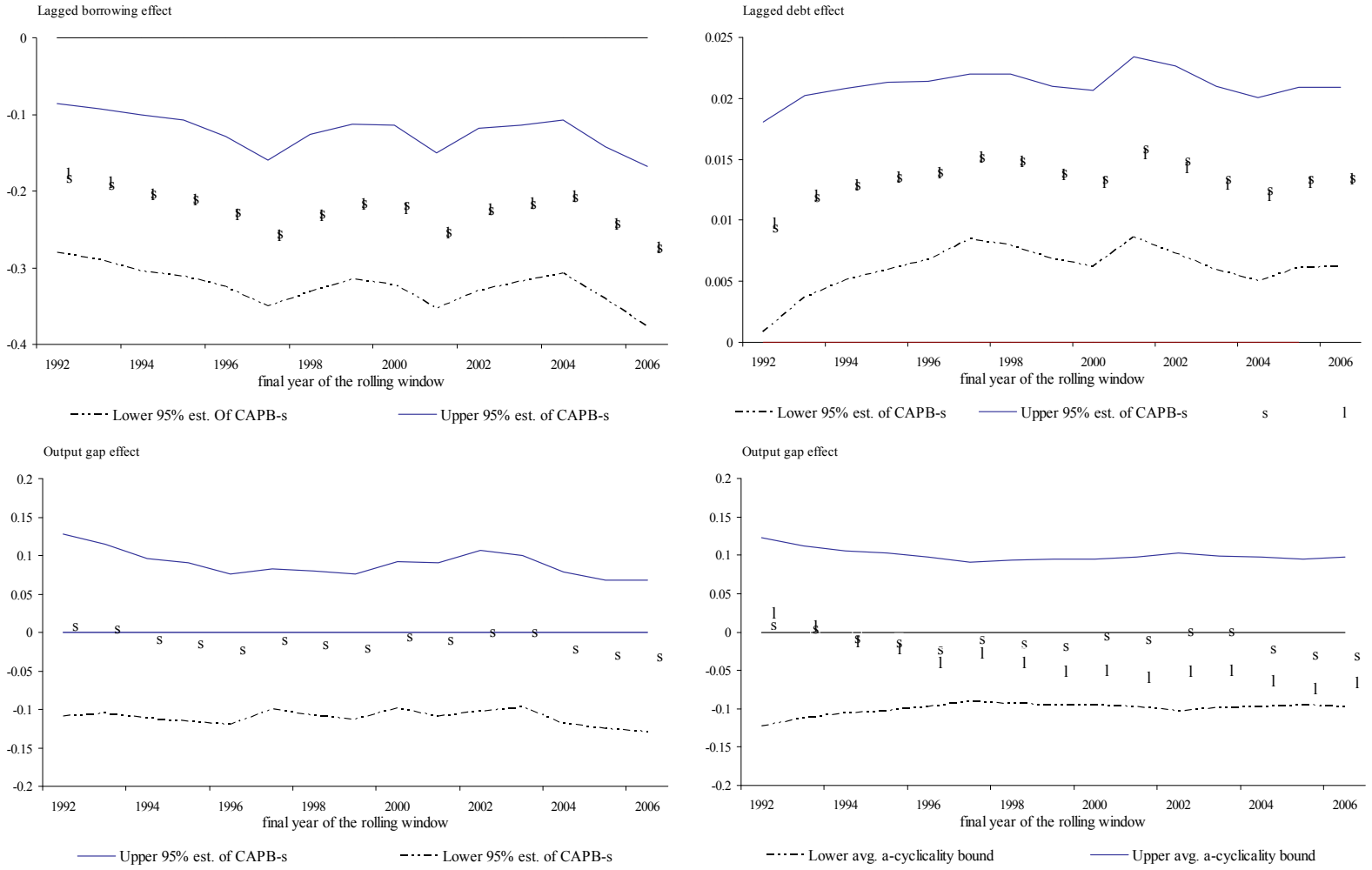
Data source:	OECD *ex post*	EC *ex post*	OECD with HP-GDP	OECD real-time
Total observations, of which:	209	200	209	209
- in good times	82	90	96	101
- in bad times	127	110	113	108
Regular elections in *t*, of which:	33	32	33	33
- in good times	13	19	18	17
- in bad times	20	13	15	16
Regular elections in *t*+1, of which:	38	36	38	38
- in good times	16	17	17	19
- in bad times	22	19	21	19
Snap elections in *t*, of which:	19	18	19	19
- in good times	6	4	6	9
- in bad times	13	14	13	10
Excess deficit cases, of which:	55	52	55	55
- in good times	7	8	13	2
- in bad times	48	44	42	53
Negative *ex ante* real interest rates, of which:	28	28	28	28
- in good times	13	15	12	9
- in bad times	15	13	16	19
Governance commitment cases, of which:	67	67	67	67
- in good times	23	31	27	31
- in bad times	44	36	40	36
Governance delegation cases, of which:	68	68	68	68
- in good times	24	25	30	30
- in bad times	44	43	38	38

Table 6.8 CAPB-s Model Estimates Using Alternative Approaches [1]

Instruments:					from *t–2* to *t–3*				from *t–2* to *t–4*			
Estimator:	Pooled OLS		Within Group		GMM-dif		GMM-sys		GMM-dif		GMM-sys	
Time dummies:	no	yes	no	yes	no	yes	no	yes	no	yes	no	yes
ϕ_{capb}	–0.186	–0.188	–0.251	–0.251	–0.506	–0.439	–0.201	–0.203	–0.409	–0.350	–0.202	–0.203
	(0.027)	(0.030)	(0.032)	(0.036)	(0.060)	(0.059)	(0.032)	(0.035)	(0.049)	(0.047)	(0.029)	(0.031)
	–7.01	*–6.22*	*–7.97*	*–7.05*	*–8.36*	*–7.40*	*–6.35*	*–5.81*	*–8.37*	*–7.38*	*–6.92*	*–6.44*
ϕ_{debt}	0.010	0.008	0.020	0.019	0.080	0.078	0.011	0.009	0.063	0.060	0.011	0.009
	(0.003)	(0.003)	(0.004)	(0.006)	(0.012)	(0.015)	(0.003)	(0.003)	(0.009)	(0.010)	(0.003)	(0.003)
	3.82	*2.93*	*4.57*	*3.51*	*6.84*	*5.21*	*4.24*	*3.48*	*6.98*	*5.77*	*4.17*	*3.28*
ϕ^{C}_{gap}	–0.119	–0.069	–0.097	–0.035	–0.059	0.082	–0.105	–0.042	–0.077	0.037	–0.110	–0.069
	(0.028)	(0.038)	(0.029)	(0.040)	(0.030)	(0.048)	(0.030)	(0.040)	(0.029)	(0.043)	(0.028)	(0.037)
	–4.31	*–1.81*	*–3.38*	*–0.86*	*–1.98*	*1.70*	*–3.53*	*–1.06*	*–2.66*	*0.86*	*–3.86*	*–1.85*
average μ_i [2]	–0.498	–0.572	–1.066	–1.485			–0.559	–0.145			–0.543	–0.131
	(0.172)	(0.526)	(0.269)	(0.532)			(0.173)	(0.394)			(0.172)	(0.393)
	–2.89	*–1.09*	*–3.96*	*–2.79*			*–3.23*	*–0.37*			*–3.15*	*–0.33*
Sargan test [3]					0.0000	0.0003	0.0261	0.0127	0.0007	0.0021	0.1045	0.0434
Dif-Sargan [4]							0.9999	0.9292			0.9875	0.9725
1st order AC [5]	0.8569	0.7605			0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2nd order AC [5]	0.1364	0.1827			0.3871	0.4018	0.4293	0.3921	0.4166	0.4190	0.4309	0.3957

[1] Time period: 1988-2006, $N \times T = 300$ (=289 for GMM-dif because the first observation is lost), $\overline{T} = 27.3$ (26.3 for GMM-dif). Below each point estimate, the standard error (in brackets) and the Student *t*. [2] Average of the 11 country-effects estimates (except for the estimates in differences, *i.e.* for GMM-dif). [3] Overidentifying restrictions test, *p*-values. [4] Difference Sargan test for additional moment conditions embodied by GMM-sys, *p*-values. [5] Residuals autocorrelation test, *p*-values (not appropriate with within group transformed residuals).

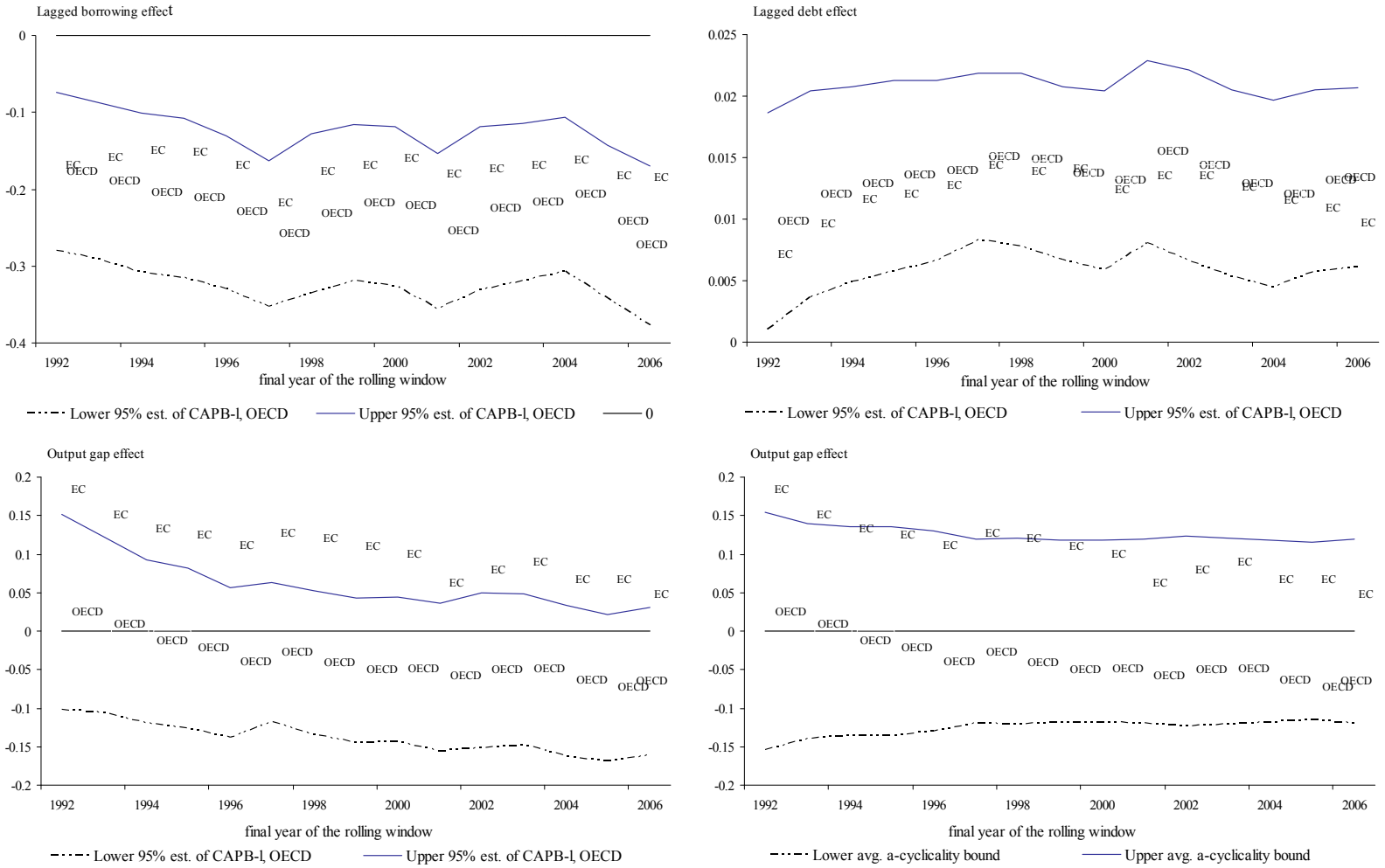
Figure *6.1* *CAPB-s and CAPB-l Models Estimates with OECD Ex Post Data in Rolling Samples* [(1)]



Note:

[(1)] The CAPB-s and CAPB-l Models estimates are indicated by *s* and *l* respectively. The first point estimates correspond to the 1978-1992 sample, the last to 1992-2006. All the sub-samples cover a fixed 15-year period. In the first three graphs the 95% confidence intervals refer to the point estimate of the CAPB-s Model corresponding parameter. The fourth graph reports the zero-interval for both point estimates with the CAPB-s and CAPB-l Models (as such, it cannot use the standard error of only one model's estimate, but the average standard errors of both CAPB-s and CAPB-l Model estimates).

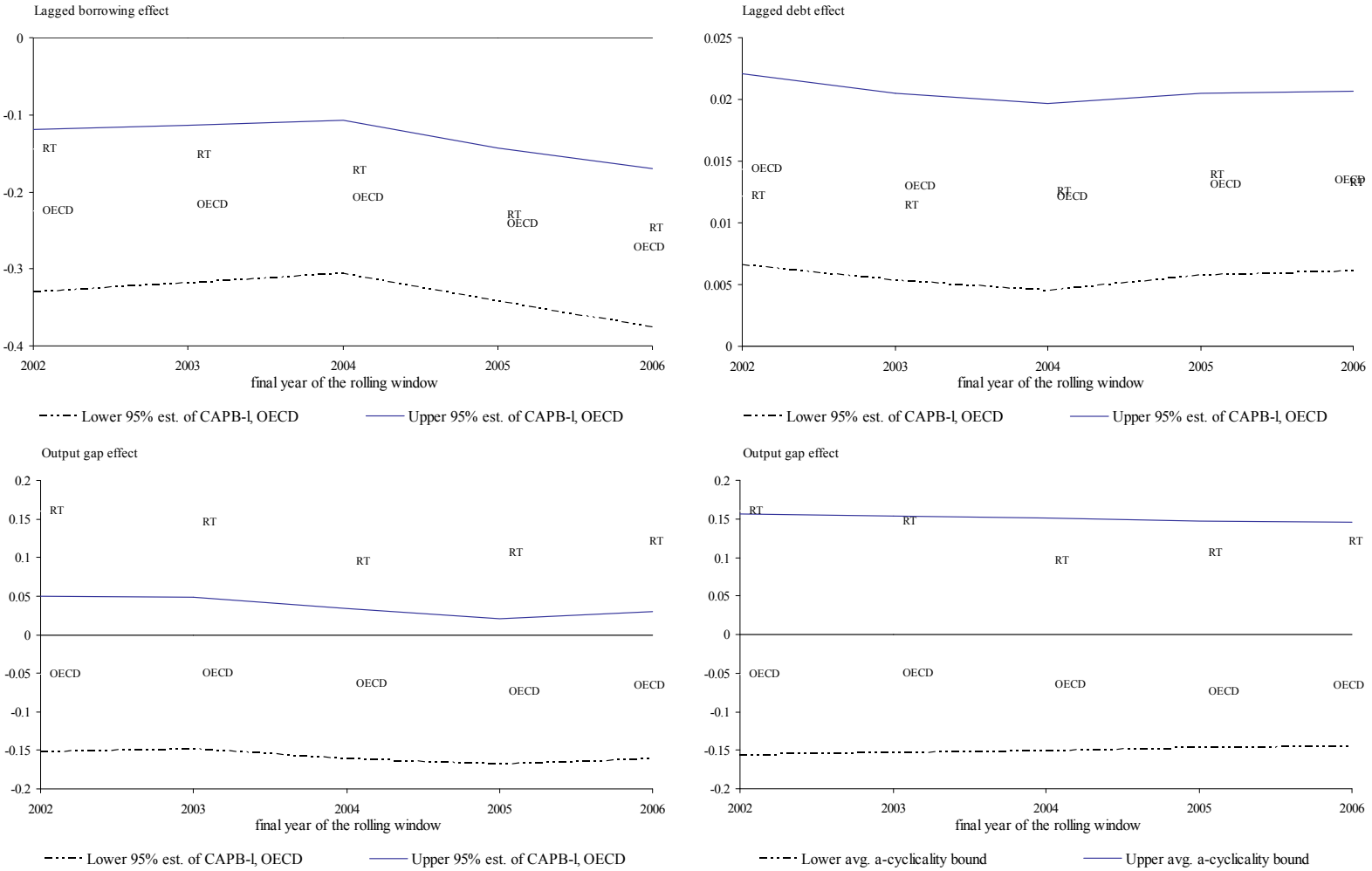
Figure 6.2 CAPB-l Model Estimates with OECD and EC Ex Post Data in Rolling Samples [1]



Note:

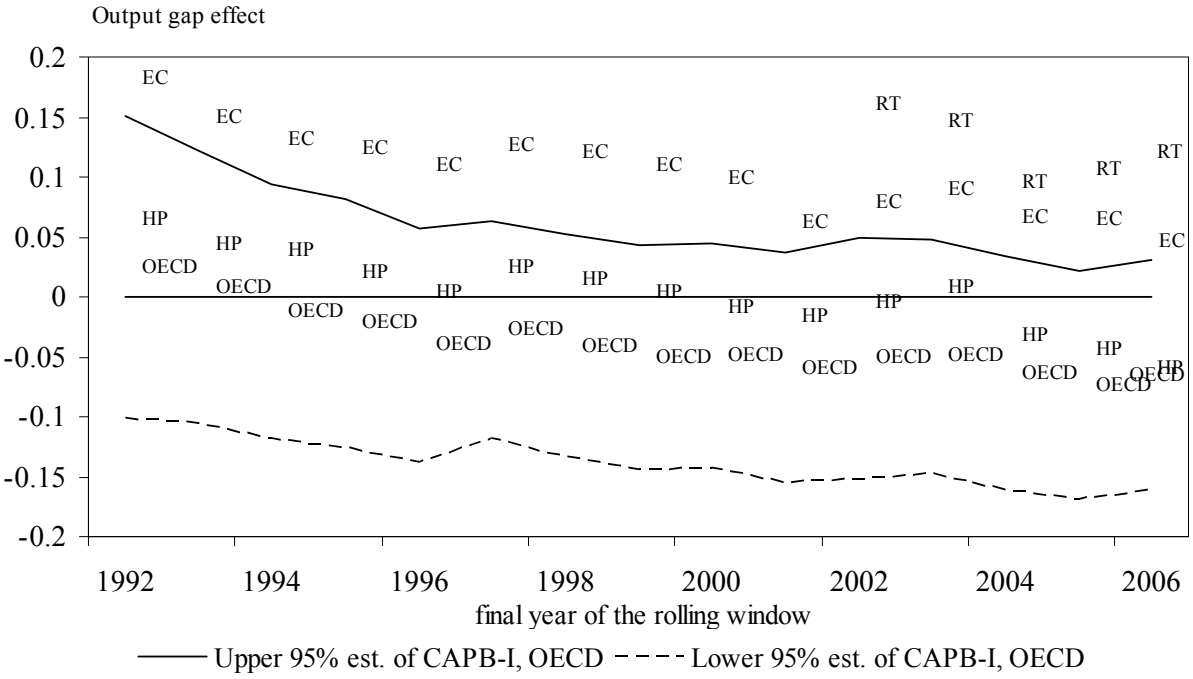
[1] The first point estimates correspond to the 1978-1992 sample, the last to 1992-2006. All the sub-samples cover a fixed 15-year period. In the first three graphs the 95% confidence intervals refer to the corresponding parameter point estimate with OECD data. The lower right-hand graph reports the zero-interval for point estimates with both OECD and EC data sources (as such, it cannot use the standard error of only one estimate from one source, but the average standard error of the estimates with both sources).

Figure 6.3 CAPB-l Model Estimates with Ex Post and Real-time OECD Data in Rolling Samples (1)



Note:
(1) The first point estimates correspond to the 1988-2002 sample, the last to 1992-2006. All the sub-samples cover a fixed 15-year period. In the first three graphs the 95% confidence intervals refer to the corresponding parameter point estimate with ex post OECD data. The lower right-hand graph reports the zero-interval for point estimates with both ex post and real-time data (as such, it cannot use the standard error of only the estimate using ex post data, but the average standard error of the estimates with both ex post and real-time data).

Figure 6.4 Estimates of ϕ^{C-I}_{gap} with Alternative Data Sources and Vintages in Rolling Samples [(1)]

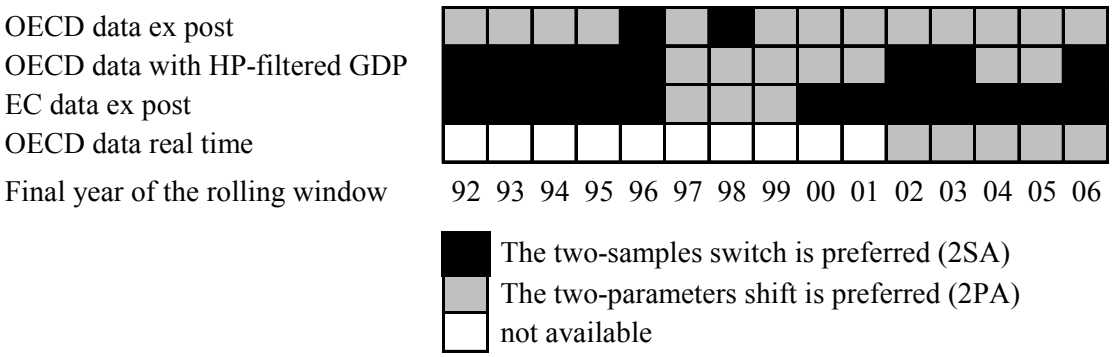


Notes:

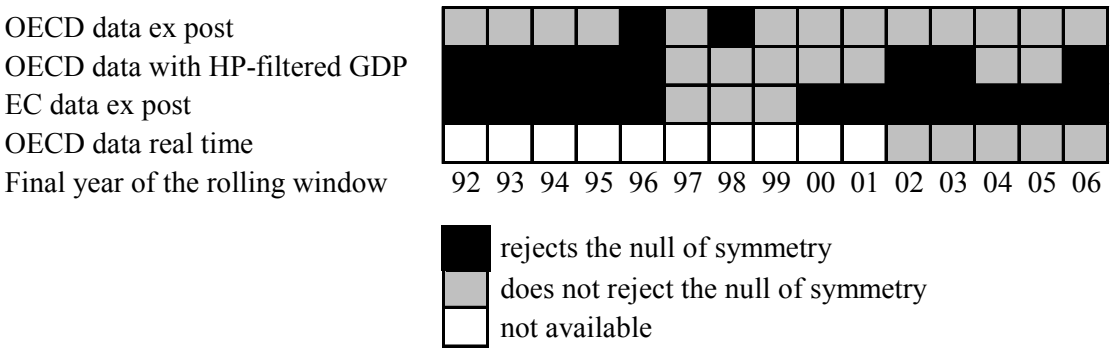
[(1)] The first point estimates correspond to the 1978-1992 sample, the last to 1992-2006. All the sub-samples cover a fixed 15-years period. The 95% confidence intervals refer to ϕ^{C-I}_{gap} estimates with *ex post* OECD data. **OECD** = *OECD ex post* data; **HP** = *OECD ex post* data for initial fiscal conditions and HP-filtered GDP for the output gap; **EC** = *EC ex post* data; **RT** = real-time *OECD* data.

Figure 6.5 Policy Asymmetry over the Cycle in Rolling Samples - CAPB-l Model [1]

(a) Selection of the most appropriate approach: either two-samples switch (2SA) or two-parameters shift (2PA) [2]



(b) Policy symmetry test outcomes using the more appropriate approach, 2SA *vs* 2PA [3]



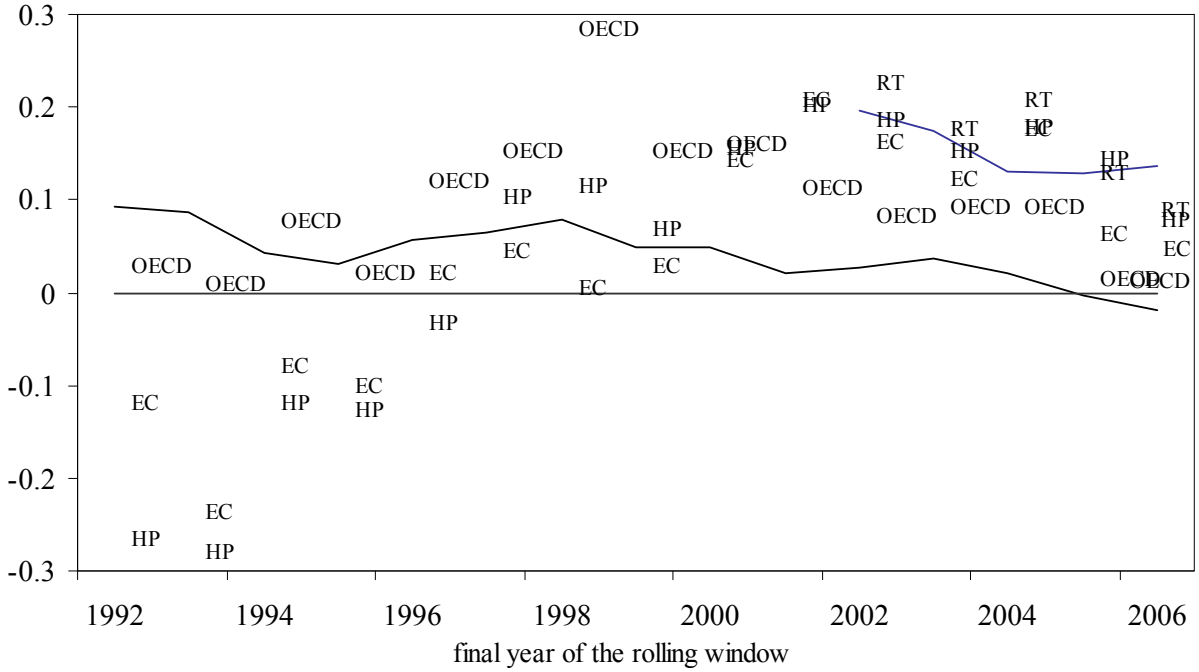
Notes:

[1] The first point estimates correspond to the 1978-1992 sample, the last to 1992-2006. All the sub-samples cover a fixed 15-years period.

[2] The 2SA approach is appropriate at 5% (then preferred) when the shifts in both initial fiscal conditions and all the model's deterministic components (country and time fixed effects) are jointly significant.

[3] The 5% rejection of symmetric policies (under the null hypothesis) is based on the p-value of the most appropriate approach (either two-samples switch, 2SA, or two-parameters shift, 2PA, see panel above) using the indicated data source over the sample period ending in the corresponding year and starting 15 years before.

Figure 6.6 Estimates of Parameter Difference in Good and Bad Times with Alternative Data Sources and Vintages in Rolling Samples [1]



Notes:

[1] The first point estimates correspond to the 1978-1992 sample, the last to 1992-2006. All the sub-samples cover a fixed 15-years period. The lower spline (since 1992) measures the average of the ϕ^{C-1}_{gap} estimates with *ex post* data, the upper spline (since 2002) measures the average of the ϕ^{C-1}_{gap} estimates with real-time data.
OECD = *OECD ex post* data; **HP** = *OECD ex post* data for initial fiscal conditions and HP-filterd GDP for the output gap; **EC** = *EC ex post* data; **RT** = real-time *OECD* data.

Discussion

Carlos Martinez Mongay

The paper by Roberto Golinelli and Sandro Momigliano addresses an EMU-relevant question that is frequently asked in the literature on fiscal policy, namely if discretionary fiscal policies in industrialised countries, and especially in the euro area, tend to be counter- or pro-cyclical. An ancillary question relates to the extent to which fiscal authorities react symmetrically over the cycle, so that the cyclical behaviour of fiscal policy might be different in upturns and downturns. To answer these questions Golinelli and Momigliano first look at the existing empirical literature. After considering an initial set of 21 studies, the authors conclude that the literature review, which focuses on 12 contributions in particular, does not give a conclusive answer to the central question of the cyclical behaviour of fiscal policy. Some of the contributions would suggest that fiscal policies tend to be pro-cyclical, while other pieces of empirical research would indicate that fiscal policies have been overall a-cyclical or even counter-cyclical. The same applies to possible behavioural asymmetries of fiscal policies over the cycle. On this basis, the authors try to identify the reasons behind the large differences across the various empirical analyses. To that end, they carry out an exhaustive empirical research programme of their own, working with a sample of 11 euro-area countries, namely all the members of the area except Luxembourg, Slovenia, Cyprus and Malta, over a time span approximately covering the latest three decades.

Cyclicality is measured through the estimate of the coefficient of the output gap in a function of the form:

$$Y = \alpha + \beta X + F(Z) + \varepsilon \qquad (1)$$

where Y is a fiscal-policy indicator, X is an indicator of the cyclical position and F(Z) is a function of a vector Z of other variables, while ε is the error term. Y and X are measured in such a way that $\beta>0$, $\beta=0$ and $\beta<0$ imply counter-cyclical, a-cyclical and pro-cyclical fiscal policies, respectively. Two alternative fiscal policy indicators are considered, namely the cyclically-adjusted primary balance (CAPB) and the primary balance (PB), while the cycle is measured through the output gap in levels. The authors consider alternative methods to calculate the output gap (H-P, production function), different data sources (AMECO, OECD), different observational timings for the output gap (real-time, ex post), and different time lags with respect to the fiscal-policy indicator (contemporaneous or lagged output gap). Moreover, in order to test the robustness of the results with respect to the inclusion of additional observations, models are estimated for rolling samples of 15-year windows.

While aware that this does not do full justice to the excellent work done by Golinelli and Momigliano, I would summarise their conclusions as follows: models for PB tend to show counter-cyclical fiscal-policy behaviour in the euro area, while CAPB models would point to a-cyclical behaviour in most cases and to pro-cyclical fiscal policies in a few. These basic results may change depending on data sources and time spans. AMECO data tend to show more counter-cyclicality than the economic series from the OECD databanks. Analogously, counter-cyclical behaviour is detected more frequently if the output gap is measured in real time than if it is measured ex post, as available in AMECO or the OECD. Interestingly, there seems to be some evidence of pro-cyclicality in the rolling samples regressions including the most recent 15-year sub-sample. Where symmetry is concerned, the authors conclude that all

the parameters of the equation, and not only that of the output gap, change when fiscal authorities exhibit asymmetric behaviour over the cycle. Overall, there seems to be some evidence of counter-cyclical policies in good times, while fiscal policy in the euro area may be pro-cyclical in bad times. However, the conclusions on symmetry seem to depend on statistical sources. Overall, as pointed out above, AMECO and real-time estimates of the output gap tend to more often show counter-cyclical policies, while the output gap series of the OECD, as well as those calculated with the H-P filter would tend towards the conclusion that pro-cyclical policies prevail. Finally, these results seem broadly robust with respect to the inclusion of certain institutional and policy indicators such as the electoral cycle, the Maastricht Treaty, monetary conditions, and fiscal governance.

These conclusions appear to be based on an exhaustive revision of the literature, as well as on a detailed comparison of relevant specifications, while using main, standard data banks. Moreover, the authors apply sound, state-of-the-art econometric techniques and carry out exhaustive robustness checks, which can be replicated relatively easily by other researchers. All these are desirable properties of good empirical analyses and, indeed, have made the life of this discussant very difficult. Fortunately, even good papers such as Golinelli and Momigliano's, are short pieces of research and, therefore, they always leave out of their scope a series of more or less relevant issues. In this particular case, I see three main interrelated topics which could deserve some consideration: (1) fiscal rules versus fiscal-reaction functions, (2) panel versus intra-country analyses (including the importance of the country sample), and (3) assessing fiscal behaviour in extended models. I will finally discuss the extent to which the question of the cyclical behaviour of fiscal policies in the euro area remains unsettled.

Golinelli and Momigliano refer to their specifications sometimes as fiscal rules and sometimes as fiscal-reaction functions, as if these two concepts were overall neutral for the empirical analysis. In my view, they are not. Moreover, I think that explicitly considering whether the paper works on fiscal rules or on fiscal reaction functions would have rendered the discussion in Section 2 more systematic and straightforward. In the relevant literature, the bulk of which is referenced in the paper, fiscal rules are considered as mirroring monetary rules *à la* Taylor. Fiscal rules refer to a discretionary fiscal target, S*, usually the CAPB, and assume that fiscal policy aims to stabilise the economy at around its potential and debt at around a debt target, d*. This would basically respond to two main challenges of fiscal policy, namely stabilisation and sustainability.

A typical formulation of a fiscal rule would be:

$$S^*_t = \alpha + \delta(d_{t-1} - d^*) + \gamma\, E(X_t/\Omega_t) \qquad (2)$$

where d_{t-1} is the debt existing at the beginning of t, and $E(X_t/\Omega_t)$ is the expected output gap (X_t) given the information available at the beginning of t, Ω_t. Generally, fiscal rules like (2) are not observable in the real world. Attaining S^*_t can be difficult due to, among other things, inertia in the budgetary process (viz. problems to fully adjust taxes and/or expenditures as planned over the budgetary year) and unexpected events (viz. a wrong assessment of budgetary impacts). This can be represented by a partial adjustment mechanism:

$$S_t = (1-\rho)\, S^*_t + \rho\, S_{t-1} + \nu_t \qquad 0 < \rho < 1 \qquad \nu_t \quad \text{iid}\ (0, \sigma^2) \qquad (3)$$

which implies

$$S_t = (1-\rho)(\alpha-\delta d^*) +(1-\rho)\,\delta d_{t-1} + (1-\rho)\,\gamma\, X_t + \rho\, S_{t-1} + \varepsilon_t \quad (4)$$

and

$$\varepsilon_t = (1-\rho)\,\gamma\,(X_t - E(X_t/\Omega_t)) + \nu_t \quad (5)$$

The 'observable' fiscal rule, which is a particular form of (1), is dynamic (inertia) and includes an error term that can be correlated with the output gap, which would justify using GMM methods, as Golinelli and Momigliano do. Note that the intercept in the fiscal rule and the debt target in (2) cannot be identified.

Within this approach, the equivalence of the CAPB and PB as specified in Section 2 of the paper seems straightforward. After reformulating expression [4] in terms of the expected output gap,

$$PB^* = CAPB^* + \omega\, E(X_t/\Omega_t) \qquad (\omega>0) \quad (6)$$

plugging it in (2) (with Y=CAPB as the fiscal target) gives

$$PB^*_t = \alpha + \delta(d_{t-1} - d^*) +(\gamma+\omega)\, E(X_t/\Omega_t) \quad (7)$$

In other words, given ω, CAPB and PB models are equivalent. Models using PB will tend show a more counter-cyclical (less pro-cyclical) policy if ω is positive, as it is expected to be. Model (4) also suggests that the inertia indicator would coincide with the fiscal target, which would rule out CAPB/PB models of the type [2] in Section 6.2 of the paper. Another implication of the 'fiscal-rule' framework is that, in panel data models, which assume the same fiscal rule (2) (same α, β, γ) over time and across countries, time/country effects might be interpreted in terms of across-time/country differences in debt targets, d*. This would call for a more exhaustive exploitation of the corresponding estimates in fixed effects models. Talking of estimates, it is interesting to note that the appropriate estimation methods depend on the hypotheses one makes about $E(X_t/\Omega_t)$. For instance, if the relevant output gap is the lagged gap, thus fully known in t, $X_t = X_{t-1}$ and $E(X_t/\Omega_t)= X_{t-1}$. Then

$$\varepsilon_t = \nu_t \qquad \text{with} \qquad \nu_t \text{ ----- iid } (0, \sigma^2) \quad (8)$$

and there would not seem to be much need to apply GMM.

Critically, some commentators would argue that, unlike monetary rules, fiscal rules *à la* Taylor are not well established empirically (see, for instance, Roeger, 2003). Consequently, it would be difficult to interpret the estimated coefficients of econometric specifications like (4) as reflecting the intentional behaviour of governments. The alternative to the fiscal-rule approach would be to specify a purely empirical relationship for PB or CAPB with respect to debt levels and cyclical conditions (see, for instance, Ballabriga and Martinez-Mongay, 2007), such as

$$S_t = \alpha + \delta d_{t-1} + \gamma X_t + \varepsilon_t \quad (9)$$

Typical specification tests applied to this baseline model would provide guidance for the analyst to determine the extent to which the model requires an inertia term (add ρS_{t-1} to (9)) or what output gap, whether contemporaneous or lagged, fits better with the data, and, therefore, what the most appropriate estimation method would be. Within this framework, models *à la*

CAPB/PB might also be ruled out. Moreover, an inertia term would be introduced if there would be evidence of a wrong dynamic specification of the model, thus requiring the inclusion of the lagged endogenous variable, rather than imposing it at the outset.

A second aspect of Golinelli and Momigliano's paper that I see as problematic is that it does not discuss the appropriateness of panel data methods. Without much justification, they go for panel data and disregard intra-country analyses. Although this is quite common in the empirical literature on fiscal rules or fiscal reaction functions, it seems clear that, as mentioned above, within a fiscal rule framework, panel data models imply that all the governments use the same fiscal rule all the time. They also imply that all the governments face the same budgetary inertia and shocks. In the fixed effects model, debt targets would change across countries and over time.

Working with fiscal reaction functions would constrain the interpretation of the coefficients less, since the aim of the research would be to estimate the 'average' fiscal policy behaviour across countries and time. Therefore, panel data models would seem to provide the researcher with lots of degrees of freedom. However, this points, in turn, to the need to test the null hypothesis of constant coefficients in the panel. In this context, there appears to be some empirical evidence pointing to large differences across countries in terms of the parameters in (9). These cross-country differences also apply to the dynamic specification of the model, not only in terms of the size of ρ, but also in terms of its statistical significance (see, for instance, Ballabriga and Martinez-Mongay, 2007). Needless to say, a discussion on the appropriateness of using panel data methods would also bring the issue of the robustness of the results to changes in the sample of countries, which is not addressed in the paper. If there are significant cross-country differences in terms of, let us say, the cyclical response, panel data estimates of the average cyclical response would be sample-dependent. However, this may be less relevant if the question on the cyclical behaviour of fiscal policy is circumscribed to the euro area.

The same fiscal rules versus fiscal reaction functions framework could shed some light on the specification and interpretation of models including institutional, policy and other variables, such as the electoral cycle, the EMU fiscal framework, or fiscal institutions. The authors assume that these variables do not interact with the other parameters of the model. Their specification is of the type:

$$S_t = \alpha_0 + \beta_1 Z_{1t} + \beta_2 Z_{2t} + ...+ \beta_\kappa Z_{\kappa t} + \delta d_{t-1} + \gamma X_t + \rho S_{t-1} + \varepsilon_t \qquad (10)$$

Within a fiscal reaction function framework, (10) is actually a null hypothesis with respect to an alternative in which institutional and policy variables interact with other parameters of the model. Therefore, this null should have been tested, in the same way that the authors have tested the extent to which asymmetric behaviour affects all the parameters of the reaction function or just the coefficient of the output gap.

Discussing the implications of using model (10) goes beyond econometrics. It seems to have implications in terms of the goals one attributes to fiscal governance. Within a fiscal rule framework, specification (10) implies that things like changes in fiscal institutions or the introduction of the EMU fiscal-policy framework would not change the cyclical response of fiscal policy, the sustainability parameter (i.e. the reaction of the primary balance to debt accumulation) or the budgetary process, which could in turn have some implications for inertia. According to this specification, fiscal institutions or rules would only have an impact on the intercept of (2) or on the debt target. The intercept of (2) is the CAPB (or PB) that would be targeted when the actual GDP would coincide with the potential and the debt level

would have attained the debt target. In other words, α would be the CAPB or PB consistent with zero debt accumulation (stable debt), while leaving the level of output at potential. Within this framework, it seems to me that the intercept of the fiscal rule appears to be determined by potential growth and other structural features of the economy, rather than by fiscal governance. An alternative interpretation would be that fiscal institutions and rules only affect the debt target. In other words, and this also applies to the reaction function approach, specification (10) would imply that fiscal institutions or rules would not change the reaction of fiscal policy to debt accumulation, even if the debt target were changed in a significant way, which is not easy to understand. It would also imply that fiscal institutions and rules would not change cyclical behaviour of fiscal policy. However, one of the main goals pursued when governments introduce certain fiscal institutions and rules is to tackle pro-cyclical biases (European Commission, 2006a). Interestingly, Golinelli and Momigliano's empirical results conclude that the consideration of institutional and policy variables do not alter the reaction of fiscal policy to the cycle. Nevertheless, the validity of this conclusion seems to me an open issue until it is tested in a model allowing impacts of the fiscal governance setting on fiscal behaviour.

Finally, I wonder to what extent the paper really settles its core question. Taking at face value the empirical estimates in the paper and considering the typical 5% significance threshold, my tentative conclusion would be that the average discretionary fiscal policy across the euro area and over the last three decades has been a-cyclical. I would also add that automatic stabilisers have operated in the expected counter-cyclical direction and that there is little evidence of discretionary pro-cyclical fiscal policies. My tentative conclusion is based on the estimates in tables 6.2-6.6, where I have found only 3 cases of pro-cyclical behaviour with a confidence of about 95%. In line with other empirical studies, the parameter capturing the relationship between the CAPB and the cycle is statistically insignificant in most cases. However, given the caveats expressed above on the use of panel data methods and the way institutional and policy variables have been specified, it seems to me that the question at the origin of the paper is still unsettled. I leave the reader the final judgement, while acknowledging that this conclusion is actually good news for some people, like this discussant, who are still working on related issues.

7 Uncertainty in Measuring the Underlying Budgetary Position and Fiscal Stance

Matthias Mohr, Richard Morris[*]

7.1. Introduction

In order to properly assess the underlying budgetary position and the fiscal stance, it is necessary to distinguish between cyclical and transitory influences on the budget balance on the one hand and the impact of policy measures (tax reforms, expenditure cuts etc) on the other hand. Budget balance estimates corrected for the economic cycle are therefore an important part of the fiscal policy maker's toolkit. They have also come to play an increasingly prominent role in the context of the Stability and Growth Pact (SGP). Firstly, Member States' compliance with their "medium-term budgetary objectives" (MTOs) is assessed in terms of the "structural balance", defined as the cyclically adjusted balance net of one-off and temporary measures.[92] Second, if the MTO is not achieved, Member States are required to take steps towards its achievement, with a 0.5% of GDP annual improvement of the structural balance taken as a benchmark. And thirdly, also in the context of the Excessive Deficit Procedure, while the 3% of GDP deficit ceiling applies to the actual (not cyclically adjusted) budget balance, fiscal policy requirements for countries in excessive deficit and the assessment of compliance also focus increasingly on annual changes of the structural budget balance.

The estimation of cyclically adjusted budget balances is, however, subject to considerable measurement uncertainty. The aim of this paper is to discuss the importance of these sources of uncertainty for assessing the underlying budgetary position and fiscal stance. Section 2 briefly describes the method of cyclically adjusting the budget balance applied by the OECD and the European Commission, as this is the “official” methodology underlying the assessment of fiscal policies in the context of the SGP. Sections 7.3 to 7.5 then consider the main measurement problems related to the measurement of the output gap, the impact of changes in the composition of output and the behaviour of tax revenues in relation to their assumed bases. It should be noted that while in this paper we focus on measurement uncertainty mainly in relation to the OECD/Commission cyclical adjustment methodology, other methodologies generally suffer from comparable measurement problems.

[*] We thank Ad van Riet, P. Rother and L. Schuknecht and members of the ECB Fiscal Policies Division for valuable comments on an earlier version of this paper. The views expressed here are those of the authors and not necessarily those of the European Central Bank.

[92] The cyclically adjusted budget balance (or the structural budget balance – netting out one-off and temporary measures) is essentially a measure of the underlying budgetary position. The fiscal stance is traditionally measured by the change in the cyclically adjusted primary budget balance. In recent years, however, the ratio of interest payments to GDP has been relatively stable in euro area countries, so that the change in the cyclically adjusted balance is approximately equal to the change in the cyclically adjusted primary balance.

7.2. A few words on the OECD / Commission method of cyclical adjustment

In a nutshell, the cyclically adjusted budget balance B^{CA} is defined as the actual budget balance *B* minus the cyclical component of the budget balance *C*. The latter is equal to the output gap, i.e. the gap between actual and (trend or) potential output $(Y_R - Y_R^P)$ [93] scaled by the sensitivity of the budget balance with respect to output $e_{b,y}$:

$$B^{CA} = B - C = B - e_{b,y}(Y_R - Y_R^P)$$ [94]

In the OECD / Commission cyclical adjustment methodology, the sensitivity of the budget balance with respect to output takes a fixed value, which is estimated independently for each country to take account of country-specific differences in the responsiveness of revenues and expenditure to output.[95] It is defined as the difference between the sum of the cyclical sensitivities of the four main revenue categories (personal income taxes, corporate income taxes, indirect taxes and social security contributions) and the cyclical sensitivity of unemployment related expenditure, all weighted by their respective shares in GDP

$$e_{b,y} = \sum_i^4 (T_i / Y) e_{t_i,y} - (G/Y) e_{g,y}$$

where T_i is the *i*th revenue category, G is unemployment related expenditure and $e_{t_i,y}$ and $e_{g,y}$ are the respective elasticities of revenues and expenditure with respect to (real) output. For unemployment related expenditure, a unit elasticity with respect to output is assumed, so that the cyclical sensitivity of expenditure is simply equal to the share of unemployment related spending in GDP. The elasticities of tax revenues with respect to output are estimated as the sum of the elasticity of each revenue category with respect to its base e_{t_i,r_i} and the elasticity of the tax base with respect to output $e_{r_i,y}$:

$$e_{t_i,y} = e_{t_i,r_i} e_{r_i,y}$$

For personal income taxes and social security contributions the relevant tax base is compensation of employees and the elasticity is determined by the structure of the tax system. The tax base for corporate income taxes is the operating surplus and for indirect taxes it is private consumption expenditure with both of these taxes assumed to have unit elasticities with respect to their bases. The elasticities of the tax bases with respect to output are estimated econometrically.

Hence, there are three principal sources of measurement uncertainty involved in the estimation of the cyclically adjusted budget balance. These are related to: (i) the measurement of the output gap $(Y_R - Y_R^P)$; (ii) the responsiveness of revenue and expenditure bases to output $e_{r_i,y}$ and $e_{g,y}$; and (iii) the behaviour of tax revenues in relation to their bases e_{t_i,r_i}.

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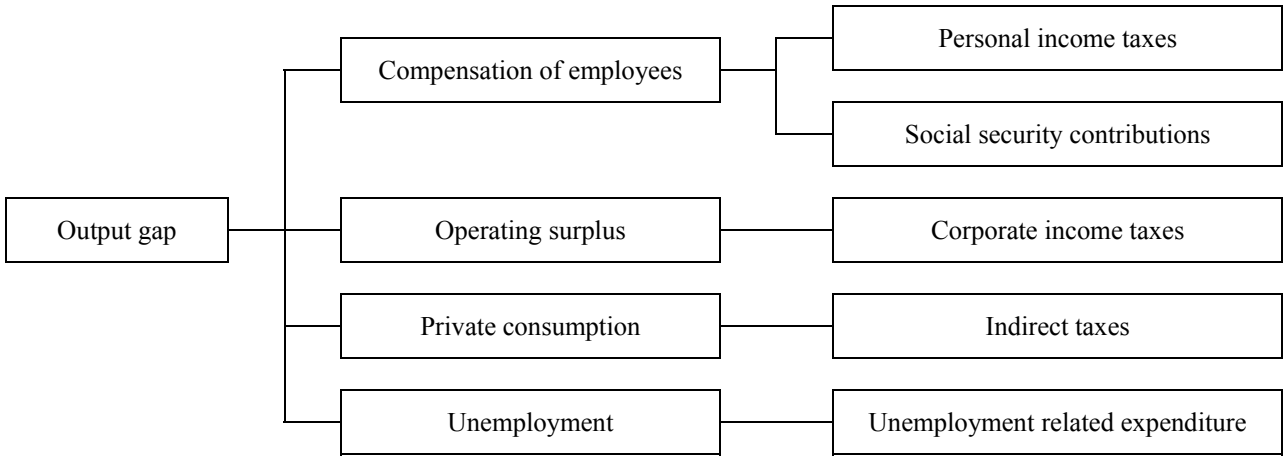
[93] Since 2003 the European Commission has estimated the output gap as the difference between actual and potential output estimated on the basis of a production function. For an explanation of this approach see Denis et al. (2002).

[94] The subscript $_R$ is used to make clear when we are referring to variables in real terms as opposed to nominal terms (i.e. Y_R = real output and Y = nominal output).

[95] For a description of this methodology see Girouard and André (2005) and before this van den Noord (2000).

Figure 7.1 Structure of the OECD/European Commission Cyclical Adjustment Methodology



7.3. Data revisions and the measurement of the output gap

A major source of uncertainty in the measurement of cyclically adjusted budget balances pertains to ex-post revisions of past data used in their computation. Firstly, observable variables such as GDP and nominal budget balances are regularly revised ex-post owing to time lags in the collection of national accounts data and because of statistical re-definitions[96]. Secondly, even in the absence of changes in observable data, unobservable variables such as potential output and the output gap are constantly revised since their estimation in any given year depends not only on past but also on expected future output. Hence, new data give rise to ex-post changes in the assessment of past (and future) structural economic developments[97].

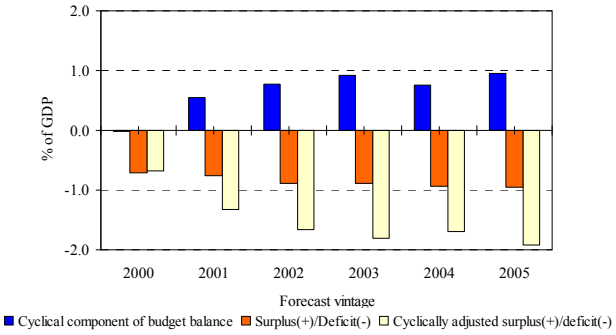
[96] Statistical revisions, which on average are sizeable, are often the result of desirable improvements in the quality of government finance statistics (see Mora and Martins (2007)).

[97] This is a general issue in the estimation of potential output which does not only concern the OECD/Commission approach. See, for instance: Orphanides (2002), Rünstler (2002), Camba-Méndez and Palenzuela (2003), and Gruen et al. (2005).

Implications for assessing the underlying fiscal position

The reliability of cyclically adjusted budget balance estimates can be measured by observing their evolution for a given year over time (i.e. over different database vintages). As an example, Figure 7.2 shows the impact that different kinds of revisions have had on measurements of the euro area cyclically adjusted balance for the year 2000. In autumn 2000, a cyclically-adjusted deficit of 0.7% of GDP was estimated. In the following years, the cyclically adjusted deficit was revised upwards step by step, to eventually obtain the value of just below 2% of GDP in the autumn 2005 data vintage. As regards the origins of these revisions, it can be seen that these largely mirrored revisions of the cyclical component of the budget balance (exclusively determined by the output gap), whereas the impact of revisions of the nominal balance (which would also capture the impact of statistical revisions) was marginal.[98] The story underlying these revisions is that the strong upturn in economic growth in 2000 was initially identified as an improvement in trend output rather than a cyclical improvement. This led to a relatively favourable estimate of the cyclically adjusted balance. However, when r/eal GDP growth in the euro area slowed down in the years after 2000, the cyclical component of the 2000 deficit was revised upwards ex post, and, consequently, the cyclically adjusted budget balance was revised downwards.

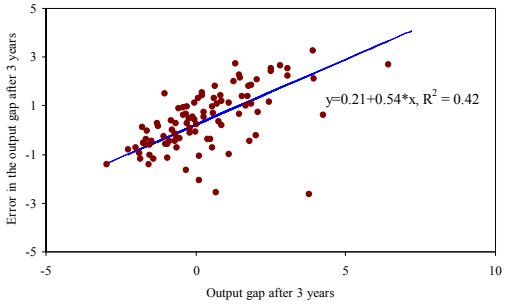
Figure 7.2 The euro area cyclically adjusted balance in the year 2000 in different estimation vintages



Note: The figures exclude negative capital expenditure from the sale of UMTS licences.

Source: European Commission AMECO database and authors' computations.

Figure 7.3 Errors in real time estimates of the output gap in the period 1996-2003[99] (in % of GDP)



Source: European Commission and authors' computations.

The year 2000 was exceptional in terms of economic growth and the following growth slowdown. Nevertheless, the initial mis-measurement of the cyclically ad.justed balance in 2000 would appear to reflect a general systematic measurement bias, which is particularly severe around turning points of the business cycle. If the output gap measured in real time were an unbiased estimator of the final measure of the output gap, the measurement error

[98] Note that the output gap estimates considered in this exercise represent the difference between actual and trend output according to the previous HP filter method applied at the time by the European Commission. Real time estimates of the output gap using the production function approach are not available for the time period considered.

[99] The data points refer to 12 euro area countries (excluding Cyprus, Malta and Slovenia) for the period 1996-2003. The error is defined as the difference between the estimate of the output gap three years later (i.e. the estimate of the output gap of year t in year t+3) and the real time estimate of the output gap (i.e. the estimate of the output gap of year t in year t). Positive values of the error indicate an underestimation of the output gap in real time compared with the estimate three years later.

should not be related to the final output gap. This is not the case, as Figure 7.3 shows: there is a systematic, positive relationship between the error (approximated as the output gap measured after three years minus the real time value of the output gap) and the final output gap (approximately defined as the output gap measured after three years). This implies that in absolute terms, output gaps are systematically underestimated[100].

Since bias in the measurement of the output gap generally carries over to the cyclically adjusted balance, one would expect that the latter are systematically overestimated in real time during economic good times while during bad times initial cyclically adjusted balance estimates are systematically too low. A regression over the time period 1996-2003 confirms this assumption (see Table 7.1)[101]: a positive output gap of 1% triggered an overestimation of the cyclically adjusted balance by 0.34% of GDP on average in the 12 euro area countries. Thus, cyclically adjusted budget balance estimates in real time are liable to give a distorted picture of the actual underlying fiscal position, particularly around the peaks and troughs of the business cycle.

Table 7.1 Panel regression of errors in cyclically adjusted budget balance ratios on output gaps and errors in budget balances

Dependent variable	Error in CAB level		
Independent variables	Error in budget balance	Output gap	Constant
Coefficient	**0.854**	**-0.337**	-0.065
Std. Err.	0.054	0.028	0.046
T	15.930	-12.200	-1.410
P>| t|	0.000	0.000	0.162
R^2	**overall: 0.771** (within: 0.858, between: 0.595)		
F test	F(2,81) = 244.13, Prob > F = 0.000		
Hausman test	Chi^2: 9.53, Prob > Chi^2: 0.0085		
Number of observations: 95. Number of euro area countries: 12. Years 1996-2003.			

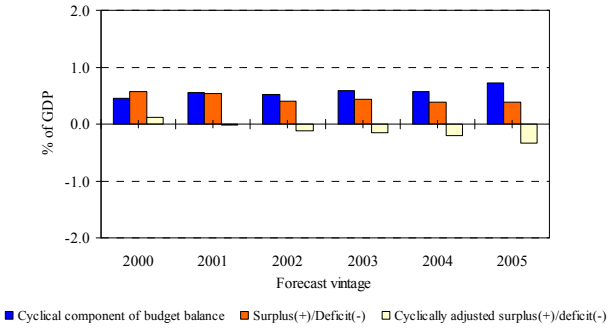
Notes: All variables are in % of GDP and are defined as year t values obtained in year t+3. Errors are computed by subtracting year t values obtained in year t. Parameter estimates significant at the 5% level are set in bold face.
Source: European Commission.

[100] In other words: in good times, when the output gap is positive, its initial estimate is too low while in bad times, when the output gap is negative, the initial measurement is too high.
[101] The error in the budget balance is included as an independent variable as well in order to control for the impact of statistical revisions. The regression results are robust against other definitions of "final" outcomes. The panel regressions use fixed effects. Random effects, which the Hausman specification test rejects, would provide slightly different estimates but not change the basic results and conclusions.

Implications for the assessment of the fiscal stance

To what extent do the reliability problems in the measurement of cyclically adjusted balances carry over to measured annual changes in cyclically adjusted balances (i.e. affecting the assessment of the fiscal stance)? Figure 7.4 replicates Figure 7.2 but this time showing the annual change in the euro area budget balance and cyclically adjusted balance in 2000 as reported in different database vintages.

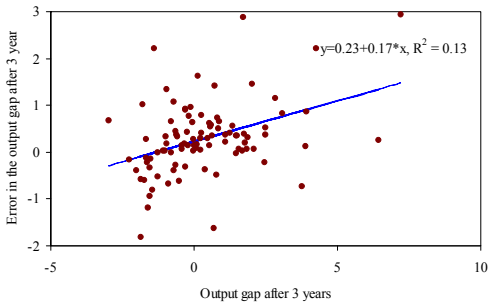
Figure 7.4 Change in the euro area cyclically adjusted balance in the year 2000 in different estimation vintages.



Note: The figures exclude negative capital expenditure from the sale of UMTS licences.

Source: European Commission and authors' calculations.

Figure 7.5 Errors in real time estimates of the annual change in the output gap in the period 1996-2003[102] *(in % of GDP)*



Source: European Commission and authors' calculations.

The change in the euro area cyclically adjusted balance in the year 2000 was estimated in autumn 2000 to amount to an increase of 0.1% of GDP. This was revised to a zero change in autumn 2001 and then to a decline of about 0.2-0.3% of GDP in the following vintages (up until autumn 2005). Again, the annual change in the nominal budget balance was not revised much. The revisions of changes in cyclically adjusted balances derived primarily from revisions to the change in the cyclical component. The graph implies that ex post revisions also affect estimated changes in the cyclically adjusted budget balance, but to a lesser extent than revisions in terms of levels. A similar picture also emerges when plotting the error in the annual changes in the output gap against the output gap level (see Figure 7.5). There is still a systematic bias, but it is less pronounced for changes in the output gap than for levels.

Table 7.2 reports the results of a regression of measurement errors in terms of annual changes in the cyclically adjusted balance on measurement errors in budget balance changes and on the output gap level. The coefficient of the output gap level turns out to be close to zero and statistically insignificant. Thus, the reliability of the change in the cyclically adjusted balance as an indicator of the fiscal stance is not much affected by the cyclical position[103].

[102] The data points refer to 12 euro area countries (except Cyprus, Malta and Slovenia) for the period 1996-2003. The error is defined as the difference between estimate of the change in the output gap three years later (i.e. the estimate of the change in the output gap of year t in year t+3) and the real time estimate of the change in the output gap (i.e. the estimate of the change in the output gap of year t in year t). Positive values of the error indicate an underestimation of the output gap in real time compared with the estimate three years later.

[103] This fits well with the general finding in the literature that estimates of changes in output gaps are often more reliable than levels.

Table 7.2 Panel regression of errors in changes in cyclically adjusted balances on the output gap and errors in budget balance changes

Dependent variable	Error in change in CAB		
Independent variables	Error in budget balance change	Output gap	Constant
Coefficient	**0.972**	-0.043	-0.103
Std. Err.	0.061	0.026	0.046
T	16.040	-1.670	-2.250
P>| t|	0.000	0.100	0.027
R^2	**overall: 0.766** (within: 0.768, between: 0.890)		
F test	F(2,81) = 131.65, Prob > F = 0.000		
Hausman test	Chi^2: 5.44, Prob > Chi^2: 0.066		

Number of observations: 95. Number of euro area countries: 12. Years 1996-2003.

Notes: All variables are in % of GDP and are defined as year t values obtained in year t+3. Errors are computed by subtracting year t values obtained in year t. Parameter estimates significant at the 5% level are set in bold face.
Source: European Commission.

Even though errors in the measurement of the change in the cyclically adjusted balance due to data revisions appear to be limited and less biased than measurement errors in levels, they may still be sizeable enough to invalidate the real time assessment of fiscal policy, for example regarding the assessment of whether or not the fiscal stance is loosening or tightening. One way to check this is again to compare real time assessments against "final" assessments, defined as the outcomes measured three years later.

Table 7.3 Errors in measurement of the fiscal stance as loosening/ tightening due to ex post revisions of the output gap

Change in the cyclically adjusted balance (fiscal stance)		Measured in year t+3		
		Neutral or tightening	Loosening	Total
Measured in year t	Neutral or tightening	47	19	66
	Loosening	7	23	30
	Total	54	42	96

Note: The sample consists of annual changes in the cyclically adjusted balance for the period 1996-2003 in 12 euro area countries (excluding Cyprus, Malta and Slovenia).
Source: European Commission and authors' computations.

As Table 7.3 shows, 42 (out of 96) cases were identified in the period 1996-2003 in which the fiscal stance, as measured by the change in the cyclically adjusted balance, worsened. Of these cases, 23 were correctly identified in real time, whereas in 19 of them, the initial assessment had pointed to a neutral or tightening fiscal stance.[104] Thus, in around one fifth of all observations, the signal the fiscal indicator provided in real time was too optimistic. In the rules based EU fiscal framework with defined budgetary objectives, it is particularly important to avoid such errors towards optimism as they will eventually widen the gap between budgetary targets and outcomes. On the other hand, in 7 out of a total of 54 cases the final outcome pointed to a neutral or tightening fiscal stance while in real-time the fiscal stance was assessed to be loosening.

7.4. The budgetary effect of changes in the composition of output

If the cyclical behaviour of the macroeconomic bases for revenues and expenditure is not in phase with overall GDP, such situations give rise to "composition effects". This is because certain components of GDP, notably private consumption and compensation of employees are fiscally more "high powered" than other components, notably exports and certain types of investment (which are subject to zero or lower tax rates). Hence, for example, in episodes of export-driven output growth, the effective cyclical impact on general government finances can fall short of and may lag behind the impact one would derive from the contemporaneous output gap multiplied by the budgetary output sensitivity.

In contrast to the OECD/Commission methodology, the method of cyclical adjustment employed within the European System of Central Banks (ESCB) does not make use of an output gap or a trend deviation of output in calculating cyclically-adjusted budget balances.[105] Rather, government revenue and expenditure categories are adjusted individually on the basis

[104] Of course in practice, a change in the cyclically adjusted balance close to zero (e.g. less than 0.2% of GDP) may simply be assessed as a "broadly neutral" fiscal stance. However, this exercise serves to illustrate the problems associated with an excessively precise interpretation of cyclically adjusted balance indicators.
[105] The ESCB cyclical adjustment methodology is explained in Bouthevillain et al (2001).

of the deviation from trend of their respective macroeconomic bases. In this way, the ESCB approach seeks to capture effects originating from variations in the composition of output.[106]

In the following exercise we seek to gauge the impact of such composition effects by replicating the ESCB methodology for euro area countries, but in a simplified fashion applying standard OECD tax elasticities and bases. [107] More formally, we calculate the impact of changes in the composition of GDP as follows:

$$comp_y = [\sum_i^4 T_i e_{t_i,r_i}(\ln R_{Ri} - \ln R_{Ri}^{\ T}) - G_u e_{g_u,u}(\ln U - \ln U^T)] - e_{b,y}(Y_R - Y_R^{\ T})$$

where:

$\ln R_{Ri} - \ln R_{Ri}^{\ T}$ is the percentage deviation of the base of tax category i with respect to trend; and [108]

$\ln U - \ln U^T$ is the percentage deviation of unemployment from trend.

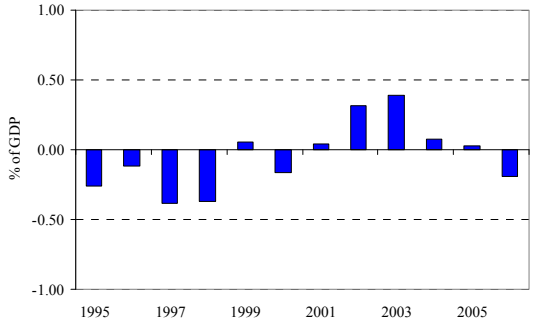
Thus $\sum_i^4 T_i e_{t_i,r_i}(\ln R_{Ri} - \ln R_{Ri}^{\ T}) - G_u e_{g_u,u}(\ln U - \ln U^T)$ is the cyclical component of the budget balance obtained in a disaggregated manner, while $e_{b,y}(Y_R - Y_R^{\ T})$ is the cyclical component of the budget balance calculated in an aggregate fashion. The difference between the two is interpreted as the composition effect, i.e. the effect on the budget balance of changes in the composition of output among the macroeconomic bases.

[106] This does not mean that the ESCB method of cyclical adjustment is superior to that of the OECD/Commission. One limitation of the ESCB approach is that the HP filtering method used to detrend the macroeconomic bases is a statistical tool that lacks micro-foundations. This critique of the HP filtering method was a major reason for the decision of the European Commission to move from HP filtering to a production function approach for estimating the output gap. It should be noted, however, that the calculation of the output gap according to the production function approach continues to rely partially on statistical filtering, for example to calculate trend factor productivity. Kiss and Vadas (2004) and (2005) have proposed a cyclical adjustment methodology, which combines a production function with a disaggregated approach and thus seeks to exploit comparative advantages of both the OECD/Commission and ESCB approaches.

[107] In this regard, following the OECD, we employ overall compensation of employees as the tax base for personal income taxes, whereas in the ESCB methodology the tax base is split into total employment (with unit elasticity) and average compensation of employees. Furthermore, we do not distinguish between the private and public sector components of personal income taxes and social contributions. A strict application of the ESCB approach would cyclically adjust the former, but not the latter. More generally, it should be noted that some EU national central banks apply variations to the standard ESCB methodology, in particular allowing for a better alignment of tax revenues to their bases, thereby exploiting available data and knowledge of tax systems at the national level (see, for example, Rodrigues Braz (2006) for Portugal). For these reasons, our estimates will differ from those computed by EU national central banks.

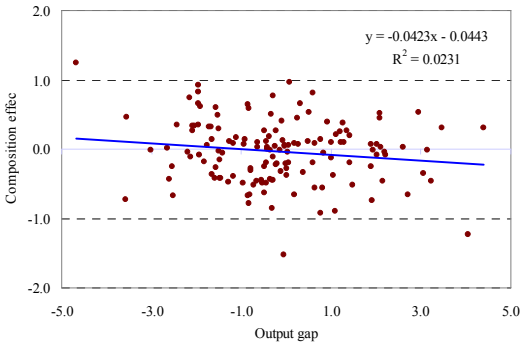
[108] Trend components are obtained using an HP filter (λ=30) applied to the macroeconomic bases in real terms. In this context, output and operating surplus are deflated by the GDP deflator, while compensation of employees and private consumption are deflated by the private consumption deflator.

Figure 7.6 Estimated effect of the composition of output on the euro area budget balance (1995-2006)



Sources: European Commission and ESCB for underlying data. Authors' calculations.

Figure 7.7 Composition effects and the output gap in euro area countries[109] 1995-2006 (% of GDP)



Sources: European Commission and ESCB for underlying data. Authors' calculations.

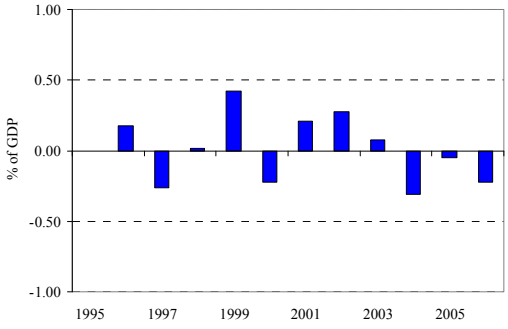
Figure 7.6 shows the estimated composition effects for the euro area for the period 1995 to 2006 and Figure 7.7 plots the composition effects for the individual euro area countries against the output gap. It can be seen that the effect of changes in the composition of output among revenue and expenditure bases for the euro area aggregate have been relatively modest in recent years, typically reaching no more than 0.3-0.4% of GDP. However, composition effects in individual euro area countries have frequently been larger than this. In our sample of 144 observations, the average (absolute) composition effect amounted to 0.3 of GDP, but in extreme cases they can be close to or even exceed 1% of GDP. In terms of levels, there is clearly no correlation between composition effects and the output gap.

Figures 7.8 and 7.9 replicate Figures 7.6 and 7.7, but this time looking at annual changes in the composition effect. This captures the impact of differences in the growth rates of individual GDP components and is what matters for the assessment of the fiscal stance. The picture that emerges in terms of changes is similar to that in terms of levels. Namely, year-on-year changes in the composition effect have been relatively modest for the euro area as a whole, typically no more than 0.3% of GDP, but have often been larger than this in individual countries. On average across the 132 observations in our sample from 1996-2006, the composition effect expressed in terms of annual changes was 0.4% of GDP and year-on-year changes in composition effects often reached 0.5% of GDP or more. Such effects would have a considerable impact on the assessment of the fiscal stance. Figure 7.9 points to a rather weak (negative) correlation between annual changes in these composition effects and changes in the output gap (i.e. suggesting that periods of higher growth have, at the margin, been driven by the less tax rich components of GDP).

Table 7.4 reports summary statistics regarding the number of observations for which the fiscal stance is assessed to be tightening or loosening for the two sets of cyclically adjusted balance estimates (calculated according to the aggregated and disaggregated approaches) for the period 1996-2006. Both approaches point to a fiscal tightening in approximately the same number of cases (79-80 out of the 132 observations)

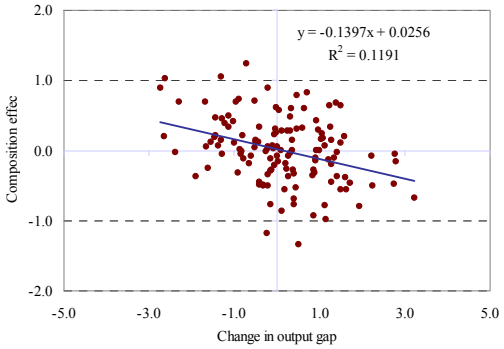
[109] Observations pertain to 12 euro area countries (excluding Cyprus, Malta and Slovenia).

Figure 7.8 Effect of change in the composition of output on the euro area budget balance



Sources: European Commission and ESCB for underlying data. Authors' calculations.

Figure 7.9 Change in composition effect and output gap in euro area countries 1996-2006 (% of GDP)



Sources: European Commission and ESCB for underlying data. Authors' calculations.

However, there are nine cases where the aggregate approach points to a fiscal tightening while the disaggregated approach points to a loosening fiscal stance and there are 10 cases where the reverse is true. Hence, in more than 15% of the observations, taking into account the estimated composition effects would give rise to a different assessment of the direction of the fiscal stance.

Table 7.4 Uncertainty in the assessment of the fiscal stance due to composition effects[110]

Fiscal stance		Measured by disaggregated approach		Total
		Tightening	Loosening	
Measured by aggregated approach	Tightening	70	9	79
	Loosening	10	43	53
	Total	80	52	132

Note: The sample consists of annual changes in the cyclically adjusted balance for the period 1996-2003 in 12 euro area countries (excluding Cyprus, Malta and Slovenia).
Sources: European Commission and ESCB for underlying data. Authors' calculations.

7.5. The behaviour of tax revenues

Tax revenues frequently fall short of or exceed by a significant margin the levels that would be implied by the growth rate of the underlying tax bases and elasticities underlying cyclical adjustment. There are several reasons for this.

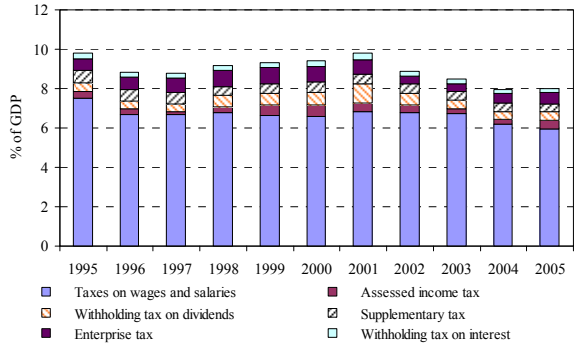
In particular the behaviour of corporate income taxes is difficult to predict and the national accounts indicator of profits (i.e. the operating surplus) is at most a poor proxy for the corporate tax base. This is partly because the operating surplus differs from the company accounts definition of profits (e.g. applying different depreciation rules and excluding income from property and capital gains).[111] It is also due to the asymmetric tax treatment of profits

[110] The sample consists of the authors' estimates of annual changes of cyclically adjusted budget balances for the euro area "12" countries calculated according to an aggregated approach (based purely on the deviation of output from trend) and a disaggregated approach (based on deviations of revenue and expenditure bases from trend).
[111] Note that in this paper we refer to personal and corporate income taxes in the broad sense as covering taxes on personal and corporate income from all sources (e.g. including capital gains), irrespective of whether such

and losses, which gives rise to significant and complex lags in corporate tax receipts. More specifically, losses incurred by a firm in one accounting period are not taxed negatively, but instead are carried forward and offset against future profits (either indefinitely or for a given period). As a consequence of these rules, during a period of economic recovery following a downturn, corporate tax receipts may initially remain subdued and later rebound strongly when the possibility for offsetting profits against previous losses expires.[112] The link between corporate taxes and operating surplus may be further weakened by profit shifting, within firms and across countries (among multinationals), and by merger and acquisition activity.

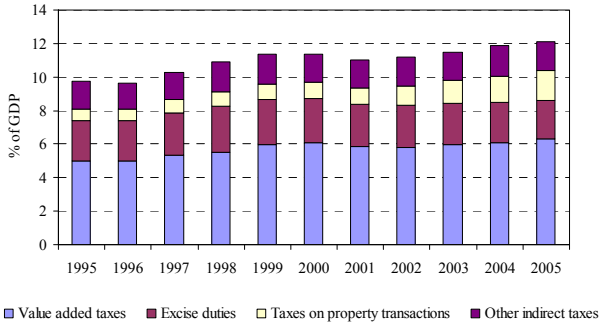
Compensation of employees is a somewhat better proxy for the base of personal income taxes. Nonetheless, a significant proportion of personal incomes accrue from "non-wage" sources, such as the profits of unincorporated businesses and capital gains, which tend to fluctuate more than regular wage income.[113] As an example, Figure 7.10 shows the structure of personal income taxes as a percentage of GDP in Germany over the 1996-2005 period. It can be seen that while the wage-related component of personal income taxes remained fairly constant, changes in the ratio of personal income taxes to GDP have been explained largely by developments in other components of personal income taxes.[114] Furthermore, taxes specifically on wages and salaries may not necessarily evolve in the way predicted by standard elasticities. In particular, the "fiscal drag" resulting from progressive personal income tax systems may vary if earnings at different ends of the income distribution respond differently to periods of buoyant or subdued economic activity.

Figure 7.10 Structure of personal income taxes in Germany



Sources: OECD and authors' calculations.

Figure 7.11 Structure of indirect taxes in Spain



Sources: OECD and authors' calculations.

There are also several reasons why indirect taxes may not grow in line with private consumption. Firstly, some (albeit mostly minor) indirect taxes are not *strictu sensu* consumption taxes. Perhaps the most important of these are taxes related to the property purchases, which in recent years have boosted tax receipts in some European countries with booming real estate markets. Figure 7.11 shows the composition of indirect taxes in Spain

sources of income are taxed together or separately. Hence, we equate personal income taxes and corporate income taxes with all direct taxes paid by households and corporations respectively.

[112] See Creedy and Gremmell (2007) for an analysis of how corporate tax rules may affect the path of corporate tax receipts.

[113] See CBO (2002a) and CBO (2002b) for an assessment of the impact of capital gains on personal income tax receipts in the United States during the late 1990s and early 2000s stock market boom and bust.

[114] For example, between 1997 and 2003, the ratio of taxes on wages and salaries to GDP was stable at between 6.6-6.8%. By contrast, the non-wage component of personal income taxes increased from 2.1% of GDP in 1997 to 3.0% of GDP in 2000 and then declined to 1.8% of GDP in 2003.

between 1996-2005, split between VAT, excise duties, taxes on property transactions and other indirect taxes. In particular the proportion of indirect taxes related to transactions in the property market has increased significantly (from 0.6% of GDP in 1996 to 1.7% of GDP in 2005) accounting for around half of the overall increase in the ratio of indirect taxes to GDP during this period.[115] Secondly, the assumed unit elasticity of indirect taxes to private consumption is based on the assumption that the regressive nature of excise taxes is broadly offset by progressivity in other indirect taxes, notably VAT (due to the fact that luxury goods are taxed at higher rates than staple goods). This, however, depends on the balance of consumption between goods subject to excise duties and other goods and services. More generally, the behaviour of indirect taxes may be sensitive to changes in the composition of consumption whereby purchases may be tilted towards more highly taxed goods during periods of greater economic activity and vice-versa.[116]

To gauge the impact of such influences on recent fiscal developments in the euro area, we compare actual tax revenues for the 2000-2006 period against the levels that would be implied by standard OECD tax bases and elasticities and available estimates of the impact of policy measures:[117]

$$(T_{i,t} - T_{i,t}^{F}) = T_{i,t} - [T_{i,t-1}(1 + e_{t_i,r_i}\dot{R}_{i,t}) + m_t]$$

where:

$T_{i,t}$ is the yield of tax category i in period t,

e_{t_i,r_i} is the elasticity of the tax to its base,

$\dot{R}_{i,t}$ is the growth rate of the tax base in period t; and

m_t is the assessed impact of policy measures.

The resulting "unexplained" changes in revenues for the euro area (expressed as a percentage of GDP) are shown in Figure 7.12.[118] For the euro area it can be seen that the downturn of 2001-2003 was accompanied by significant shortfalls of tax revenues compared to what one could have expected on the basis of the assumed elasticities and tax bases. Cumulatively, this loss in tax revenues amounted to more than 1% of GDP. Since 2004, however, these revenue

[115] The other major determinant in the growth rate of indirect taxes in Spain has been VAT, which is also (at least partly) related to developments in the housing market, as VAT (as opposed to stamp duty) is paid on purchases of new dwellings. For an overview of the impact of booming asset markets on tax revenues in Spain see Martinez Mongay et al (2007).

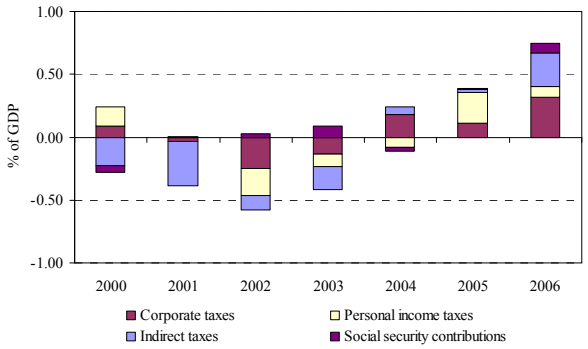
[116] Overall government revenues will also be affected by revenues not falling within the four main tax categories considered for cyclical adjustment, notably capital taxes (which include, for example, inheritance and gift taxes) and other non-tax revenues (such as fines and licence fees).

[117] In this exercise we apply the unit elasticities for corporate income taxes and indirect taxes as specified in Girouard and André (2005) as well as their estimates for the elasticity of social security contributions with respect to compensation of employees. In the case of personal income taxes, in some cases the elasticities reported in Girouard and André gave rise to a systematic (negative) bias. In these cases, we applied instead the respective elasticity reported in Bouthevillain et al (2001). Estimates of the impact of policy measures are based primarily on information provided by national central banks.

[118] These unexplained changes in revenues can be seen as broadly analogous to the "residual" in Kremer et al (2006).

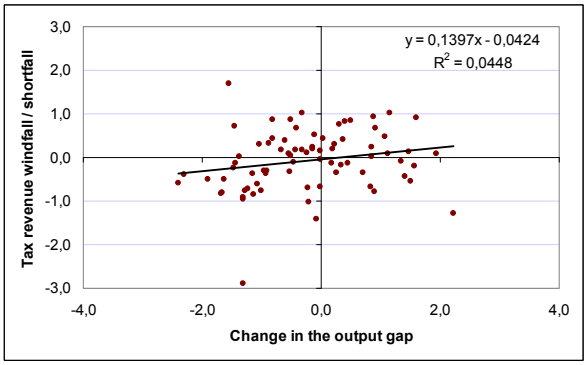
shortfalls have been more than offset by unexpected revenue gains (windfalls).[119] Personal and corporate income taxes as well as indirect taxes all contributed to this development while, as one would expect, the evolution of social security contributions is tracked much more closely by the corresponding tax base. Figure 7.13 plots the estimated revenue windfalls / shortfalls for the euro area 12 countries over the 2000-2006 period against changes in the output gap, showing that there is no obvious relationship, even though one might have expected one given the aggregate development at the euro area level.

Figure 7.12 Revenue windfalls / shortfalls in the euro area (% of GDP)



Sources: European Commission and ESCB for underlying data. Authors' calculations.

Figure 7.13 Tax revenue windfalls / shortfalls and changes in the output gap (% of GDP)



Sources: European Commission and ESCB for underlying data. Authors' calculations.

Following the exercise carried out in previous sections we can assess the implications of these "unexplained" changes in tax revenues for the assessment of the fiscal stance by comparing the change in the cyclically adjusted budget balance including and excluding such effects. The results are reported in Table 7.5. Out of our 84 observations, in 9 cases the fiscal stance is considered to be tightening, but would be assessed to be loosening if the estimated revenue windfalls would be netted out. On the other hand, in 12 cases a fiscal stance considered to be loosening on the basis of the change in the cyclically adjusted balance would have been tightening were it not for the observed revenue shortfalls.

Table 7.5 Uncertainty in the assessment of the fiscal stance due to revenue windfalls / shortfalls

Fiscal stance		Change in cyclically adjusted balance (-/+) revenue windfall / shortfall		Total
		Tightening	Loosening	
Change in cyclically adjusted balance	Tightening	37	9	46
	Loosening	12	26	38
Total		49	35	84

Note: The sample consists of annual changes in the cyclically adjusted balance for the period 1996-2003 in 12 euro area countries (excluding Cyprus, Malta and Slovenia).
Sources: European Commission and ESCB for underlying data. Authors' calculations.

[119] This experience is not unique to the euro area. There have also been significant revenue windfalls in the United States in recent years (see Swiston et al (2007) for an analysis).

Accounting for revenue windfalls

The magnitude of revenue windfalls and shortfalls in euro area countries in recent years raises the question of whether and how such variations in revenues could be better accounted for in the process of cyclical adjustment. The origins of revenue windfalls and shortfalls can usually be ascertained from an analysis of detailed tax revenue data. However, such data is not available in a sufficiently detailed, timely and harmonised way across countries for use in standardised cyclical adjustment methodologies.[120]

Relying instead on more aggregated data, alternatives may be to apply time varying elasticities or to include or complement cyclical adjustment based on the output gap with other indicators. To gauge the potential usefulness of doing so we undertake panel regressions of our unexplained changes in revenues on changes in the output gap (to test for time varying elasticities) and on other indicators often assumed to be related to revenue fluctuations, namely changes in stock and residential property prices and the change in the current account balance.[121] Given our small sample, with at most 77 observations, we test for each indicator individually and then include significant variables in a final regression.[122]

The results obtained for tax revenues (direct and indirect taxes) overall are shown in Table 7.6 and the results for the individual tax categories (i.e. personal income taxes, corporate income taxes and indirect taxes) are reported in Tables 7.7-7.9 in Appendix. According to our results, the most relevant indicator is the change in the stock price index, the lagged value of which turns out to be significant at the 1% level for changes in direct and indirect taxes overall. The lagged change in the stock price index turns out to be significant for both corporate and personal income taxes (at the 1% and 5% level respectively), while the contemporaneous change in stock prices is also significant (at least at the 10% level) for indirect taxes. The lagged impact on direct taxes would be consistent with the idea that increasing stock prices take time to be reflected in capital gains realisations. Moreover, stock prices may also be a good indicator of profits, which then take time to be reflected in tax receipts given the well-known collection lags. It should be stressed, however, that even for this best performing indicator, the overall explanatory power of the regressions in not large.

The change in the output gap generally turns out not to have much explanatory power. On its own, it is found to be significant (at the 5% level) for corporate income taxes and for personal income taxes (with a lag) and significant at the 10% level for direct and indirect taxes overall. These results, however, were not robust when stock prices were included as an additional

[120] Girouard and Price (2004) compute cyclically adjusted balances corrected for variations in capital gains tax receipts. However, the data necessary for such a correction is only available for a subset of OECD countries.

[121] Wolswijk (2007) finds evidence that tax elasticities in the Netherlands are sensitive to the output gap. Eschenbach and Schuknecht (2004) and Morris and Schuknecht (2007) find evidence of important budgetary effects of equity and real estate prices.

[122] The regressions cover 11 euro area countries (excluding Cyprus, Luxembourg, Malta, and Slovenia) and use fixed country effects. The estimations including residential property prices as an explanatory variable also exclude Portugal and Finland. The stock price indices used are as follows: Austria: Austrian Trades, Belgium: BEL 20, Germany: DAX 30 Performance, Spain: IBEX 35, Finland: Hex General, Greece: Athens General, Ireland: ISEQ, Italy: MIB 30, Netherlands: AEX, Portugal PSI-20. Residential property prices are for new and existing dwellings, good and poor condition and were rescaled as the difference between the annual change and the average annual change for all countries in the sample over the sample period. Changes in the output gap and in the current account balance are annual changes as a percentage of GDP.

explanatory variable in the regression. Moreover, for indirect taxes, the (lagged) change in the output gap turns out to be significant, but with the wrong sign.

The change in the current account balance also turns out to be a relatively poor indicator for unexplained changes in revenues. It turns out to have the right sign (i.e. negative), but is only weakly significant (at the 10% level) for personal income taxes, and not significant at all for indirect taxes (as one might have presumed) or for corporate income taxes. Changes in residential property prices also (generally) have the expected sign, but do not appear as significant in the regressions.[123] Overall, these estimates highlight the difficulty of finding "broad", cross country indicators to account for the behaviour of tax revenues in individual countries, which may be explained by a multitude of factors.

Table 7.6 Panel regression of tax revenue[124] windfalls / shortfalls in euro area countries

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Change in output gap	0.161 (2.08)*						-0.02 (-0.26)
Change in output gap (-1)		0.009 (0.12)					
Change in stock price index			**0.008** **(2.36)****				0.006 (1.97)*
Change in stock price index (-1)				**0.011** **(4.86)*****			**0.010** **(4.61)*****
Change in current account balance					-0.041 (-0.78)		
Change in residential property prices						0.016 (0.64)	
R^2	0.15	0.09	0.16	0.33	0.09	0.08	0.37
Number of observations: 77. Number of euro area countries: 11. Years 2000-2006							

Notes: Values in brackets are t-statistics. *, **, *** significant at the 10%, 5% and 1% levels respectively.
Parameter estimates significant at the 5% level are set in bold face.
Data sample: Euro area countries except Cyprus, Luxembourg, Malta, and Slovenia.

7.6. Conclusions

While cyclically adjusted budget balance estimates are an important tool for assessing the underlying budgetary position and the fiscal stance, they should be interpreted with caution in view of the considerable measurement issues that arise in their estimation. Cyclically adjusted budget balances are regularly revised ex post owing to revisions in the assessment of the output gap, which is rarely estimated accurately in real time. The impact of such revisions on the level of the cyclically adjusted budget balance can be quite large (as much as 1% of GDP). The impact of ex post revisions on annual changes of cyclically adjusted balances is much smaller, but still sufficient to lead to errors in fiscal surveillance.

Even detracting from the problem of ex post revisions, cyclically adjusted balances may not always provide an appropriate picture of the underlying fiscal position and the fiscal stance.

[123] The lack of explanatory power of the current account balance and of residential property prices is perhaps not so surprising given the nature of the exercise. It is generally assumed that large external deficits and booming property markets are associated with "tax rich" domestic demand driven output growth. However, such effects may already be (at least partially) captured by the use of private consumption as the tax base for indirect taxes. Moreover, it may also be that such effects are relevant for some countries but not others, depending on the nature of the tax system and distinct economic developments during the period considered.
[124] Direct and indirect taxes.

Standard approaches typically ignore the impact of changes in the composition of output, which can be quite large in individual countries, even if they have been relatively modest for the euro area in recent years. In addition, the tax bases and elasticities underlying cyclical adjustment cannot fully account for the actual behaviour of tax revenues, which have been characterised by significant windfalls and shortfalls in individual years.

From a fiscal policy perspective, the important message is that cyclically adjusted budget balances are liable to overestimate the strength of the underlying budgetary position and the improvement of the fiscal stance when (i) the output gap (as measured ex post) is reaching its peak; (ii) there is a fiscally (relatively) favourable composition of output growth, and (iii) revenues are boosted by factors (e.g. booming equity markets) that are not accounted for in the tax bases used for cyclical adjustment purposes. During such periods, a prudent fiscal policy is called for whereby higher than expected revenues are used to improve the budget balance and so create additional "room for manoeuvre" in bad times without putting budgetary positions at risk.

Appendix

Table 7.7 Panel regression of revenue windfalls / shortfalls in euro area countries: personal income taxes

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Change in output gap	-0.008 (0.21)						
Change in output gap (-1)		**0.074** **(2.13)****					**0.068** **(2.06)****
Change in stock price index			0.001 (0.54)				
Change in stock price index (-1)				**0.003** **(2.76)****			**0.003** **(2.34)****
Change in current account balance					-0.061 (-1.97)*		-0.050 (-1.72)*
Change in residential property prices						-0.004 (-0.30)	
R^2	0.13	0.19	0.14	0.22	0.18	0.10	0.30
Number of observations: 77. Number of euro area countries: 11. Years 2000-2006							

Notes: Values in brackets are t-statistics. *, **, *** significant at the 10%, 5% and 1% levels respectively.
Parameter estimates significant at the 5% level are set in bold face.
Data sample: Euro area countries except Cyprus, Luxembourg, Malta, and Slovenia.

Table 7.8 Panel regression of revenue windfalls / shortfalls in euro area countries: corporate income taxes

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Change in output gap	**0.123** **(2.66)****						0.032 (0.64)
Change in output gap (-1)		0.025 (0.54)					
Change in stock price index			0.003 (1.45)				
Change in stock price index (-1)				**0.006** **(4.58)*****			**0.006** **(3.58)*****
Change in current account balance					-0.004 (-0.10)		
Change in residential property prices						0.005 (0.34)	
R^2	0.15	0.06	0.08	0.28	0.04	0.08	0.29
Number of observations: 77. Number of euro area countries: 11. Years 2000-2006.							

Notes: Values in brackets are t-statistics. *, **, *** significant at the 10%, 5% and 1% levels respectively.
Parameter estimates significant at the 5% level are set in bold face.
Data sample: Euro area countries except Cyprus, Luxembourg, Malta, and Slovenia.

Table 7.9 Panel regression of revenue windfalls / shortfalls in euro area countries: indirect taxes

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Change in output gap	0.030 (0.80)						
Change in output gap (-1)		**-0.091** **(-2.66)****					-0.070 (-1.96)*
Change in stock price index			**0.004** **(2.55)****				0.003 (1.81)*
Change in stock price index (-1)				0.001 (1.07)			
Change in current account balance					0.032 (1.24)		
Change in residential property prices						0.016 (1.24)	
R^2	0.14	0.22	0.21	0.15	0.12	0.17	0.25
Number of observations: 77. Number of euro area countries: 11. Years 2000-2006.							

Notes: Values in brackets are t-statistics. *, **, *** significant at the 10%, 5% and 1% levels respectively.
Parameter estimates significant at the 5% level are set in bold face.
Data sample: Euro area countries except Cyprus, Luxembourg, Malta, and Slovenia.

Discussion

Lorenzo Codogno

The aim of the paper is to discuss the importance of uncertainty in the estimates of the underlying budgetary position and the fiscal stance, especially in the context of the European multilateral surveillance. The paper addresses in a clear and well-documented fashion the issues at stake. Uncertainty is analysed by disentangling its major sources.

In my view, these sources can be grouped in: (1) data revisions, (2) methodological issues related to the measurement of the output gap, (3) forecasting errors in GDP growth (4) the budgetary effect of changes in the composition of output, and (5) the behaviour of tax revenues.

Starting with the uncertainty related to revisions of backward data (1), most of the changes are related to decisions by Eurostat. Some of them are simply normal revisions of data, while some others are linked to methodological changes introduced by Eurostat to improve the recording of data. These latter changes are supposed to improve the quality of statistics and thus incrementally reduce the impact of revisions over time. Some one-off changes, such as the shift to chain-weighted GDP accounting, have been particularly significant but not likely to repeat in the foreseeable future. Moreover, these changes are largely outside the control of policymakers and thus not subject to possible manipulations. The sign of their impact cannot be assessed *ex ante.* The paper estimates that changes related to the nominal fiscal balance, which captures the impact of statistical revisions, are broadly "marginal" for levels, although less so for changes.

On the other hand, the paper shows that sizeable errors largely mirror revisions in the cyclical component of the budget balance, which is determined by the differentials between real time estimates and *ex post* data (after 3 years) on cyclically-adjusted balances net of one-off and temporary measures (CABs).

Although the paper does not address methodological issues (2), these differentials are not likely to be related to the method used to estimate output gaps. Estimates used in the study are calculated according to the HP filter method that is no longer in use for the purpose of multilateral surveillance at the European Commission. Nevertheless, the shift to the new methodology based on a Cobb-Douglas production function would have likely resulted in no significant change in the overall results. Therefore, we are left with typical forecasting errors which make for typical volatility of *any* estimate of output gaps.

Before addressing this issue in more detail, I should also add that the period chosen for the analysis may well represent a case of sample bias. The paper notes: "the strong upturn in economic growth in 2000 was initially identified as an improvement in trend output rather than a cyclical improvement". This happened also in the following years as indicated by private-sector forecasts of GDP growth being always above actual data during that period (see for instance Consensus Economics). While similar mistakes may well repeat in the future around turning points of the business cycle, it looks like the period selected called for an exceptionally large revision and this may well explain why the paper finds a positive relationship between the error and the final output gap, implying a systematic underestimation of output gaps in absolute terms.

Besides, the results presented by the authors may be explained by a more subtle reason, i.e. the natural tendency by all forecasters, and especially by cautious governments, to assume a return towards trend growth over the forecast horizon (3). This implies a systematic underestimation of output gaps in absolute terms, i.e. estimates of a smaller absolute output gaps both in bad *and* good times, as the output gap estimate depends not only on past data but also on forecasts for future years. Therefore, the assessment by the authors that CABs are systematically overestimated in real time—and thus that are liable to give a distorted picture—appears solid, although for reasons not highlighted in the paper. In my view, they are linked to unbiased and inevitable forecasting errors on the one hand and to a biased—but also fully understandable—convergence of GDP projections towards trend growth on the other. The two issues are conceptually different, although clearly linked as new forecasts give rise to *ex post* changes in the assessment of past and future structural economic developments.

Let me now move to the source of uncertainty related to the composition of output (4). Here the authors introduce an elegant way to estimate the shift in the composition of growth by making use of the cyclical adjustment methodology developed by the European System of Central Banks. I find the idea intuitive and effective in isolating this impact. The results show a modest impact for level/changes (0.3/0.4 percentage points for the Euro Area), but sizeable effects for individual countries (>1.0 percentage point). These sizeable effects suggest that more work on individual countries is needed to single out the underlying phenomena. Another interesting finding is that there is no correlation between the composition effect and the output gap, while the correlation is negative on changes, i.e. higher growth comes together with less revenue-rich components.

Finally, the authors analyse the behaviour of tax revenues (5). The behaviour is difficult to predict as there are changes in the tax code, no good proxies for the tax base, profit shifting phenomena, mergers and acquisitions, and the effects of the fiscal drag. To make things even worse, EU enlargement to 25 in 2004 and to 27 in 2007 resulted in a more heterogeneous structure of revenues and expenditures across the European Union, and this is also true for the Euro Area. This suggests that there must be something better than the simple assumption of fixed elasticity of tax revenues to GDP. Although it is well-known that more reliable estimates of elasticities would come at the expense of simplicity/transparency/comparability of the approach, it would probably be worthwhile trying to improve estimates anyway.

For the reasons explained above, the assessment of problems is likely to be less severe than suggested in the paper. Moreover, there are many ways estimates can be improved, but in the paper there are no explicit indications on the way forwards. For the purpose of multilateral surveillance, the paper suggests extra caution when there is a risk of a turning point in the economic cycle (assuming we can know it in real time) or there is a perception that revenues are boosted by factors that are not accounted for in the tax bases used for cyclical adjustment purposes, such as booming equity markets, or when the composition of output growth looks relatively favourable.

All in all, it is a sound and well-rooted warning that cyclically adjusted balances may not always provide an appropriate picture of the underlying fiscal position and the fiscal stance.

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