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Fiscal Indicators

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Fiscal indicators

Edited by Martin Larch and João Nogueira Martins

Abstract:

Fiscal indicators are the backbone of effective fiscal policy-making, including the coordination and surveillance of budgetary policy at the EU level. The **Workshop organized by the Directorate-General for Economic and Financial Affairs of the European Commission on 22 September 2006 in Brussels** aimed at enriching the debate on the fiscal indicators and improving the understanding of their functioning. In this Economic Paper we publish the proceedings of the workshop. On top of a brief introduction which puts the topics into perspective, the volume collects all the contributions presented and discussed at the workshop. Mirroring the structure of the workshop the proceedings are organised in the parts: (i) long-term sustainability, (ii) the measurement of the underlying budgetary position and discretionary fiscal policy and (iii) the reliability of fiscal indicators.

Keywords: fiscal indicators, government budget, EU fiscal surveillance

JEL classification: H60, H61, H68, E6

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1.

Introduction

*Martin Larch and João Nogueira Martins**

Fiscal indicators are the backbone of effective fiscal policy-making, including the coordination and surveillance of budgetary policy at the EU level. The quality and success of the EU surveillance framework, in particular the timeliness and appropriateness of any policy recommendation or decision taken in the context of the Stability and Growth Pact (SGP), crucially depend on the quality of its diagnostic instruments. The right conclusions can only be drawn if the underlying analysis is comprehensive and accurate.

Ever since its inception, the history of fiscal surveillance in the EU and of the SGP has *inter alia* been characterised by a continuous upgrading of the analytical toolkit, so as to be able to respond to new requirements and challenges with the ultimate goal to provide a robust, consistent and accurate assessment of fiscal policy in the Economic and Monetary Union.

The 2005 reform of the SGP has confronted us with a number of important new challenges. Key requirements of the reformed Pact are made contingent on the prevailing economic conditions in the Member States and are expressed in structural terms, net of cyclical factors and one-off and other temporary measures. As a consequence, the reform has broadened and stepped up the scope for gauging the economic and fiscal performance.

As regards the preventive arm of the reformed Pact, the adjustment process towards sustainable medium-term budgetary positions can be modulated depending on prevailing or expected cyclical conditions. In good times the annual structural adjustment should be higher than the 0.5% of GDP benchmark; it can be less than that in economic bad times. The medium-term objectives (MTOs) themselves are defined in structural terms. Finally, as regards the corrective arm of the reformed Pact, the annual adjustment to be achieved by Member States with an excessive deficit is also expressed in structural terms.

Besides the increased focus on structural budget balances, there is another and more complex element in the reformed Pact with important implications for the assessment of fiscal performance, notably long-term sustainability. The EU Council agreement of March 2005, which underpins the reform of the Pact, while confirming the key role of the 3% and 60% of GDP thresholds of the government deficit and debt, puts additional emphasis on the public finance developments over the long term. It specifically identifies the surveillance of debt and sustainability as one of the main areas where improvements can be made to revive the provisions of the SGP.

* The views expressed in this chapter are those of the authors and are not attributable to the European Commission. Assistance by Fabio Balboni and Stig Malmedal is gratefully acknowledged.

The increased prominence of both the structural budget balance and the long-term sustainability in the EU fiscal surveillance framework raises a number of straightforward yet taxing questions related to the measurement of economic and fiscal performance. Is the current toolkit sufficiently appropriate with respect to the provisions of the reformed SGP? How accurate are the available estimates of the cyclical position and the structural budget balance? What are the major caveats and how can they be overcome? Besides the available standard indicators, what are the viable alternatives to the assessment of the long-term sustainability of public finances?

These and a number of other issues were the focus of the workshop on Fiscal Indicators in the EU Budgetary Surveillance organised by the Directorate General for Economic and Affairs on 22 September 2006 in Brussels. This volume collects the papers presented at the workshop together with the respective discussions. The three sessions of the workshop mirror the main challenges outlined above notably (i) long-term sustainability, (ii) the measurement of the underlying budgetary position and discretionary fiscal policy and (iii) the reliability of fiscal indicators.

Reflecting the increasing relevance of long-term issues, the first part of this volume covers two chapters which discuss alternative avenues to assess the long-term sustainability of public finance. The work by F. Ballabriga and C. Martinez-Mongay discusses various tests and rules based on the recent literature on fiscal-reaction functions. They test for a positive response of the primary surplus to accumulated debt in the data and check for robustness considering alternative specifications, estimation techniques and structural breaks. One of their interesting policy conclusions is that stricter conditions do not necessarily ensure sustainability; what matters is enforcement. They conclude that the response to debt has fluctuated over the sample 1977-2005, but sustainability has been prevalent in EU15: most governments have tended to apply a fluctuating but generally positive primary surplus adjustment in response to debt accumulation.

The chapter by J. Gokhale uses long-term economic and fiscal projections to determine if and to what extent current and future expenditure trends, in particular taking into account ageing population, give rise to fiscal imbalances. The results show relatively large gaps which will have to be tackled in the coming years. He proposes the adoption of an extended framework of budget accounting and reporting within the context of the SGP's long-term fiscal policy surveillance requirement. Gokhale argues that traditional debt and deficit measures can be potentially misleading as measures of a nation's fiscal stance and suggests adopting fiscal and generational imbalance measures, as these indicators incorporate comprehensive information about future fiscal prospects under current policies. He also provides estimates which show large fiscal imbalances for most EU countries until 2051. The author acknowledges that different underlying assumptions may generate wide variations in estimates of fiscal and generational imbalances and in their ratios to GDP or tax bases. Yet, rather than an argument against adopting such measures, this implies a need to supplement those estimates with measures of the associated uncertainty.

The second part of this volume is devoted to the measurement of the underlying budgetary position and discretionary fiscal policy. The empirical results in Chapters 4 and 5 highlight a tendency of running pro-cyclical policies, especially in 'good times'. P. Brandner, L. Diebalek and W. Köhler-Töglhofer estimate an unobserved components model while A. Afonso and P. Claeys apply structural VAR analysis. These two chapters

identify a recurring pattern according to which estimated changes in the headline deficit net of cyclical factors were not consistent with the policy objective of stabilising cyclical swings of aggregate output. More in particular, Brandner and co-authors track fiscal policy behaviour over time by decomposing the observed budget balance into four unobserved components: a core balance, an automatic or built-in fiscal stabiliser component, a component reflecting discretionary fiscal policy responses to the business cycle, and, finally, a component reflecting all other transitory shocks to the fiscal position. Their results for Austria highlight that the revenue side seems to be prone to procyclical responses whereas the expenditure side shows opposite behaviour. Moreover, during economic downturns, the overall impact of fiscal policy seems to be countercyclical, whereas in periods of economic upturn the impact of automatic stabilisers is nearly neutralised.

Afonso and Claeys' focus is on the relation between the cyclical components of total revenues and expenditures and the budget balance in France, Germany, Portugal and Spain. A disaggregate analysis of fiscal policy in a structural VAR that mixes long- and short-term constraints allows them to look into the transmission channels of fiscal policy and to derive a model-based indicator of structural balance. Their main conclusions are that fiscal slippages are mainly due to reversals in tax policies, which are unmatched by expenditure adjustments. As a consequence, deficits rise when economic conditions worsen but cause a 'ratcheting up' in the size of government in economic booms. The Pact has not eradicated these procyclical policies. Bad policies in 'good times' also contribute to aggregate macroeconomic instability. The result of both teams clearly raises concerns about the current situation and calls for both improvements in the available diagnostics as well as particular vigilance. Starting in 2005, Europe entered in a comparatively positive cyclical phase, in which Member States that have not yet reached their medium-term budgetary objective (MTO) are expected to step up their consolidation efforts and Member States that are already in MTO should implement counter-cyclical policies.

The third part of these proceedings calls attention to the reliability of fiscal indicators; the two respective chapters recall and illustrate the margins of uncertainty involved in the available set of fiscal indicators. A critical view of the reliability of the underlying fiscal statistics is offered in Chapter 6 by F. Balassone, D. Franco and S. Zotteri on the basis of episodes of large-scale upward revision in government deficits. They discuss the causes of such revisions and raise attention to the potential for opportunistic accounting, or 'fiscal gimmickry' in their own words. A permanent and detailed cross-checking of available data – starting with, but going deeper than, the simple comparisons of deficit and changes in debt – should reduce the scope for exploiting existing loop holes in the reporting of budgetary positions.

In Chapter 7, R. Barrell, I. Hurst and J. Mitchell provide estimates of the degree of uncertainty attached to the output gap. Uncertainty about the cyclically-adjusted budget deficit is further compounded by uncertainty on the link between the gap and the government accounts. They advocate that the measurement of fiscal stance should make explicit the bounds around the available data on the cyclically adjusted deficit. Yet, those in charge of fiscal surveillance cannot waive the responsibility of taking action, even if taking decisions in real time implies taking into account a certain, and in some cases a high, degree of uncertainty.

Part I

Long-term Sustainability

2.

A Further Inquire about the Sustainability of Fiscal Policy in the EU

*Fernando Ballabriga and Carlos Martinez-Mongay**

2.1 Introduction

The Stability and Growth Pact (SGP) is one of the main pillars of the Economic and Monetary Union (EMU). It was agreed with the aim of setting a proper balance between fiscal discipline and the macroeconomic stabilization role of fiscal policy. It was conceived as a discipline device which should ensure budgetary balances close to balance or in surplus, while keeping gross debt at low levels in terms of GDP.

Since the very moment of its conception the Pact has been the subject of numerous criticisms, which would suggest more or less drastic reforms of the institutional framework of the EU Member States (see, among many others, Brunila and Martinez-Mongay, 2002; Buti *et al.*, 2003, 2005). The debate on the drawbacks, challenges and possible reforms of the Pact significantly gathered momentum in 2002, when budgetary developments in some Member States, especially in Germany and France, put the Pact under serious stress. The final trigger for reform took place in November 2003 when the ECOFIN Council refused to adopt the recommendations by the European Commission to step up the excessive deficit procedure for France and Germany (see, for instance, Buti, 2007).

In a communication adopted in September 2004 the European Commission put forward a series of proposals to introduce changes in the Pact (European Commission, 2004). These mainly aimed at avoiding pro-cyclical policies, better defining the medium-term objective (MTO) of fiscal policy, giving greater prominence to the debt criterion, considering economic circumstances in the implementation of the excessive deficit procedure (EDP) and improving governance and enforcement. Taking the Commission communication as a starting point, the ECOFIN Council of March 2005 reached an agreement to introduce changes in the Pact. Where necessary, legislative changes were proposed in both its preventive (surveillance and coordination of economic policies basically through the assessment of convergence and stability programs) and corrective (excessive deficit procedure) arms (Council, 2005). The legislative process ended in July 2005.

One of the most recurrent critical issues on the Pact was based on an apparently excessive focus on short-term objectives for the budget deficit, which might not only create incentives for creative accounting and the recourse to one-off deficit-reducing measures,

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but also to almost fully disregard debt developments, and so to an inadequate handling of long-term sustainability issues.

Disregard of the issue of public debt was considered as a clear limitation of the original SGP (Buti *et al.*, 2005). Consequently, taking more into consideration public debt and long-term sustainability when assessing budgetary positions was broadly shared by policy makers as one of the lines along which the Pact should be reformed. The agreement reached at the ECOFIN Council in March 2005 gave a more prominent role to debt in the preventive arm by differentiating medium-term budgetary objectives across Member States on the basis of their potential growth and debt levels. Also, structural reforms with positive effects on long-term fiscal sustainability have to be taken into consideration when assessing the adjustment path toward the medium-term objective, when considering deviations from the target, and when evaluating the deficits exceeding the 3% of GDP limit.

The Council also called for giving a stronger weight to public debt in the implementation of the Pact, but was not able to agree on, for instance, a minimum debt reduction for countries with very high debt ratios (Buti *et al.*, 2005). In terms of the role of debt and sustainability, the reform of the Pact also appears limited when compared with some proposals made during the long debate on the Pact, such as the permanent balance rule by Buiter and Grafe (2003) and the debt sustainability pact by Coeuré and Pisani-Ferry (2003). The permanent budget balance is given by the difference between the constant long-run average future values of tax revenue and government spending. The rule proposed by Buiter and Grafe (2003) was to keep the permanent budget adjusted for inflation and real growth in balance or surplus. For countries with debt levels below 50% of GDP, Coeuré and Pisani-Ferry (2003) proposed to give them the choice of opting out the corrective arm (the excessive deficit procedure) and adopt a so-called debt sustainability pact, according to which countries should submit a five-year budgetary program with a debt ratio target for the period.

However, if the concern is government solvency such debt criteria impose unnecessary constraints on fiscal policy on the basis of debt ceilings (as the Pact also does) or relationships between the components of the budget and *ad hoc* discount factors. Where government solvency is concerned, this paper emphasizes that sufficient conditions for solvency are rather weak, while, as general rule, it does not appear that sustainability has been in danger during the last 30 years in Europe.

Specifically, this paper analyzes sustainability within the framework of the recent literature on fiscal reaction functions, which provides a convenient framework to assess fiscal sustainability. This literature investigates the type of fiscal flow reaction (*viz.* the primary surplus) to public debt accumulation that would guarantee fiscal sustainability. Bohn (1998) and Canzoneri *et al.* (2001) have developed and applied this approach for the US case. Ballabriga and Martinez-Mongay (2003, 2005) have estimated the reaction of the primary surplus to debt levels for the EU Member States. In the line of Canzoneri *et al.* (2001), Ballabriga and Martinez-Mongay (2003) focused on the fiscal dominance versus monetary dominance debate. They estimated fiscal and monetary policy reaction functions and found supportive evidence of a monetary dominance regime in the EU Member States. Our paper of 2005 put the emphasis on fiscal sustainability and, in this sense, is closer to Bohn (1998). By fine-tuning the estimation of the fiscal reaction functions reported in 2003, the paper provided evidence of the existence of a structural policy shift in the run-up to the euro (after 1995), which enhanced sustainability.

On theory grounds, Ballabriga and Martinez-Mongay (2005) have been criticized for seemingly discarding the distinction between *ad hoc* sustainability and *model-based* sustainability as discussed in Bohn (2005a). On empirical grounds, the availability of additional sample evidence allows to confront the existence of the sustainability-enhancing impulse associated to the run-up to the euro with a potential post-EMU fatigue, which would have shown up after 1999. Furthermore, the *ad hoc* dummy-modelling approach for the ‘euro impulse’ can be complemented with an *endogenous* mechanism for structural shift detection.

Within this framework, the objective of this chapter is to develop further the assessment of the sustainability of EU public finances. Alternative theoretical and empirical approaches in the literature to assess the sustainability of public finances are discussed in section 2.2. Section 2.3 takes a first descriptive look at the evolution of gross debt series in 14 Member States (EU 15 except Luxembourg), the US and Japan over the period 1977-2005. Section 2.4 presents alternative estimates of the reaction of the primary surplus to debt levels and concludes that a positive reaction of the former to the latter is rather ubiquitous both across countries and over time. This section also presents evidence of a series of structural breaks in such a response, which can be associated to the adoption of the Maastricht Treaty and the convergence criteria after 1992, to the launching of the euro after 1995, and to the adoption of the euro after 1999. Moreover, a positive response of the primary surplus to debt levels is robust with respect to alternative specifications and estimation methods. Comparing the posterior distributions generated by the pre-Maastricht, Maastricht and EMU sub-sample periods, Section 2.5 considers Bayesian-modelling as a systematic endogenous mechanism to explore potential structural breaks in the response of the primary surplus to debt levels. Section 2.6 concludes the chapter.

2.2 How to Assess the Sustainability of Fiscal Policy

Definition of Sustainability

In line with standard practice in dynamic optimization models, we term fiscal policy as sustainable when government debt issuing policy does not use Ponzi financing schemes, *i.e.* financing strategies consisting in rolling over a given initial level of debt that would never be repaid. The absence of Ponzi schemes in debt policy is a general equilibrium condition required by rational private sector agents in order to be willing to lend to the government. A no-Ponzi scheme condition guarantees that the government intertemporal budget constraint (IBC) is satisfied, so that its outstanding debt is backed by future primary surpluses.

Formally, a no-Ponzi scheme condition takes the form of a transversality condition (TC) whereby the discounted value of debt issued infinitely far in the future is zero. In stochastic economies, IBCs and TCs take the algebraic form of expectations of products of the discount factor and the components of the government budget equation. As we discuss below, this fact turns out to be relevant to distinguish between existing approaches in the literature to assess the sustainability of fiscal policy.

To make explicit the IBC and TC expressions we start out from the budget *equation* for period t :

$$d_{t-1} = (s_t + d_t)\beta_t \quad (2.1)$$

where d is the stock of debt at the end of the period, s is the primary surplus, both as a percentage of GDP, and β is the discount factor. Forwarding equation (2.1) one period, iterating forward T periods and taking expectations conditional on information at time t (E_t) gives:

$$d_t = E_t \sum_{j=1}^T (\alpha_{tj} s_{t+j}) + E_t (\alpha_{tT} d_{t+T}) \quad \text{with } \alpha_{tj} = \prod_{j \geq 1} \beta_{t+j} \quad (2.2)$$

Taking finally the iteration to the limit and given convergence of the discounted sum we get:

$$d_t = E_t \sum_{j=1}^{\infty} (\alpha_{tj} s_{t+j}) + \lim_{T \rightarrow \infty} E_t (\alpha_{tT} d_{t+T}) \quad (2.3)$$

which shows that:

$$d_t = E_t \sum_{j=1}^{\infty} (\alpha_{tj} s_{t+j}) \Leftrightarrow \lim_{T \rightarrow \infty} E_t (\alpha_{tT} d_{t+T}) = 0 \quad (2.4)$$

The right-hand side term in (2.4) is the TC that excludes Ponzi schemes, so that the discounted value of debt issued infinitely far in the future is zero, and the left term is the government IBC, which states that outstanding debt is backed by future primary surpluses. Bohn (1995) has shown that conditions of type (2.4) apply to a wide range of general equilibrium stochastic models, providing therefore a rather general test for fiscal sustainability.

A key characteristic of (2.4) is that, in a general equilibrium stochastic setting, the discount rate α depends on the risky rate of return, which in turn depends on the intertemporal marginal rate of substitution of consumers (Bohn, 1995). This means that we should expect, in general, a non-zero correlation¹ between α and fiscal variables s and d , and implies therefore that the factorization of expression (2.4) as discounted values of expected fiscal terms is generally incorrect. This complicates the empirical testing of fiscal sustainability.

Testing Sustainability

The most common empirical approach in the literature to test fiscal policy sustainability is based on the analysis of the time series properties of fiscal data. Influential papers in this stream of the literature are Hamilton and Flavin (1986), Trehan and Walsh (1988, 1991) and Quintos (1995).

¹ In particular, all three may depend on aggregate output.

This approach rewrites (2.4) in the form:

$$d_t = \sum_{j=1}^{\infty} (1+r)^{-j} E_t(s_{t+j}) \Leftrightarrow \lim_{T \rightarrow \infty} (1+r)^{-T} E_t(d_{t+T}) = 0 \quad (2.5)$$

where r is usually interpreted as the difference between the expected return on government debt and the growth rate of GDP. Then unit roots and cointegration conditions on fiscal debt and deficit guaranteeing that this version of the government IBC holds are derived and tested.

But versions of (2.5) are problematic. A first problem is that (2.5) factorizes the product of the discount rate and fiscal variables, ignoring that the discount factor may be correlated with the primary surplus and debt, as we have just mentioned. The choice of this discount factor is a second controversial feature of this empirical approach, since, as we have also mentioned, the proper discount factor in a stochastic setting is the risky rate of return (*i.e.* the return of state-contingent claims), not the rate of safe assets. The arbitrariness of both the factorization and the choice of the discount factor have motivated the distinction (Bohn, 2005a) between *ad hoc* sustainability, based on (2.5), and *model-based* sustainability, based on (2.4).

The third characterizing feature of this approach is that it tests (2.5) by testing for unit roots and cointegration among debt and the components of the budget deficit. However, the order of integration of debt seems to be irrelevant, as any debt series that are stationary after any finite number of differencing operation would satisfy (2.5) (Bohn, 2005b), rendering the order of integration of government debt uninformative for fiscal policy sustainability.

A more recent and promising alternative empirical approach to sustainability testing is provided by the literature on fiscal reaction functions. This literature investigates the type of flow reaction to government debt accumulation that would guarantee that (2.4) is satisfied. Its main result (Bohn, 1998; Canzoneri *et al.*, 2001) is that a positive response of the primary surplus to debt accumulation is a sufficient condition for sustainability. More precisely, assume that the primary surplus can be written as:

$$s_t = \delta_t d_{t-1} + \varphi_t \quad (2.6)$$

where φ is a bounded component and $\delta_t \geq 0 \forall t$ with $\delta_t > 0$ applying infinitely often. Then it can be shown that fiscal policy satisfies the general condition (2.4).

The intuition of this result is that by adjusting the primary surplus in response to debt developments the government reduces the exponential growth of debt by a factor δ relative to the discount rate, which is sufficient to satisfy the TC in (2.4).

2.3 Government Debt Accounting

The evolution of government debt is the bottom line reference for the sustainability of fiscal policy. In this section we take a look at debt developments in the EU 15 Member States, excluding Luxembourg, during the sample period 1977-2005, with the US and

Japan as background references. A debt accounting exercise is also performed, which provides an illustrative first contact with fiscal data.

Fiscal Developments

While in 1977 debt levels measured in terms of GDP were close to or well below the 60% Maastricht reference value, 15 years later, in the aftermath of the adoption of the Maastricht Treaty, seven European countries, as well as the US and Japan, were recording debt levels above such a reference value (Table 2.1). In three of them (Belgium, Greece and Italy), government gross debt had jumped above 100% of GDP, while in Ireland the figure was higher than 90% of GDP. In the rest of the countries debt had also increased, and it was approaching the 60% ratio in the cases of Spain and Portugal. Until the first half of the nineties, just after the formal launching of the euro, the upward trend continued in most of the countries in the sample. Only Ireland, Finland and, to a lesser extent, Belgium and the Netherlands had managed to curve rising debt levels. As a result, all the countries in the sample, except the UK, were recording debt levels close to or well above the 60% reference value by the middle of the past decade.

Table 2.1 Gross Debt Developments, 1977-2005 (% of GDP)

	1977	78-93*	1993	94-96*	1996	97-99*	1999	00-05*	2005
Belgium	58,7	4,5	130,5	-1,2	126,9	-4,4	113,6	-3,4	93,3
Germany	26,8	1,2	45,8	4,2	58,4	0,6	60,2	1,3	67,7
Greece	20,1	5,6	110,1	0,4	111,3	0,3	112,3	-0,8	107,5
Spain	12,9	2,8	56,9	3,3	66,7	-1,7	61,6	-3,1	43,2
France	19,1	1,5	43,7	4,6	57,6	0,2	58,3	1,5	67,2
Italy	54,7	3,8	114,9	1,9	120,6	-2,3	113,7	-1,2	106,4
Ireland	58,5	2,1	92,6	-6,7	72,4	-8,1	48,1	-3,4	27,6
Netherlands	37,8	2,3	74,8	-0,9	72,1	-3,9	60,5	-1,3	52,9
Austria	28,5	2,0	60,4	2,4	67,6	-0,4	66,5	-0,6	62,9
Portugal	30,3	1,7	58,2	0,6	59,9	-2,9	51,4	2,1	63,9
Finland	7,8	3,0	56,1	0,2	56,7	-3,6	46,0	-0,9	40,5
Denmark	13,8	4,0	77,0	-2,6	69,2	-3,9	57,4	-3,6	35,9
Sweden	26,7	2,7	70,6	0,8	73,0	-3,6	62,2	-2,0	50,3
UK	60,8	-0,8	47,5	1,6	52,2	-2,4	44,9	-0,2	43,5
US	46,9	1,8	75,4	-0,7	73,4	-3,1	64,1	0,4	66,4
Japan	34,9	2,5	74,9	6,3	93,9	10,6	125,7	5,9	161,1

Note: * Average of the annual changes in percent of GDP over the period, including the extremes of the interval.

Source: European Commission for EU15 and OECD for US and Japan.

The mid-1990s marked a turning point in debt developments in most EU countries, as well as in the US. Only in Germany, Greece and France were the debt ratios still on an increasing path. Between 1996 and 1999, the debt had decreased by around 8 percentage points of GDP per year in Ireland, by 4½ in Belgium and by between 3 and 4 points in the Netherlands, Portugal, Finland, Denmark and Sweden. Debt reduction was also sizeable in Spain, Italy and the UK. Similar debt-decreasing trends seem to be still in motion in the current decade, albeit at a slower pace. However, debt has continued to increase in Germany and France, while the downward trends have been reversed in Portugal and the US. In Japan, debt levels have not ceased to increase, especially since the early nineties on the back of a strong expansionary fiscal policy.

Such debt developments are associated to soaring deficits and interest expenditure, and resulted in a perverse feedback between higher deficits, higher debt levels, higher interest expenditure and back to higher deficits, while primary surpluses plummeted (Table 2.8 in Appendix 2.A).

Already in the second half of the 1970s, the size of the general government deficits in percentage of GDP were high by international standards in a few EU countries. This was the case of Belgium, Italy, Ireland and Portugal, which, as shown above, recorded debt increases until the early nineties. However, in a majority of countries, budget balances were below the 3% of GDP threshold and in some cases they were close to balance or in surplus. Deficits soared during the 1980s, and in 1993, in the aftermath of the economic crisis, only Ireland and Denmark were recording deficits below 3% of GDP. High deficits were also predominant until the mid-nineties, and it was only after the launching of the euro when countries were able to rein on deficits. Leaving aside Greece (and Japan) no country recorded a government deficit above 3% of GDP in 1999. In EMU and underlying the slowdown in debt reduction, deficits have risen again, especially in Germany, Greece, France, Italy, Portugal and the UK, although up to lower levels than in the past, especially than in the first half of the nineties.

A steadily rising debt, combined with high interest rates,² put pressure on interest expenditures. In 1977, interest expenditure represented less than 5% of GDP. Only in Belgium, Italy, Ireland and the UK, countries with debt levels above 50% of GDP, did interest expenditure represent more than 3½% of GDP. In countries like Spain or Finland, interest expenditure was almost negligible (less than 1%). However, 15 years later, in no European country, except in the UK, interest expenditure was below 3% of GDP, and in the high-debt ones interest expenditure was above (Greece, Italy) or very close to 10% of GDP (Belgium). Since then, the ratio to GDP of interest expenditure has been on a steady downward path. This appears unambiguously linked to the stability-oriented economic policy framework already largely set up in the second stage of EMU (until the late 1990s), characterized by a better control of inflation, which significantly lowered interest rates in many countries, and a fiscal tightening prompted by the Maastricht criteria and further enhanced by the SGP, which reduced debt levels. In the most recent years, interest expenditure has attained levels well below those corresponding to the early nineties and, in some cases, of the magnitude observed in the late seventies.³

In a majority of countries, primary deficits were contributing to debt accumulation in the late seventies. Only in France, the Netherlands, the Nordic countries, and the UK revenues overweighted primary spending. However, in the early nineties, when both deficits and interest expenditures were at their peaks, a positive reaction of the primary surplus to debt accumulation seems to be predominant. Only in Spain and France, and the US, primary surpluses deteriorated while debt was rising.⁴ With the exception of Portugal

² For instance, between 1977 and 1993 the implicit interest rate on government debt (the ratio of interest expenditure to the stock of debt) had increased from 6.5% to 8% in Belgium, from 6% to 11.5% in Greece, from 2% to 9% in Spain, from 6% to 7.5% in France, from 8% to 10% in Italy, or from 4.5% to 10% in Portugal (see Table 2.8 in Appendix 2.A).

³ In addition, the implicit interest rates on government debt are well below not only those recorded in the early nineties, but also those recorded at the beginning of the sample period (1977). As a matter of fact, the implicit interest rates have converged across euro area Member States to around 4.5% in 2005 (see Table 2.8 in Appendix 2.A).

⁴ Note that a stronger deterioration was recorded in Finland and Sweden. However, the timing in Tables 2.1 and 2.8 may not be the most appropriate for these two countries. The bulk of the increase

in the second half of the 1990s, and Japan, a general improvement of primary balances over the nineties helped to put debt levels on a downward path. However, in parallel with the reduction of debt levels, primary surpluses have actually worsened during the current decade. This is the case of all the EU countries except Spain, Austria and Denmark, where primary surpluses did not deteriorate while debt fell.

All in all, periods of rising debt appear broadly coincidental with an improvement in primary balances, while primary balances have tended to worsen in parallel with the reduction of debt. Therefore, Tables 2.1 and 2.8 (the latter in Appendix 2.A) seem to suggest that fiscal behaviour in the EU (and probably in the US, but less evident in Japan) has overall been sensitive to debt developments.

Debt Accounting

Further insights about government debt developments during our sample period are obtained by performing a simple accounting exercise of the sources of debt growth. The exercise highlights the importance of the growth dividend compared to that of the so-called stock-flow adjustment (SFA) as determinants of debt growth.

Expressing the fiscal variables in percent of GDP, the flow government budget *identity* for period t can be written as:

$$d_t = -s_t + \left(\frac{1+i_t}{1+\lambda_t} \right) d_{t-1} \quad (2.7)$$

where i is the nominal interest charge in government debt and λ is the nominal GDP growth rate. Subtracting then d_{t-1} in both sides of expression (2.7) and rearranging terms, we obtain the equivalent expression:

$$d_t - d_{t-1} = def_t - \left(\frac{\lambda_t}{1+\lambda_t} \right) d_{t-1} \quad (2.8)$$

according to which the change in the debt-to-GDP ratio in year t is equal to the budget deficit inclusive of interest expenditure, $def_t = -s_t + i_t d_{t-1}$, minus the growth dividend, the second term in the right-hand side.

In the real world, equations (2.7)-(2.8) do not generally hold. The reason is that the principles according to which the government deficit and debt are compiled are different. As a result, once it is corrected from the effect of nominal growth, the change in the outstanding stock of debt can be larger or smaller than the deficit (European Commission, 2005). One of the main reasons for this comes from the differences in the gross and net

in debt levels in Finland took place suddenly in the early 1990s, when after the fall of the soviet regime and the concomitant drastic reduction of Finish exports plunged the country into a recession, the result of which was that the surplus of 5% of GDP recorded in 1990 turned into a deficit of 8% of GDP in 1993. In parallel, debt levels rose from 14% of GDP in 1990 to 56% of GDP in 1993. Similarly, in Sweden the surplus of 4% of GDP recorded in 1990 turned into a deficit of 11% of GDP in 1993, with debt going up from 42% to 71% of GDP. Also note that the deterioration of the primary surplus in the UK in the late 1980s/early 1990s is associated to a reduction of debt levels from 61% of GDP in 1977 to 48% of GDP in 1993.

recording of transactions with financial assets.⁵ Specifically, the government balance is the difference between expenditures and revenues, excluding financial transactions. However, government debt is compiled in gross terms, and it changes when the financial assets of the government change, thus generating flows of payments and receipts that do not enter the deficit. When the government accumulates financial assets, debt increases above the right-hand side of equation (2.8), while the opposite applies for a reduction of financial assets. Such a residual is known as the stock-flow adjustment (SFA). Taking it into account, equation (2.8) becomes:

$$d_t - d_{t-1} = def_t - \left(\frac{\lambda_t}{1 + \lambda_t} \right) d_{t-1} + sfa_t \quad (2.9)$$

where *sfa* is the stock-flow adjustment in percentage of GDP.

Averaging over the sample period both sides of expression (2.9) it is possible to obtain the average contribution of each of the right hand side components to the average debt growth, all in terms of GDP. The result is shown in Table 2.2 for the whole sample period, 1977-2005, and for the first half of it, 1977-1993. Table 2.10 in Appendix 2.A presents the results of the same exercise for different sub-periods between 1994 and 2005.

Considering the whole sample period, the most striking feature in Table 2.2 is that, as a general rule, the growth dividend has fully offset pervasive budget deficits. The exceptions appear to be Germany, where annual deficits have been around ¼ of a percentage point of GDP higher than the growth dividend, France, with a difference slightly above ½% of GDP, and Italy (and Japan), where the difference is around 1% of GDP. The table also reveals that SFAs have been important for debt dynamics in an ample majority of the 16 countries in the sample.⁶

The picture changes slightly if one looks at the first part of the period. Until 1993, the number of countries in which the growth dividend did not compensate for the deficit includes not only France and Italy (and Japan), but also Belgium, Greece, Spain, and the Netherlands. On the other hand, the contribution of the SFA is even greater than in the whole sample period.

Interestingly, both over the full sample and until 1993, the number of countries that managed to maintain primary surpluses is not negligible, although the surpluses were in many cases relatively small. As a matter of fact, primary deficits appear to be the characteristic of only some catching-up countries, such as Greece, Spain and Portugal, where the growth dividend was relatively high.

⁵ This is not the only reason (European Commission, 2005). The fact that deficits are compiled in accrual terms, while debt is a cash concept also leads to differences between the changes in debt and the deficit in any given year. Additional differences arise from other adjustments and valuation effects.

⁶ As noted in European Commission (2005) large SFAs are a source of concern, especially in high-debt countries in deficit. On the one hand, by excessively focusing on deficits, budgetary surveillance may create incentives to shift budget items from deficit ('above the line') to SFAs ('below the line'). On the other hand, large SFAs may be indicative of inconsistent and low-quality budgetary statistics. However, large SFAs may not always be the result of bad fiscal behavior. It appears that countries with low debt levels and in surplus (see the cases of Finland, Denmark or Sweden in Table 2.1) would prefer to invest in financial assets rather than to reduce the already low debt.

Table 2.2 *Debt Accounting, 1977-2005 and 1977-1993*

	Debt	Deficit	Interest	Primary	Nominal		Real GDP	Stock-flow
	(1)	(2)	burden	balance	GDP	Inflation	growth	adjustment
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
1977-2005								
Belgium	1,23	5,07	7,79	-2,72	-5,09	-2,95	-2,14	1,26
Germany	1,46	2,44	2,81	-0,37	-2,22	-1,25	-0,97	1,24
Greece	3,12	7,73	6,84	0,89	-8,66	-6,82	-1,85	4,05
Spain	1,08	3,14	2,77	0,28	-3,52	-2,31	-1,22	1,46
France	1,72	2,59	2,65	-0,05	-1,95	-1,13	-0,82	1,07
Italy	1,84	7,52	7,58	-0,05	-6,83	-5,26	-1,57	1,15
Ireland	-1,10	3,94	5,36	-1,42	-7,09	-3,80	-3,29	2,04
Netherlands	0,54	2,86	4,56	-1,70	-2,78	-1,37	-1,40	0,46
Austria	1,23	2,54	3,34	-0,79	-2,47	-1,29	-1,18	1,16
Portugal	1,20	5,15	4,61	0,54	-6,11	-4,80	-1,31	2,16
Finland	1,17	-1,47	2,25	-3,72	-1,71	-0,85	-0,86	4,34
Denmark	0,79	0,76	5,32	-4,62	-2,99	-1,92	-1,07	3,02
Sweden	0,84	1,32	4,90	-3,58	-3,46	-2,30	-1,16	2,98
UK	-0,62	2,54	3,58	-1,04	-3,60	-2,51	-1,09	0,45
US	0,70	3,09	2,67	0,41	-2,82	-0,97	-1,85	0,43
Japan	4,51	3,12	1,45	1,67	-2,16	-0,28	-1,88	3,55
1977-1993								
Belgium	4,48	7,75	8,45	-0,70	-5,74	-3,83	-1,91	2,34
Germany	1,19	2,30	2,56	-0,26	-2,91	-1,85	-1,06	1,80
Greece	5,63	8,89	5,56	3,33	-8,17	-7,70	-0,47	4,51
Spain	2,75	3,84	2,22	1,47	-3,23	-2,51	-0,71	2,08
France	1,54	2,14	2,32	-0,17	-1,94	-1,37	-0,56	1,25
Italy	3,76	9,95	7,63	2,32	-8,23	-6,69	-1,54	1,85
Ireland	2,13	7,31	7,21	0,10	-8,05	-5,23	-2,81	2,84
Netherlands	2,31	3,95	4,98	-1,03	-2,56	-1,30	-1,26	0,72
Austria	1,99	2,74	0,00	-0,46	-2,62	-1,61	-1,02	1,84
Portugal	1,74	6,02	5,26	0,76	-8,30	-6,94	-1,36	3,88
Finland	3,02	-1,89	1,62	-3,51	-1,05	-0,83	-0,22	5,74
Denmark	3,95	2,02	6,17	-4,24	-3,28	-2,52	-0,77	5,22
Sweden	2,74	1,95	5,30	-3,35	-3,96	-3,26	-0,70	4,53
UK	-0,83	2,88	4,12	-1,23	-4,54	-3,59	-0,95	0,85
US	1,78	3,86	2,69	1,16	-3,75	-2,18	-1,56	1,56
Japan	2,50	1,11	1,47	-0,36	-3,57	-1,42	-2,14	5,06

Notes: (1) Annual average change in the debt-to-DGP ratio (%)

(2) Annual average change in the deficit-to-DGP ratio (%)

(3) Annual average change in interest expenditure (% of GDP)

(4) Annual average change in the primary balance-to-DGP ratio (%) (4)=(2)-(3)

(5) Annual average effect of nominal GDP growth

(6) Annual average effect of inflation

(7) Annual average effect of real GDP growth (7) = (5) - (6)

(8) Annual average stock-flow adjustment (8) = (1) - (2) - (5)

Source: European Commission for EU15 and OECD for US and Japan.

A drastic reduction of budget deficits below the average growth dividend, which is unambiguously associated to the reduction of debt levels recorded after 1996, is the most salient characteristic of debt dynamics in most EU countries after 1993, and in particular after 1996 (see Table 2.10 in Appendix 2.A), once the effects of the 1992-1993 economic crisis had faded out, and the enhanced budgetary surveillance and fiscal discipline framework was in place. Still, favourable developments in the SFA, in many cases reflecting the allocation of privatisations proceeds to redeem debt, had a significant

impact on debt dynamics, especially in the second half of the 1990s. During most of the last decade, primary surpluses have been ubiquitous.

Although informative about debt developments and the contribution of different budget components to debt accumulation, data in Tables 2.1 and 2.2 convey scarce information about the sustainability of fiscal policy. For example, one might be tempted to interpret the fact that budget deficits have been the norm in our sample as indicative of underlying Ponzi games. However, sustainability conditions impose very weak constraints in the behaviour of deficits. As a matter of fact, sustainability is compatible with permanent budget deficits as long as they induce a debt growth rate lower than the discount rate.⁷ Similarly, a declining debt-to-GDP ratio might be seen as indicative of fiscal sustainability, but it is actually compatible with Ponzi schemes whereby the government rolls over a given level of debt when the interest rate on government debt is lower than the GDP growth rate. This analysis above suggests in fact that commonly used fiscal indicators may be misleading as signals of sustainability and that more formal approaches are needed in order to establish whether a given fiscal policy is sustainable.

2.4 Determinants of the Fiscal Primary Surplus

Baseline Model

In accordance with the fiscal reaction function approach to sustainability discussed in section 2.2, we start with the following basic specification of the determinants of the primary surplus:

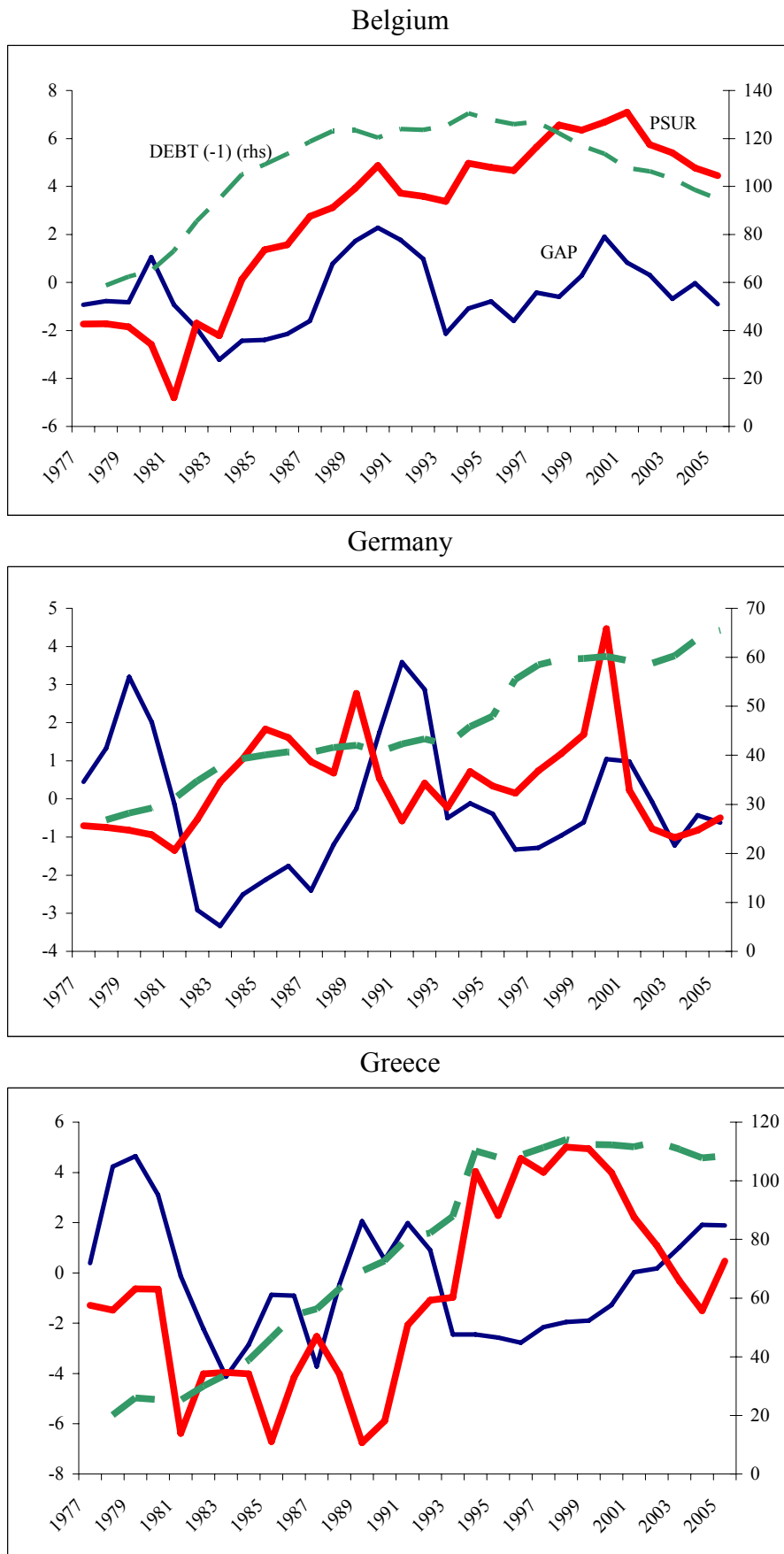
$$s_t = c + \delta d_{t-1} + \gamma x_t + \rho s_{t-1} + \varepsilon_t \quad (2.10)$$

The motivation for equation (2.10) is to capture the potential response of the primary surplus to debt, while trying to avoid omitted variable bias. To that end we include two components considered important in government fiscal behaviour. On the one hand, the response to the cyclical conditions of the economy, as represented by the output gap x . On the other hand, the inertial process typically associated with fiscal policy that is captured by the primary surplus lag. Finally, equation (2.10) incorporates a random term representing other potential factors affecting the evolution of the primary surplus, as for example non-systematic discretionary policy actions.

Figure 2.1 plots the three series involved in equation (2.10) for each one of the 16 countries in the sample. As already pointed out in Section 2.3, there seems to be in a number of countries a positive correlation between the primary surplus and the stock of debt at the end of the previous period. Interestingly, although one would have expected a strong positive correlation between primary surpluses and output gaps, so primary balances would improve in times of positive output gaps, Figure 2.1 seems to suggest that in a number of countries such an automatic counter-cyclical behaviour of the primary balances has been offset by pro-cyclical discretionary fiscal policies.

⁷ Sustainability is even compatible with policies that may generate primary deficits on average, as for example fiscal policies that targeting debt/output stabilization require a surplus or a deficit depending on output fluctuations.

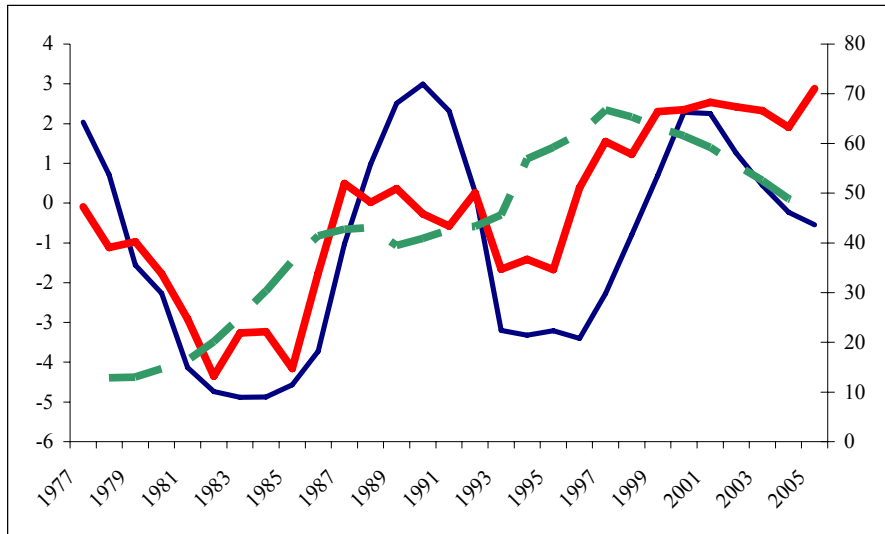
Figure 2.1 Primary Surplus, Debt and Output (% of GDP)



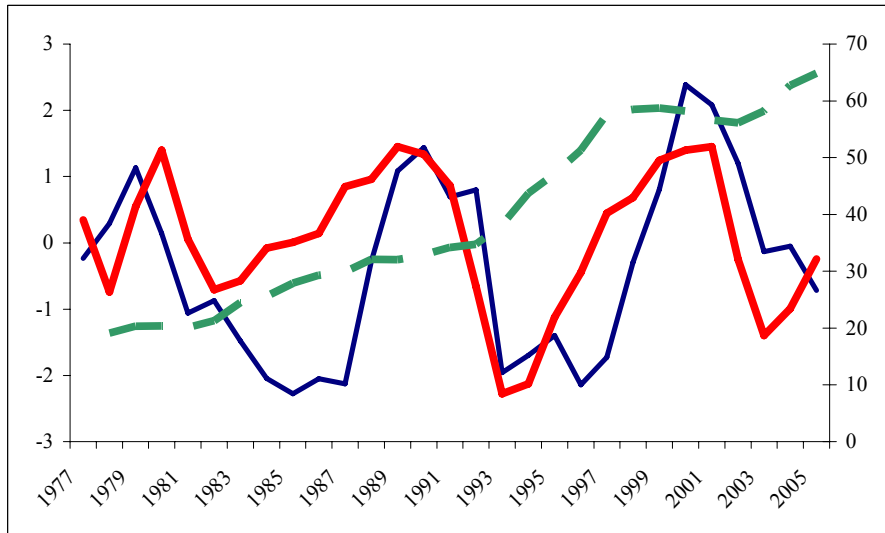
Note: DEBT (-1) – government gross debt (rhs); PSUR – primary surplus; GAP – output gap.

Figure 2.1 (continued)

Spain



France



Italy

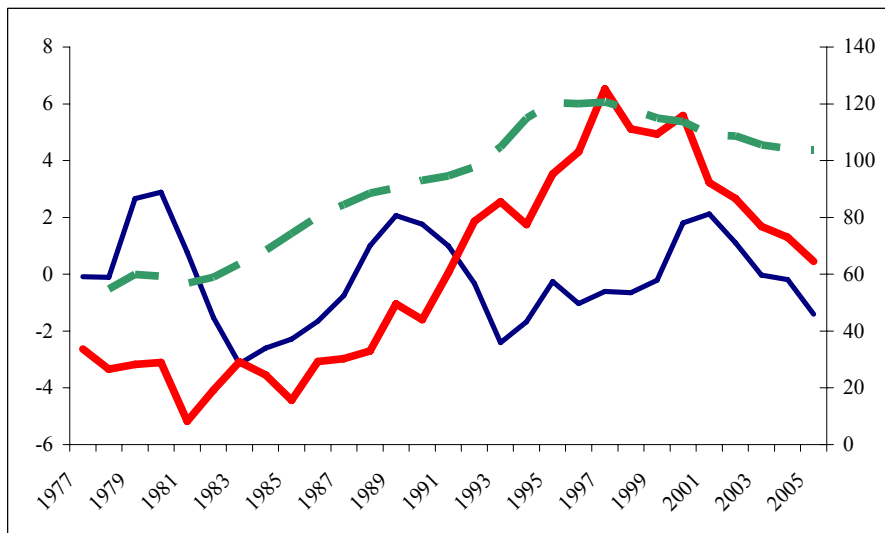


Figure 2.1 (continued)

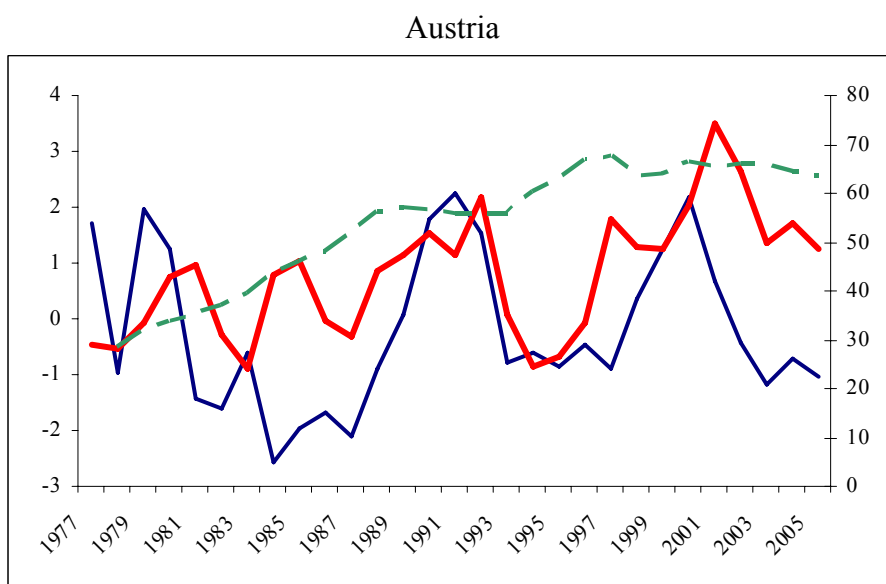
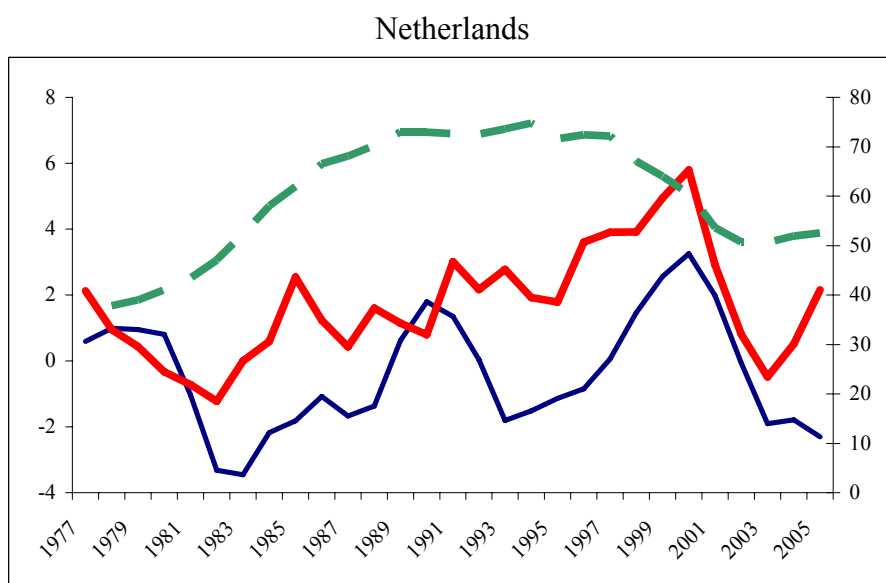
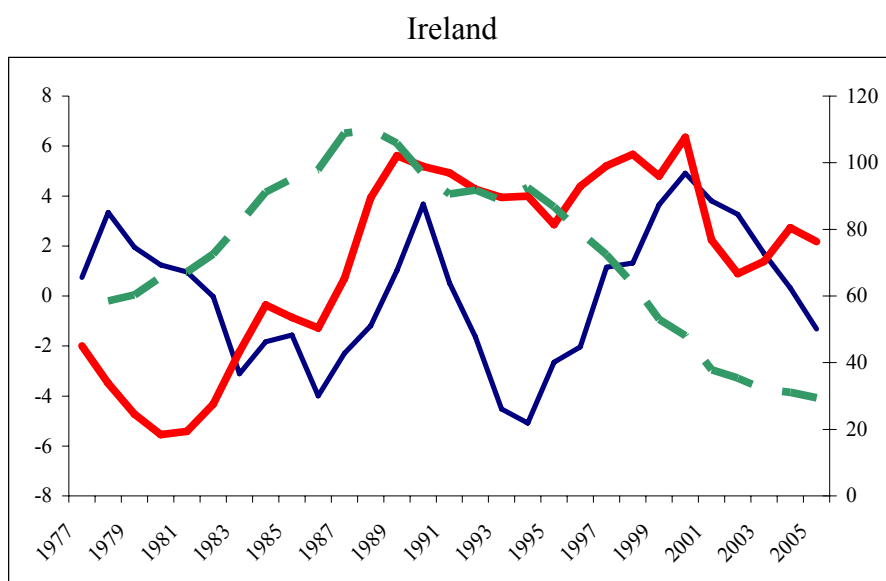


Figure 2.1 (continued)

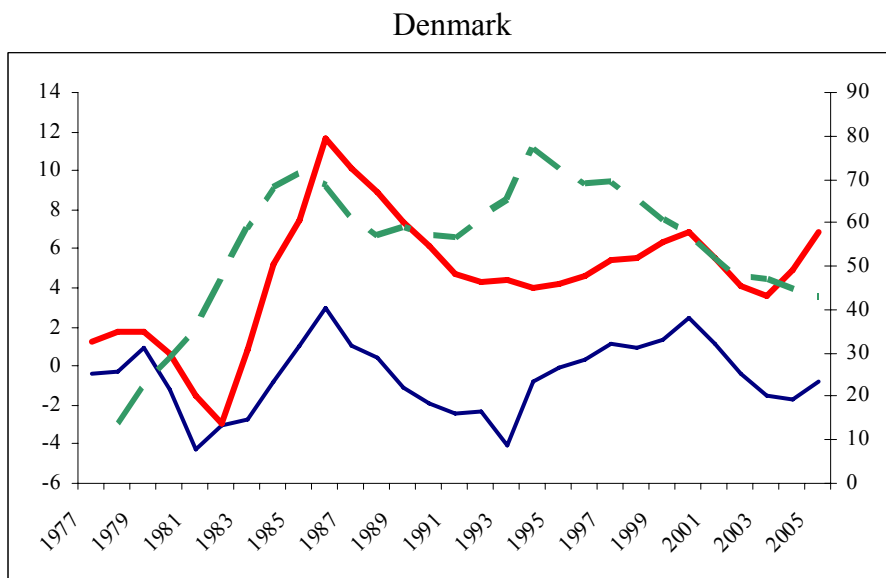
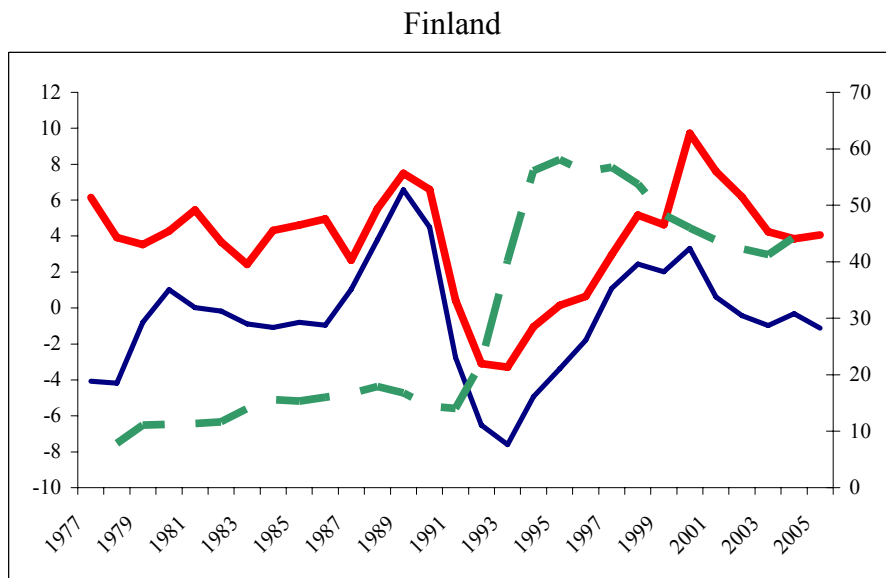
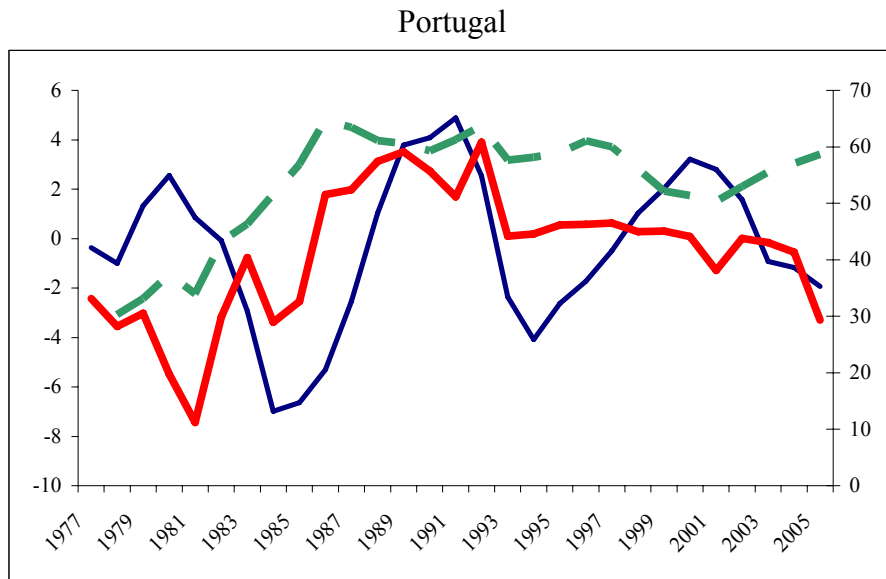


Figure 2.1 (continued)

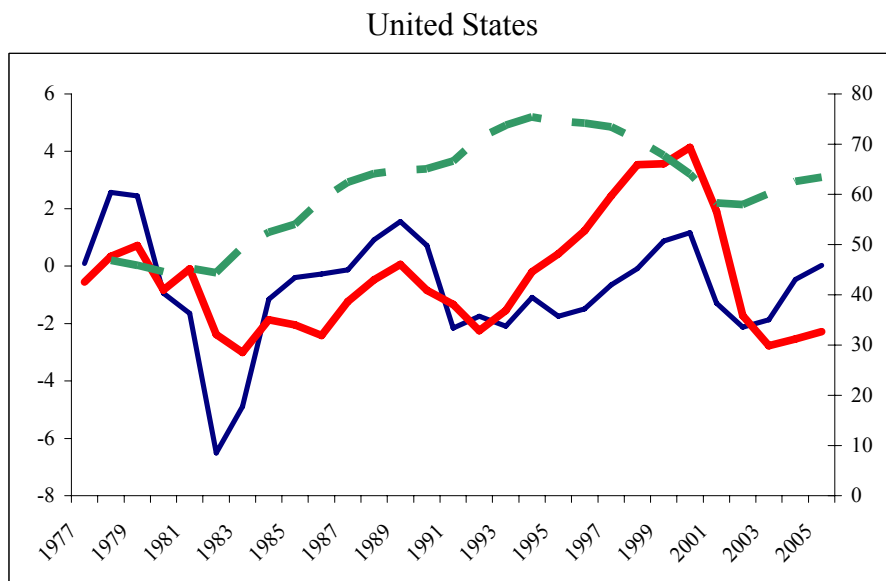
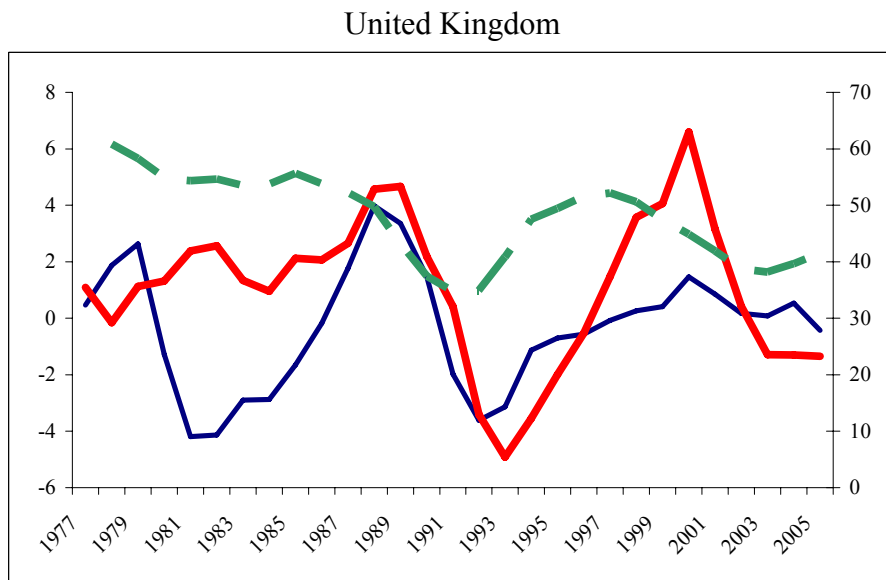
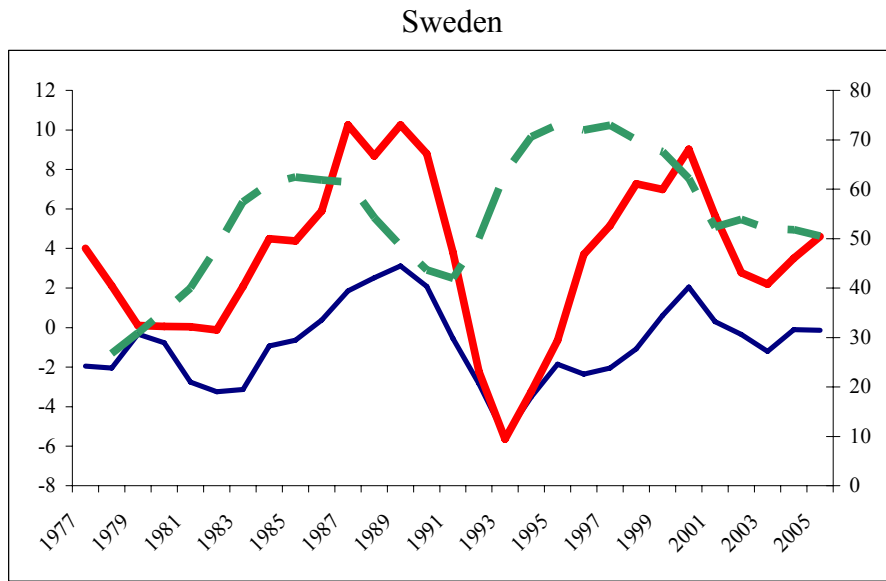


Figure 2.1 (continued)

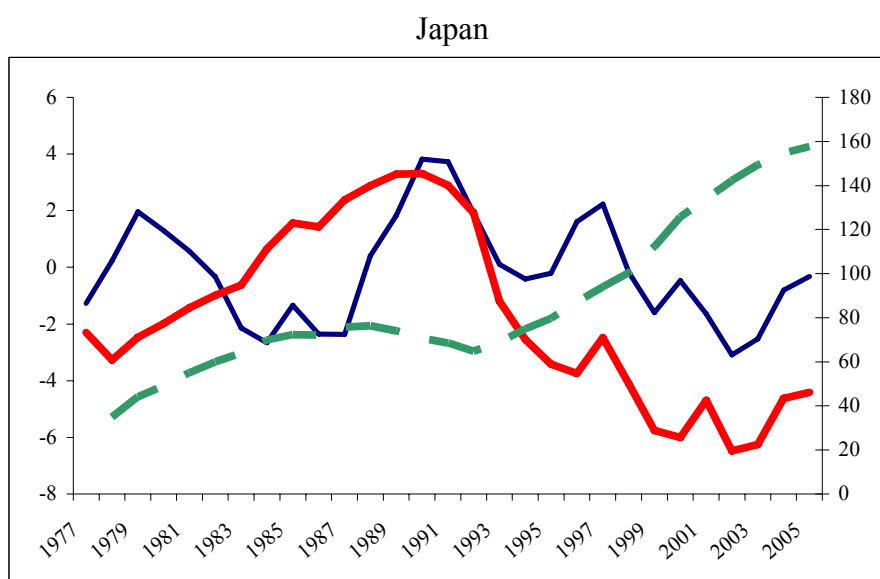


Table 2.3 presents summary statistics related to the estimation of model (2.10) by ordinary least squares (OLS). A positive and statistically significant (at 5% at least) response is observed in Belgium, Spain, Italy, Netherlands, Portugal, Denmark, Sweden, UK and the US. In the rest of the countries, except in Japan, the reaction of the primary balance to debt stocks is either significant at 10% (Ireland and Austria) or non-significant, although the estimate is positive. Only in Japan, the estimate is negative but non-significant. When significant, the reaction of the primary surplus to the output gap is positive, thus pointing to counter-cyclical fiscal policies. This seems to be the case in most EU Member States not in the euro area, as well as Finland, Austria and, to a much lesser extent, Portugal. In Belgium, Germany, Greece and Ireland the correlation between the primary balance and the output gap is negative albeit non-significant. Finally, in all the countries, except in Portugal, the inertia is statistically significant, positive indeed and in some cases relatively strong. In countries like Ireland, Japan and, to a lesser extent, Belgium, UK and US it appears pretty close to 1.

Table 2.3 *Fiscal Reaction Function: Econometric Results for the Baseline Model*

	Intercept	DEBT	GAP	PSUR ₋₁	R ²	h-Durbin
Belgium	-2.64 0.82***	0.03 0.01***	-0.01 0.13	0.78 0.09***	0.95	-1.73
Germany	-0.11 0.69	0.01 0.02	-0.14 0.10	0.49 0.24**	0.33	-0.54
Greece	-2.48 1.38*	0.03 0.02	-0.08 0.16	0.65 0.13***	0.74	0.01
Spain	-1.50 0.42**	0.04 0.01***	0.19 0.12	0.57 0.18***	0.82	0.001
France	0.04 0.55	0.00 0.01	0.11 0.16	0.59 0.19***	0.48	6.06
Italy	-4.93 1.59***	0.06 0.02***	0.01 0.11	0.61 0.10***	0.92	0.09
Ireland	-1.12 0.98	0.02* 0.01	-0.05 0.11	0.91 0.06***	0.88	0.76
Netherlands	-1.51 1.01	0.04 0.02**	0.26 0.21	0.44 0.21**	0.57	0.98
Austria	-0.63 0.61	0.02* 0.01	0.20 0.10**	0.45 0.16***	0.48	0.68
Portugal	-8.37 -2.80***	0.15 0.05***	0.18 0.10*	0.27 0.16	0.72	2.00
Finland	1.71 0.55***	0.01 0.01	0.51 0.12***	0.51 0.10***	0.78	1.34
Denmark	-0.15 0.62	0.04 0.02**	0.51 0.16***	0.62 0.10***	0.84	2.57
Sweden	-0.82 1.68	0.07 0.03***	1.12 0.31***	0.42 0.14***	0.84	2.41
UK	-5.48 1.61***	0.12 0.03***	0.25 0.12**	0.77 0.09***	0.78	1.34
US	-2.08 0.98**	0.04 0.02**	0.33 0.07***	0.74 0.10***	0.79	2.68
Japan	0.03 0.47	-0.00 0.01	0.02 0.11	0.93 0.08***	0.86	1.78

Note: The sample period is 1997-2005.

Models estimated by OLSQ with heteroskedastic-consistent standard errors;

'***' significant at 1%; '**' significant at 5%; '*' significant at 10%.

Source: European Commission for EU15 and OECD for US and Japan.

In general, and given its simplicity, the explanatory power of the model is relatively good. In any case, it is comparable or better than other estimates in the literature, such as Ballabriga and Martinez-Mongay (2003) or Bohn (2005a). The explanatory power is high in Belgium, Greece, Spain, Italy, Ireland, Finland, Denmark, Sweden, UK, US and Japan, where 75% or more of the variability of the primary surplus within the sample period is explained by the stock of debt, the output gap and the inertia. However, in some cases, such as Germany, France and Austria the explanatory power of the model is lower. In addition, although in many countries the model passes the usual specification tests, in others, such as Belgium, France, Portugal, Denmark, Sweden, US and Japan, the h-Durbin statistic suggests a clear departure from the white noise hypothesis for the residuals.

Robustness Checks

Taken at face value, Table 2.3 raises some doubts about the sustainability of fiscal policies in Germany, Greece, France, Ireland, Austria, Finland, and, indeed, Japan, where a positive and significant reaction of the primary balance to the stock of debt has not been estimated. However, according to Section 2.2, the reaction of the primary surplus to debt levels does not need to be positive all the time, while the descriptive analysis carried out in Section 2.3 suggests that fiscal policy has changed over the sample period, in particular after 1993 once the convergence criteria entered into force. Therefore, there is a case to explore possible structural breaks, as well as non-linearity (Bohn, 2005a), in the response of the primary balance to the stock of debt. In addition, the fact that the fiscal policy stance may have an impact on the cycle would imply that output gaps may be partially determined by the primary surplus, thus leading to simultaneity biases (Ballabriga and Martinez-Mongay, 2003), which might put into question the estimation method and advocate for instrumental variable methods. Alternatively, it might also call for the substitution of the contemporaneous output gap by the lagged one in order to avoid simultaneity. Finally, the parameters in specification (2.10) can be seen as a linearization of the parameters in a partial adjustment non-linear model, in which the actual responses of the primary balance to the debt and the output gap are the estimated in (2.10) divided by the complement of the inertia (Ballabriga and Martinez-Mongay, 2005). This would ask for a non-linear estimation of (2.10). Alternatively, one could consider a linear specification in which the inertia is absent.

Table 2.4 contains the result of the analysis of robustness of the estimates of the primary surplus reaction to debt against the above alternative specifications of the reaction function. In all cases, the table shows the estimate of the coefficient of debt and its heteroskedastic-consistent standard error.⁸ The first column reproduces the results for the baseline model (2.10) in Table 2.3. The second column presents the baseline model estimated by instrumental variable methods. Following Ballabriga and Martinez-Mongay (2003), the instrument for the contemporaneous output gap for each country is a sort of country-specific international gap estimated on the basis of the bilateral trade-weighted average of the output gaps of the rest of the OECD countries. Overall, the potential simultaneity bias seems to be negligible. France, where the estimate shifts from positive to negative but remains non-significant; the Netherlands, where it decreases; and Portugal, where it increases but remains positive and significant, are the only differences with respect to the OLSQ estimation. Similarly, dealing with potential simultaneity bias by substituting the contemporaneous gap with the lagged one (third column) leaves results basically unaffected, with just a reduction in the size and significance (10%) of the coefficient in Portugal.

The fourth column considers the effects of dropping inertia in (2.10). As a general rule, the reaction of the primary surplus to debt becomes larger in many countries, and significant in Greece and Austria. However, it decreases in Portugal and becomes non-significant in Sweden and the UK. Moreover, usual tests indicate the presence of significant misspecification errors. The estimation of the baseline model by non-linear methods (fifth column) does not change the conclusions of the baseline model either, since the non-linear estimates are very close to the linear ones in the first column of Table 2.4 after being divided by $(1-\rho)$ with ρ as estimated in the fourth column of Table 2.3. Similarly, estimation of the model by non-linear two-stage least squares (instrumental

⁸ Detailed estimates are available upon request from the authors.

variables with the international gap as the instrument for the contemporaneous gap, column sixth) gives debt reactions which are equal to those in the second column of Table 2.4 when divided by $(1-\rho)$.

Columns 7 to 12 deal with possible specification bias linked to non-linearities and structural breaks in the response to debt. Only Greece, Ireland and Denmark (and the US) appear sensitive to the inclusion of the square of the deviation of the debt with respect to its sample average (column DEBT2). The consideration of dummies that take value 1 from 1993 onwards (DUM93), from 1996 (DUM96) or from 2001 (DUM01), individually or combined, has significant effects on the estimates of the reaction to debt in several countries, with interesting implications about the effects on fiscal behaviour of economic integration in the EU. This seems to be the case in at least Germany, Greece, Spain, Ireland, Austria and Finland. As shown below, in most euro area countries, the introduction of structural breaks leads to an increase of the reaction to debt after 1993 and/or 1996, while in some cases the response falls after 2001. Also, the consideration of structural breaks has significant impacts in the US and Japan. More detailed estimation results for models with structural breaks are provided below.

To assess the impact of the large and relatively omnipresent and persistent SFAs showed in section 2.3, the baseline model has been re-estimated by including a sort of 'gross primary surplus' obtained by subtracting the SFAs, calculated for each year in the debt accounting exercise (see Table 2.2) to the recorded primary surplus. The result is the primary surplus that would have been compiled if positive SFAs had been considered as primary expenditures, while negative SFAs had been accounted as revenues. The results of re-estimating (2.10) with this gross primary balance is presented in Table 2.5 in the rows labelled GPSUR.

Table 2.4 *Estimates of the Response of the Primary Surplus to Debt in Alternative Models*

	Baseline OLSQ	Baseline IV	OLSQ GAP ₁	OLSQ Static	Baseline Non-linear	Baseline NL2SLS (IV)	DEBT2	DUM93	DUM96	DUM01	DUM93 DUM01	DUM96 DUM01
Belgium	0.03 0.01***	0.03 0.01***	0.03 0.01***	0.11 0.01***	0.15 0.04***	0.14 0.04***	0.03 0.01**	0.04 0.01***	0.05 0.01***	0.04 0.01***	0.05 0.01***	0.05 0.02***
Germany	0.01 0.02	0.01 0.02	0.01 0.02	0.02 0.02	0.01 0.04	0.02 0.04	0.01 0.02	0.05 0.03	0.04 0.03	0.06 0.03**	0.10 0.03***	0.06 0.03**
Greece	0.03 0.02	0.03 0.02*	0.03 0.01**	0.07 0.01***	0.08 0.03***	0.08 0.03***	0.06 0.02***	0.01 0.03	0.03 0.02	0.04 0.02**	0.00 0.03	0.04 0.02
Spain	0.04 0.01***	0.04 0.01***	0.04 0.01***	0.06 0.01***	0.09 0.03***	0.10 0.04***	0.04 0.01***	0.03 0.02	0.02 0.01*	0.04 0.01***	0.03 0.02	0.02 0.01**
France	0.00 0.01	-0.01 0.01	0.01 0.01	-0.01 0.01	0.00 0.03	-0.02 0.01	-0.00 0.01	0.05 0.04	-0.02 0.03	0.01 0.01	0.06 0.05	-0.02 0.03
Italy	0.06 0.02***	0.06 0.02***	0.06 0.02***	0.14 0.01***	0.14 0.02***	0.14 0.02***	0.09 0.02***	0.06 0.02***	0.06 0.02***	0.05 0.02***	0.05 0.02***	0.06 0.02***
Ireland	0.02 0.01*	0.02 0.02	0.01 0.01	0.03 0.02	0.22 0.17	0.24 0.17	0.03 0.01**	0.02 0.02	0.03 0.01**	0.01 0.02	0.02 0.03	0.04 0.02
Netherlands	0.04 0.02**	0.03 0.02*	0.04 0.02**	0.06 0.02***	0.08 0.03***	0.10 0.05**	0.04 0.02**	0.04 0.02**	0.05 0.02***	0.04 0.02*	0.03 0.02	0.04 0.02*
Austria	0.02 0.01*	0.02 0.01*	0.03 0.01*	0.04 0.01***	0.04 0.02**	0.04 0.02**	0.03 0.02	0.03 0.02**	0.01 0.01	0.02 0.01	0.04 0.01***	0.01 0.02
Portugal	0.15 0.05***	0.19 0.06***	0.03 0.01*	0.04 0.01***	0.20 0.05***	0.21 0.04***	0.23 0.04***	0.16 0.05***	0.17 0.05***	0.16 0.05***	0.16 0.05***	0.17 0.05***
Finland	0.01 0.01	0.01 0.01	0.02 0.02	-0.02 0.02	0.02 0.03	0.02 0.02	0.01 0.02	-0.26 0.09***	0.00 0.02	0.01 0.02	-0.26 0.09***	0.00 0.03
Denmark	0.04 0.02***	0.04 0.02***	0.05 0.02**	0.08 0.02***	0.11 0.03***	0.15 0.05***	0.05 0.02*	0.05 0.02***	0.05 0.02*	0.05 0.02***	0.07 0.02***	0.05 0.02***
Sweden	0.07 0.03***	0.07 0.02***	0.09 0.02***	0.05 0.04	0.12 0.05***	0.13 0.07**	0.09 0.03***	0.09 0.03**	0.06 0.03*	0.07 0.03**	0.07 0.04*	0.04 0.03
UK	0.12 0.03***	0.12 0.03***	0.13 0.04***	0.08 0.05	0.53 0.21***	0.50 0.19***	0.10 0.03***	0.15 0.03***	0.14 0.03***	0.10 0.05**	0.12 0.04***	0.10 0.04**
US	0.04 0.02**	0.04 0.02***	0.04 0.02**	0.05 0.03**	0.14 0.07**	0.17 0.10*	0.05 0.01***	0.02 0.02	0.04 0.02**	0.04 0.01**	-0.02 0.02	0.01 0.02
Japan	-0.00 0.00	-0.00 0.00	-0.00 0.00	-0.04 0.01***	-0.03 0.07	-0.02 0.07	-0.00 0.01	0.05 0.01***	0.02 0.02	-0.01 0.01	0.05 0.01***	0.01 0.03

Note: '***' significant at 1%; '**' significant at 5%, '*' significant at 10%

Source: European Commission for EU15 and OECD for US and Japan.

Table 2.5 *Robustness with Respect to the SFAs. Baseline Models*

	Model	Intercept	DEBT	GAP	PSUR ₁	R ²	h-Durbin
Belgium	GPSUR	-7.77**	0.08**	-0.18	0.73***	0.85	-2.42
	NDEBT	-3.52***	0.04***	-0.00	0.75***	0.92	-1.62
Germany	GPSUR	-4.49***	0.08***	-0.14	0.13	0.24	-0.20
	NDEBT	-0.03	0.01	-0.14	0.50	0.29	-0.48
Greece	GPSUR	-9.33**	0.07*	0.35	0.13	0.29	-0.31
	NDEBT	-2.89	0.03	-0.15	0.62***	0.74	-0.22
Spain	GPSUR	-4.44***	0.09***	0.53**	0.24	0.70	1.06
	NDEBT	-1.65***	0.04***	0.17	0.55***	0.85	0.16
France	GPSUR	-0.81	0.58	0.38**	0.20	0.26	2.06
	NDEBT	0.30	-0.01	0.16	0.55***	0.51	6.38
Italy	GPSUR	-9.16***	0.10***	0.34**	0.47***	0.91	0.18
	NDEBT	-5.76***	0.06***	0.01	0.57***	0.92	0.13
Ireland	GPSUR	-3.28	0.05*	0.24	0.66***	0.50	-2.65
	NDEBT	-0.98	0.02	-0.03	0.90***	0.87	0.73
Netherlands	GPSUR	-4.20***	0.09***	0.34	0.38**	0.69	-0.28
	NDEBT	-1.95**	0.05**	0.20	0.49**	0.66	1.08
Austria	GPSUR	-5.68***	0.10***	0.07	0.20	0.47	1.57
	NDEBT	-0.54	0.02	0.19*	0.46***	0.48	0.80
Portugal	GPSUR	-13.6***	0.23**	0.35	0.44***	0.59	-0.82
	NDEBT	-7.59**	0.14**	0.13	0.38	0.65	1.98
Finland	GPSUR	-3.18***	0.10***	0.82**	0.21	0.66	2.93
	NDEBT	1.94***	0.02	0.63***	0.39***	0.82	1.14
Denmark	GPSUR	-4.37*	0.12***	1.31***	0.45***	0.79	0.41
	NDEBT	-0.35	0.05***	0.47***	0.61***	0.83	2.88
Sweden	GPSUR	-15.4***	0.32***	1.81***	0.00	0.88	-0.71
	NDEBT	-1.50	0.09***	1.25***	0.37***	0.88	2.36
UK	GPSUR	-6.59***	0.15***	0.39*	0.67***	0.72	0.47
	NDEBT	-7.63***	0.17***	0.28***	0.79***	0.85	0.37
US	GPSUR	-7.97***	0.13***	0.24	0.51***	0.62	0.06
	NDEBT	-2.36**	0.04**	0.29***	0.75***	0.81	2.40
Japan	GPSUR	-1.48	0.00	-0.01	0.67***	0.55	-0.71
	NDEBT	0.27	-0.01	0.02	0.90***	0.88	1.95

Note: '***' significant at 1%; '**' significant at 5%, '*' significant at 10%

Source: European Commission for EU15 and OECD for US and Japan.

Alternatively, model (2.10) has been re-estimated by re-calculating the stock of debt net of SFAs to obtain the stock of debt that would have prevailed had the SFAs been zero. The results are shown in Table 2.5 in the rows labeled 'NDEBT'. Leaving aside the fact that the reactions of the 'gross primary surplus' to gross debt tend to be higher than that of the standard primary surplus, be it to gross or 'net' debt, the main conclusions of Table 2.3 remain unaltered.

Finally, the main conclusions of Table 2.3 also remain when a country-specific selection model is carried out, so that for each country the model with the best adjustment power and the least misspecification error is chosen, as shown in Table 2.6.⁹

⁹ Notice that some models (Belgium, France, Italy, see Table 2.6) include an intervention in 1993 (i.e. a variable that takes value 1 in that year 0 elsewhere) with no significant impacts as regards the reaction of the primary surplus to debt levels. This intervention tries to deal with a large increase in debt levels observed in many countries in 1993, which appear to be associated to the application of the statistical regulations adopted in connection with the fiscal Maastricht criteria with a view to providing rigorous criteria to compile deficit and debt levels in the Member States. As shown by the large SFAs recorded that year, such debt increases were not associated to increases in the deficit

Table 2.6 *Refined Estimates*

	Intercept	DEBT	GAP	PSUR ₋₁	Maastricht	Launching of the euro	EMU	Adj. R ²	DW/h-Durbin
Belgium	-3.73	0.04	0.13	0.57		0.01		0.93	-1.74
(1a)	1.06***	0.01***	0.12	0.14***		0.004***			
Germany	-2.25	0.07	-0.10	0.34			-0.04	0.55	-0.66
(1b)	1.00**	0.03**	0.08	0.09***			0.01***		
Greece	-2.85	0.02	0.18	0.44		0.03		0.77	-1.38
	1.23**	0.01	0.17	0.15***		0.01*** (2)			
Spain	-1.20	0.02	0.32	0.26		0.03		0.87	0.69
	0.34***	0.01*	0.09***	0.14*		0.01***			
France (1a)	-2.44	0.11	0.26	0.18	-0.06		-0.02	0.70	1.96
	0.89***	0.03***	0.12**	0.15	-0.02***		0.01***		
Italy (1a)	-4.69	0.06	0.01	0.67			-0.01	0.93	-1.16
	1.57***	0.02***	0.10	0.11***			0.003***		
Ireland	-2.63	0.03	-0.06	0.82		0.03		0.88	1.04
	1.17**	0.01**	0.10	0.06***		0.01***			
Netherlands	-1.96	0.05	0.30	0.22		0.02		0.64	1.49
	0.98**	0.02***	0.19	0.19		0.006***			
Austria	-0.32	0.01	0.17	0.32		0.01		0.57	-0.70
	0.57	0.01	0.09*	0.15**		0.006*			
Portugal	-13.0	0.23	0.20	0.22				0.72	1.45
(1c)	2.52***	0.04***	0.08**	0.15					
Finland	2.17	0.00	0.45	0.52				0.82	-1.20
(1d)	0.52***	0.01	0.09***	0.07***					
Denmark	-0.15	0.04	0.51	0.62				0.82	2.93
	0.62	0.02***	0.16***	0.10***					
Sweden	-0.94	0.07	0.95	0.54				0.85	1.52
(1d)	1.52	0.02***	0.29***	0.14***					
UK (1c)	-4.03	0.10	0.23	0.78				0.83	-0.84
	1.74**	0.03***	0.09***	0.09***					
US (1c)	-3.37	0.05	0.40	0.72				0.83	1.25
	0.98***	0.01***	0.08***	0.09***					
Japan	-2.87	0.05	0.16	0.60	-0.04			0.95	-0.09
	0.52***	0.01***	0.09*	0.05***	0.004***				

Notes: (1a) The model includes an intervention in 1993 to correct for the effect of large statistical revisions of debt levels that took place in such a year;

(1b) The model includes an intervention in 1995 when the debt rose by almost 8 percentage points ³/₄ of which was explained by a stock-flow adjustment;

(1c) The model includes a non-linear term, positive in the cases of Portugal and the US and negative in the UK;

(1d) The model includes a dummy taking value 1 between 1990 and 1992, the coefficient of which is negative and significant at 1% (-0.15) in Finland and at 5% (-0.05) in Sweden;

(2) The dummy takes value 1 between 1993 and 2000;

Standard errors are shown below the parameter estimate:

*** significant at 1%, ** significant at 5%, * significant at 10%.

Source: European Commission for EU15 and OECD for US and Japan.

If the whole period is considered (see column 'DEBT' in Table 2.6) there is no country for which a negative and statistically significant reaction to debt has been estimated. Moreover, in some euro area countries such as Belgium, Greece, Spain, Ireland, the Netherlands and Austria, the reaction of the primary balance to the stock of debt was increased either after 1993, thus linked to the adoption of the Maastricht Treaty and the convergence criteria, or after 1996, thus in the aftermath of the formal launching of the

and/or the reduction of the growth dividend. In the case of Germany the intervention takes place in 1995, when the new Erblastentilgungsfonds (administered by the federal level) took over the debt from the Treuhandanstalt, which privatized the assets of the former East-Germany and accumulated debt in order to make the companies fit for privatization (or cover the social payments if companies were liquidated). The new fund also took over a debt stock of about 7% of GDP. While they do not have a significant impact on the estimates of debt reaction, the inclusion of such interventions improves the adjustment and the specification tests.

euro at the end of 1995. As a result, a non-significant reaction in Greece and Austria became significant during the nineties, thus fulfilling the sustainability condition (2.6). In the case of Spain, a relatively weak response became much stronger after 1996. In France, the positive and relatively large response of the primary balance to debt was halved after 1993, but still leaving it to a size comparable to that estimated for other countries (around 0.05). In Japan, the change in fiscal policy that occurred after the crisis of the early nineties has totally offset the secular positive reaction of the primary surplus to debt.

Interestingly, in a number of countries, namely Germany, Greece, France and Italy, there is some evidence of a sort of EMU fatigue, which has lowered the reaction of the primary surplus to debt during the 2000s. The reduction appears sizeable in Germany, as well as in France, where it added to that taking place after 1993. The reduction has also been important in Greece, where the positive reaction of 0.03 that prevailed during the nineties left way to the behaviour already observed in the seventies and the eighties.

All in all, after controlling for breaks in the baseline model (Table 2.3), Table 2.6 confirms that the fulfilment of the sustainability condition given by (2.6) has been general across the sample.¹⁰ Greece and Finland seem to be the only outstanding exceptions. However, in the latter case, one should bear in mind that the events of the period 1990-1992, when the effects of the fall of the former USSR and the 1992 crisis overlapped prompting a dramatic increase of debt levels (see Section 2.3), made the estimation of reaction function for this country very difficult. In addition, the primary surplus has started to fall only recently while its debt has been on a downward path since 1993, which does not point precisely to an unsustainable fiscal behaviour. On the other hand, we should not forget that our requirement for sustainability is a sufficient but not a necessary condition.

2.5 A Closer Look at the Response of Primary Surplus to Debt

The analysis in Section 2.4 provides robust evidence supporting the conclusion that most EU countries can be characterized as having a positive response of the primary surplus to debt accumulation over the full sample period. It also allows to identify some significant shifts in the response of some countries as the economic and monetary integration process in Europe has evolved, indicating the existence of some degree of time variation in that response.

However, the analysis of last section does not allow tracing with some precision that degree of time variation. This is so because it cannot provide relatively precise estimates of the value of the response in small sub-samples, due to the lack of degrees of freedom. It provides estimates of the average response for the overall sample period, which is then *permanently* corrected with *ad hoc* dummy effects after specific sample events. But it does not provide a systematic updating mechanism to obtain explicit probability distributions of the primary surplus response to debt for different (small) sub-sample periods. Explicit characterization of these distributions would be helpful for a systematic investigation of the statistical evolution of time variation over the sample.

¹⁰ Implicit in our analysis is the assumption that debt and primary surplus have the same order of integration. Appendix 2.B reports unit root test results which fail to display unambiguous statistical evidence in this sense. However, our sample size is too small for this matter and we take this as inconclusive evidence.

This section gives a step in this direction by specifying and estimating a Bayesian version of our basic model (2.10), which avoids *ad hoc* permanent corrections of the response to debt accumulation. A Bayesian updating scheme is a sensible approach in our small sample setting, where low degrees of freedom and difficulties to apply asymptotic results or to establish long run statistical properties of time series make questionable the application of classical econometric methods.

Model (2.10) has a vector autoregressive form with government debt and output gap as exogenous variables. This allows a straight application of the Bayesian Vector Autoregressive (BVAR) methodology.¹¹ BVAR models are well designed to handle the trade-off between over and under parameterization in contexts of limited size samples, providing an objective scheme for the updating of prior estimates.

The specification of prior beliefs is in fact the critical point once we move to a Bayesian framework. With long samples, the prior effect on posterior estimates is negligible because sample information ends up shaping the final results. However, with small samples, the prior might be the determinant factor (arguably leading to *ad hoc* final results when prior information is *ad hoc*). This would be the case if the specified prior is so tight (very small variance) that final results are unaffected by sample observations. On the other extreme, a too loose (large variance) prior could lead to very volatile posterior estimates, largely affected by new sample observations, as it is the typical case in a context of scarce degrees of freedom. Ideally we want a not too loose/not too tight prior. A prior that deals with the degrees of freedom problem, but is at the same time sensitive to new sample observations that call for its modification. This is one of the underlying principles in BVAR models. A second principle is that the prior odds are tilted towards own lags, which have a higher prior variance.

With these principles in mind our prior specification treats the parameter vector in (2.10), $\beta = (\rho, \delta, \gamma, c)$, as a multivariate normal with independent components and the following mean vector and covariance matrix:

$$\bar{\beta} = \begin{pmatrix} \hat{\rho} \\ \hat{\delta} \\ 0 \\ 0 \end{pmatrix}; \quad \text{cov}(\beta) = \text{diag}[0.5\hat{\sigma}_\varepsilon \quad 0.01(0.5\hat{\sigma}_\varepsilon) \quad 0.01(0.5\hat{\sigma}_\varepsilon) \quad 40(0.5\hat{\sigma}_\varepsilon)] \quad (2.11)$$

where $\hat{\rho}$ and $\hat{\delta}$ are the least square estimates in Table 2.6 and $\hat{\sigma}_\varepsilon$ is the least square estimate of the error term variance in an autoregressive regression of the primary surplus with one lag, a scaling factor helpful to control for the units of measurement of variables.

In line with BVAR models, the covariance in (2.11) gives more weight to the own lag coefficient (50% of the error term variance) than to the coefficients of other variables (1% of the own lag coefficient variance), and specifies a flat prior for the constant term. As for the prior mean vector, a common practice in the BVAR literature is to specify a prior mean equal to one for the own first lag and equal to zero for the rest of the coefficients in the equation. The vector in (2.11) incorporates a slight deviation from this practice by taking as useful prior information the estimates in Table 2.6 for the inertia component and, our focus of attention, the reaction to debt accumulation.

¹¹ For a description of the methodology see e.g. Doan *et al.* (1986) and Ballabriga (1997).

Our objective is to compare the posterior distribution of the primary surplus response to debt across different sub-samples. To that end, we combine according to the Bayes rule the prior information in (2.11) with each of the following three sub-sample periods: 1977-1991, 1992-1999, 2000-2005. Doing this, we can assess the extent to which the information in each of these sub-periods is compatible with the estimates for the overall sample response in Table 2.6. The resulting posterior densities are reported in Table 2.7, with the corresponding graphical representation in Figure 2.2.

Table 2.7 Posterior Distributions for δ

	1977-1991		1992-1999		2000-2005	
	Mean	Standard Deviation	Mean	Standard Deviation	Mean	Standard Deviation
Belgium	0,05	0,022	0,02	0,019	0,04	0,027
Germany	0,07	0,043	0,04	0,023	0,02	0,010
Greece	-0,02	0,035	0,07	0,049	0,00	0,032
Spain	0,04	0,025	0,04	0,043	0,02	0,015
France	0,07	0,028	0,07	0,032	0,04	0,042
Italy	0,04	0,020	0,03	0,032	0,02	0,014
Ireland	0,06	0,027	0,00	0,020	0,10	0,041
Netherlands	0,04	0,020	0,01	0,033	0,05	0,057
Austria	0,03	0,018	0,01	0,040	0,02	0,044
Portugal	0,15	0,058	0,11	0,008	0,10	0,070
Finland	0,05	0,105	0,06	0,046	0,11	0,031
Denmark	0,08	0,038	0,01	0,015	0,05	0,075
Sweden	0,10	0,051	0,10	0,097	0,09	0,056
UK	0,05	0,039	0,16	0,053	0,10	0,029
US	0,01	0,026	0,03	0,016	0,03	0,045
Japan	0,05	0,017	-0,02	0,028	-0,02	0,030

A general feature of the information in Table 2.7 is that it conveys evidence of time variation in the response to debt accumulation in most countries. More specifically, we detect a rather clear shift across sub-periods of the posterior distribution in the cases of Belgium, Germany, Greece, France, Ireland, Netherlands, Finland, Denmark, UK and Japan. The rest of the countries in the panel seem to display more stability. On the other hand, in most euro area countries the shift in the posterior may be associated with the economic and monetary integration effects modelled as dummy effects in Table 2.6. Only in the cases of Spain and Austria the integration effects identified in Table 2.6 are not visible in Table 2.7.

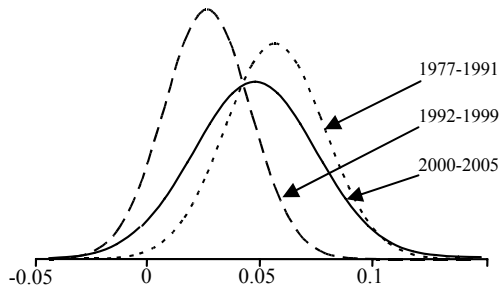
Looking at particular countries, some interesting features are noteworthy. First, the results for Germany and France nicely reflect the progressive deterioration of fiscal discipline across sub-periods, especially in the case of Germany. Second, the posterior is centred on a non-positive mean in the cases of Greece (except in 1992-99) and Japan (except in 1977-91). Third, Finland now displays a progressive and significant improvement in terms of the sustainability of its fiscal policy. The difficulties visible during the period 1977-91 are overcome in the following two sub-periods, ending with a current sound fiscal position. This is in sharp contrast with the overall conclusion in Table 2.6.

Overall, Table 2.7 conveys a similar qualitative message of Table 2.6: the response of the primary surplus to accumulated debt has been generally positive across countries and sub-sample periods, except in Greece and Japan. This result reinforces the robustness of the

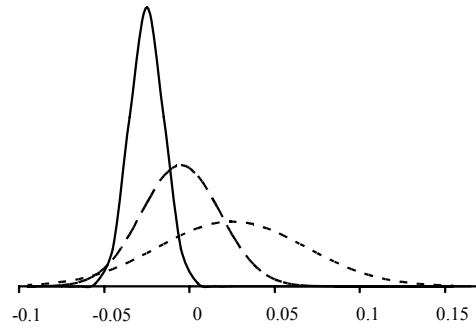
conclusion that fiscal policy has been sustainable in EU15 countries during the last 30 years.

Figure 2.2 *Posterior Density Functions for the Response of the Primary Surplus to Debt Accumulation*

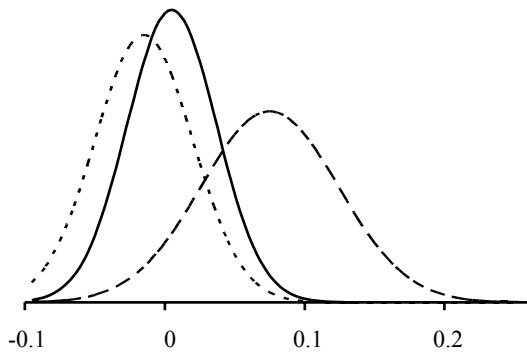
Belgium



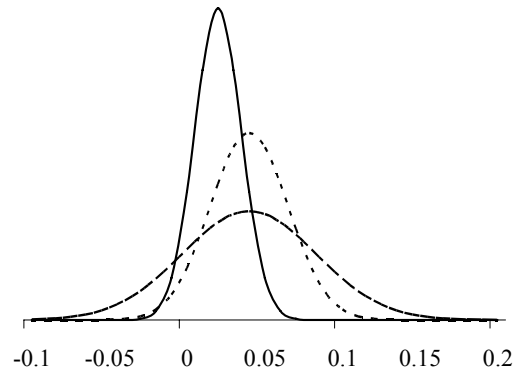
Germany



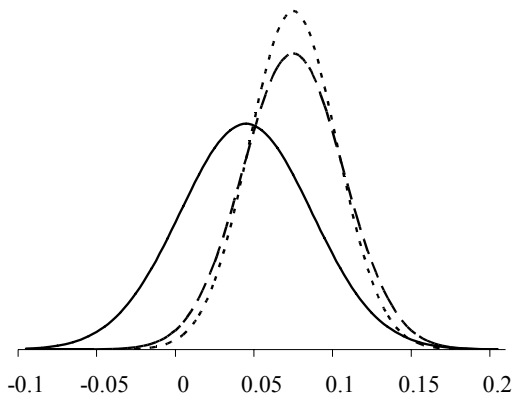
Greece



Spain



France



Italy

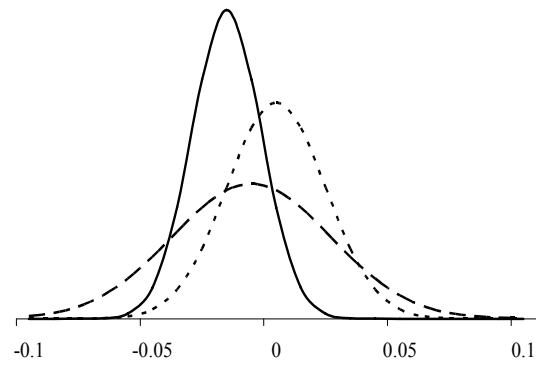
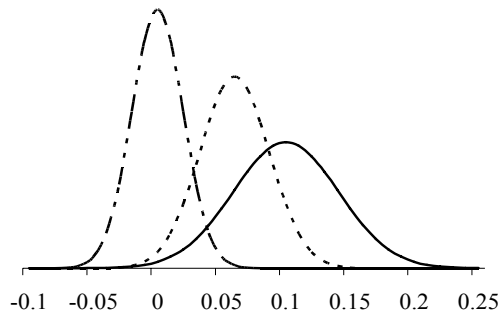
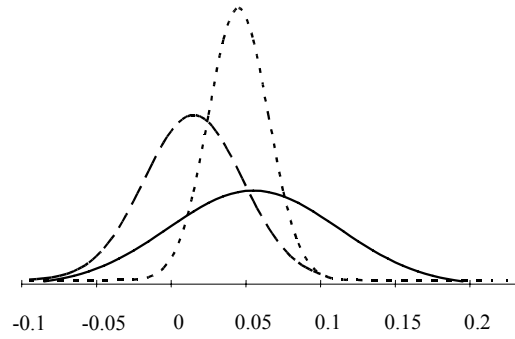


Figure 2.2 (continued)

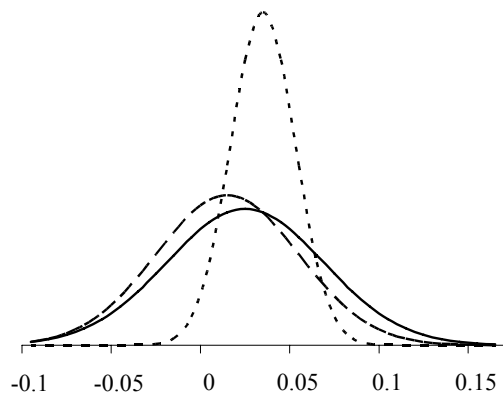
Ireland



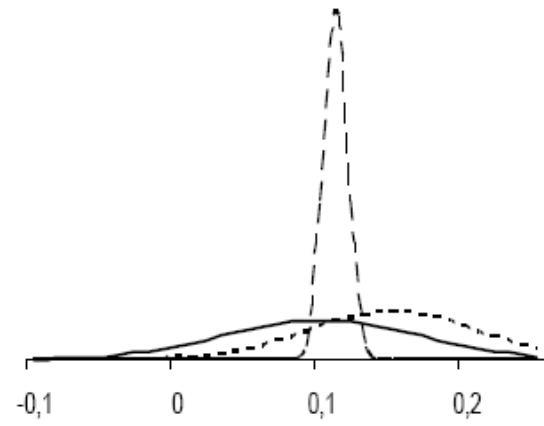
Netherlands



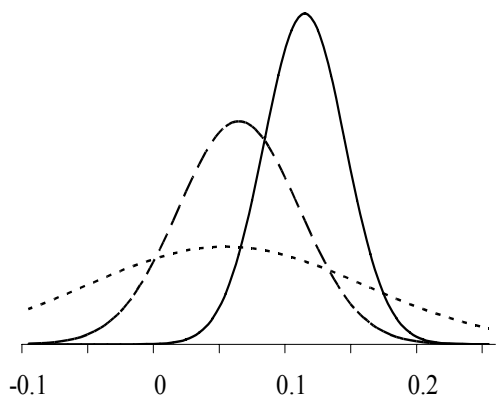
Austria



Portugal



Finland



Denmark

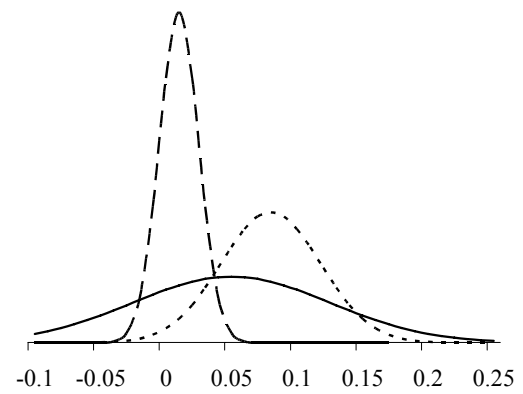
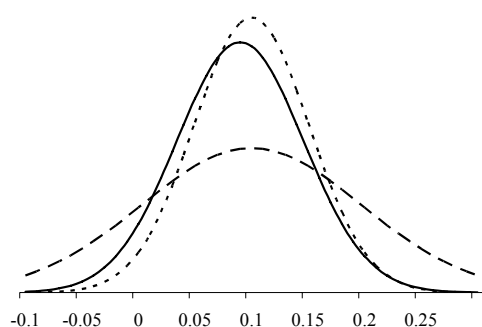
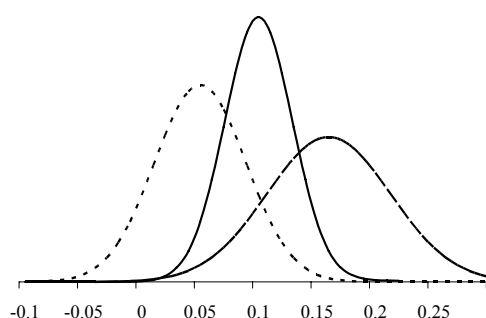


Figure 2.2 (continued)

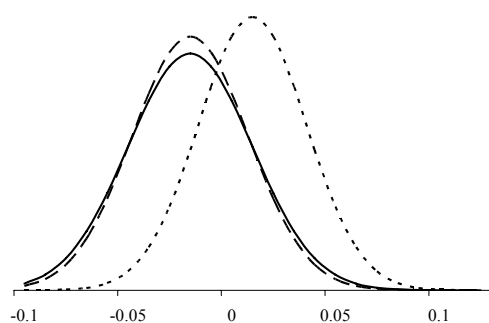
Sweden



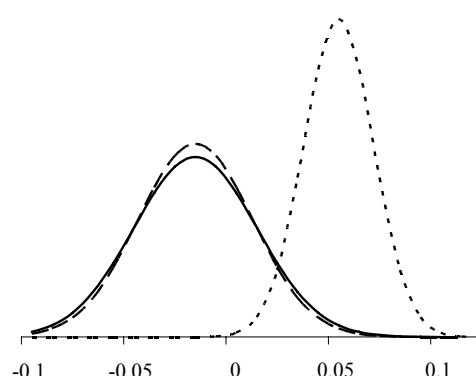
United Kingdom



United States



Japan



2.6 Conclusion

This chapter analyses the sustainability of EU15 public finances in line with the recent literature on fiscal reaction functions. According to this approach a positive response of the primary surplus to debt accumulation is *sufficient* for sustainability in a wide range of dynamic stochastic general equilibrium models, thus providing a rather general condition for testing the sustainability of fiscal policy.

Our baseline fiscal reaction function specification assumes that the primary surplus responds to debt accumulation and to the output gap, and also incorporates the lagged surplus to capture fiscal inertia. The estimation of this baseline model for the sample period 1977-2005 suggests that a positive response to debt accumulation is quite widespread, thus indicating that fiscal policy is sustainable in most countries.

A main concern of the chapter is the robustness of this result. Therefore, we consider several alternatives to our baseline in order to investigate the potential existence of simultaneity bias, the effect of including and excluding different explanatory variables, and the effect of specifying a non-linear fiscal reaction function. The qualitative baseline result is robust to these changes. We also explore the existence of structural breaks in the

response to debt through the inclusion of *ad hoc* dummy effects associated with specific events along the process of economic and monetary integration in the European Union. This analysis does not change the qualitative baseline result, but reveals the existence of a Maastricht/euro-launching positive correction in the response to debt in many countries, and the existence of a “Maastricht fatigue” in some of them, indicating time variation in the response of governments to debt accumulation.

Another main concern of this chapter is to provide an alternative to *ad hoc* dummies in order to investigate this time variation in the response to debt accumulation from a more systematic perspective. In this respect, we argue that a Bayesian approach provides a sensible endogenous updating scheme in our small sample context, and we estimate a Bayesian version of the baseline model for three different sub-samples: 1977-1991, 1992-1999, 2000-2005. We find that the posterior distribution has tended to shift across sub-samples in most countries, which supports the hypothesis of a time varying response to debt. The comparison of posteriors provides an explicit characterization of this time variation, and indicates that a positive posterior mean for the response to debt accumulation is pervasive. This enhances the robustness of our results.

From a policy perspective, we see two messages from our analysis. First, if sustainability is the issue, there is no clear reason for concern. The evidence for last 30 years suggests that, with the exception of Greece, EU15 governments have tended to apply a fluctuating but generally positive primary surplus adjustment in response to debt accumulation. This is sufficient to guarantee the sustainability of fiscal policy.¹² Second, the posterior distribution from our Bayesian analysis provides a sensible, easy-to-update indicator for the evolution of the sustainability position of countries. A country with a posterior centred on a non-positive response for a given number of periods could be called for a fiscal correction on sustainability grounds.

Finally, a comment on follow-up research. A natural direction for further work in the issue of sustainability is to try to specify and estimate a model with time varying coefficients. This may require longer samples. A successful attempt though would generate time series for the response of the primary surplus to debt accumulation, thus providing the raw material that would allow moving from the objective of testing sustainability, the focus of this chapter, to the objective of identifying its potential determinants.

¹² Although the size of response is also relevant in order to exclude explosive debt-to-GDP ratios.

Appendix 2.A Complementary Tables

Table 2.8 Government Balances, Interest Payments and Primary Surpluses*, 1977-2005

Government balances (net lending in % of GDP)*									
	1977	77-93**	1993	93-96**	1996	96-99**	1999	99-05**	2005
Belgium	-5,6	-7,8	-7,0	-4,8	-3,8	-1,8	-0,5	0,0	-0,1
Germany	-2,4	-2,3	-3,4	-3,1	-3,3	-2,4	-1,5	-2,5	-3,3
Greece	-2,5	-8,9	-13,6	-10,3	-7,4	-5,4	-3,5	-4,9	-4,4
Spain	-0,6	-3,8	-6,6	-6,1	-4,9	-3,0	-1,2	-0,3	1,1
France	-0,8	-2,1	-5,6	-5,0	-4,1	-2,8	-1,7	-2,7	-2,9
Italy	-6,9	-10,0	-9,1	-8,1	-6,9	-3,7	-1,7	-2,8	-4,3
Ireland	-6,9	-7,3	-2,3	-1,5	-0,1	1,5	2,4	1,4	1,0
Netherl.	-0,8	-4,0	-3,0	-3,0	-1,7	-0,7	0,6	-0,7	-0,3
Austria	-2,2	-2,7	-4,1	-4,4	-4,0	-2,6	-2,3	-1,3	-1,6
Portugal	-3,8	-6,0	-5,6	-5,3	-4,5	-3,4	-2,7	-3,6	-6,0
Finland	5,4	1,9	-7,8	-5,6	-3,5	-0,4	1,6	3,5	2,4
Denmark	-0,6	-2,0	-2,8	-2,1	-1,1	0,6	2,2	2,4	4,7
Sweden	1,6	-2,0	-11,4	-7,7	-2,8	0,1	2,3	1,9	2,7
UK	-3,2	-2,9	-7,7	-6,0	-4,2	-1,3	1,1	-0,9	-3,5
US	-2,1	-3,9	-4,9	-3,5	-2,2	-0,4	0,9	-2,1	-4,1
Japan	-2,8	-1,1	-2,4	-4,0	-5,1	-5,4	-7,2	-6,9	-6,1
Interest expenditure (% of GDP)									
	1977	77-93***	1993	93-96***	1996	96-99***	1999	99-05***	2005
Belgium	3,8	8,4	10,3	9,3	8,5	7,6	6,9	5,8	4,5
Germany	1,7	2,6	3,1	3,4	3,5	3,3	3,1	3,0	2,8
Greece	1,2	5,6	12,6	12,8	12,0	10,1	8,4	6,5	4,8
Spain	0,3	2,2	4,9	5,0	5,2	4,4	3,5	2,7	1,8
France	1,1	2,3	3,3	3,5	3,6	3,3	3,0	2,9	2,7
Italy	4,3	7,6	11,7	11,1	11,3	8,9	6,7	5,7	4,7
Ireland	4,9	7,2	6,2	5,3	4,5	3,5	2,4	1,5	1,2
Netherl.	2,9	5,0	5,8	5,5	5,3	4,8	4,3	3,1	2,4
Austria	1,8	3,2	4,2	4,1	3,9	3,7	3,5	3,3	2,9
Portugal	1,4	5,3	5,7	5,6	5,1	3,9	3,0	2,9	2,7
Finland	0,8	1,6	4,5	4,7	4,2	3,7	3,0	2,3	1,6
Denmark	1,7	6,2	7,2	6,4	5,7	4,8	4,1	3,1	2,1
Sweden	2,4	5,3	5,8	6,3	6,5	5,7	4,7	3,0	1,9
UK	4,3	4,1	2,8	3,3	3,7	3,5	2,9	2,3	2,2
US	1,6	2,7	3,4	3,4	3,4	3,1	2,7	2,1	1,8
Japan	0,5	1,5	1,2	1,3	1,3	1,4	1,5	1,5	1,6
Primary surpluses*									
	1977	77-93****	1993	93-96****	1996	96-99****	1999	99-05****	2005
Belgium	-1,7	0,7	3,4	4,5	4,7	5,8	6,4	5,8	4,5
Germany	-0,7	0,3	-0,2	0,2	0,2	0,9	1,7	0,5	-0,5
Greece	-1,3	-3,3	-1,0	2,5	4,6	4,6	4,9	1,6	0,5
Spain	-0,1	-1,5	-1,7	-1,1	0,4	1,4	2,3	2,4	2,9
France	0,3	0,2	-2,3	-1,5	-0,4	0,5	1,2	0,2	-0,2
Italy	-2,6	-2,3	2,5	3,0	4,3	5,2	4,9	2,8	0,4
Ireland	-2,0	-0,1	3,9	3,8	4,4	5,0	4,8	2,9	2,2
Netherl.	2,1	1,0	2,8	2,5	3,6	4,1	4,9	2,4	2,2
Austria	-0,5	0,5	0,1	-0,4	-0,1	1,1	1,2	2,0	1,2
Portugal	-2,4	-0,8	0,1	0,4	0,6	0,4	0,3	-0,7	-3,3
Finland	6,1	3,5	-3,3	-0,9	0,6	3,3	4,6	5,8	4,1
Denmark	1,2	4,2	4,4	4,3	4,6	5,5	6,3	5,4	6,8
Sweden	4,0	3,3	-5,6	-1,5	3,7	5,8	7,0	5,0	4,6
UK	1,1	1,2	-4,9	-2,7	-0,5	2,1	4,1	1,5	-1,3
US	-0,6	-1,2	-1,5	0,0	1,2	2,7	3,6	0,0	-2,3
Japan	-2,3	0,4	-1,2	-2,7	-3,7	-4,0	-5,8	-5,5	-4,4

Notes: * A minus sign represents a deficit.

** Averages of the balances recorded during the period including the two extreme years of the time interval.

*** Averages of the interest expenditure recorded during the period including the two extreme years of the time interval.

**** Averages of the balances recorded during the period including the two extreme years of the time interval.

Source: European Commission for EU15 and OECD for US and Japan.

Table 2.9 Implicit Interest Rates of Gross Government Debt, 1977-2005

	1977	77-93*	1993	93-96*	1996	96-99*	1999	99-05*	2005
Belgium	6,5	8,1	7,9	7,2	6,7	6,3	6,0	5,6	4,8
Germany	6,2	6,7	6,9	6,5	6,0	5,6	5,2	4,8	4,2
Greece	6,1	9,4	11,5	11,7	10,8	9,0	7,5	5,9	4,5
Spain	2,2	5,6	8,7	8,2	7,9	6,8	5,6	5,0	4,2
France	6,0	8,0	7,5	7,0	6,3	5,7	5,1	4,7	4,0
Italy	7,8	9,6	10,2	9,4	9,3	7,6	5,9	5,3	4,4
Ireland	8,3	8,4	6,7	6,4	6,2	5,9	5,0	4,3	4,2
Netherlands	7,7	8,3	7,7	7,6	7,4	7,3	7,1	5,8	4,6
Austria	6,2	6,8	6,9	6,3	5,8	5,6	5,3	5,0	4,5
Portugal	4,5	9,7	9,9	9,4	8,5	7,0	5,9	5,2	4,2
Finland	9,8	9,2	8,0	8,3	7,4	7,2	6,5	5,2	4,1
Denmark	12,5	11,5	9,3	9,0	8,2	7,6	7,1	6,5	6,0
Sweden	9,0	10,4	8,2	8,7	8,9	8,3	7,5	5,6	3,9
UK	7,1	8,3	5,9	6,5	7,0	7,1	6,5	5,7	5,0
US	3,4	4,6	4,5	4,6	4,6	4,5	4,2	3,5	2,7
Japan	1,4	2,2	1,6	1,5	1,4	1,3	1,2	1,0	1,0

Note: * Averages of the ratio of the interest expenditure to debt recorded during the period including the two extreme years of the time interval.

Source: European Commission for EU15 and OECD for US and Japan.

Table 2.10 Debt Accounting, 1994-1996, 1997-1999 and 2000-2005

	Debt (1)	Deficit (2)	Interest burden (3)	Primary balance (4)	Nominal GDP growth (5)	Inflation (6)	Real GDP growth (7)	Stock- flow adjustment (8)
1994-1996								
Belgium	-1,19	4,08	8,89	-4,81	-4,44	-1,65	-2,79	-0,83
Germany	4,20	3,04	3,44	-0,40	-1,60	-0,74	-0,86	2,76
Greece	0,40	9,26	12,89	-3,63	-11,49	-9,39	-2,10	2,63
Spain	3,27	5,91	5,01	0,90	-3,73	-2,33	-1,40	1,08
France	4,63	4,80	3,57	1,23	-1,48	-0,68	-0,80	1,31
Italy	1,89	7,74	10,93	-3,20	-7,29	-5,19	-2,10	1,45
Ireland	-6,73	1,24	4,98	-3,75	-8,02	-1,89	-6,13	0,05
Netherlands	-0,88	2,97	5,41	-2,44	-3,49	-1,34	-2,15	-0,35
Austria	2,42	4,57	0,00	0,54	-2,60	-1,14	-1,46	0,45
Portugal	0,60	5,14	5,58	-0,44	-4,13	-2,48	-1,65	-0,41
Finland	0,21	4,84	4,76	0,09	-3,09	-1,09	-2,00	-1,54
Denmark	-2,62	1,93	6,20	-4,27	-3,79	-1,14	-2,65	-0,76
Sweden	0,78	6,49	6,43	0,06	-3,75	-1,69	-2,06	-1,96
UK	1,56	5,43	3,41	2,02	-2,79	-1,25	-1,54	-1,08
US	-0,65	2,96	3,44	-0,48	-1,86	0,66	-2,51	-1,76
Japan	6,34	4,51	1,28	3,23	-1,02	0,48	-1,50	2,85
1997-1999								
Belgium	-4,45	1,12	7,31	-6,19	-4,78	-1,52	-3,26	-0,79
Germany	0,58	2,09	3,29	-1,20	-1,37	-0,24	-1,13	-0,15
Greece	0,33	4,78	9,43	-4,65	-8,95	-5,35	-3,60	4,50
Spain	-1,72	2,41	4,10	-1,69	-4,23	-1,58	-2,65	0,10
France	0,22	2,45	3,24	-0,79	-2,04	-0,37	-1,67	-0,19
Italy	-2,29	2,55	8,08	-5,52	-4,48	-2,49	-1,99	-0,37
Ireland	-8,10	-2,03	3,19	-5,23	-8,47	-2,83	-5,64	2,40
Netherlands	-3,88	0,39	4,64	-4,25	-4,14	-1,41	-2,73	-0,13
Austria	-0,38	2,18	0,00	-1,44	-2,02	-0,20	-1,82	-0,54
Portugal	-2,86	3,05	3,45	-0,40	-4,19	-1,96	-2,23	-1,72
Finland	-3,58	-0,69	3,56	-4,25	-3,66	-1,15	-2,51	0,77
Denmark	-3,93	-1,19	4,54	-5,74	-2,69	-1,04	-1,65	-0,04
Sweden	-3,60	-1,07	5,39	-6,47	-3,10	-0,77	-2,33	0,58
UK	-2,44	0,34	3,38	-3,04	-2,77	-1,28	-1,49	-0,01
US	-3,12	-0,16	3,02	-3,19	-1,81	1,23	-3,04	-1,14
Japan	10,59	5,52	1,40	4,11	0,61	0,36	0,26	4,46
2000-2005								
Belgium	-3,38	-0,08	5,61	-5,69	-3,83	-1,95	-1,88	0,53
Germany	1,26	2,70	2,96	-0,26	-1,12	-0,42	-0,69	-0,32
Greece	-0,80	5,17	6,16	-0,99	-8,41	-3,90	-4,51	2,44
Spain	-3,07	0,14	2,54	-2,40	-3,87	-2,11	-1,76	0,66
France	1,49	2,84	2,84	0,01	-2,18	-1,08	-1,09	0,82
Italy	-1,23	3,02	5,51	-2,48	-4,05	-2,86	-1,19	-0,20
Ireland	-3,41	-1,27	1,36	-2,63	-3,37	-1,40	-1,96	1,22
Netherlands	-1,26	0,94	2,89	-1,95	-2,32	-1,56	-0,76	0,12
Austria	-0,59	1,16	0,00	-2,08	-2,23	-1,09	-1,14	0,47
Portugal	2,09	3,72	2,85	0,87	-2,21	-1,64	-0,57	0,57
Finland	-0,92	-3,81	2,14	-5,94	-1,80	-0,63	-1,17	4,69
Denmark	-3,59	-2,42	2,88	-5,30	-1,96	-1,16	-0,80	0,79
Sweden	-1,97	-1,87	2,75	-4,62	-2,16	-0,80	-1,36	2,06
UK	-0,23	1,21	2,25	-1,04	-1,92	-0,89	-1,03	0,48
US	0,39	2,59	2,05	0,54	-1,34	0,34	-1,68	-0,86
Japan	5,91	6,90	1,49	5,41	-0,37	2,06	-2,43	-0,61

Notes: (1) Annual average change in the debt-to-DGP ratio (%);

(2) Annual average change in the deficit-to-DGP ratio (%);

(3) Annual average change in interest expenditure (% of GDP);

(4) Annual average change in the primary balance-to-DGP ratio (%) (4)=(2)-(3);

(5) Annual average effect of nominal GDP growth;

(6) Annual average effect of inflation;

(7) Annual average effect of real GDP growth (7) = (5) - (6);

(8) Annual average stock-flow adjustment (8) = (1) - (2) - (5).

Source: European Commission for EU15 and OECD for US and Japan.

Appendix 2.B Unit Root Tests

The comparison of developments in government gross debt over the last ten years (see figures below) reveals that debt growth has been entirely nominal in Belgium, Spain, Ireland, Italy, Netherlands, Finland and Sweden, and has been real in Germany, Greece, France, Austria, Portugal, UK, US and Japan. Both when measured in nominal and real terms, government gross debt appear to behave as integrated series in a majority of countries. As a matter of fact the usual unit root tests are not able to reject the null of unit root for both nominal and real debt.¹³

When debt levels are scaled by GDP a somewhat different picture emerges. After being on a rising path, the debt-to-GDP ratio attained a maximum in most countries around the mid-nineties and has been on a descendent path since them. The clearest exceptions appear to be Germany and France (and Japan). Yet, as shown in Table 2.11, the usual unit root tests, including that by Kwiatkowski *et al.* (1992), where the null hypothesis is mean or trend stationary when the residuals are assumed to be AR(1)¹⁴ fail to present unambiguous statistical evidence against the existence of a unit root in the debt-to-GDP ratios.

Table 2.11 Unit Root Tests for Gross Debt Series in % of GDP, 1977-2005

	η_{μ} (1)	η_{τ} (2)	W-S (3)	ADF (4)	PP (5)
Belgium	0.60	0.37	-1.71	-2.88	-0.86
Germany	1.46	0.10*	-2.04	-2.83	-8.77
Greece	1.44	0.30	-0.63	0.25	0.64
Spain	1.15	0.28	-1.27	-1.44	0.74
France	1.50	0.14*	-1.46	-3.14°	-8.18
Italy	1.28	0.32	-0.67	-1.39	-0.93
Ireland	0.79	0.36	-1.33	-2.81	-2.53
Netherlands	0.44*	0.37	-2.86	-3.18°°	-1.74
Austria	1.36	0.33	-0.25	-0.64	-0.86
Portugal	0.62	0.29	-1.65	-3.74°°	-4.74
Finland	1.15	0.15*	-2.02	-2.21	-5.38
Denmark	0.35*	0.29	-1.08	-2.35	-3.66
Sweden	0.46*	0.19	-2.15	-2.70	-5.91
UK	0.75	0.13*	-2.63	-3.08	-8.44
US	0.83	0.33	-2.18	-2.29	-2.94
Japan	1.32	0.31	-1.32	-3.25	-2.24

Notes: (1) Test of Kwiatkowski *et al.* (null hypothesis mean-stationary): critical value at 5%: 0.46.

(2) Test of Kwiatkowski *et al.* (null hypothesis trend-stationary): critical value at 5%: 0.15.

(3) Weighted-symmetric (null hypothesis unit root).

(4) Augmented Dickey-Fuller (null hypothesis unit root).

(5) Phillips-Perron (null hypothesis unit root).

* The null of mean/trend-stationary can be accepted at 5%.

°° The null unit root can be rejected at 1% (° 5%, ° 10%).

¹³ Results available on request from the authors.

¹⁴ The Barlett window, $1 - s/(l + 1)$, in the test is calculated for $l=1$ (then $s=1$).

Table 2.12 reports unit root test results for the primary surplus scaled by GDP with only marginally more consistent results across alternative tests.

Table 2.12 Unit Root Tests for Gross Primary Surplus Series in % of GDP, 1977-2005

	η_{μ} (1)	η_{τ} (2)	W-S (3)	ADF (4)	PP (5)
Belgium	1.30	0.23	-1.70	-1.20	-4.92
Germany	0.19*	0.14*	-2.48	-2.19	-12.6
Greece	0.77	0.17	-1.74	-1.97	-6.95
Spain	1.03	0.12*	-2.19	-3.94 ^{oo}	-10.1
France	0.08*	0.06*	-3.73 ^{oo}	-3.73 ^{oo}	-10.5
Italy	1.18	0.19	-1.10	-0.71	-3.02
Ireland	0.94	0.28	-1.49	-1.30	-4.60
Netherlands	0.54	0.12*	-3.11 ^{oo}	-3.08	-11.1
Austria	0.64	0.06*	-2.77	-2.47	-12.7
Portugal	0.48	0.28	-1.30	-0.75	-4.76
Finland	0.14*	0.14*	-2.13	-1.92	-8.76
Denmark	0.34*	0.16	-2.47	-2.48	-7.83
Sweden	0.11*	0.08*	-3.56 ^{oo}	-3.22 ^o	9.69
UK	0.11*	0.07*	-3.76 ^{oo}	-3.37 ^{oo}	-9.22
US	0.24*	0.12*	-3.36	-3.22 ^{oo}	-7.07 ^o
Japan	0.70	0.30	-2.02	-2.35	-3.84

Notes: (1) Test of Kwaikowski *et al.* (null hypothesis mean-stationary). Critical value at 5%: 0.46.

(2) Test of Kwaikowski *et al.* (null hypothesis trend-stationary). Critical value at 5%: 0.15.

(3) Weighted-symmetric (null hypothesis unit root).

(4) Augmented Dickey-Fuller (null hypothesis unit root).

(5) Phillips-Perron (null hypothesis unit root).

* The null of mean/trend-stationary can be accepted at 5%.

^{oo} The null unit root can be rejected at 1% (^{oo} 5%, ^o 10%).

Figure 2.3 Gross Debt Development

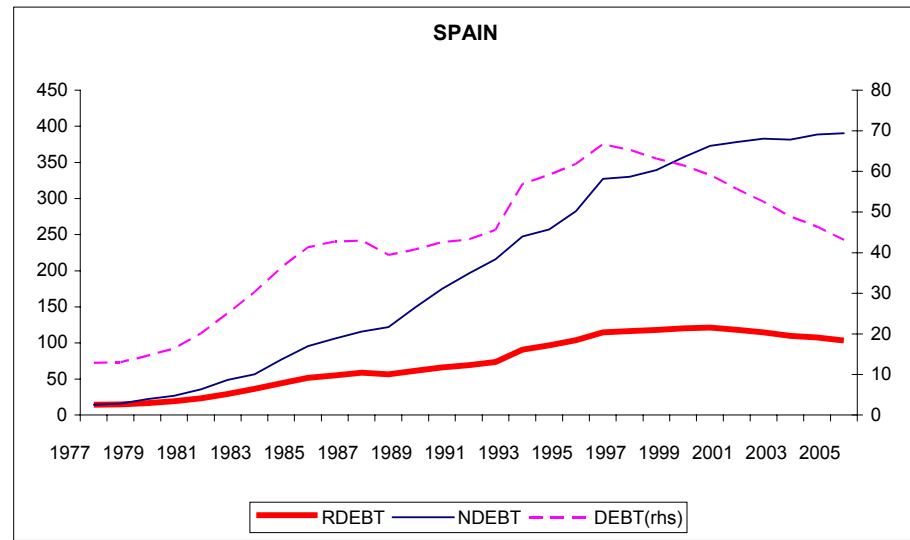
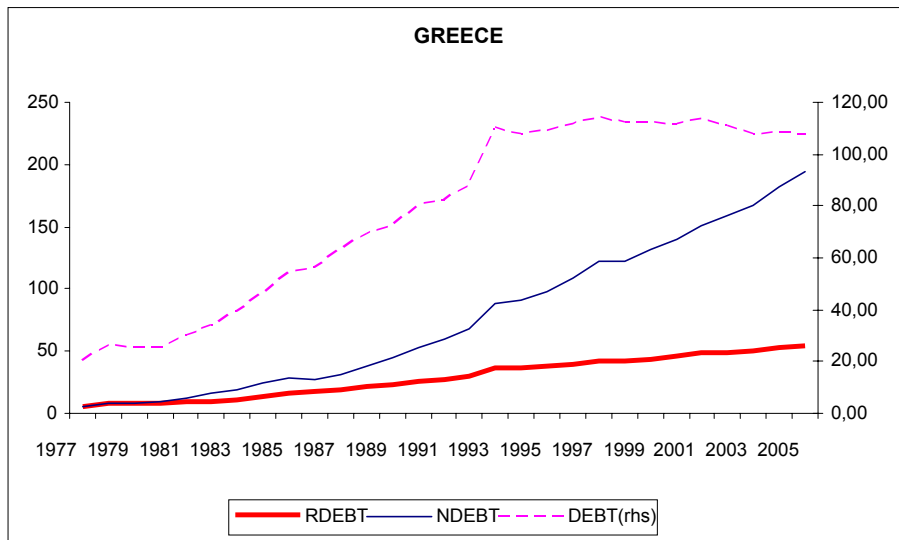
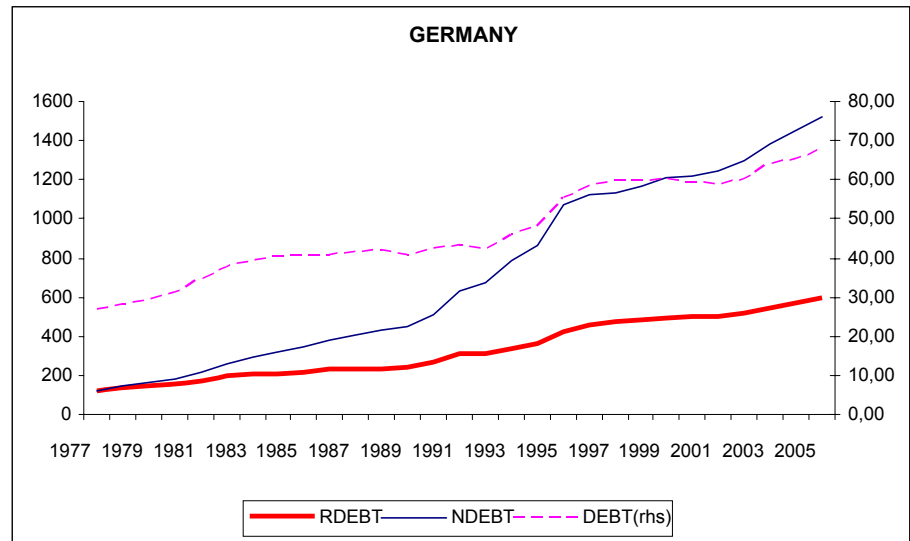
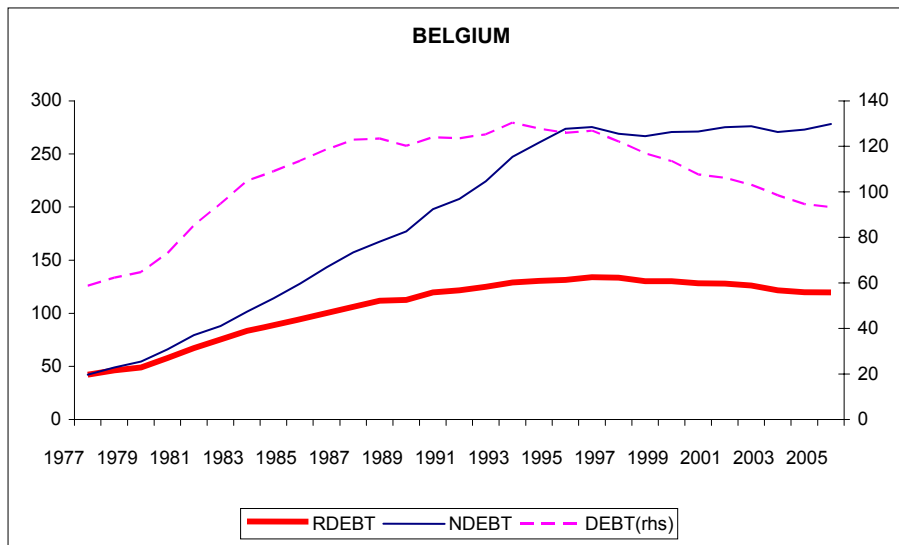


Figure 2.3 (continued)

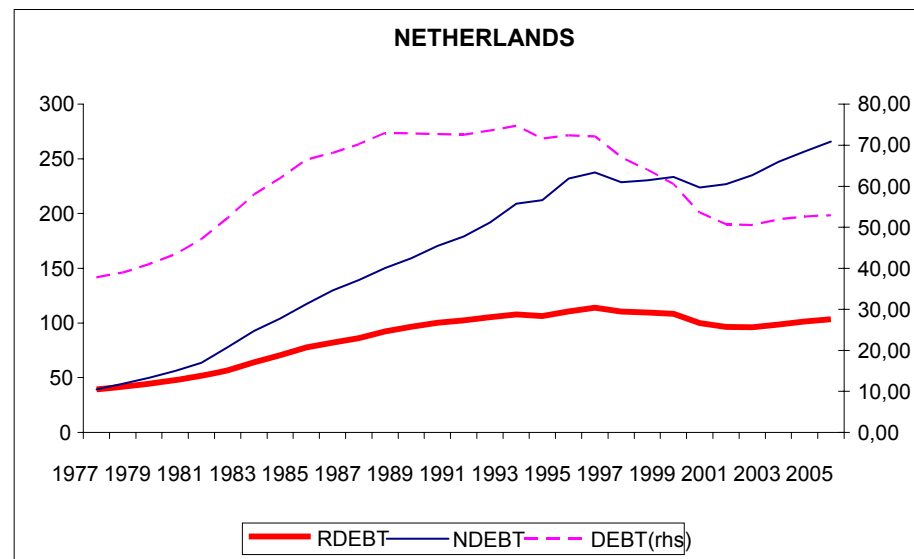
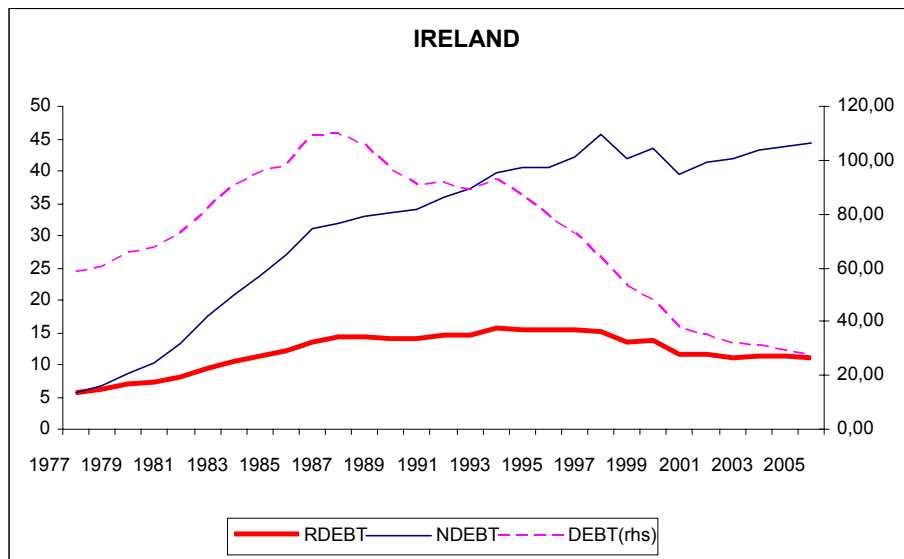
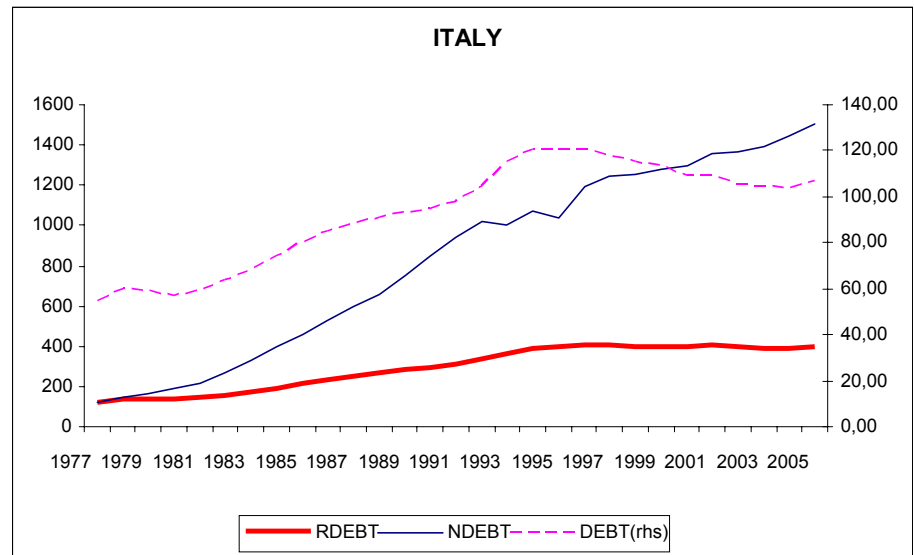
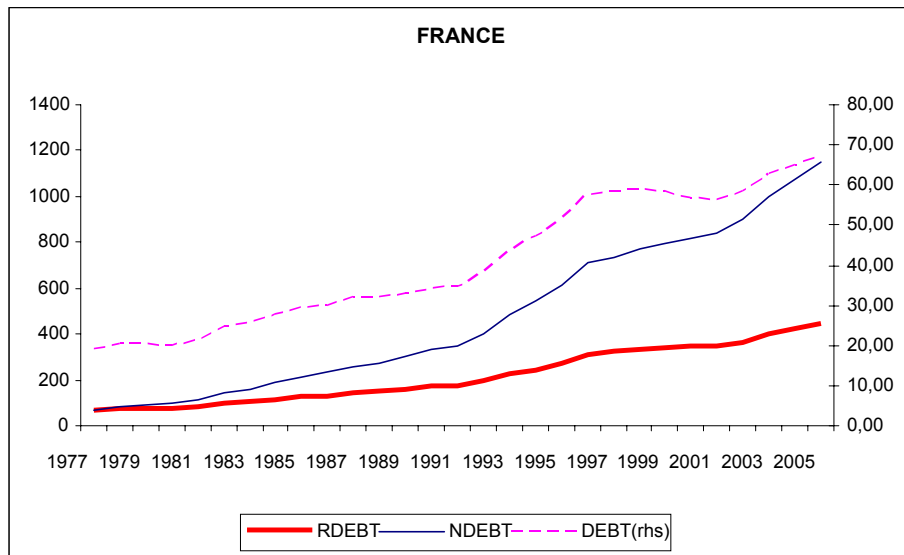


Figure 2.3 (continued)

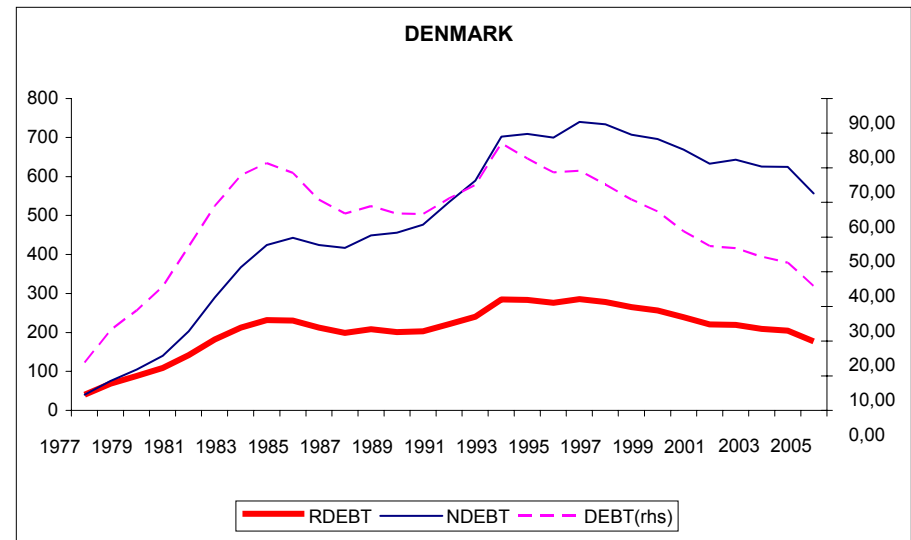
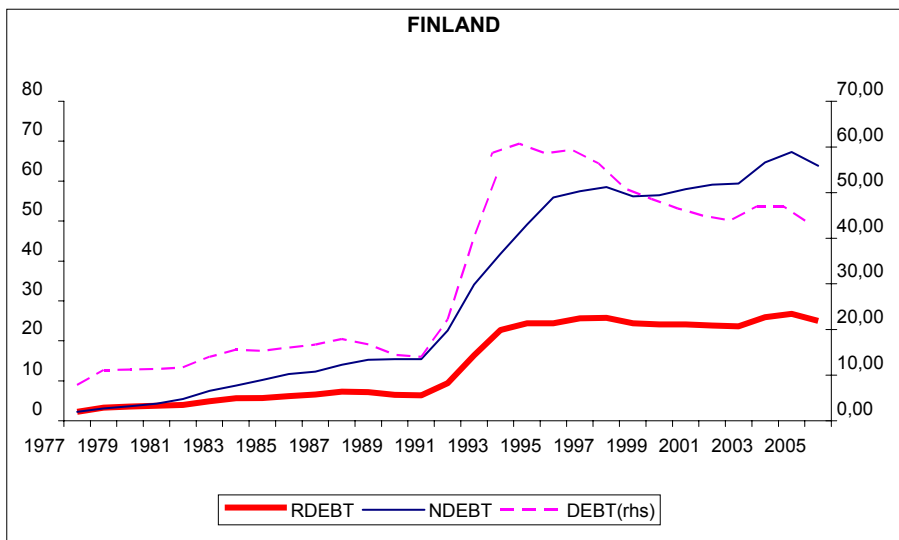
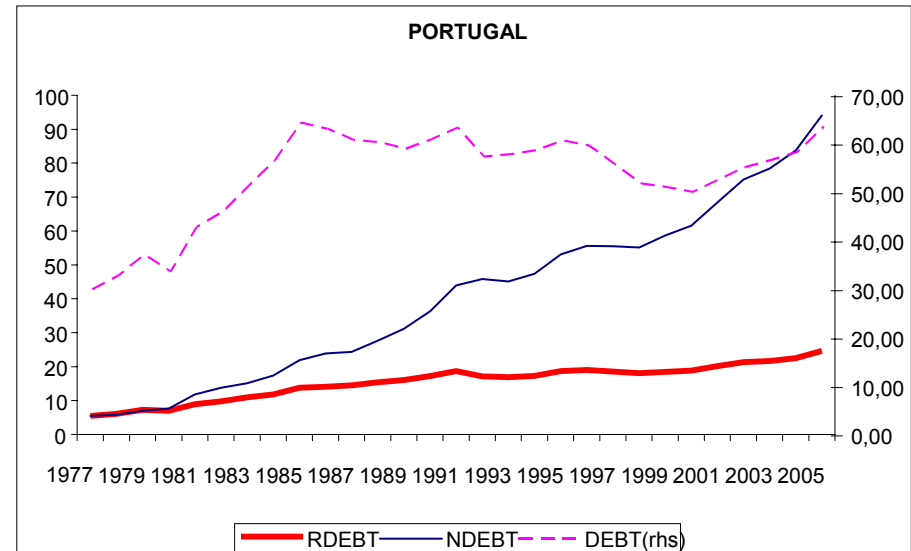
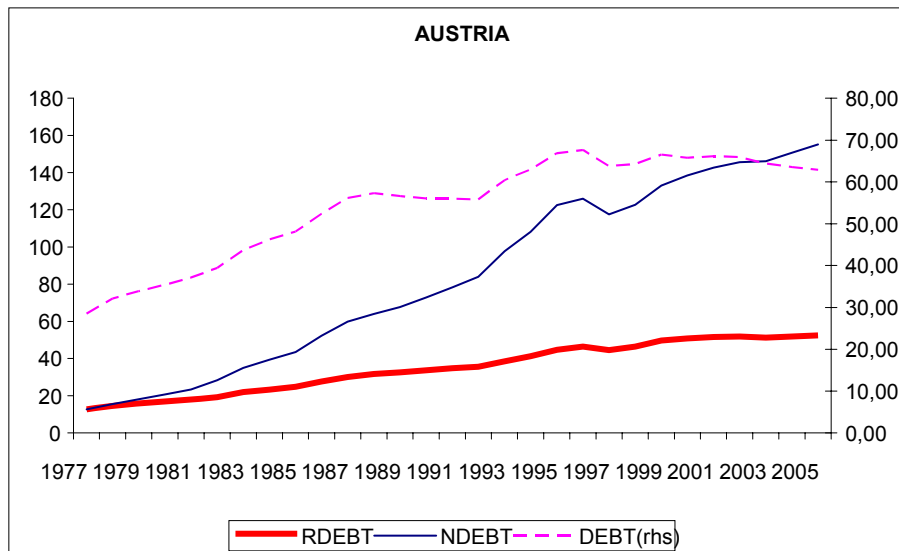
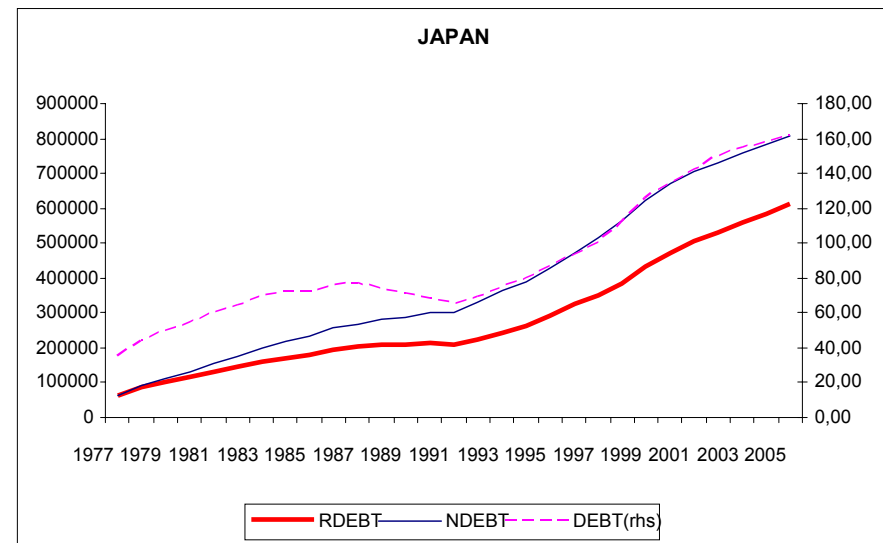
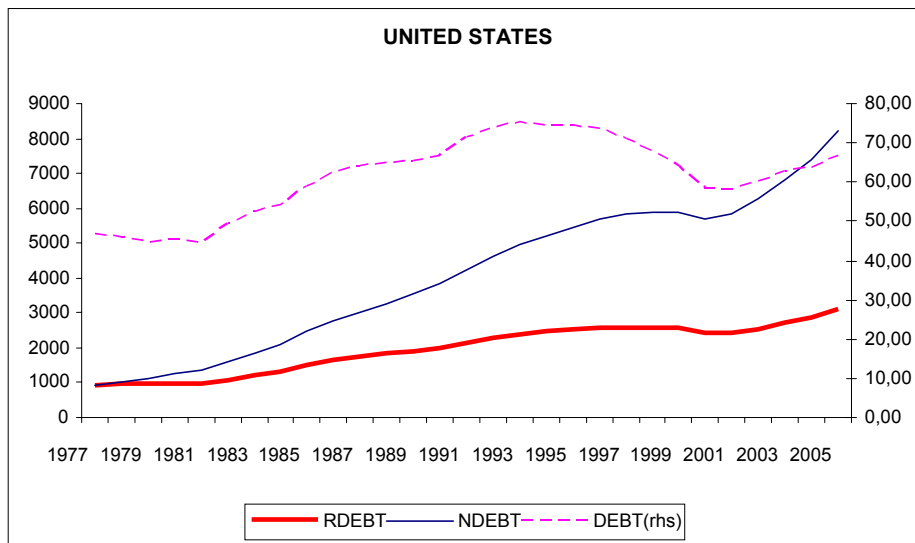
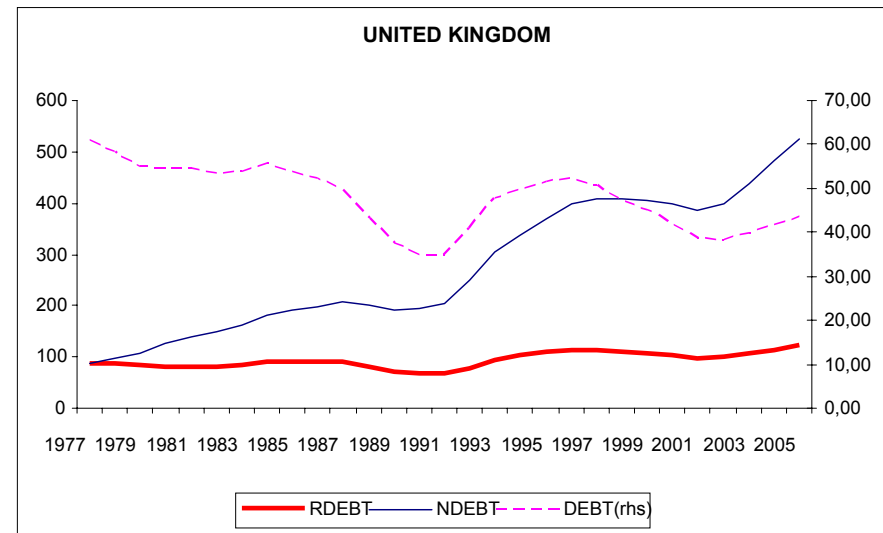
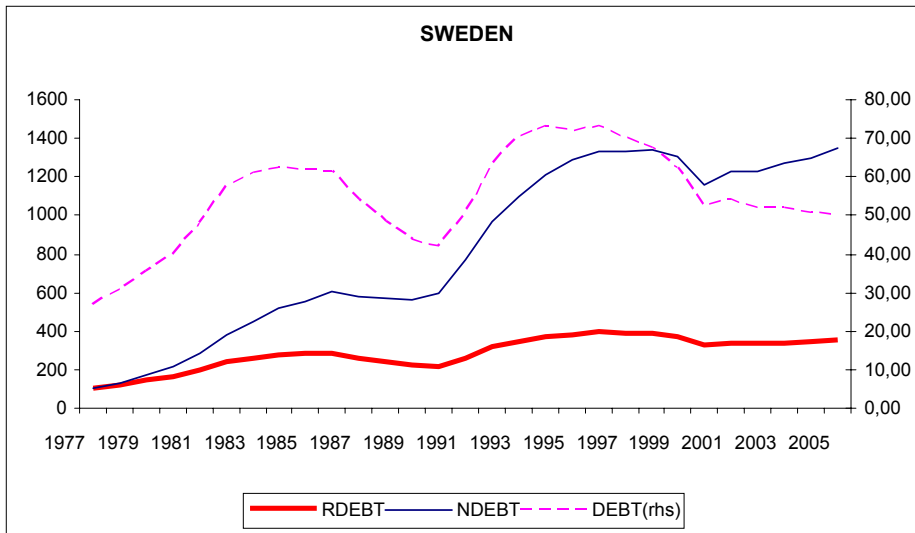


Figure 2.3 (continued)



Discussion

Fabrizio Balassone

Chapter 2 estimates fiscal reaction functions for EU member countries over 1977-2005 to assess the sustainability of fiscal policy. Specifically, the chapter tests the consistency of fiscal policy with solvency as defined by the “no-Ponzi game” condition. The authors find that a necessary condition for solvency — *i.e.* that the primary balance improve in response to an increase in the debt-to-GDP ratio — is met in most countries (the more so after Maastricht). From this they derive strong policy implications. They argue that “if the concern is government solvency [debt ceilings] impose unnecessary constraint on fiscal policy” and “if sustainability is the issue, there is no clear reason for concern [in the EU]”.

The chapter clearly defines the analytical issues. The econometric analysis is accurate. The results appear to be robust. However, some caution is warranted in deriving the policy implications.

The no-Ponzi game condition is a weak requirement. It requires that the debt-to-GDP ratio grows at a rate lower than the difference between the interest rate and the growth rate (McCallum, 1984). It is consistent with an ever growing debt ratio, a situation that most analysts would not regard as sustainable.

Moreover, while the chapter finds that the response of the primary balance to the debt ratio was positive in most EU countries over 1977-2005, this does not allow a straightforward extrapolation of this behaviour in the future. A growing debt ratio calls for a growing primary surplus, but what is the maximum sustainable primary surplus? Whether a given fiscal policy is or is not sustainable ultimately depends on its effects on macro parameters such as the rate of interest and the rate of growth. “[T]he issue [...] is how interest service will affect the economy” (Musgrave and Musgrave, 1984, p. 689), and “the problem of the debt burden is a problem of an expanding national income...” (Domar, 1944, p. 166).

Policy implications aside, the reading of econometric results in the chapter would benefit from further discussion of some issues. For instance, those concerning the “power” of the tests conducted in the chapter, and the role of the cyclicity of fiscal policy in determining debt dynamics.

The solvency test conducted in the chapter cannot identify policies that are inconsistent with solvency. A positive response of the primary balance to the debt ratio is a sufficient condition for solvency, but it is not necessary. A policy characterised by a negligible or even negative response of the primary balance to the debt ratio could still be consistent with solvency (and sustainability). This may explain, for instance, why a country like Finland, whose debt-to-GDP ratio has never exceeded 57 percent over the sample period fails to pass the solvency test in Section 2.4.

The estimated fiscal reaction functions indicate a very low sensitivity of the primary surplus to cyclical conditions (as measured by the output gap). As noted by the authors, this suggests that pro-cyclical discretionary policy is offsetting the operation of automatic stabilizers. There is evidence that such offsetting is asymmetric — *i.e.* that it mainly occurs during upturns — thereby introducing a ratchet-effect on debt dynamics, with significant implication for sustainability (Balassone and Francese, 2004).

3.

Unfunded Obligation Measures for EU Countries

*Jagadeesh Gokhale**

3.1 Introduction

Europe is undergoing two major transitions – demographic and economic. First, the populations of many European countries are aging rapidly as their baby-boom generations approach and enter retirement, human longevity continues to increase, and fertility rates remain well below replacement. Second, thirteen European countries have joined in a monetary union (EMU) by adopting the euro as a common currency, and more countries are to join the EMU during the next few years. The objective of monetary union is to eliminate exchange rate risks and streamline product pricing and price comparisons of similar goods and services across member nations to induce greater competitive efficiencies. Entering a monetary union implies surrendering control over monetary policymaking, but all current and prospective EMU nations would largely retain sovereignty in setting fiscal policies – except for the loose overall constraints set under the latest Maastricht agreement.

Both transitions will place tremendous but conflicting pressures on Member States' domestic national budgets. Decision makers will face growing demands to increase public expenditures and fulfil promises of retirement and health care benefits to retirees precisely when growth in labour forces and tax bases slows. That points toward larger future fiscal deficits and growing debt levels. At the same time, policymakers will face growing pressures from the “EMU club” to maintain low deficits, prevent increases in interest rates, and maintain European investment levels. Exercising proper economic stewardship during these twin transitions will become more difficult if policymakers remain poorly informed about the likely consequences of making alternative policy choices.

To streamline the process of monetary union, prospective EMU member countries adopted the Stability and Growth Pact in 1997 (SGP-97). Along with the Treaty of the European Union, SGP-97 provided the framework of rules for coordinating fiscal policies across EMU members – both current and prospective ones. It was generally accepted that without such coordination, member states would have stronger incentives to follow “short-sighted” fiscal policies causing chronic budget deficits and higher debt-to-GDP ratios. If carried too far, such policies would erode the European Central Bank's ability to

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maintain the euro's purchasing power. If high deficits ultimately cause faster inflation, it would only neutralize the advantages of establishing a monetary union.

Beginning in 2002, however, the SGP-97's deficit and debt constraints and its preventive and corrective mechanisms proved unacceptable.¹⁵ SGP-97 called for corrective fiscal policies to be adopted if a breach of deficits or debt limits appeared imminent regardless of the Member State's position in the business cycle and potential for GDP growth. A revised Stability and Growth Pact has now been in effect since March 2005 (SGP-05). It incorporates constraints and objectives (time paths of future deficits and debt) tailored to each member country's economic conditions.

The revised agreement introduces greater flexibility in implementing the SGP's constraints and allows implementation of preventive and corrective mechanisms to be deferred in case a member country faces temporary economic difficulties. Some observers claim, however, that although SGP-05 continues to define constraints in terms of traditional deficit and debt-to-GDP levels, it really represents an abandonment of the original objectives underlying those constraints (Feldstein, 2005 and Wiertz *et al.*, 2006) of preventing excessive discretion in fiscal policies. If correct, this would constitute good news. This chapter's thesis is that traditional fiscal measures – annual deficits and debt-to-GDP levels – are both potentially misleading indicators of a country's fiscal stance.

The SGP-05 also calls for the development of long-term fiscal indicators for policy surveillance of Member States. This effort should consider recently developed fiscal measures that are theoretically sound and policy relevant. They would better inform EU policymakers of the condition of each Member State's current fiscal stance and provide a basis for an apples-to-apples comparison of the policy options and trade-offs that each country faces. The bad news is that many member countries and EMU policymaking bodies appear to be a long way from developing appropriate long-term fiscal accounting measures and from developing a consensus on whether they should be part of formal preventive mechanisms.

This chapter first addresses issues relating to the proper accounting and reporting of the government's net prospective payment obligations. It compares alternative long-term measures of a country's fiscal stance and discusses their theoretical soundness, applicability to budget reporting, and ability to reveal information about the true economic choices that policymakers face. Four types of measures are considered -- traditional deficit and debt measures, accrual accounting measures and two measures based on actuarial accounting. The latter include generational accounting and fiscal and generational imbalance measures.

The chapter argues for the adoption of fiscal and generational imbalance measures by integrating these measures into existing country budget reports. It provides brief examples of how fiscal and generational imbalance measures could help policymakers to define the feasible set of policy choices and the trade-offs involved in selecting from among them.

¹⁵ The deficit constraint requires each Member State to maintain annual deficits at 3 percent of GDP or less. Each member state is also required to maintain a total debt-to-GDP ratio of 60 percent or less. These constraints were specified in the original Maastricht treaty of the European Union.

This chapter also attempts to quantify the size of the long-term fiscal challenges confronting EU countries by reporting estimates of fiscal imbalances (FI) for 23 EU countries. The FI estimates suggest sizable gaps between the fiscal shortfalls reported under traditional backward-looking debt and deficit measures and those implied by forward-looking fiscal imbalance measures.

The chapter concludes by suggesting that European countries need to undertake a third transition – to step back from the current broad provision of social insurance programs and allow greater scope for individual determination and private provision of these services. Introducing this important element in structural reforms by encouraging significant reductions in public spending commitments appears to be the only economically feasible way of addressing future fiscal challenges. The alternative of increasing taxes and imposing additional regulatory restrictions on member countries to preserve the *status quo* in social protection programs is likely to prove counterproductive.

3.2 Unfunded Obligation Measures

Concern about fiscal sustainability arising out of the current demographic structure in developed countries has spurred interest in developing forward-looking measures of fiscal policy. Several alternatives exist for depicting the future course of federal budget balances. The first and most obvious measure is a projection of future total government revenues, expenditures and the annual gaps between the two. Although future projections of this type are reported in the official budgets of many countries, the projections are usually limited to the next 5 or 10 years. For example, the annual budget reports of the UK Treasury (HM Treasury, 2006) adopt a 5-year time horizon – with the horizon advancing by 1 year every year. The same is true of the official budget reports of many other EU countries.¹⁶

Given the obvious inadequacy of such short-term budget projections for designing long-term policy reforms, several measures have been proposed by budget practitioners and academic economists. They include (i) simply extending the time horizon of traditional deficit and debt measures, (ii) accrual accounting, (iii) generational accounting, and (iv) fiscal and generational imbalances. This section provides a discussion of their strengths and weaknesses.

Traditional Measures – Government Deficits and Debt

Traditional short-term deficit and debt measures of the national fiscal stance are grounded in Keynesian macroeconomic theory that considers the gap between revenues and expenditures as providing a fiscal impulse that could be calibrated for macroeconomic stabilization over business cycle time horizons. Given the need for greater spending on welfare programs during economic downturns and the wide prevalence of progressive income taxation, annual budget deficits naturally move countercyclically. Discretionary elements of revenues and expenditures could be used, however, to enhance these countercyclical movements to yield even larger macroeconomic impulses to dampen business cycles and stabilize the pace of economic activity and growth. A large and

¹⁶ See federal budget reports, for example, of Denmark National Bank (2005), General Administration of the Treasury of Belgium (2005), Ministry of Finance, Sweden (2005), and several other EU countries.

growing literature has attempted to measure the economic impulses from discretionary fiscal policy using annual deficits as the key measure of fiscal impulses provided by government policies (Galí and Perotti, 2003; Alesina and Perotti, 1995).

Fiscal policymakers and budget practitioners have an abiding interest in maintaining these definitions and tools for exercising short-term operational control over government budgets. Hence, if short-horizon fiscal measures prove inadequate for analyzing long-term fiscal sustainability and structural reform issues, the simplest solution is to extend the time horizon over which traditional deficits and debt are projected. One proposal is to project and report government revenues, expenditures, and surpluses/deficits over the next 50 or 75 years under alternative economic and demographic assumptions. These measures can be calculated for both the general government as a whole and for subprograms that are financed out of dedicated revenues—such as retirement and health programs.

Accrual Accounting Measures

For most EU countries, future outlay increases on retirement and health benefits are already built into fiscal systems, and they imply growing annual deficits. Hence, the evaluation of a country's fiscal stance should explicitly recognize those costs as additional debt owed by the government. One way of doing so is to adopt accrual accounting, which would include a summary measure of future payment obligations net of assets accrued from past transactions – called “unfunded accrued obligations.” Accrual accounting considers the government's financial obligations and assets that have been “earned” or “booked” based on events that have occurred through the current period whether or not the funds associated with those events have been paid or received as yet.

In the context of government finances, there could be considerable uncertainty and controversy about what constitutes an obligation-triggering event. A common example is that of public pension programs that link benefits payable in the future to current or past labour force participation, earnings, or tax payments. However, when social transfers scheduled under today's laws may be altered by changing those laws, it remains unclear whether past employment, tax payments, or other such events are by themselves sufficient to trigger future benefits and, therefore, whether those events justify inclusion in “unfunded accrued obligations” on a par with contractual (deeded) debt owed by the government.

This problem could be resolved by distinguishing the information provision role of budget measures from the liability recognition function that is usually associated with budget accounting and reporting. Fulfilling the former need not imply the latter, and this difference should be made transparent. The objective under the former is to characterize the stance of *current* fiscal policy without implying any additional recognition of liabilities that are on a par with outstanding explicit debt.

Hence, as a “budget measure,” the inclusion of accrued obligations in accounting for the government's financial condition would reflect the future implications of existing policies. Under this assumption, if maintaining current policies would result in future transfers based on past triggering events, those accruals should be included in measuring the government's total financial obligations under current laws. Similarly, events that would trigger larger future government receipts under today's policies would increase the government's total accrued assets.

The liabilities created by some government programs may already be evaluated under accrual accounting – for example, the budget costs of loans and loan guarantees, insurance and underwriting costs, and so on. Several developed countries have adopted accrual accounting for their government budgets although only a couple of them have adopted such accounting comprehensively (New Zealand and Sweden).¹⁷ Accrual accounting could be broadly applied to public pension and other programs that imply future government net payment obligations but are excluded from traditional debt and deficit measures.

Generational Accounting

Generational accounting reorganizes government budget information and implements actuarial estimates of the lifetime fiscal treatment of current and future generations (Auerbach *et al.*, 1991, 1994). Each generation’s resources include those it earns, inherits, and receives from the government as transfer payments net of taxes. Generational accounting calculates the last of these three elements on a prospective basis for each living generation. It also calculates the generational account for future generations based on the government’s overall budget constraint – which specifies that the government must pay for all the public goods and services it provides. As such, generational accounting helps to assess the government’s net financial commitments to current generations under current fiscal policies and, by implication, the net fiscal burden those policies would place on future generations.¹⁸

Generational accounting employs an *ex post* perspective in analyzing the long-term sustainability of current fiscal policy. Allowing PV_P_c to represent the present value of total government purchases of future public goods under current policies (subscripted by *c*), PV_L_c to represent the total present value of prospective *lifetime net tax payments* (tax payments minus transfer receipts) by living generations under current policies, PV_F_h to represent the total lifetime net taxes of future-born generations under a *hypothetical* policy (subscripted by *h*) for achieving budget balance, and NW_c to represent the government’s current financial net wealth, the government’s *ex post* intertemporal budget constraint could be specified as

$$PV_P_c \equiv NW_c + PV_L_c + PV_F_h. \quad (3.1)$$

Equation (3.1) says that making future net payments to current generations under current policies and assuming that the government’s intertemporal budget constraint is balanced – as it must be *ex post* – reveals, by construction, the hypothetical net payments required for future generations. Note that the objective of this exercise is to discover the total

¹⁷ For example, New Zealand applies accrual accounting to its budget process and fiscal management, adhering to the standard principles of generally accepted accounting practice (Richardson, 1996); Canadian provincial governments shifted from cash to accrual accounting methods during the 1980s (Hillier, 1996); Germany’s Länder have instituted pilot programs to explore new budget accounting conventions including accrual based budgeting (Lüder, 2002); Sweden has introduced accrual accounting and reporting without extending the same to its appropriations process (Swedish National Financial Authority, 2001); the United Kingdom adopts accrual accounting for government agencies and is extending such accounting to broader government operations in stages (International Federation of Accountants, 1995). Recent changes introduced by the Government Accounting Standards Board (GASB) require state governments in the United States to report “other post-employment benefits” (which include health care benefits) under accrual accounting.

¹⁸ Ricardian motives that effectively extend the time horizon beyond one’s own lifetime are found to be empirically inoperative—at least in the case of the United States.

hypothetical payment that must be imposed on future generations as a whole to deliver *ex post* budget balance.¹⁹

Imposing existing fiscal policies on current newborns throughout their lifetimes yields their generational account. Its ratio to the present value of their lifetime earnings, where earnings are projected using an assumed rate of productivity growth, yields a lifetime net tax rate for current newborns. Imposing the (hypothetical) residual unfunded obligation, PV_{F_h} , exclusively on future generations (assuming an equal productivity-growth-adjusted distribution per capita of the total hypothetical burden across all future generations) implies a hypothetical lifetime net tax rate on those generations – again under the assumed rate of labor productivity growth and labor earnings.

Current fiscal policy is considered to be balanced and sustainable if, given (i) government spending commitment, PV_{P_c} , (ii) government net financial assets, NW_c , and (iii) *lifetime net tax rates* estimated under current fiscal policies for today’s newborns (based on their net payments under current policies), the hypothetical total payment from future generations, PV_{F_h} (that balances the government’s intertemporal budget constraint specified in equation 3.1) implies the *same* lifetime net tax rate for future generations.²⁰

Fiscal and Generational Imbalances

Fiscal and generational imbalance measures are an offshoot of generational accounting. They are designed to parsimoniously capture the most important elements of generational accounting with an eye toward simplicity and policy relevance. The fiscal imbalance measure is the present value of government financial shortfalls projected to occur throughout the future under the assumption that current policies remain unchanged. However, unlike generational accounting’s distinction between the fiscal treatment of living and future generations, the FI measure projects all (including future) generations’ net payments under current policies. In other words, it views the government’s intertemporal budget constraint from a “current policy” (*ex ante*) perspective. Although the government’s budget (equation (3.1)) would remain unbalanced under such a fiscal treatment of future generations, that is precisely the point of the calculation – to measure the size of the total imbalance built into current fiscal policies.

The FI measure equals the present value of prospective *lifetime net payments* (taxes minus transfers) to living and future generations plus the present value of projected government purchases and minus the government’s current net financial assets. Thus,

$$FI = PV_{P_c} - PV_{L_c} - PV_{F_c} - NW_c \quad (3.2)$$

Because it is the government’s budget choices that are being evaluated, present values are calculated using the government’s opportunity cost of funds – the interest rate expected to prevail on the longest-term government bonds.

FI measures can also be calculated for government subprograms that exclusively provide transfers to private individuals (old-age retirement benefits, for example) and are financed out of dedicated revenues (a payroll tax, for example). The revenues and expenditures of such programs are attributable to particular generations.

¹⁹ Present values are calculated by using an interest rate reflecting private agents’ (average) opportunity cost of investment.

²⁰ Technical details about generational accounting methods are available in Gokhale *et al.* (1997).

$$FI_s = PV_{L_{s,c}} - PV_{F_{s,c}} - NW_{s,c} \quad (3.3)$$

Here, the subscript s indicates a generic “social security” program that conforms to the financing conditions described above.

Generational imbalance (GI) measures the contribution of past and living generations to FI. The motivation for the GI measure is the same as that for generational accounting—to analyze the intergenerational redistribution of resources that current fiscal policies would bring about if they were maintained throughout the lifetimes of current generations. GI represents the simplest decomposition of FI. It is alternatively called the “closed-group unfunded obligation” where the term “closed-group” refers to past and living generations. That is, GI is derived by subtracting the government’s total unfunded obligations under current policies on account of future generations from FI.²¹ However, whereas FI can be calculated for the entire government and for subprograms having the features described earlier, the GI measure can be easily calculated only for such subprograms.²²

The significance and policy relevance of GI measures are not well appreciated, even among budget practitioners. Many believe that GI is similar to the unfunded accrued obligation concept and is relevant only to “fully funded” pension programs – such as those offered by private employers.²³ However, the GI measure is also relevant and useful within the context of a “pay-as-you-go” public pension system. It indicates the amount of total outstanding obligations arising under current policies on account of past and living generations. Obligations arising from past generations’ transactions with the government and from the past transactions of living generations are incorporated in the government’s accumulated net financial assets. Also included in GI are future net payment obligations under current policies triggered by *past transactions* involving living generations and future payment obligations that would be triggered under current policies by *future events* involving living generations.

The size of GI reveals the amount of benefits living generations may, under current policies, expect to receive from a government program in excess of their past and future expected taxes or contributions toward funding them. This measure remains policy-relevant because it represents a net (expected) wealth gain for living generations. Not only are such fiscal-policy-induced wealth gains directly policy-relevant, they also hold the potential to influence those generations’ economic choices – their consumption and labor force participation. Hence, analyzing the potential behavioral implications of the current fiscal stance requires a measure of the public provision of net benefits to living

²¹ The FI and GI concepts correspond to the accounting concepts of open-group and closed-group unfunded obligations, respectively. The open-group unfunded obligation refers to government obligations to all individuals regardless of their cohort affiliation (that is, their birth dates) – whether in the past or in the (infinite) future. Limited-horizon open-group obligations are also calculated by excluding the net obligations arising after a specific (future) date. Closed-group obligation measures include the net obligations to a subset of individuals – for example, those born before a certain date. However, all past net payments and future net obligations to such individuals are included in the calculation

²² Calculating GI for the entire government would require making strong assumptions about the intergenerational distribution of benefits from government public goods and services provision – such as defense, international diplomacy, domestic security, judicial services, and so on.

²³ Private sector firms that offer pension benefits to employees may be subject to regulations about funding adequacy. That requires measurement of existing funding levels for comparison with regulated thresholds, and accrual accounting is normally used to provide the benchmark for 100 percent funding.

generations. Note that this measure is also forward-looking – and fundamentally different from the traditional backward-looking debt and deficit measures.

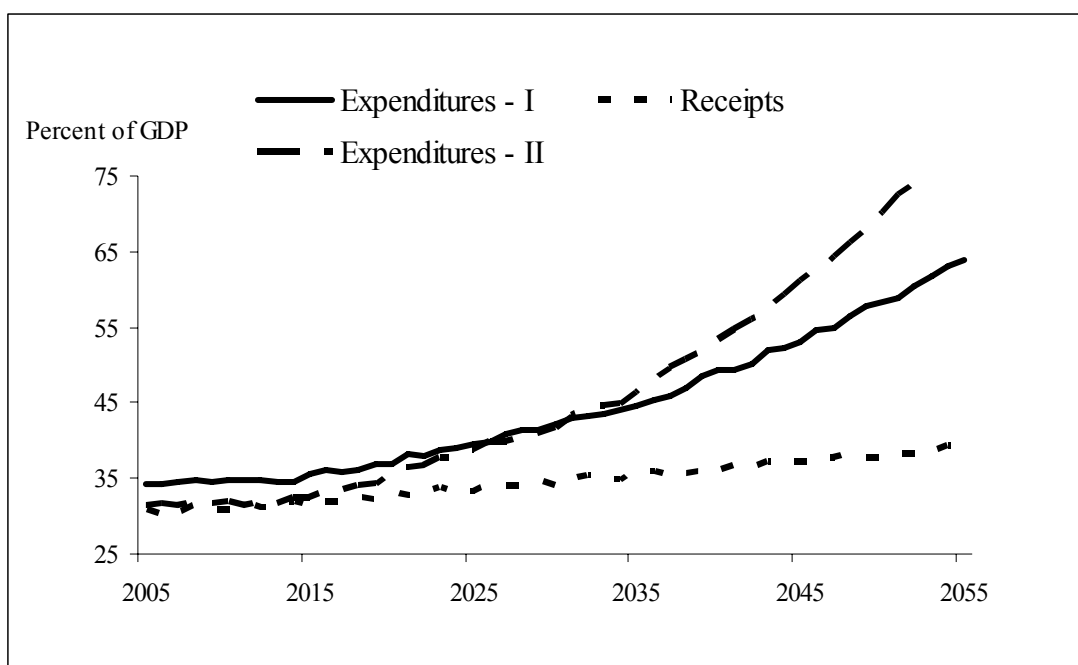
3.3 Evaluating Unfunded Obligation Measures

Long-term Projections of Revenues, Expenditures, and Annual Deficits

Time series of annual budget cash flow projections – revenues, expenditures, deficits, and debt – have some advantages but also have a few shortcomings: Their advantage lies in clearly exhibiting the time profile of future revenue shortfalls given projected discretionary and aging-related spending. Such projections are useful for showing how quickly large financial shortfalls are likely to emerge under current policies. For example, Figure 3.1 shows a nominal revenue time series and two alternative nominal expenditure time series. Under the Expenditures-I alternative, moderate deficits accrue during the first decade and then rise rapidly as a result of aging-related expenses. Under the Expenditure-II alternative, however, the gap between revenues and expenditures is very small during the first ten years, but it expands more rapidly thereafter compared to the Expenditure-I alternative. The difference in the timing and accrual rates of aging-related deficits constitutes useful and policy-relevant information.

One obvious shortcoming of such time profiles of nominal revenues, expenditures, and deficits is that they do not place current and future dollars on a level playing field. Although future nominal deficits appear to be larger, their real values may not be as large if projected inflation plus real interest rates are high.

Figure 3.1 Projected Total Expenditure and Receipts (Hypothetical Data)



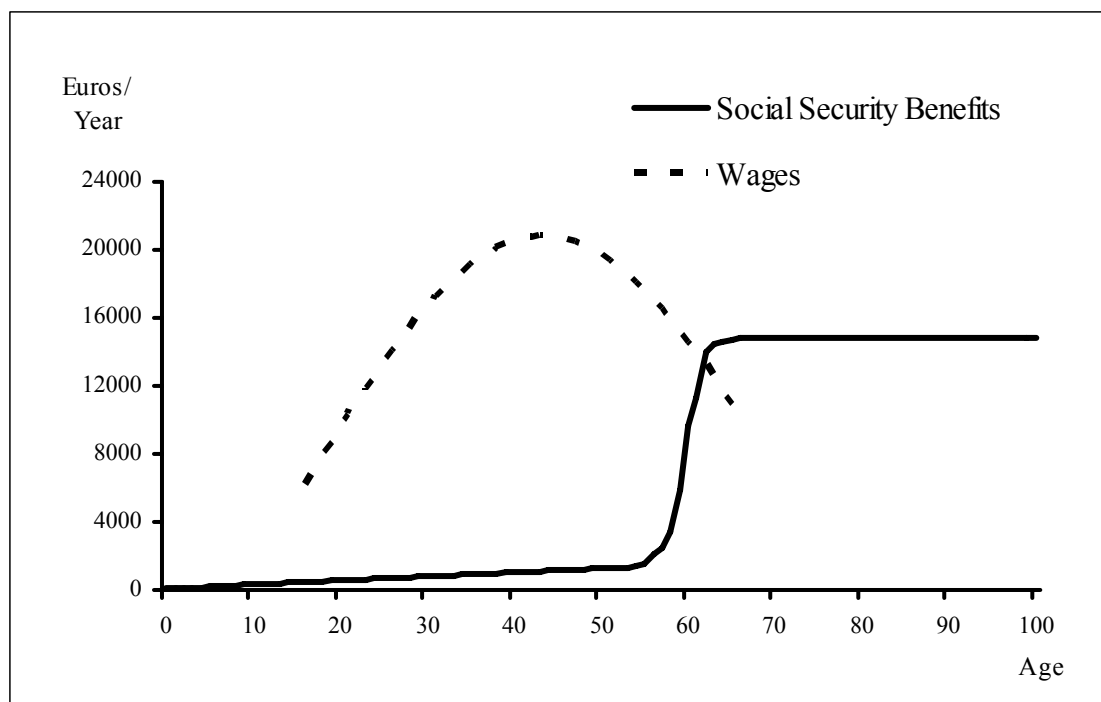
Second, nominal deficits and debt levels do not appear to hold significant and stable relationships with other economic variables of interest—namely, interest rates, currency values, inflation, productivity growth, etc. Hence, strict fiscal rules based on deficits and debt may not be sufficient to ensure fiscal stability and long-term sustainability. Third,

some countries could follow policies that maintain or even reduce explicit deficits and debt levels while simultaneously increasing prospective deficits (the so-called “one-off” measures). Such policies would alter the timing of deficit accruals but are unlikely to be associated with any measurable regularity in real fiscal impulses.

The reason for drawing such a conclusion is that a particular time series of government net cash flows may be associated with myriad ways of arranging the sizes and timing of different taxes and expenditures – each of which may generate different expectations among the public about whether they are temporary or permanent, and each of which could be associated with different distributions of fiscal burdens among private agents situated differently in their life-cycle stages. Hence, a particular time series of deficits and debt may be associated with wildly different real underlying fiscal policies – that is, a given time series may be associated with different real flows and distributions of consumption, saving, investment, and output, and different levels of real interest rates, inflation, and exchange rates. These differences in real economic outcomes would emerge primarily because each distinct policy would exert differential effects on different subgroups of individuals—distinguished, especially, with regard to their life-cycle stage.²⁴

To provide a simple example, consider a strictly pay-as-you-go expansion of a public pension program. Retiree benefits are increased immediately and permanently by €X each year and those increases are financed by additional receipts of €X each year sourced from workers’ payrolls. Figure 3.2 shows stylized profiles of public pension benefits and wage earnings by age. Those profiles show that the policy of pay-as-you-go pension increases would benefit older generations and the payroll tax increases would impose additional financial burdens on younger workers. By construction, however, there would be no change in the time series of the projected *difference* between total annual receipts and outlays as a result of this policy change.

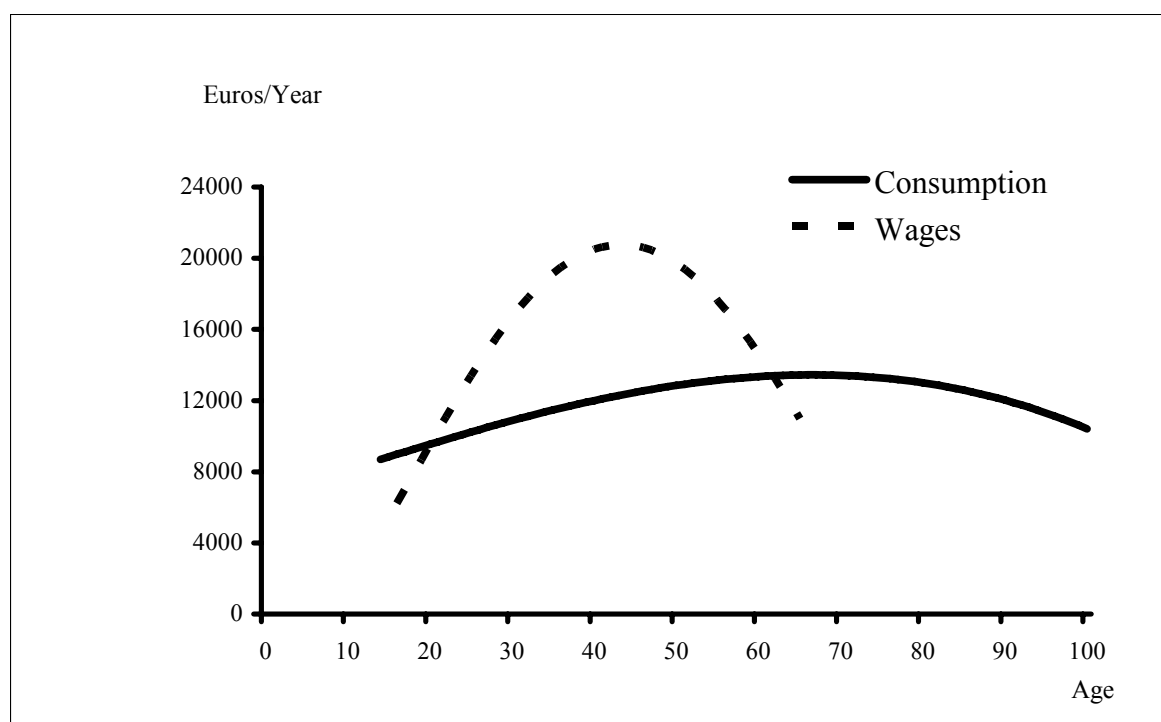
Figure 3.2 Social Security Benefit and Wage Profiles by Age



²⁴ For a related discussion see Gokhale (2004).

One could argue that showing the government's future funding shortfall in terms of total receipt and outlay time series would capture such a policy change as an upward shift in both series. However, other policies could be implemented that would maintain both the projected levels of revenues and expenditures and the gap between them (annual deficits), yet exert real economic effects by redistributing resource across generations. Consider Figure 3.3, which shows stylized profiles by age of payroll tax and consumption tax payments. Because the consumption tax profile is flatter and extends across older individuals, a permanent pay-as-you-go structural tax change – that is, an annually revenue-neutral switch from consumption to labour income taxes – time would accomplish a sizable redistribution of tax burdens and wealth across generations.

Figure 3.3 Consumption and Wage Profile by Age



As in the case of the pay-as-you-go expansion of public pensions, this policy also provides a windfall benefit to current older generations but reduces the lifetime resources of younger and future generations.²⁵ However, such a policy change would be invisible to Figure 3.1's fiscal measure – the time series of projected revenues, expenditures, and deficits. If propensities to consume out of resources of older generations are different (say, higher) than those of younger generations, permanent redistributive policy changes of this type would very likely exert real economic effects – affecting saving, capital formation, interest rates, and eventually inflation and exchange rates.

The above discussion suggests that when policymakers enact diverse fiscal changes designed to alter the time profiles of expenditures and revenues to reduce short-term deficits, only some of those policies may be reflected in traditional cash-flow measures

²⁵ Generally, a reduction of consumption taxes would make all existing assets more valuable because the consumption financed through their sale would now face a lower tax rate. Much of the immediate increase in asset values arising from this policy would benefit existing older generations who hold most of the country's wealth.

such as deficit and debt levels, or time series of total expenditure and revenue levels as shown in Figure 3.1. The net result of such policies may be larger or smaller deficits and debt levels over time, but also erosions or increases in national saving and capital formation independent of the impact on short- and long-term deficits and debt levels. Because Figure 3.1 does not fully reflect the impact of all policy changes, it remains a poor guide for decision makers and should be complemented with additional information. In the words of Auerbach and Kotlikoff, "...conventional deficit measures may cause alarm when alarm is not warranted and, conversely, may calm observers when alarm is most appropriate."²⁶

Accrual Accounting

As mentioned earlier, accrual accounting "books" obligations and assets based on triggering events through the current period. Since the objective of accrual accounting for the budget would be to characterize current policy, future benefits based on past births, labor force participation, earnings, and tax payments (as is common in the case of public pensions) should be counted among government obligations. Even in the case of health care benefits, future payments based on projected cost growth may be included to get a fuller estimate of the government's financial obligations under current policies.

Proposals to adopt accrual accounting for measuring the government's intertemporal budget balance are generally motivated by the attractive symmetry of applying the same accounting rules to the government as are applied to private companies when evaluating their pension and other obligations. However, the government as an economic entity is sufficiently different from private entities to warrant a different accounting standard. In particular, private entities can potentially fail and terminate at any time, whereas the government is infinitely lived, at least in principle. Moreover, unlike private entities, governments possess the sovereign power to levy taxes.

The purpose of accrual accounting for private firms is to reveal the extent of funds that must be set aside to meet contractual deferred liabilities – pensions and health coverage for retired employees, etc. Most such liabilities are created from past employee performance and are measurable because they are determined by applying explicit benefit formulas. In contrast, the objective of long-term government budget accounting is to evaluate the sustainability of current tax and spending rules – not to evaluate total liabilities if the "government fails." Given its power to levy taxes, the government need not necessarily set funds aside each time it enacts laws that create additional future payment obligations. Applying accrual accounting to government liabilities could, therefore, create the impression that the government's future obligations to pay pension, health, and welfare benefits somehow are contractual obligations – or liabilities – that can never be reduced.²⁷

²⁶ See Auerbach and Kotlikoff (1987). They make the case that deficits and national debt are not theoretically well grounded fiscal concepts and that their values over time reflect little more than the particular accounting conventions used for labeling different government transactions as taxes and transfers versus loans and repayments of principal plus interest. These arguments are amplified in Kotlikoff (1989).

²⁷ Discussions about federal financial reporting standards in the United States go into great detail about precisely defining liability recognition criteria and the nature of events that trigger a recognizable federal liability. Such discussions are obviously driven by concerns that if the reporting standards were to adopt broader definitions of triggering events and liability recognition criteria, the public

Moreover, accrual accounting measures are also (partially) backward looking because they include only those future fiscal flows (taxes and transfers) that would result from *past* triggering events. Given that governments are infinitely lived in principle, however, it does not appear legitimate to ignore future obligation-triggering events – labor force participation, earnings, tax-payments, etc. – if current policies are continued.²⁸ Indeed, if accrued net obligations are positive but continuing current fiscal policies would generate net future receipts, reporting accrued net obligations would indicate a large positive net liability position even though current policies may be sustainable.

Generational Accounting

Generational accounting's actuarial (as opposed to accrual) approach includes an evaluation of future government obligations and resources triggered by future obligating events. This method provides a comprehensive perspective for evaluating current fiscal policy. However, its *ex post* perspective on the government intertemporal budget constraint implies that concepts associated with generational accounting such as "generational balance" involve subtle thought experiments that are difficult to communicate. Those experiments involve hypothetical and nonimplementable policies – of treating all future-born generations differently compared to the treatment of living generations under existing fiscal policies. In addition, generational accounts are calculated from the perspective of private individuals rather than of the government's financial constraint. That makes generational accounts difficult to integrate with existing budget reports, which usually include short-term projected annual aggregate cash flows (revenues, expenditures, and budget deficits) and total outstanding net debt.

Generational accounts are calculated and used as complementary indicators of fiscal policy in several countries. They are reported in considerable detail in most generational accounting studies – for individual age-sex cohorts (Auerbach *et al.*, 1999). Generational accounting also reports the generational lifetime fiscal burdens that would prevail under policy adjustments for achieving a sustainable fiscal policy. Alternatively, it reports the "menu of pain" – policy changes that would be required to restore sustainability. However, the key information about the sustainability of current policies often becomes obscured by the focus (and often confusion) associated with the multiplicity of numbers included in most generational accounting reports.²⁹

Fiscal and Generational Imbalances

Fiscal Imbalance. The FI measure assumes continuation of current policy (including scheduled future changes in current laws) throughout the future. Thus it involves no complicated thought experiments or hypothetical future policies. It provides a summary measure of total budget shortfalls – the sum of accrued shortfalls to date and prospective

might come to view those liabilities as contractual and immutable rather than simply legal—that is, based on the laws prevailing when the payment comes due (which may be different in the future relative to current laws). For example, see Federal Accounting Standards Advisory Board (2004).

²⁸ Including the obligations from future triggering events would convert the accrued obligation measure into the "closed-group unfunded obligation" measure. See Gokhale and Smetters (2003) for details.

²⁹ For example, generational accounts are supposed to represent each cohort's lifetime net fiscal burden under current policies. However, when the meta-message is that current policies are not sustainable, the value of focusing on the accounts as reported becomes diluted. Generational accounts have been subject to several other criticisms in the fiscal policy literature. See Cutler (1993), Diamond (1996), and Haveman (1994).

shortfalls under current policy evaluated without a time limit. It is a comprehensive measure of the government's fiscal position because it spans the entire future without limit and includes the totality of government's operations. The FI measure is also easy to communicate: It is the amount of additional resources that the government must have on hand today, invested at interest, in order to continue current policies indefinitely. Alternatively, FI equals the additional amount of net receipts or cost savings that the government must obtain through future policy adjustments.³⁰

Many practitioners express doubts about calculating and reporting fiscal imbalances through the infinite future. Their main objection is that future projections are uncertain and the degree of uncertainty increases the further forward budget projections are carried. Hence, most agencies that report FI base them on projections truncated after 25, 50, or 75 years into the future.³¹ Although these objections appear valid, arguments favoring infinite-horizon calculations seem to be stronger. First, setting any specific limit on the projection horizon implies, at best, the assumption that the government budget is in balance beyond that horizon. However, if current policies would result in large imbalances persisting beyond the projection horizon, truncating the horizon would be equivalent to ignoring future uncertainty – exactly the opposite of most recommendations about how to deal with future uncertainty. A better approach would be to report those imbalances under the best available economic assumptions and projections in addition to the imbalances calculated under a truncated projection horizon.

Second, truncating the horizon usually leads to the “rolling-window” problem. Reforms implemented to achieve budget balance through a predetermined time horizon would be thrown off balance by the mere passage of time and relatively quickly.³² If future imbalances are large and growing – as is likely to be the case in countries with rapidly aging populations – it would necessitate repeated reforms to pull the government's finances back into balance to avoid escalating fiscal deficits.

The most important but often least appreciated reason for adopting infinite-horizon calculations is that truncated budget projections would introduce a bias in policymaking. The bias can be described using a simple example of a reform proposal to establish “social security” personal accounts. Suppose such accounts were created by diverting a portion of existing wage taxes (assumed to be dedicated to the program) for investment in private securities. In exchange for allowing individuals to invest a part of their payroll taxes in personal accounts, they would have to agree to actuarially fair reductions in their future social security benefits. “Actuarially fair” means that for every euro of payroll taxes deposited in personal accounts, future benefits worth one euro in present value would be surrendered, where present values would be calculated using the government's long-term borrowing rate and average mortality factors.

³⁰ Finally, unlike traditional measures of deficits and debt, this measure is not subject to change because of the way certain government receipts and outlays are labeled – as taxes and transfers, respectively, or borrowing and repayment of principal with interest, respectively.

³¹ However, both the Social Security and Medicare Trustees in the United States have been reporting infinite-horizon measures of those programs' financial shortfalls – precisely the “fiscal imbalance” measure. They also report “generational imbalances” for both programs. The 2003 Technical Advisory Panel that makes recommendations to the Trustees of Social Security and Medicare has endorsed both measures as providing useful additional information.

³² This is a well-recognized phenomenon in the context of U.S. Social Security program which was reformed in 1983 to achieve balance through 2058. Now, however, the program faces a sizable 75-year shortfall because the new horizon includes financial shortfalls between 1959 and 2080.

Under such a reform, the government's financial position is clearly unchanged – the loss in tax revenues is exactly matched in present value by a reduction in future benefit commitments. However, if a truncated estimate of government's fiscal imbalance were used, it would show a worsening in the government's financial position: Revenue losses during the short term would be counted when evaluating the government's position, but reductions in benefit payments accruing beyond the truncated horizon would be excluded. Hence, a truncated calculation of fiscal imbalance would bias policymakers toward rejecting a personal accounts reform of public pensions even though it would leave the government's true financial position unchanged.

This example could be carried one step further. If the public pension system is initially financially unsustainable, it could be improved through the reform described earlier: The government could offer a personal accounts reform wherein future benefits are reduced by more than dollar-for-dollar in present value. Some individuals may agree to the exchange of smaller future benefits for personal accounts that they would own and control. Implementing such an exchange would imply a larger reduction in future government outlay commitments compared to the immediate reduction in wage tax receipts. However, again, the reduced revenues in the short term would be included under a truncated projection horizon, but the larger decline in future obligations would be excluded. Thus, focusing exclusively on a truncated FI measure would bias policymakers to reject a reform that could potentially improve the government's financial condition.

This example also provides the final rationale for adopting an infinite-horizon fiscal imbalance measure in preference to truncated-horizon measures. The FI measure facilitates an apples-to-apples comparison of different policy options. If two budget reform options are financially equivalent in present value terms but one (option A) involves higher costs in the short term compared to the other (option B), policymaking would be biased in favor of option B if the evaluation were based on a truncated projection horizon. Alternatively, reform option A might be financially sounder than option B, but the latter might involve larger short-term financial gains and larger long-term costs. If the long-term costs remain hidden under a truncated projection horizon, policymakers may be biased in favor of option B. These considerations are likely to be quite important in the EU and EMU context because of the many differences in member countries' endowments, fiscal policies, and demographic profiles. Hence, long-term fiscal surveillance should be based on comprehensive and policy-neutral fiscal measures, and evaluations of fiscal options should use metrics that allow apples-to-apples comparisons among available choices.

Generational Imbalance. In general, the generational imbalance measure can be calculated only for programs not involving pure public goods and that are fully or partially financed out of dedicated government receipts. Provided that it can be implemented, the generational imbalance measure shows the amount of transfers that past and living generations may expect to receive under current policies in excess of their past and future tax payments toward funding them. Thus, excluding the contribution of future generations to the fiscal imbalance yields the generational imbalance measure (see Gokhale *et al.*, 2003 for details).

Most European countries have pension and health care programs that are partly financed out of dedicated taxes. Excess outlays over dedicated revenues are financed out of transfers from the general budget account. Although such programs are usually considered to be “in balance” by definition, the fiscal imbalance measure can be used to

show the extent to which the general government is obligated to cover future financial shortfalls in dedicated revenues compared to benefit payments under current fiscal policies. In such cases, GI calculated using just dedicated taxes would indicate the extent to which past and living generations' net benefits are responsible for creating general government obligations for financing the program.³³

GI calculations provide information that is complementary to FI. The FI measure tells us how much additional resources must be raised to restore a sustainable fiscal policy. But FI cannot indicate which among the myriad ways of raising the necessary resources might be preferable. However, because GI provides information about how a given policy would change the net benefits of living and future generations, it can help in selecting from alternative policies.

Essentially, GI would inform policymakers about the trade-offs involved in raising resources from current versus future generations for achieving fiscal sustainability. For example, suppose $FI = €2,000$ billion and $GI = €1,600$ billion. This implies that past and living generations account for €1,600 of the total FI of €2,000, and future generations account for €400 billion.³⁴ Policymakers could choose to enact tax and benefit changes that reduce GI to €600 billion and reduce future generations' contribution to FI to – €600 billion. Such a policy would reduce $FI = GI + (FI - GI)$ to zero. Or policymakers could adopt an alternative combination of taxes and benefits that imposed a larger additional burden on living generations and a smaller additional burden on future generations – for example, by reducing GI to €400 billion and $(FI - GI)$ to –€400 billion.

Hence, adopting the combination of FI and GI as indicators of the overall financial condition and generational stance, respectively, of current fiscal policies would provide a powerful tool for evaluating the available policy alternatives based on their impact on today's versus future generations.

3.4 General Considerations of Fiscal and Generational Imbalance Measures for EU Countries

Adoption of measures such as FI and GI need not imply that those amounts are immutable liabilities of the government.³⁵ Instead, they should be viewed as policy guideposts – designed to help in implementing appropriate changes to future fiscal

³³ Alternatively, both FI and GI could be calculated by allocating both dedicated and general taxes according to the generations that pay those taxes. This calculation would reveal the part of (zero-valued) FI that past and living generations contribute and the part future generations would contribute under current policies. Note that even if $FI = 0$, by definition because of funding from of general revenues, GI (and $FI - GI$) need not also equal zero.

³⁴ Note that if $FI < GI$, current policies would award living generations net benefits that exceed the total fiscal imbalance, implying that future generations would pay taxes on net.

³⁵ Concern that the public would view the adoption of such measures as recognition that they stand on a par with outstanding government debt – as immutable government liabilities – appears to be a chief reason cited by those opposing their adoption.

policies – including future taxes, pensions, and other government outlays – with the aim of restoring a sustainable fiscal outlook.³⁶

Second, it is obvious that FI and GI are static measures. Adopting FI and GI for estimating country fiscal positions is only the first step in policy formulation within the EMU context. Obviously, static country-specific estimates are insufficient in the context of a monetary union among countries that are currently undergoing economic transitions and are, by definition, in disequilibrium. Even without any policy changes – were that possible – demographic transitions at differential rates would engender inter-EU-country and international capital flows and labor migrations. Those flows and future policy adjustments may invalidate the economic and demographic assumptions on which FI and GI calculations are based. Nevertheless, the static FI and GI estimates constitute useful information in the formulation of future policies because they indicate the extent of pressure generated by the current fiscal stance that would induce private sector adjustments. If maintained and allowed to grow, large fiscal and generational imbalances may imply larger future taxes and higher interest rates and may cause larger private sector adjustments in capital and labor flows.

FI and GI numbers presented in terms of billions (or trillions) of euros are not easily comprehensible. To provide a reference for comparison, it is useful to calculate them as ratios of GDP or the wage tax base out of which they would have to be financed. Since FI and GI refer to present values of future fiscal flows, it is appropriate to use the present values of GDP or the present value of the wage tax base when forming such ratios. These ratios would show the additional percentage of future GDP or wages that must be devoted to restore a balanced fiscal policy. Using alternative taxes or expenditures as a reference base – such as total public plus private consumption, personal plus corporate income, social transfers, etc. – would show the size of the fiscal adjustment required for achieving a balanced policy in terms of those economic flows. Such measures would provide broader understanding of the trade-offs involved under alternative combinations of future fiscal adjustments.

An important characteristic of FI is that, like a corpus of outstanding debt, it grows larger over time because of accruing interest costs: Hence, a nonzero FI represents fiscal disequilibrium and would necessitate future policy adjustments (See Gokhale and Smetters, 2003 for details). In addition, fiscal policies that imply $FI \neq 0$ are unsustainable because the ratio of FI to the present value of GDP (or some other income or tax base) also grows larger over time.³⁷

Finally, FI and GI could be decomposed according to the contributions of alternative rates of population aging and alternative fiscal structures adopted by EU member countries. The motivation for this lies in past experience: The SGP – focused on short- and medium-term objectives – was revised in 2005 to take account of country-specific economic features. The same need is likely to arise if and when the current constraints force further consideration of longer-term structural adjustments to facilitate convergence toward a balanced fiscal stance across EU countries. Reporting the contributions of demographics

³⁶ It is implicit in this discussion that establishing a sustainable fiscal outlook is desirable because it would boost the performance of the private sector by reducing expectations of future benefits, thereby increasing private saving and work efforts.

³⁷ This result is due to the normal condition of a dynamically efficient economy where the interest rate exceeds the growth rate. For the U.S. context, see Abel *et al.* 1989. See Gokhale and Smetters (2006) for more details.

and country-specific fiscal structures to long-term fiscal imbalances would reveal the feasibility and desirability of adopting differential adjustments by different EU member nations.

Although it was argued earlier that the FI measure would be comprehensive only if calculated over the infinite horizon, doing so in the European context proved impossible given the limited amount of data available at the time of preparing the estimates. That is because low fertility in EU countries and low net external immigration cause projected populations to implode over time for several EU countries. Hence, the FI measures reported in Section 3.5 below are calculated over a finite horizon—through the terminal year of population projections available from Eurostat, 2051.³⁸

3.5 Fiscal Imbalance Estimates for EU Countries

Overall Fiscal Imbalance and Its Decomposition by Sources – Demographics and Budget Policy

This section presents FI estimates for 23 EU countries calculated using data available at the time of writing.³⁹ These estimates should be regarded as provisional because there remains considerable scope for improving the underlying inputs. They are used here mainly to complement the accounting and reporting framework being proposed. Supplementing existing budget reports with FI and GI indicators would reveal the long-term implications of current EU members’ policies and the sources of differences among them. Notwithstanding the scope for improving the estimates, however, the numbers reported here are based on detailed country-specific data and capture underlying inter-country demographic and fiscal policy differences.

To reveal those differences, FI is first calculated for the average EU economy defined with reference to four dimensions: demographics, productivity, budget allocations, and generational policy. An “EU demographic benchmark” is constructed by averaging all countries’ projected populations – separately by year, age (16 and older), and gender—between 2004 and 2051.⁴⁰ The EU demographic benchmark contains about 16 million people.⁴¹

The “EU productivity benchmark” is constructed by calculating a population-weighted geometric mean of annual labor productivity growth rates (output per hour worked) across EU countries. Country-specific labor productivity growth rates are calculated by using annual geometric average growth rates during the recent past – between 1996 and 2004.

³⁸ As noted earlier, truncating the projection horizon at 2051 implies that a fully apples-to-apples comparison of policy options would not be feasible because cost and benefits of alternative policies beyond 2051 would be excluded from the calculations. However, adopting such long horizon measures is still better than truncating the horizon after just five or ten years.

³⁹ Cyprus and Hungary are excluded because data on their annual labor productivity growth are not available.

⁴⁰ Although the terminology employed is “EU benchmark,” it should be understood that the calculations include just 23 countries. See the previous footnote.

⁴¹ Calculations regarding the construction of the “EU benchmark” and other calculations described below are available from the author upon request.

Similarly, harmonized general government taxes and expenditures are averaged to derive the “EU budget allocation benchmark.” This benchmark consists of population-weighted averages of harmonized taxes and spending per capita.⁴² Table 3.1 shows general government revenues, expenditures, surpluses/deficits, and debt figures for the base year of the calculation (2004) for the 23 EU countries included in the calculations and shows the corresponding averages across those countries. The totals are calculated using data on detailed revenue and expenditure categories taken from the Eurostat database.

It should be noted that the total revenue column in Table 3.1 includes “imputed social contributions”, which represent unfunded obligations on account of social transfer guarantees provided by some countries—guarantees that are not supported by explicit transactions for funding them. The motivation for including those imputed revenue items was to avoid over-representing current fiscal deficits and retain comparability of fiscal cash flows across EU countries.

Finally, profiles by age and gender of various harmonized taxes and transfer payments per capita are averaged across all EU countries using age- and gender-specific population weights. Unfortunately, data on tax and transfer profiles are not available for all EU countries. Hence, the estimates reported below are based on available partial data used to construct the “EU cohort-distributive benchmark”.⁴³

Putting all four dimensions together yields an EU benchmark economy. As shown below, this construct enables a decomposition of country-specific fiscal imbalances into their demographic, productivity, and fiscal policy (budget allocation and cohort-distribution) components. Replacing the EU benchmark value of one of the components – either one of demographic, productivity growth, budget allocation, or cohort-distribution profiles – with its value for a specific country and recalculating FI would show that component's contribution to the FI of the country in question. Replacing all of a particular country's features (and rescaling to match the country's population size) would show the overall contribution of all components.

The purpose of such a set-up is to enable a detailed surveillance of country-specific differences in fiscal imbalances by distinguishing between those arising from demographic and fiscal policy differences. Knowledge of these differences is likely to prove useful when judging and negotiating long-term fiscal reforms. Agreement on an EU benchmark construct would provide a common reference point against which to evaluate each country's fiscal stance and the sources of difference. It would provide a common metric, permitting an apples-to-apples comparison of each country's fiscal position.

⁴² An alternative method would be to use simple averages across countries of their per capita taxes and transfers. That would imply placing equal weight on each sovereign nation's budget allocation. However, the resulting allocation would not correspond to a “representative” EU budget allocation. Implementing the alternative allocation results in a slightly smaller estimate of the “EU benchmark” economy's Fiscal Imbalance because countries with the largest individual FI values receive smaller weights.

⁴³ This terminology is adopted for lack of a better one. Obviously, generational policy is also influenced by changing budget allocations – and not just by changing the age-gender distributions of particular taxes and transfers. Additional information is available from the author upon request.

Fiscal Imbalance Estimates and Components for EU Countries

The EU benchmark FI is calculated by using the methodology and data described earlier. The population projections used for distributing 2004 budget aggregates by age and gender, as described above based on projections taken from Eurostat through the year 2051. Future taxes, transfers, and general government spending on public goods are estimated for the EU benchmark by applying an average labor productivity growth factor of 0.24 percent per year. This average is calculated by taking a population-weighted geometric mean of average growth in output per hour worked for each of the 23 EU members between 1996 and 2004. The calculations use data on output per hour worked as reported by Eurostat.

A fixed and constant real rate of discount is used for discounting projected fiscal flows back to the year 2004. The inflation-adjusted discount rate is calculated as the interest rate on long-term government bonds minus average expected inflation. Long-term budget transactions spanning 50 or more years should be discounted using the government's opportunity cost of funds over a similar term. However, the longest-term interest rates available are on 10-year government bonds. The geometric mean of annual rates calculated over the period 1996–2005 and across all 23 EU countries (using data available from Eurostat at the time of writing this chapter) equals 5.39 percent per year. Average expected inflation is calculated as the geometric mean of inflation rates across all EU countries from 1997 through 2005 (according to data availability). The resulting rate (3.01 percent) is subtracted from the nominal interest rate on government bonds to obtain a real discount rate of 2.38 percent.⁴⁴

Figure 3.4 shows FI estimates for 23 EU countries and for the EU benchmark case calculated for the base year – 2004.⁴⁵ The EU-benchmark economy's overall Fiscal Imbalance is estimated at €1,971 billion. Of this, outstanding debt amounts to €282 billion, and the present value of prospective fiscal shortfalls equals €1,690 billion. Note that the EU benchmark economy constructed is only one twenty-third as large as the sum total of the 23 EU economies included in the calculations. Figure 3.5 shows that FI for the EU benchmark equals 8.3 percent of the present value of GDP projected through the year 2051.

Figure 3.4 also shows that, in euro terms, Germany (€9,263), France (€9,111), Italy (€5,054), and the United Kingdom (€7,666) contribute the largest fiscal imbalances. However, relative to the present value of GDP, the largest imbalance ratios prevail for Malta (12.8 percent of GDP, although Malta has the smallest fiscal imbalance in euro terms) and Greece (10.9 percent of GDP). Estonia (3.2 percent of GDP), Ireland (3.4 percent of GDP), Lithuania (3.8 percent of GDP), and Latvia (4.9 percent of GDP) are among those with the smallest fiscal imbalances as a percent of the present value of their

⁴⁴ FI estimates under country-specific long-term interest rate differences are not calculated because capital mobility over time may be expected to erase existing interest rate differentials on long-term government debts. Any residual differences would reflect country-specific government default risks, which are likely to be minor. The calculation's details are available from the author upon request.

⁴⁵ The estimates shown in Figure 3.4 use only one year's revenues and expenditures for making future projections. Since 2004 was neither a recession year nor a year of particularly strong growth, the estimates are unlikely to be influenced by extreme cyclical variability of fiscal cash flows. If projections of short-run budget forecasts had been available, the resulting FI estimates would have been more accurate because such projections usually incorporate expected changes in future fiscal flows due to policy changes that have already been enacted.

respective GDPs. The present discounted values of EU member nations' projected GDPs are shown in Figure 3.8.

Figure 3.6 shows the demographic component of FI. It shows the excess imbalance resulting from replacing a particular country's demographic structure with the EU benchmark demographic structure. The figure reports this excess as a percent of the FI estimated for the EU benchmark case. Thus, positive numbers indicate demographic features that increase budget shortfalls under current (EU benchmark) fiscal policies – either population aging that is more rapid due to increases in longevity, or a larger than average baby-boom generation approaching retirement, or a baby-boom generation that is closer to retirement than under the EU benchmark case, or a recent relatively more rapid decline in fertility that reduces the number of tax-paying workers.

Figure 3.6 suggests that despite their large FI estimates – in both absolute euro terms and as percentages of the present value of GDP – population aging is not more rapid than average in the case of Germany, Italy and the United Kingdom. This result may appear surprising, but it must be noted that these large countries contribute significantly to the “average” demographics of the EU benchmark. On the other hand, France's demographics causes a 5 percent increase in FI relative to the EU benchmark FI. The largest FI-increasing influence of demographics appears in the cases of Ireland and Malta, whereas Estonia, Lithuania, and Latvia appear to have younger projected populations or slower population aging through 2051.

Figure 3.7 shows the budget allocation components of FI for EU member states. As mentioned earlier, this experiment replaces a particular country's harmonized tax, transfer, and spending components with those of the EU benchmark case. Figure 3.7 shows that the budget-allocations of Germany, France, and the United Kingdom contribute significantly toward high FI values. However, Denmark and Luxembourg appear to be following “budget allocation” policies with the largest prospective fiscal impact in terms of generating high FI values. Most of the new entrants into the EU appear to be following budget allocation policies consistent with reducing fiscal imbalances.

Similar experiments are not implemented here for the productivity and cohort-distribution components because the required data are unavailable. In the case of productivity, a straightforward replacement of a member country's productivity growth rate would not be appropriate because a higher productivity rate would generally reduce the projected levels of future means-tested social transfer programs and may be associated with higher revenues in a nonlinear manner. Implementing this experiment requires careful calibration of the response of welfare expenditures to changes in productivity growth – that is not feasible given data availability.⁴⁶

Adequate information is also not available for estimating the impact of country-specific cohort-distribution policies. However, the experiments described earlier of isolating the demographic and budget allocation components provide the basic framework for isolating these components as well. Finally, estimating GI measures is also not feasible given that

⁴⁶ This observation may cast doubt on the validity of constructing the EU productivity benchmark as described in the text. However, that appears to be the best, if not the only, alternative.

institutional details about financing arrangements for various subprograms are not available (to the author).⁴⁷

The Impact of Delaying Fiscal Adjustments

It is easy to show that FI grows larger over time if the initial FI value is positive (see Appendix A in Gokhale and Smetters, 2003). That is because of accruing interest on the current FI – similar to that on a corpus of outstanding debt. When FI is calculated over a finite projection horizon, the addition of another year’s budget surplus or shortfall at the end of the horizon also influences next year’s FI estimate. Table 3.3 shows estimates of FI for EU countries through the year 2010. Each estimate covers a rolling period of 47 years – 2004 through 2051 for the FI reported under “2004”; 2005 through 2052 for the FI reported under “2005”; and so on. These calculations are based on extending each EU member nation’s demographic projections for a few additional years beyond 2051.

Table 3.3 shows that FI (calculated over a 47 year horizon) for the EU benchmark case grows from €1,971 billion in 2004 to €2,489 billion by 2010 if current policies and long-term projections remain unchanged through that year. The increase in FI from one year to the next generally implies an increase in the cost of future fiscal adjustments because the resources available to pay for the shortfalls, the present value of GDP, generally grow at a slower rate.

Table 3.3 shows that with each passing year, about one-third of the increase in FI arises from advancing the terminal year of the projection horizon by an additional year. The remainder of the increase in FI arises from accruing interest. This indicates the shortcoming of adopting a finite projection horizon for capturing the cost of postponing fiscal adjustments. Were policymakers to adopt fiscal adjustments to reduce fiscal imbalances as measured under a limited time horizon, a positive fiscal imbalance would re-emerge in the very next year and grow larger over time.⁴⁸

Take the case of France. The French government reported a deficit of 2.9 percent of GDP – that is, €49.6 billion – in 2005.⁴⁹ According to Table 3.3, however, the change in the French FI for 2005 equals €368.2 billion – an order of magnitude larger than the reported fiscal deficit for 2005. Similar remarks apply to current reporting on many other EU countries’ fiscal stance based on traditional deficit and debt measures. Table 3.4 compares the reported annual public balances (Eurostat) with FI accruals for 2005 taken from Table 3.3. In the case of some EU countries, a surplus public balance indicates an improving fiscal condition, but the FI accrual is positive pointing to the opposite conclusion. Thus, depending on backward-looking fiscal measures such as deficits and debt would cause policymakers to draw incorrect conclusions about their country’s evolving fiscal condition.

⁴⁷ However, see Gokhale and Smetters (2006) for examples based on calculations for U.S. Social Security and Medicare programs.

⁴⁸ These calculations were made after extending the official (Eurostat) population projections beyond 2051. Details regarding the methods used are available from the author upon request.

⁴⁹ Indicateurs de progrès de l’économie française (2006).

A Proposal for Integrated Reporting of Short- and Long-term Budgetary Conditions

Even after taking account of the new SGP's constraints, each EU country retains considerable sovereignty over its fiscal policies. For sure, each EU member country retains full control over the accounting and reporting of national budget information. Nevertheless, when it comes to fulfilling SGP-related budget reporting for long-term fiscal policy surveillance, the budget reports of all countries would benefit from the introduction of a few additional features.

Both short-term budget projections and the long-term implications of current fiscal policies should be included in the reports. The FI measure appears to be the easiest to integrate into most existing budget reporting frameworks because it is essentially a "budget measure" and comprehensively incorporates forward-looking fiscal information (as discussed earlier). For social transfer (and possibly other) programs with independent and dedicated financial resources, it is also easy to integrate presentations of both fiscal and generational imbalance measures into existing budget reports.

Many existing short-term budget reports divide the overall budget summary table into "current" and "capital" accounts. Table 3.2, for example, shows a prototype budget report containing "current" and "capital" accounts followed by additional information on long-term sustainability measures – that is, the implications of continuing current policies through the long-term projection horizon of several decades (if not through the infinite time horizon).

The FI figures for each year beyond the base year show FI as of the corresponding future year. As discussed earlier, if the initial FI is positive, future years' FI figures will grow larger over time. In addition, FI grows larger even as a percentage of the present value of GDP. The components of each year's change in FI could also be included. In the case of finite-horizon estimates, the total change in FI across years would include those arising from accruing interest and the addition of another year at the end of the projection horizon. As discussed earlier, such information would be useful for policymakers to appreciate the cost of postponing fiscal reforms.

This could be followed by reports of the financial implications of current policies for independently financed subprograms, and a final subsection could include FI and its revenue and expenditure components for the rest-of-government sector. This subsection would "close" the account by reporting intra-government liabilities and net liabilities to the public (net outstanding debt). Supplementary tables could break out the overall fiscal imbalance into its demographic, budget allocation, and cohort-distribution components – as described in earlier sections.

Comparison with Sustainability Measures Proposed by the Ageing Working Group

The Working Group on Ageing Populations (AWG) recommends a two-stage approach to assessing the sustainability of long-term finances (Economic Policy Committee, 2001). Its assessment of sustainable public finances takes the SGP's fiscal constraints as a starting point. The objective is to evaluate prospects for compliance with EMU requirements – avoiding excessive deficits and keeping debt levels below 60 percent of GDP. The SGP requires that EU Member States maintain a "close to balance or surplus" position over the medium term (three to five years) but not over a longer term. However,

if followed, this would result in *de facto* sustainability in a simple and transparent manner (Balassone and Franco, 2000).

The arguments provided in this chapter, however, suggest that such an approach would be inadequate. The problem is that a short-term and “short-sighted” view of the implications of current policy – over the next three to five years – does not provide sufficient and relevant information to policymakers. One can envision a situation where policies are enacted to ensure compliance with the SGP’s constraints, only to soon discover that the job is not yet finished – indeed, the problem may have grown larger as the budget window moves forward and the opportunity to save resources in the meanwhile with a more vigorous adjustment is lost.

Defining sustainability as a non-violation of predetermined levels of deficits and debt is simply not useful because (as discussed earlier) those indicators alone do not fully reveal the budget and real economic implications of alternative ways of achieving fiscal sustainability and economic convergence. The simple projections of future debt and deficit levels also do not comprehensively reveal the sources of economically meaningful imbalances – not just in overall budgets, but also in terms of net payments to different sub-groups, such as young, old, and future generations. The traditional fiscal metrics do not permit answers to several important questions such as: How decision makers rank alternative policies that result in the same – say, slightly lower – debt and deficit trajectories? Who benefits and who loses under each alternative, and what is the likely impact on the economy? Obviously, policymakers should be provided ways for answering such questions but traditional measures and a short-horizon focus would be insufficient. There appears to be no short cut to specifying sustainability in terms of comprehensive forward-looking measures as described earlier. More work is needed to complement existing theoretical developments with empirical information in order to improve the quality of long-term sustainability estimates.

Another issue concerns the incorporation of future policy changes that have already been enacted. The calculations reported in this chapter are based on current (2005) levels of taxes, transfers, and government purchases. However, if cuts in pension benefits or revenue-increasing measures are already scheduled in the laws – information that is unavailable to the author at the time of writing – those policies should be incorporated into FI and GI calculations because they are consistent with the definition of “current policy.” A note of caution needs to be registered, however, that not all scheduled policies may be politically or economically feasible and some may be very unlikely. In addition, future policies may be incompletely specified – say, scheduled to terminate at a certain date with no indication of what would occur thereafter. Although such policy environments do exist, they make it difficult to implement long-range calculations of FI and GI measures. In such cases, providing ranges of FI and GI estimates under alternative policy projections would be more appropriate – and still better than fiscal reporting exclusively on the basis of traditional short-horizon measures.

3.6 Conclusion

This chapter began by observing that EU countries are undergoing twin transitions: a demographic transition wherein the populations of most EU countries are aging and an economic transition resulting from the adoption of a single currency and associated adjustments in fiscal constraints and agreements. These processes are likely to impose severe and conflicting pressures on policymakers, on the one hand, to increase deficit spending to support expanding retiree cohorts and, on the other, to limit deficits and debt in order to continue expanding a heretofore successful process of monetary unification.

This chapter proposes the adoption of an extended framework of budget accounting and reporting within the context of the SGP's long-term fiscal policy surveillance requirement. Among the several available fiscal measures, this chapter argues for adopting fiscal and generational imbalance measures because they can potentially incorporate comprehensive and policy relevant information about the future implications of continuing current policies. The baseline FI and GI estimates can be supplemented with their demographic, budget allocation, productivity growth, and cohort-distribution policy components. The advantage of doing so is to present policymakers with tools for comparing inter-country differences in fiscal stances and for evaluating the feasibility and likely economic effects of alternative policy options.

This chapter argues in detail why traditional debt and deficit measures can be potentially misleading as measures of a government's fiscal stance. It also argues that accrual-accounting approaches, although already adopted by several countries, are less appropriate for government entities than for private ones. Among generational accounting and fiscal and generational imbalances, the two latter measures appear simpler to communicate and can be more easily integrated into existing budget reports – as demonstrated through a prototype reporting template described in this chapter.

This chapter also provides provisional estimates of fiscal imbalances for 23 EU countries and for the EU benchmark case under a projection horizon extending from 2004 through 2051. Although they are based on provisional and incomplete data, they are likely to be reasonably accurate estimates of prevailing fiscal imbalances in EU member countries and of the sources of inter-country differences. The estimated fiscal imbalances are quite large for many EU countries. On average, EU countries face a Fiscal Imbalance of 8.3 percent of the present value of GDP projected through 2051. That implies a considerable shortfall of resources to pay for social transfers and other general government expenditures during the next four or five decades.

The estimates show considerable differences in underlying demographics and budget allocations that generate the country-specific FI values. In addition, the results show a much higher rate of accruing fiscal costs compared to public balances reported under traditional and backward-looking budget measures. Those accruals suggest the need to adopt fiscal adjustments to resolve outstanding EU fiscal imbalances sooner rather than later.

Future fiscal adjustments would involve combinations of tax increases or reductions in social and other expenditures. On balances, it appears that EU countries need to undergo a third transition in order to facilitate a resolution of outstanding fiscal imbalances – one that results in a retrenchment in the existing system of social protections—if only because the current protections appear to be unaffordable. Attempting to redress existing fiscal

imbalances through yet higher taxes would exacerbate the already high tax rates that EU citizens are facing – 40 percent for the EU benchmark economy.

Finally, one response to the fiscal measures proposed in this chapter is that different underlying assumptions may generate wide variations in estimates of fiscal and generational imbalances and in their ratios to GDP or tax bases. However, that does not constitute an argument against adopting such measures; instead, it suggests a reason to supplement them with estimates of the associated uncertainty. The usual response to uncertainty is to be “cautious” about embracing long-term measures. However, under rapid population aging and prospects of steep increases in the costs of social insurance programs, a policy of “wait and see” may be just as dangerous as it could deprive policymakers of key information on policy trade-offs and cause more delays in adopting fiscal reforms. Indeed, large changes in fiscal imbalances due to small changes in underlying economic assumptions (discount and growth rates, etc.) is *more* likely if the underlying long-term future fiscal shortfalls are larger rather than smaller. But if that is the case, it indicates the need for haste rather than caution in adopting the fiscal measures suggested herein.

Table 3.1 Total Revenues, Total Expenditures, Budget Balances, and Consolidated Debt Levels (2004) - EU Countries and EU Average

Country	Millions of				GDP	Percent of GDP			
	Total Revenues	Total Outlays	Surplus(+)/ Deficit(-)	General Govt. Debt		Total Revenues	Total Outlays	Surplus(+)/ Deficit(-)	General Govt. Debt
Belgium	134,843	140,417	-5,574	272,874	288,089	46.8	48.7	-1.9	94.7
Denmark	97,996	108,077	-10,080	84,000	197,222	49.7	54.8	-5.1	42.6
Germany	880,780	1,038,040	-157,260	1,451,000	2,215,650	39.8	46.9	-7.1	65.5
Greece	62,703	83,270	-20,567	182,702	168,417	37.2	49.4	-12.2	108.5
Spain	293,926	325,095	-31,169	388,495	837,316	35.1	38.8	-3.7	46.4
France	743,826	880,553	-136,727	1,069,165	1,659,020	44.8	53.1	-8.2	64.4
Ireland	45,282	50,072	-4,791	43,743	147,569	30.7	33.9	-3.2	29.6
Italy	564,912	657,167	-92,255	1,441,879	1,388,870	40.7	47.3	-6.6	103.8
Luxembourg	10,461	11,696	-1,235	1,782	27,056	38.7	43.2	-4.6	6.6
Netherlands	187,204	227,535	-40,331	256,924	488,642	38.3	46.6	-8.3	52.6
Austria	104,181	118,255	-14,074	150,649	235,819	44.2	50.1	-6.0	63.9
Portugal	37,945	65,668	-27,722	83,781	143,029	26.5	45.9	-19.4	58.6
Finland	66,082	76,505	-10,423	67,270	151,935	43.5	50.4	-6.9	44.3
Sweden	143,857	159,814	-15,957	144,066	282,014	51.0	56.7	-5.7	51.1
United Kingdom	640,281	750,629	-110,348	684,776	1,733,603	36.9	43.3	-6.4	39.5
Cyprus									
Czech Republic	31,608	38,468	-6,860	28,069	87,205	36.2	44.1	-7.9	32.2
Estonia	2,936	3,292	-357	486	9,043	32.5	36.4	-3.9	5.4
Hungary									
Lithuania	5,163	6,007	-844	3,522	18,083	28.6	33.2	-4.7	19.5
Latvia	3,185	3,997	-812	1,547	11,157	28.5	35.8	-7.3	13.9
Malta	1,558	2,084	-526	3,211	4,316	36.1	48.3	-12.2	74.4
Poland	65,908	85,907	-19,998	94,578	203,711	32.4	42.2	-9.8	46.4
Slovakia	8,315	13,434	-5,119	14,560	33,863	24.6	39.7	-15.1	43.0
Slovenia	10,408	12,396	-1,988	7,697	26,146	39.8	47.4	-7.6	29.4
EU Benchmark*	180,146	211,234	-31,088	281,599	450,338	40.0	46.9	-6.9	62.5

Note: * Population-weighted per capita values multiplied by EU benchmark population (= total EU population divided by 23).

Source: Author's calculations based on data from Eurostat.

Table 3.2 Long-term Budget Reporting

a) Budget Report - Country X (€ billion)

	2006	2007	2008	2009	2010
Current Budget					
Total Current Receipts					
Total Current Outlays					
Current Surplus(+) / Deficit(-)					
Capital Budget					
Net Investment					
Net Borrowing					
Public Sector Net Debt - end of year					

b) Future Implications of Current Policies

Fiscal Imbalance (Open-group obligations through year ...)					
Annual Change					
Interest Accrual					
Shift in Projection Window					
Program 1: (Public Pensions)					
Fiscal Imbalance					
Generational Imbalance					
Present Value: Current Generations' Future Net Benefits					
Assets (Claims on Rest of Government)					
Present Value of Future Generations' Net Benefits					
Program 2: (Unemployment Insurance)					
Fiscal Imbalance					
Generational Imbalance					
Present Value: Current Generations' Future Net Benefits					
Assets (Claims on Rest of Government)					
Present Value of Future Generations' Net Benefits					
Rest of Government					
Fiscal Imbalance					
Net Debt Outstanding					
Present Value of Excess Future Outlays over Revenues					
Present Value of Future Outlays					
Present Value of Future Revenues					
Liability to Program 1					
Liability to Program 2					
...					
...					

Table 3.3 Annual Changes in Fiscal Imbalances: Interest Accruals and Shifting the Projection Window

Country	Measure	2004	2005	2006	2007	2008	2009	2010	2004	2005	2006	2007	2008	2009	2010
		€ billions							FI as percent of PV_GDP and annual change and components as percent of annual GDP)						
EU Benchmark	Fiscal imbalance	1,971.1	2,050.9	2,133.2	2,218.1	2,305.6	2,395.8	2,488.6	8.3	8.6	8.9	9.3	9.6	10.0	10.4
	Annual change	-	79.8	82.3	84.9	87.5	90.2	92.8	-	17.6	18.0	18.4	18.8	19.3	19.8
	Interest accrual	-	46.9	48.8	50.8	52.8	54.9	57.0	-	10.3	10.7	11.0	11.4	11.7	12.1
	Shift in projection window	-	32.9	33.5	34.1	34.7	35.3	35.8	-	7.3	7.3	7.4	7.5	7.5	7.6
Belgium	Fiscal imbalance	853.8	886.5	920.1	954.7	990.2	1,026.9	1,064.6	5.9	6.1	6.3	6.6	6.8	7.0	7.3
	Annual change	-	32.6	33.6	34.6	35.6	36.6	37.7	-	11.3	11.6	11.9	12.2	12.5	12.8
	Interest accrual	-	20.3	21.1	21.9	22.7	23.6	24.4	-	7.0	7.3	7.5	7.8	8.0	8.3
	Shift in projection window	-	12.3	12.5	12.7	12.9	13.1	13.2	-	4.3	4.3	4.4	4.4	4.5	4.5
Denmark	Fiscal imbalance	753.5	781.6	810.6	840.5	871.3	903.2	936.0	7.8	8.1	8.4	8.7	9.0	9.3	9.6
	Annual change	-	28.1	29.0	29.9	30.8	31.8	32.9	-	14.2	14.6	15.1	15.5	16.0	16.4
	Interest accrual	-	17.9	18.6	19.3	20.0	20.7	21.5	-	9.1	9.4	9.7	10.1	10.4	10.8
	Shift in projection window	-	10.2	10.4	10.6	10.8	11.1	11.4	-	5.2	5.2	5.3	5.5	5.6	5.7
Germany	Fiscal imbalance	9,263.4	9,605.9	9,957.5	10,318.2	10,688.3	11,067.8	11,456.9	9.2	9.5	9.9	10.2	10.6	11.0	11.4
	Annual change	-	342.5	351.5	360.7	370.1	379.5	389.1	-	15.4	15.8	16.2	16.6	17.0	17.5
	Interest accrual	-	220.5	228.6	237.0	245.6	254.4	263.4	-	9.9	10.3	10.6	11.0	11.4	11.8
	Shift in projection window	-	122.1	122.9	123.7	124.5	125.1	125.7	-	5.5	5.5	5.6	5.6	5.6	5.6
Greece	Fiscal imbalance	1,470.4	1,539.2	1,610.7	1,685.0	1,762.3	1,842.5	1,925.8	10.9	11.4	11.9	12.5	13.1	13.7	14.3
	Annual change	-	68.8	71.5	74.3	77.2	80.2	83.3	-	39.8	40.5	41.1	41.7	42.3	43.0
	Interest accrual	-	35.0	36.6	38.3	40.1	41.9	43.9	-	20.3	20.7	21.2	21.6	22.1	22.6
	Shift in projection window	-	33.8	34.9	36.0	37.1	38.3	39.4	-	19.6	19.7	19.9	20.1	20.2	20.3
Spain	Fiscal imbalance	2,044.7	2,129.9	2,217.0	2,306.1	2,397.1	2,490.1	2,585.1	5.4	5.6	5.8	6.1	6.3	6.5	6.8
	Annual change	-	85.2	87.1	89.1	91.0	93.0	95.0	-	10.1	10.3	10.4	10.7	10.9	11.2
	Interest accrual	-	48.7	50.7	52.8	54.9	57.1	59.3	-	5.8	6.0	6.2	6.4	6.7	7.0
	Shift in projection window	-	36.5	36.4	36.3	36.1	35.9	35.7	-	4.3	4.3	4.3	4.2	4.2	4.2

Table 3.3 (continued)

Country	Measure	2004	2005	2006	2007	2008	2009	2010	2004	2005	2006	2007	2008	2009	2010
		€ billions							FI as percent of PV_GDP and annual change and components as percent of annual GDP)						
France	Fiscal imbalance	9,111.0	9,479.2	9,858.9	10,250.6	10,654.6	11,071.1	11,500.5	9.7	10.0	10.4	10.8	11.2	11.6	12.0
	Annual change	-	368.2	379.7	391.7	404.0	416.5	429.3	-	22.0	22.5	23.0	23.5	24.0	24.6
	Interest accrual	-	216.8	225.6	234.6	244.0	253.6	263.5	-	13.0	13.4	13.8	14.2	14.6	15.1
	Shift in projection window	-	151.4	154.1	157.1	160.0	162.9	165.9	-	9.0	9.1	9.2	9.3	9.4	9.5
Ireland	Fiscal imbalance	599.7	639.3	681.1	725.2	771.6	820.4	871.6	3.4	3.6	3.9	4.1	4.3	4.5	4.8
	Annual change	-	39.6	41.8	44.1	46.4	48.8	51.2	-	25.9	26.3	26.7	27.1	27.5	27.9
	Interest accrual	-	14.3	15.2	16.2	17.3	18.4	19.5	-	9.3	9.6	9.8	10.1	10.4	10.6
	Shift in projection window	-	25.4	26.6	27.9	29.1	30.4	31.7	-	16.6	16.7	16.9	17.0	17.2	17.3
Italy	Fiscal imbalance	5,054.0	5,224.2	5,398.2	5,576.0	5,757.7	5,943.5	6,133.4	9.7	10.1	10.4	10.8	11.1	11.5	11.9
	Annual change	-	170.2	173.9	177.8	181.8	185.8	189.9	-	12.3	12.7	13.1	13.5	13.9	14.4
	Interest accrual	-	120.3	124.3	128.5	132.7	137.0	141.5	-	8.7	9.1	9.5	9.9	10.3	10.7
	Shift in projection window	-	50.0	49.6	49.3	49.0	48.7	48.4	-	3.6	3.6	3.6	3.6	3.7	3.7
Luxembourg	Fiscal imbalance	101.7	106.6	111.6	116.8	122.1	127.7	133.4	5.1	5.3	5.5	5.7	5.9	6.2	6.4
	Annual change	-	4.8	5.0	5.2	5.4	5.6	5.8	-	17.5	17.8	18.1	18.4	18.7	19.0
	Interest accrual	-	2.4	2.5	2.7	2.8	2.9	3.0	-	8.8	9.0	9.3	9.5	9.8	10.0
	Shift in projection window	-	2.4	2.5	2.5	2.6	2.7	2.7	-	8.8	8.8	8.8	8.9	8.9	9.0
Netherlands	Fiscal imbalance	2,556.3	2,655.2	2,757.3	2,863.1	2,972.4	3,085.5	3,202.4	9.0	9.4	9.7	10.0	10.4	10.8	11.1
	Annual change	-	98.8	102.2	105.7	109.3	113.1	116.9	-	20.0	20.5	21.0	21.5	22.0	22.5
	Interest accrual	-	60.8	63.2	65.6	68.1	70.7	73.4	-	12.3	12.7	13.0	13.4	13.8	14.2
	Shift in projection window	-	38.0	39.0	40.1	41.2	42.3	43.5	-	7.7	7.8	8.0	8.1	8.2	8.4
Austria	Fiscal imbalance	967.1	1,005.1	1,044.2	1,084.3	1,125.5	1,167.8	1,211.2	8.5	8.8	9.1	9.5	9.8	10.1	10.5
	Annual change	-	38.1	39.1	40.1	41.2	42.3	43.4	-	16.1	16.5	16.9	17.2	17.6	18.0
	Interest accrual	-	23.0	23.9	24.9	25.8	26.8	27.8	-	9.7	10.1	10.4	10.8	11.2	11.6
	Shift in projection window	-	15.0	15.2	15.3	15.4	15.5	15.6	-	6.4	6.4	6.4	6.4	6.5	6.5

Table 3.3 (continued)

Country	Measure	2004	2005	2006	2007	2008	2009	2010	2004	2005	2006	2007	2008	2009	2010
		€ billions							FI as percent of PV_GDP and annual change and components as percent of annual GDP)						
Portugal	Fiscal imbalance	703.4	730.1	757.7	785.9	814.9	844.7	875.3	10.1	10.5	10.9	11.3	11.7	12.1	12.6
	Annual change	-	26.8	27.5	28.3	29.0	29.8	30.6	-	18.6	19.1	19.5	20.0	20.4	21.0
	Interest accrual	-	16.7	17.4	18.0	18.7	19.4	20.1	-	11.6	12.0	12.4	12.9	13.3	13.8
	Shift in projection window	-	10.0	10.1	10.2	10.3	10.4	10.5	-	7.0	7.0	7.1	7.1	7.1	7.2
Sweden	Fiscal imbalance	819.7	852.2	885.8	920.6	956.5	993.6	1,031.9	9.6	9.9	10.3	10.7	11.1	11.5	12.0
	Annual change	-	32.5	33.6	34.7	35.9	37.1	38.3	-	21.2	21.7	22.2	22.8	23.3	23.8
	Interest accrual	-	19.5	20.3	21.1	21.9	22.8	23.6	-	12.7	13.1	13.5	13.9	14.3	14.7
	Shift in projection window	-	13.0	13.3	13.7	14.0	14.3	14.6	-	8.5	8.6	8.7	8.9	9.0	9.1
Finland	Fiscal imbalance	1,214.6	1,264.1	1,315.5	1,369.1	1,424.7	1,482.5	1,542.6	7.3	7.6	7.8	8.1	8.4	8.7	9.1
	Annual change	-	49.5	51.5	53.5	55.6	57.8	60.0	-	17.4	17.9	18.3	18.8	19.4	19.9
	Interest accrual	-	28.9	30.1	31.3	32.6	33.9	35.3	-	10.1	10.4	10.7	11.0	11.4	11.7
	Shift in projection window	-	20.6	21.4	22.2	23.1	23.9	24.7	-	7.2	7.4	7.6	7.8	8.0	8.2
United Kingdom	Fiscal imbalance	7,666.1	8,009.6	8,366.4	8,736.9	9,121.6	9,520.7	9,934.5	6.4	6.7	7.0	7.3	7.6	7.9	8.2
	Annual change	-	343.5	356.7	370.5	384.7	399.1	413.8	-	19.5	19.9	20.3	20.7	21.1	21.6
	Interest accrual	-	182.5	190.6	199.1	207.9	217.1	226.6	-	10.3	10.6	10.9	11.2	11.5	11.8
	Shift in projection window	-	161.1	166.1	171.4	176.7	182.0	187.2	-	9.1	9.3	9.4	9.5	9.6	9.8
Cyprus	Fiscal imbalance	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Annual change	-	0.0	0.0	0.0	0.0	0.0	0.0	-	0.00	0.00	0.00	0.00	0.00	0.00
	Interest accrual	-	0.0	0.0	0.0	0.0	0.0	0.0	-	0.00	0.00	0.00	0.00	0.00	0.00
	Shift in projection window	-	0.0	0.0	0.0	0.0	0.0	0.0	-	0.00	0.00	0.00	0.00	0.00	0.00
Czech Republic	Fiscal imbalance	514.0	538.6	564.1	590.5	618.0	646.5	675.9	8.6	9.0	9.5	9.9	10.4	10.9	11.4
	Annual change	-	24.6	25.5	26.5	27.5	28.5	29.5	-	27.6	28.2	28.7	29.3	29.8	30.3
	Interest accrual	-	12.2	12.8	13.4	14.1	14.7	15.4	-	13.8	14.2	14.6	15.0	15.4	15.8
	Shift in projection window	-	12.3	12.7	13.1	13.4	13.7	14.1	-	13.9	14.0	14.2	14.3	14.4	14.5

Table 3.3 (continued)

Country	Measure	2004	2005	2006	2007	2008	2009	2010	2004	2005	2006	2007	2008	2009	2010
		€ billions							FI as percent of PV_GDP and annual change and components as percent of annual GDP)						
Estonia	Fiscal imbalance	41.0	43.9	47.1	50.5	54.1	58.0	62.2	3.2	3.4	3.7	3.9	4.2	4.6	4.9
	Annual change	-	3.0	3.2	3.4	3.6	3.9	4.2	-	31.1	31.9	32.9	33.8	34.6	35.5
	Interest accrual	-	1.0	1.0	1.1	1.2	1.3	1.4	-	10.3	10.5	10.8	11.1	11.5	11.8
	Shift in projection window	-	2.0	2.1	2.3	2.4	2.6	2.8	-	20.8	21.4	22.0	22.6	23.2	23.7
Hungary	Fiscal imbalance	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Annual change	-	0.0	0.0	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0	0.0
	Interest accrual	-	0.0	0.0	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0	0.0
	Shift in projection window	-	0.0	0.0	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0	0.0
Lithuania	Fiscal imbalance	89.5	95.4	101.7	108.5	115.7	123.4	131.5	3.8	4.0	4.3	4.6	4.9	5.3	5.6
	Annual change	-	5.9	6.3	6.8	7.2	7.7	8.1	-	31.5	32.2	33.0	33.7	34.5	35.2
	Interest accrual	-	2.1	2.3	2.4	2.6	2.8	2.9	-	11.3	11.5	11.8	12.1	12.4	12.7
	Shift in projection window	-	3.8	4.1	4.3	4.6	4.9	5.2	-	20.2	20.7	21.2	21.7	22.1	22.5
Latvia	Fiscal imbalance	68.1	72.3	76.8	81.6	86.7	92.0	97.7	4.9	5.2	5.6	6.0	6.3	6.8	7.2
	Annual change	-	4.2	4.5	4.8	5.1	5.4	5.6	-	36.5	37.2	38.0	38.7	39.4	40.1
	Interest accrual	-	1.6	1.7	1.8	1.9	2.1	2.2	-	13.9	14.2	14.5	14.8	15.2	15.6
	Shift in projection window	-	2.6	2.8	3.0	3.1	3.3	3.5	-	22.6	23.0	23.4	23.8	24.2	24.6
Malta	Fiscal imbalance	18.7	19.3	19.9	20.5	21.1	21.7	22.4	12.8	13.1	13.4	13.7	14.0	14.4	14.7
	Annual change	-	0.6	0.6	0.6	0.6	0.6	0.7	-	13.5	14.0	14.4	14.9	15.5	16.0
	Interest accrual	-	0.4	0.5	0.5	0.5	0.5	0.5	-	10.4	10.8	11.3	11.7	12.2	12.7
	Shift in projection window	-	0.1	0.1	0.1	0.1	0.1	0.1	-	3.1	3.2	3.2	3.2	3.2	3.3
Poland	Fiscal imbalance	3,162.9	3,386.9	3,626.6	3,882.8	4,156.1	4,447.3	4,757.0	9.0	9.7	10.4	11.2	12.0	12.9	13.8
	Annual change	-	224.0	239.7	256.2	273.3	291.2	309.7	-	104.4	106.1	107.7	109.3	110.8	112.2
	Interest accrual	-	75.3	80.6	86.3	92.4	98.9	105.8	-	35.1	35.7	36.3	36.9	37.6	38.4
	Shift in projection window	-	148.7	159.1	169.9	180.9	192.3	203.8	-	69.3	70.4	71.4	72.3	73.1	73.9

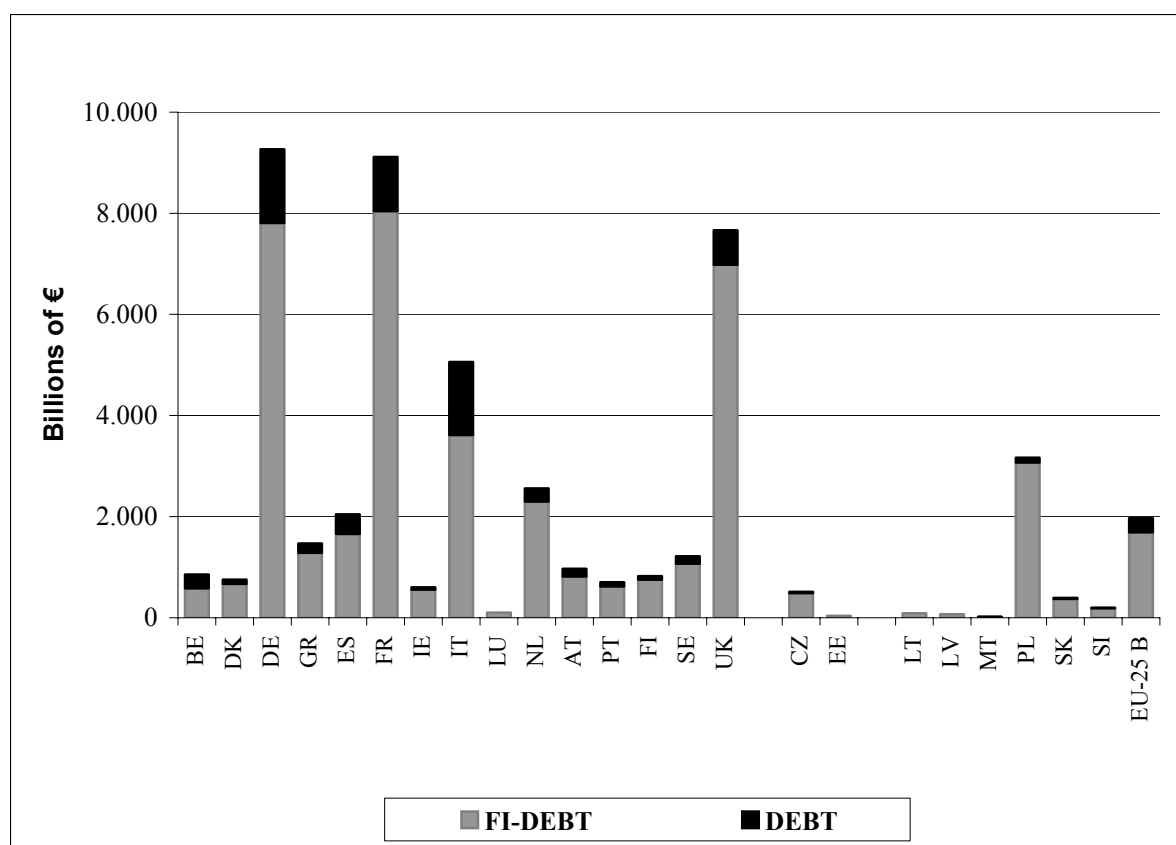
Table 3.3 (continued)

Country	Measure	2004	2005	2006	2007	2008	2009	2010	2004	2005	2006	2007	2008	2009	2010
		€ billions							FI as percent of PV_GDP and annual change and components as percent of annual GDP)						
Slovakia	Fiscal imbalance	390.7	415.7	442.3	470.5	500.4	531.9	565.1	8.7	9.3	9.9	10.6	11.3	12.0	12.8
	Annual change	-	25.1	26.6	28.2	29.8	31.5	33.3	-	70.9	72.0	73.1	74.2	75.2	76.1
	Interest accrual	-	9.3	9.9	10.5	11.2	11.9	12.7	-	26.3	26.8	27.3	27.8	28.4	29.0
	Shift in projection window	-	15.8	16.7	17.7	18.6	19.6	20.6	-	44.6	45.2	45.8	46.3	46.8	47.2
Slovenia	Fiscal imbalance	197.2	207.7	218.7	230.1	242.0	254.4	267.3	8.7	9.2	9.6	10.2	10.7	11.2	11.8
	Annual change	-	10.5	11.0	11.4	11.9	12.4	12.9	-	39.1	39.7	40.3	40.8	41.4	41.9
	Interest accrual	-	4.7	4.9	5.2	5.5	5.8	6.1	-	17.4	17.9	18.3	18.8	19.2	19.7
	Shift in projection window	-	5.8	6.0	6.2	6.4	6.6	6.8	-	21.7	21.8	22.0	22.1	22.1	22.2

Table 3.4 Comparing Public Balances and Accruing Fiscal Imbalances in EU Countries for 2005 (€ billions)

	Public Deficit	FI Accrual	Public Deficit	FI Accrual	Public Deficit	FI Accrual		
Belgium	-0.3	32.6	Luxembourg	0.6	4.8	Estonia	-0.2	3.0
Denmark	-10.2	28.1	Netherlands	1.5	98.8	Lithuania	5.4	5.9
Germany	74.0	342.5	Austria	3.7	38.1	Latvia	0.1	4.2
Greece	8.2	68.8	Portugal	8.8	26.8	Malta	0.0	0.6
Spain	-10.0	85.2	Finland	-4.1	32.5	Poland	0.2	224.0
France	49.6	368.2	Sweden	-8.4	49.5	Slovakia	6.1	25.1
Ireland	-1.6	39.6	UK	64.5	343.5	Slovenia	1.1	10.5
Italy	58.1	170.2	Czech Rep.	2.6	24.6	EU benchmark	10.6	79.8

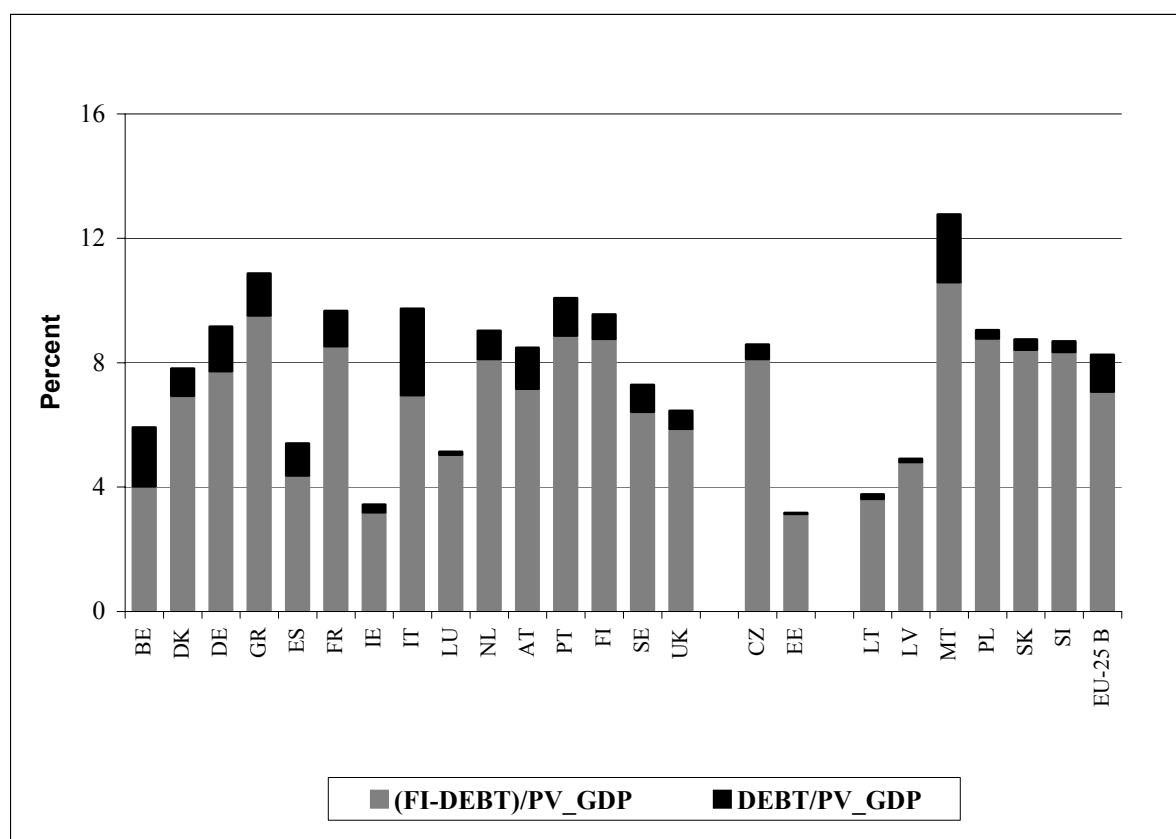
Figure 3.4 Fiscal Imbalances of EU Countries (billions of €)



	Total FI	Debt	FI-Debt		Total FI	Debt	FI-Debt
Belgium	854	273	581	Sweden	1,215	144	1071
Denmark	754	84	670	UK	7,666	685	6981
Germany	9,263	1451	7812	Cyprus			
Greece	1,470	183	1288	Czech Rep.	514	28	486
Spain	2,045	389	1656	Estonia	41	1	41
France	9,111	1069	8042	Hungary			
Ireland	600	44	556	Lithuania	90	4	86
Italy	5,054	1442	3612	Latvia	68	2	67
Luxembourg	102	2	100	Malta	19	3	16
Netherlands	2,556	257	2299	Poland	3,163	95	3068
Austria	967	151	817	Slovakia	391	15	376
Portugal	703	84	620	Slovenia	197	8	190
Finland	820	67	752	EU	1,971	282	1690
				bench'k			

Source: Author's calculations.

Figure 3.5 Imbalances of EU Countries – Percent of the Present Value of GDP



	Total FI	Debt	FI-Debt		Total FI	Debt	FI-Debt
Belgium	5.9	1.9	4.0	Sweden	7.3	0.9	6.4
Denmark	7.8	0.9	6.9	UK	6.4	0.6	5.9
Germany	9.2	1.4	7.7	Cyprus	0.0		
Greece	10.9	1.4	9.5	Czech Rep.	8.6	0.5	8.1
Spain	5.4	1.0	4.4	Estonia	3.2	0.0	3.1
France	9.7	1.1	8.5	Hungary			
Ireland	3.4	0.3	3.2	Lithuania	3.8	0.1	3.6
Italy	9.7	2.8	7.0	Latvia	4.9	0.1	4.8
Luxembourg	5.1	0.1	5.0	Malta	12.8	2.2	10.6
Netherlands	9.0	0.9	8.1	Poland	9.0	0.3	8.8
Austria	8.5	1.3	7.2	Slovakia	8.7	0.3	8.4
Portugal	10.1	1.2	8.9	Slovenia	8.7	0.3	8.3
Finland	9.6	0.8	8.8	EU bench'k	8.3	1.2	7.1

Figure 3.6 Demographic Components of Fiscal Imbalances

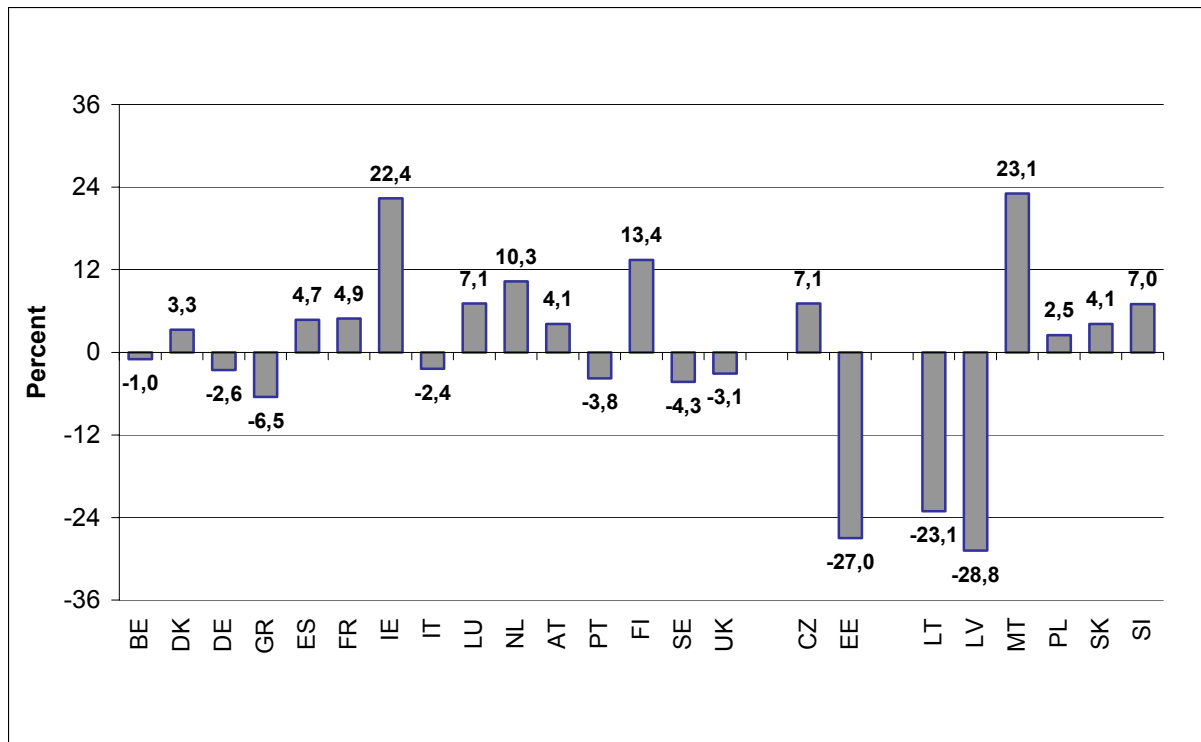


Figure 3.7 Budget Allocation Components of Fiscal Imbalances

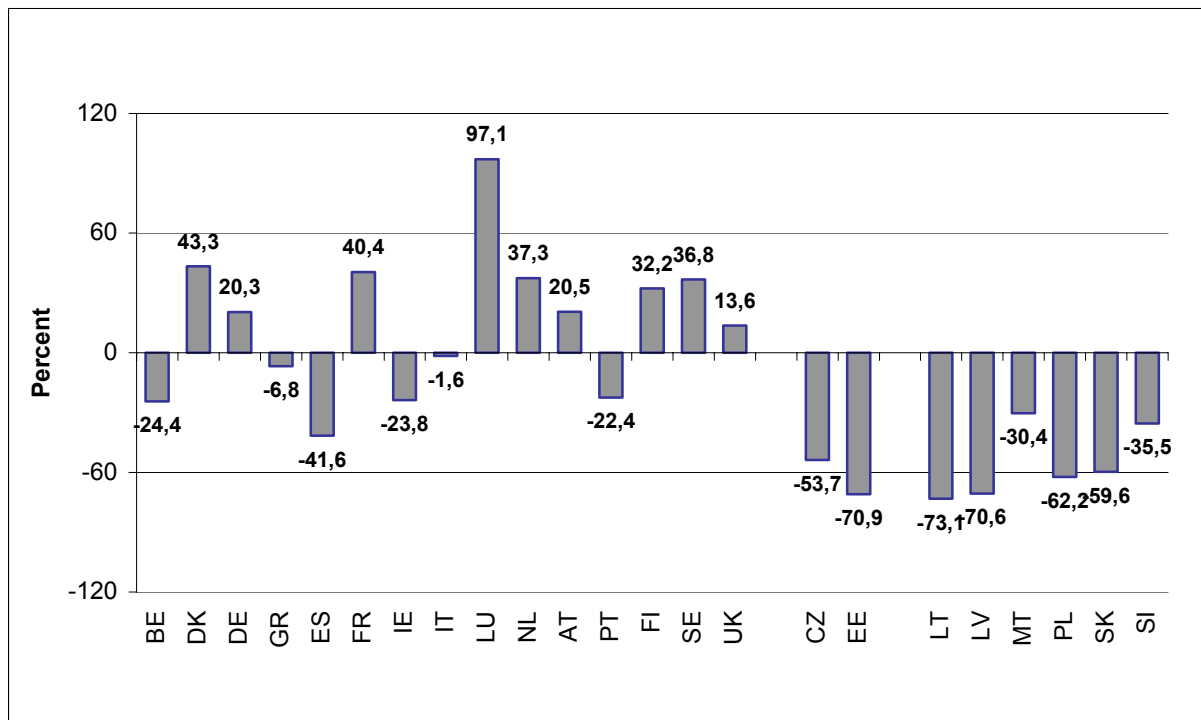
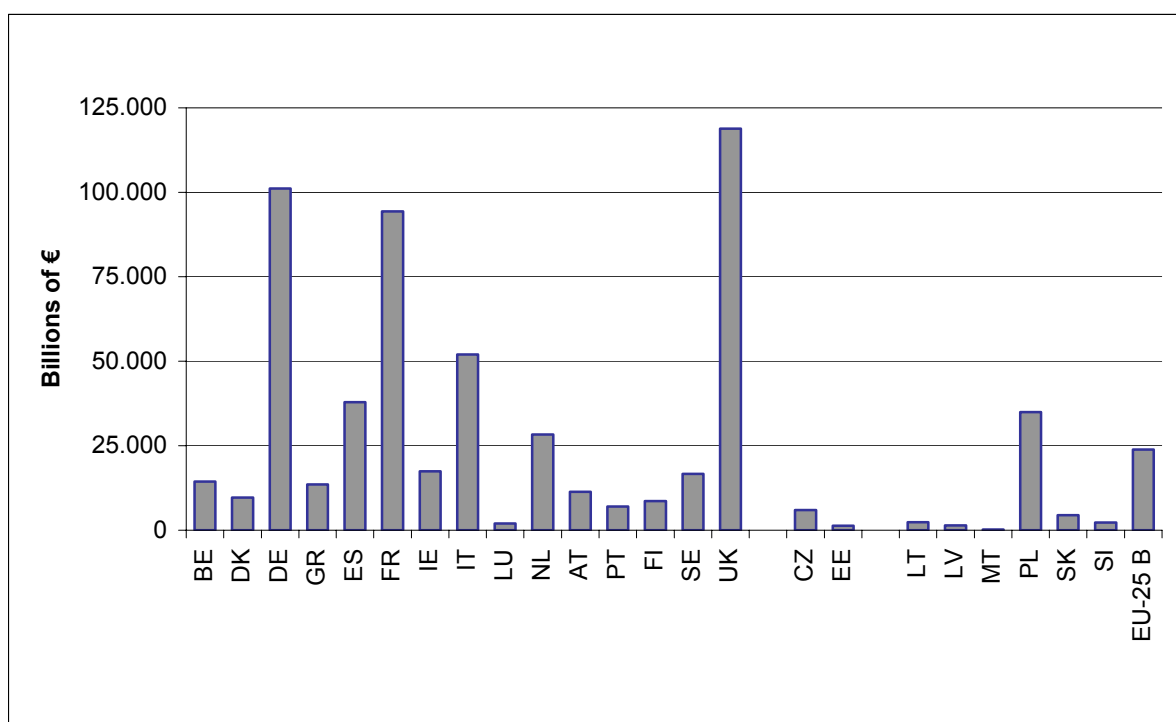


Figure 3.8 Present Value of GDP through 2051 (billions of inflation adjusted €)



	PV_GDP (€ billions)		PV_GDP (€ billions)		PV_GDP (€ billions)
Belgium	14,435	Netherlands	28,326	Hungary	
Denmark	9,653	Austria	11,401	Lithuania	2,375
Germany	101,130	Portugal	6,985	Latvia	1,387
Greece	13,530	Finland	8,580	Malta	146
Spain	37,851	Sweden	16,682	Poland	34,970
France	94,327	UK	118,870	Slovakia	4,470
Ireland	17,435	Cyprus		Slovenia	2,271
Italy	51,949	Czech Rep.	5,987	EU bench'k	23,891
Luxembourg	1,982	Estonia	1,292		

Discussion

*Per Eckefeldt**

The excellent chapter by Jagadeesh Gokhale tries to answer the crucial question on how the EU countries should cope with ageing populations in the euro area characterised by centralised monetary policy and decentralised fiscal (economic) policies. The author draws on his extensive research in the area of intertemporal allocation of resources and its implications for the design of sustainable pension policies.

This issue is highly topical in the face of population ageing in the coming decades worldwide and especially in Europe. In particular, the reform of the EUs fiscal framework, the Stability and Growth Pact underscores the importance of appropriately catering for long-term sustainability concerns also in the medium-term budgetary policy-making process. In more practical terms, the chapter focuses on fiscal imbalances measures. A similar measure, though with some differences, is regularly used in the EUs analysis of long-term fiscal sustainability (called the S2 sustainability gap indicator; see European Commission, 2006).

With regard to the results in the chapter, it should be noted that the chapter's estimated fiscal imbalance of some 8% of GDP (about 7% points due to implicit debt and about 1% point due to explicit debt), is considerably higher than the Commission's estimate of 3½% of GDP (according to the so-called S2 sustainability gap indicator consistent with respecting the intertemporal budget constraint of the government over an infinite horizon). An important source of difference could be the assumption of 'current policies'. Gokhale appears to assume that the tax/benefit structure of age and gender remains unchanged over time (a preliminary assumption that may need to be modified). The Commission's data allows splitting the projected increase in the pension expenditure ratio in the EU. While the old-age dependency effect is very strong, reflecting the projected strong increase in the old-age dependency ratio (doubling in the period to 2050), this is to a considerable degree offset by a notable decrease in the benefit ratio (*i.e.* average pensions in relation to GDP per worker) and also to some extent by lower take-up ratio (see again European Commission, 2006).

This results from the fact that the EUs long-term budgetary projections explicitly model the institutional settings in each Member State with respect to pensions. In many cases, this implies that public spending on pensions on average will rise slower than average income in the future, due to pension system reforms aimed at exactly containing spending pressures arising from an increased number of older people.

The impact of reforms is very important in the EU fiscal surveillance. In particular, with the reform of the SGP, the medium-term objectives for the government budgetary position should fulfil a triple aim: (i) provide a safety margin with respect to the 3% of

* The views expressed in this chapter are those of the author and are not attributable to the European Commission.

GDP deficit limit; (ii) ensure rapid progress towards sustainability; and, (iii) taking account of the first two, allow room for budgetary manoeuvre and in particular public investment. The MTOs should furthermore be revised when a major reforms that improve fiscal sustainability have been undertaken, or at least every four years. It would be an advantage if fiscal indicators reflected the long-term budgetary impact of major reforms and the design of fiscal imbalance indicators therefore was made in such a way that they displayed this desirable property.

The fiscal imbalance measure proposed in the chapter could actually underestimate the sustainability challenge. Indeed, if there is a fiscal imbalance after the last year (*i.e.* 2051), or, if there is an ageing impact also beyond that year, this would not be captured by the measure. This would, as for example in the mainstream US Congressional Budget Office (CBO) calculations, give rise to the ‘rolling window’ problem; when the horizon is extended, an additional imbalance is added. Fiscal indicators for assessing the long-term sustainability of public finances should gainfully reflect the size of the fiscal challenge, or imbalance over the long-term. The design of fiscal imbalance indicators could therefore be made in a way so that they avoid possible underestimation of the size of the challenge by opting for an infinite horizon rather than an ad hoc cut-off point, as indeed highlighted in the chapter.

Part II

The Measurement of the Underlying Budgetary Position and Discretionary Fiscal Policy

4.

Budget Balances Decomposed: Tracking Fiscal Policy in Austria

*Peter Brandner, Leopold Diebalek, and Walpurga Köhler-Töglhofer**

4.1 Introduction and Motivation

The Maastricht Treaty and the Stability and Growth Pact (SGP) stipulate that budget balances in EU countries should be balanced over the business cycle, since this would allow automatic stabilisers to work properly in cushioning cyclical fluctuations and to create some room for discretionary policy. Hence, in order to act in accordance with the intention of the SGP, governments should avoid pro-cyclical policies in recessions and strive for budgetary consolidation during economic booms; in other words, governments should behave counter-cyclically and react symmetrically to output fluctuations. This “ideal” notwithstanding, there is some evidence that fiscal policy behaved more pro-cyclically than counter-cyclically in the past decades. Thus the question arises to which extent a fiscal policy regime change is or would have been necessary in order for governments to comply with the spirit of the European fiscal rules.

In order to analyse this issue for a country – as we do for Austria in this chapter – one has to assess whether discretionary fiscal policy has actually offset or reinforced the operation of automatic fiscal stabilisers, whether there have been significant transitory variations in the fiscal position unrelated to business cycle fluctuations, and what the behaviour of the underlying (“core”) fiscal position over time has been. The variability of the latter reflects discretionary measures not related to the cycle, such as permanent consolidation measures, measures aiming at distributional and allocative/structural goals or effects of macroeconomic shocks, demographic changes, etc.

The economic cycle affects a government’s fiscal position – this is all but new. Correcting budget balances for the effects of the business cycle in general gives a better measure of the policy-related part of the budget and reduces the simultaneity bias that may arise as budgets and economic growth interact. The conventional approach relies on adjusting the budget balance for the impact of the automatic stabilisers, i.e. decomposing the budget balance into two components: the cyclically adjusted balance and the automatic stabiliser component (or cyclical component). Adjusting the budget balance for the impact of the automatic stabilisers is only appropriate, for example, for predicting the room for discretionary stabilisation policy measures in an economic slowdown, given a threshold for the general government deficit (since in this case the cyclical component should indeed be limited to effects of the automatic stabilisers). If, however, the aim is to analyse the policy behaviour related to macroeconomic developments, the adjustment

* The views expressed herein are those of the authors and should not be attributed to the Federal Ministry of Finance, Austria and the Oesterreichische Nationalbank. We are grateful to Jonas Fischer for helpful comments.

should also include discretionary fiscal measures that have been a normal feature of a country's stabilisation policy (Boije, 2004).

On closer inspection, however, the cyclically adjusted budget balance contains several components that capture different dimensions of fiscal policy, such as a core balance describing the underlying fiscal position; a component reflecting discretionary fiscal policy responses to the business cycle that can move either pro- or counter-cyclically with the output gap; and a residual component capturing all remaining shocks to the fiscal position, reflecting transitory changes in the fiscal position due to non-stabilisation-oriented discretionary policy and/or macroeconomic shocks.⁵⁰ Disregarding these latter aspects could provide an explanation for the sometimes quite substantial variations of cyclically adjusted balances during the cycle.

Following an approach suggested by Jaeger (1998) and expanded by Brandner and Diebalek (2000), we track fiscal policy behaviour over time by decomposing the observed budget balance (as a percentage of GDP) into four unobserved components: (1) a core balance, (2) an automatic or built-in fiscal stabiliser component, (3) a component reflecting discretionary fiscal policy responses to the business cycle, and (4) a component reflecting all other transitory shocks to the fiscal position.

By means of an unobserved components (UC) model, we provide an estimate of a core balance for Austria. For this purpose we analyse the relationship between the budget balance and the cyclical development of the Austrian economy by looking at the impact of both automatic stabilisers and discretionary policies aimed at output stabilisation – with particular attention to the latter.⁵¹ By doing this, we can assess whether fiscal policy in a broader sense was pro- or counter-cyclical or reacted asymmetrically in up- or downturns. Moreover, by looking at disaggregated data, we can answer the question whether the pro-cyclicality / counter-cyclicality was related primarily to the expenditure or the revenue side.

In section 4.2 we discuss some related literature before we move on to explain the methodology chosen in section 4.3. Section 4.4 is devoted to the discussion of the main results of our study; in section 4.5 we draw some conclusions.

4.2 Related Literature

The behaviour of fiscal policy over the business cycle has received increasing attention from researchers in recent years. The conventional wisdom is that fiscal policy should be counter-cyclical, stabilising economic growth around potential. In a recession, this would call for higher deficits, while in a boom a contractionary budget would help dampen cyclical upswings and prevent the economy from overheating. This “ideal”

⁵⁰ Galí and Perotti (2003) conceptually split the cyclically adjusted budget balance into a “systematic” or “endogenous” component (a component that reflects changes in structural spending or revenues in a systematic way in response to changes in the actual or expected cyclical conditions of the economy; corresponding to γ in section 4.3) and in a “non-systematic” or “exogenous” component (that captures changes in the budget variables that do not correspond to systematic responses in cyclical conditions, but are instead the consequence of exogenous political processes of extraordinary non-economic circumstances; corresponding to what we name core balance in this paper).

⁵¹ Further research will focus on the analysis of the “driving forces” of the core balance.

notwithstanding, evidence of pro-cyclicality in fiscal policy has been uncovered in a number of studies.

Galí and Perotti (2003) show that EMU countries' fiscal policies seem to have been significantly pro-cyclical in the pre-Maastricht period. In the post-Maastricht period, however, EMU countries' fiscal policies appear to be more counter-cyclical. According to Galí and Perotti, the behaviour of discretionary fiscal policy during recessions turned from being somewhat pro-cyclical to becoming counter-cyclical. EMU countries seem to have been lagging behind non-EMU countries since they pursued largely pro-cyclical policies during the recession of the early 1990s and changed their behaviour only in the early 2000s. Galí and Perotti base their study on both a panel estimate and individual country regressions. With respect to Austria, interestingly, they find a mildly counter-cyclical fiscal policy before Maastricht (a feature that is in contrast to all other EMU countries) and a stronger counter-cyclicality in the post-Maastricht period.

Hallerberg and Strauch (2002) find pro-cyclical policies for the last three decades, at least for the EU. According to Hallerberg and Strauch, discretionary measures have tended to undermine automatic stabilisers while taxes have fluctuated counter-cyclically in a conventional manner. On the expenditure side, they find that public investment displays a consistent pro-cyclical pattern. The latter was also found by Alberola *et al.* (2003).

Buti *et al.* (1997), too, state that contractionary fiscal policies prevailed during recessions and that fiscal discipline was lacking during the expansionary periods as deficits persisted during mild phases of expansions and only abated at the peaks. They conclude that the deterioration during expansions was much more marked than the strengthening of fiscal discipline during recessions, as the debt ratio grew sharply in the 1980s and the first half of the 1990s.

Pro-cyclicality of fiscal behaviour in the EMU countries has also been observed by the IMF (2004). Based on a method very similar to Galí and Perotti (2003), the study shows that the degree of pro-cyclicality reflects, *inter alia*, country-specific budgetary institutions, structural characteristics, such as the sensitivity to real disturbances, and inherited fiscal positions. According to this IMF study, pro-cyclical fiscal impulses turn out to be more pronounced in good times (loosening) than in bad times (tightening), which points to the difficulty of resisting pressures to increase spending or cut taxes in the face of revenue windfalls. The study, however, also finds that the European fiscal framework appears to have led to some reduction in pro-cyclical fiscal behaviour in EMU, owing to a more counter-cyclical policy stance in bad times that was not balanced out by sufficient deficit reduction in good times.

Also the European Commission (2001) comes to the conclusion that between 1970 and 2000 the deficits of EU countries did not fall during favourable cyclical periods, *i.e.* that the effects of the automatic built-in stabilisers were offset by countries' discretionary fiscal policies, namely by tax cuts and, in particular, by expenditure increases, which necessitated a tightening during economic downturns.

Gavin and Perotti (1997) detect that in Latin American countries – in sharp contrast to the industrial economies – fiscal policies have been pro-cyclical, and particularly so in recessions. For industrial countries they find asymmetries insofar as budget surpluses increase during good times; during bad times, however, the fiscal response to changes in output growth is much larger. In their view, for industrial countries this is consistent with

the idea that recessions are economically and/or politically more costly than output booms, and that the fiscal policy response to them is accordingly stronger. But it is also consistent with the idea that some elements of the fiscal structure, such as unemployment compensation, are relatively insensitive to the business cycle at high levels of economic activity, but become larger in deep recessions.

As pro-cyclicality contrasts with the stabilisation function of fiscal policy, a number of explanations are offered for these results, including conflicting policy goals, information problems (real-time data problems), complexity of decision-making and implementation lags. Talvi and Vegh (2000) offer a model rationalising pro-cyclical fiscal policies primarily in developing countries but also in the industrialised world – for countries with a large variability of the tax base in general. If the latter is the case, tax smoothing would require large deficits to be run in economic downturns, and high surpluses in upswings. But finance ministers may be tempted to avoid large surpluses knowing that they will nurture political pressures to spend public monies, and prefer to run a pro-cyclical policy. Tornell and Lane (1999), on the other hand, argue that the degree of political competition increases during upswings. After all, each group or power block competing for public resources knows that governments will not run surpluses during economic expansions, but that other groups will increase their appropriate share by an even greater amount. Therefore, they will compete more intensely for resources during expansions, and less so during recessions. As a consequence, fiscal policy becomes more pro-cyclical the more fragmented and open governments are to such pressures.

Yet a range of literature also points to possible asymmetries in fiscal responses to recessions and upturns. Mayes and Virén (2004) find strong evidence of asymmetric cyclical behaviour of government deficits, with these asymmetries mainly relating to the cyclically adjusted deficit. Structural deficits increase when output shrinks, but structural deficits (structural surpluses) also tend to increase (decrease) when output expands. According to Mayes and Virén, the different cyclical effects show up in both revenues and expenditures. Revenues seem to be more sensitive to output growth in depressions than in booms. Thus, in booms, the revenue/trend output ratio remains more or less constant, while in depressions it decreases quite markedly. Expenditures seem to increase in depressions and decrease in booms. They conclude that from the viewpoint of counter-cyclical fiscal policy, the main problem appears to be behaviour in “good times” when discretionary action does not seem to help smooth the output growth path.

Also the OECD (2003) concludes – on the basis of a panel estimate – that, overall, countries conducted pro-cyclical fiscal policies in cyclical upturns and counter-cyclical policies in downturns. However, sustainability problems associated with indebtedness seem to be a key determinant of whether the fiscal stance is pro-cyclical during downturns.

Forni and Momigliano (2004), using real time data, find that fiscal policy was generally counter-cyclical during adverse economic periods. They conclude that fiscal policy was more counter-cyclical at the beginning of the 1990s than during the recent downturns.

Balassone and Francese (2004), too, highlight that fiscal policies in OECD countries have been counter-cyclical mainly in downturns. While automatic stabilisers are left free to operate during downturns, during expansions their effect is compensated by discretionary loosening, which implies that budgetary balances are not improving in upturns.

Moreover, they show that overall elasticities (including the discretionary actions) are asymmetric with respect to upturns and downturns.

Tujula and Wolswijk (2004) show that fiscal policies have not operated symmetrically over the business cycle as governments have been more prone to stimulate economies in downswings via expanding budgets than to restrict economic growth in upswings via tightening budget balances.

In contrast to the above mentioned studies, Mélitz (2000) highlights that fiscal policy responds in a stabilising manner to the cycle; the automatic stabilisation through fiscal policy is, however, much weaker than generally perceived.⁵² Moreover, while expansion raises tax receipts, it also raises government expenditures. Net stabilisation therefore only occurs because of a larger reaction of taxes than expenditures. His findings are in principle in line with Wyplosz (1999), who also shows the “same mildness” of the stabilising response to the cycle. According to Wyplosz’s estimates an extra percent of output above potential raises the primary budget surplus by 0.18 (Mélitz’s estimate, in contrast, amounts to about 0.10). This actually means weak automatic stabilisation in contrast to what is usually estimated (see van den Noord (2000), Girouard and André (2005)). Lane (2003) finds that current government spending tends to be mildly counter-cyclical; however, the government consumption component of current spending, in particular wage government spending, is pro-cyclical. Hence, he concludes that the counter-cyclical behaviour of current government spending emanates from the behaviour of government transfers (automatic stabilisers) and/or debt interest payments. The most pro-cyclical component of government spending is government investment.⁵³ Hercowitz and Strawczynski (2004) – similar to Lane (2003) – find the deficit/GDP ratio to be counter-cyclical. According to their finding, this is mostly due to recessions whereas in expansions, the deficit/GDP ratio is essentially a-cyclical.

In checking for the cycle dependency of cyclically adjusted figures of the European Commission (EC), Alberola *et al.* (2003) by means of a panel estimate conclude that the cyclical component seems to be overestimated, which means that the cyclically adjusted balances tend to be overestimated during downturns and underestimated during expansions. According to their findings, the overall impact seems, however, to be counter-cyclical in general. In their opinion this result might signal a problem with the computation of elasticities, which turn out to be too high; at the same time, the results could capture a systematic discretionary reaction of governments to developments in economic activity. But, as they state, it does not appear to be easy to disentangle the two possibilities from each other.

The approaches taken for investigating the cyclical-related impact of fiscal policies (from built-in stabilisers as well as from deliberate policy decision) are quite heterogenous. Some studies analyse overall changes in the budget balance (primary or total), without distinguishing between discretionary actions and automatic stabilisers (e.g. Mélitz (2000), Balassone and Francese (2004), Tujula and Wolswijk (2004), Lane (2003), Mayes and Virén (2004), Fatás and Mihov (2001)) whereas others analyse changes in the cyclically

⁵² According to Wyplosz (2002) this mildly stabilizing response (coefficients of 0.1-0.2 instead of around 0.5) could be an effect of the extension of the sample period to include the 1990s, an atypical period of low growth and closing down of the deficit to meet the Maastricht convergence criteria. It may also reflect the combination of the counter-cyclical automatic stabilizers, with an elasticity of 0.5, with discretionary pro-cyclical actions.

⁵³ Also Alberola *et al.* (2003) confirm this result.

adjusted balances (e.g. Alberola *et al.* (2003), OECD (2003), Forni and Momigliano (2004)) or the impact on the level of cyclically adjusted primary balances (e.g. Galí and Perotti (2003)).

4.3 A Stylised Framework

Several techniques have been developed to estimate the variations of budget aggregates arising from the economic cycle.⁵⁴ The conventional approach (e.g. EC, OECD, IMF) to correct budget balances for fluctuations in economic activity starts from a notional decomposition of the observed budget balance b_t into two (unobserved) components: the cyclically adjusted budget balance bs_t , often called "structural" balance, and a cyclical component ba_t aimed at capturing the built-in stabilisers. To adequately estimate the cyclical component ba_t , various methods have been developed by international institutions such as the EC, the OECD, the IMF and the ECB. Within these approaches, the structural balance bs_t is defined as the difference between the observed and the cyclical balance, $bs_t = b_t - ba_t$. Obviously, any other dimension of fiscal policy, even if it is related with the cycle, shows up in the structural component.

However, if the focus is on the development of the underlying fiscal position (adjusted for all temporary impacts irrespective of whether they are "economy dependent or policy dependent"⁵⁵ (Braconier and Forsfält, 2004, p.4)) a direct calculation of the structural balance as a "long-run component" via specific filtering techniques (see Brandner *et al.*, 1998) may be more appropriate. If so, the effects of the built-in stabilisers as well as cyclically related discretionary measures are captured in the resulting "cyclical" component $ba_t = b_t - bs_t$.

To analyse the issues raised, we set up a framework that allows distinguishing between several dimensions of fiscal policy, short-run vs. long-run, and active vs. passive. We start with a quite general decomposition

$$b_t = \mu_t + ba_t + bd_t + \varepsilon_t \quad (4.1)$$

of the actual/observed balance b_t into the core balance μ_t , two cyclically related components - namely ba_t capturing the impact of the automatic stabilisers, and bd_t capturing the discretionary policy in response to the cycle - and a residual component ε_t reflecting all remaining (temporary) effects ("fiscal noise"). To be more precise, we specify

$$ba_t = \alpha_t \cdot I_t^a \quad (4.2.1)$$

$$bd_t = \gamma_t \cdot I_t^d \quad (4.2.2)$$

⁵⁴ However, all these techniques are subject to a number of methodological problems, notably defining trend/potential output – a shortcoming that unfortunately is also valid for our approach.

⁵⁵ I.e. pro- or countercyclical discretionary policy measures such as a temporary increase in the volume of labour-market programmes due to political decisions.

I_t^a and I_t^d are indicators for the cyclical developments which will be specified later on, and α_t and γ_t are the corresponding sensitivities/elasticities. The use of different indicators of the cyclical development is motivated by the fact that in general policy-makers do not necessarily respond to variables economists have in mind.

Inserting (4.2.1) and (4.2.2) in (4.1) constitutes our unobserved component model specification, naturally cast as a state-space system. The measurement/signal equation

$$b_t = \mu_t + \alpha_t \cdot I_t^a + \gamma_t \cdot I_t^d + \varepsilon_t \quad (4.3.1)$$

links the observed balance to its components, while the state/transition equations

$$\mu_{t+1} = \mu_t + \eta_{t+1} \quad \eta_t \sim \text{iid } N(0, \sigma_\eta) \quad (4.3.2)$$

$$\alpha_{t+1} = \alpha_t + \psi_{t+1} \quad \psi_t \sim \text{iid } N(0, \sigma_\psi) \quad (4.3.3)$$

$$\gamma_{t+1} = \gamma_t + \zeta_{t+1} \quad \zeta_t \sim \text{iid } N(0, \sigma_\zeta) \quad (4.3.4)$$

describe the dynamics of the states. In the estimation, the log-likelihood is constructed using the Kalman filter.⁵⁶

Equation (4.3.2) specifies the core balance as a random walk, the innovations η_t capturing fiscal shocks that have a permanent or enduring impact on the level of the budget balance. Similarly, equations (4.3.3) and (4.3.4) set up the automatic sensitivity of the budget balance α_t and the policy response γ_t as random walks. While a positive (negative) sign of γ_t typically indicates a counter-cyclical (pro-cyclical) reaction of discretionary fiscal policy, the sign is interpreted just the other way round in the case of expenditure variables. In principle, all three state equations could be generalised to include exogenous variables. We take (4.3.1)–(4.3.4) as a transparent, easy-to-use device to decompose budget balances.

In the general representation (4.3.2)–(4.3.4) the states – and hence budget components – are assumed to move stochastically. If the estimation yields very small variances, this is an indication that the corresponding component is rather deterministic. In such a case, the model can be simplified by setting disturbances to zero (the states would then enter (4.3.1) as recursive coefficients).

Since the focus of our interest lies primarily on the impact of the policy response to cyclical developments (rather than on the automatic stabilisers), we can estimate a smaller, “reduced model” for the structural balance bs_t , consisting of the measurement equation

$$bs_t = \mu_t + \gamma_t \cdot I_t^d + \varepsilon_t \quad (4.4)$$

and state equations (4.3.2) and (4.3.4).

⁵⁶ Estimations have been carried out with RATS v6.

By taking the cyclically adjusted (primary) budget balance $bs_t = b_t - ba_t$, as calculated by the European Commission as dependent variables,⁵⁷ we refrain from estimating the cyclical component, which is thus $ba_t = \alpha_t \cdot I_t^a = \alpha \cdot GAP_t$.

If, however, the discretionary policy response component and the automatic stabiliser component respond to the same cyclical indicator I^c , general equation (4.3.1) is reduced to

$$b_t = \mu_t + (\alpha + \gamma)_t \cdot I_t^c + \varepsilon_t, \quad (4.5.1)$$

state equation (4.3.2) and

$$(\alpha + \gamma)_{t+1} = (\alpha + \gamma)_t + \xi_{t+1}, \quad \xi_t \sim \text{iid N}(0, \sigma_\xi) \quad (4.5.2)$$

Whereas the actual budget balance is expressed as a ratio of nominal GDP, the core balance and the cyclically adjusted balances are expressed as ratios of nominal potential GDP (since cyclically adjusted balances should be interpreted as values of the deficits (surpluses) that would be observed if output were at some reference potential level). However, one should be aware of the fact that policy-makers, the public and international institutions such as the EC generally monitor the development of public finances relative to nominal GDP. Actual and cyclically adjusted budget balance figures as well as revenue and expenditure figures are taken from the AMECO database.

The indicator I_t^a is always specified as the output gap. However, at the current stage of our research, the indicator I_t^d is specified as the output gap on the one hand and split up into I_t^{d+} and I_t^{d-} on the other hand in order to capture upturns and downturns.⁵⁸

4.4 Results

Estimating the impact of the discretionary policy response to the cycle only (equation 4.4), *i.e.* taking the cyclically adjusted total balance in % of potential GDP as dependent variable and the output gap as explanatory variable, gives a negative parameter value for γ of a size of about -0.35 (see Figure 4.1, Figure 4.2 and Table 4.1). A negative value of this coefficient reveals a pro-cyclical impact of discretionary policy responses on cyclical developments.

⁵⁷ The cyclically adjusted budget balance has been corrected for an estimated output gap (compositional effects are not taken into account), *i.e.* the budget balance figures are adjusted for a) the difference between actual output and estimated potential output (the output gap) and b) the difference between the actual unemployment rate and the estimated equilibrium unemployment rate (the unemployment gap).

⁵⁸ We intend to broaden the analysis to include the period $t-1$ expected real GDP growth rate of period t on which the respective budget draft in Austria is based. This projection is part of the regular economic outlook of the Austrian Institute of Economic Research (WIFO). Even though growth does not represent an adequate proxy for cyclical conditions one has to bear in mind that politicians may just look at growth rates when taking discretionary decisions. Using real-time growth data moves the focus on the intentions fiscal policy makers had, when deciding discretionary measures, whereas the use of ex post output gap allows the assessment of the actual (or ex post) counter-/pro-cyclicality of fiscal policies (Forni and Momigliano (2004)).

Figure 4.1 Results for the Total Balance

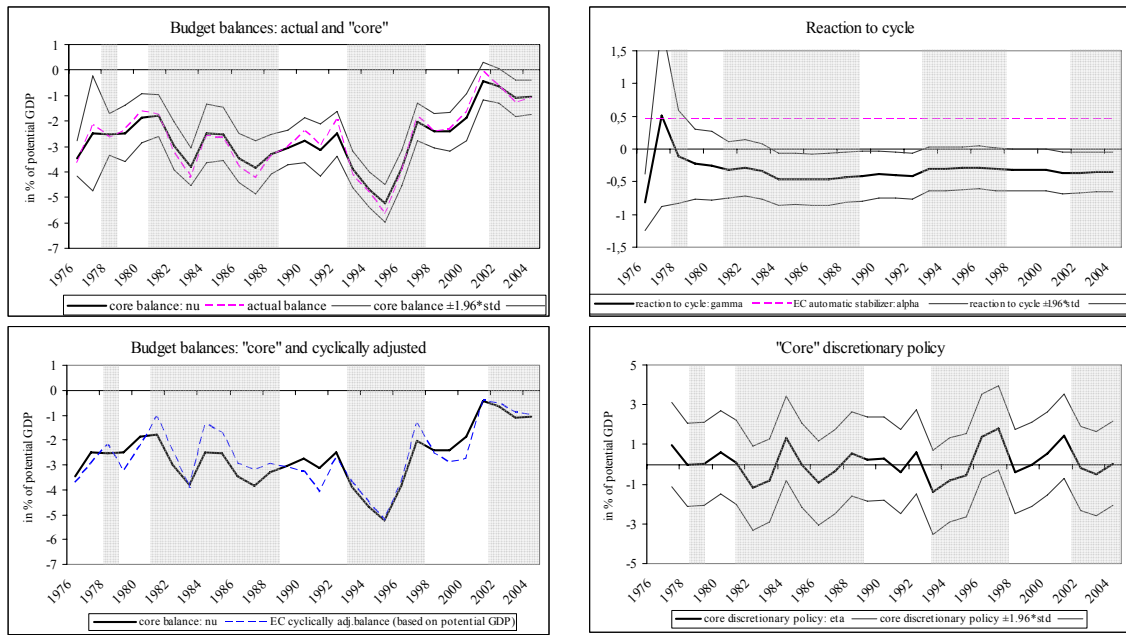


Figure 4.2 Decomposition of the Total Balance

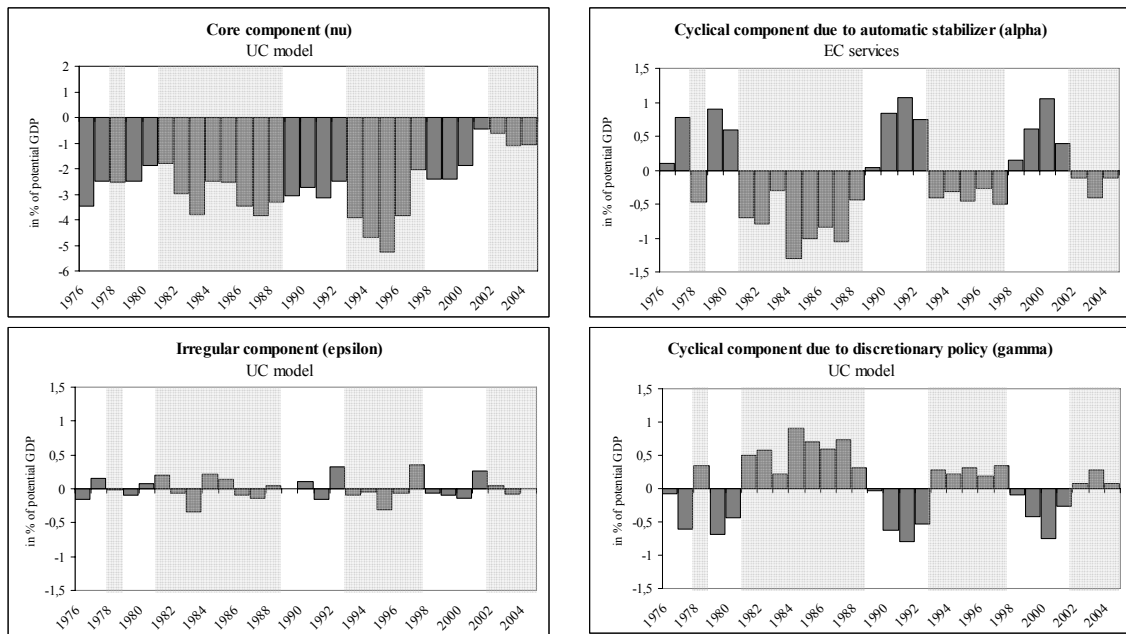


Table 4.1 Estimation Results

Dependent variable: cyclically adjusted balances (in % of potential GDP)								
Parameter:	Total balance	Primary balance	Total revenues	Primary expenditure	Total balance	Primary balance	Total revenues	Primary expenditure
var(ε)	0.14	0.00	0.00	0.00	0.04	0.00	0.00	0.00
var(η)	0.86	1.15	0.79	0.84	0.95	1.04	0.74	0.85
var(ξ)	0.00	0.00	0.00	0.00	.	.	.	.
var(ξ^+)	.	.	.	.	0.00	0.00	0.00	0.00
var(ξ^-)	.	.	.	.	0.02	0.02	0.00	0.00
Final states:								
Core balance (μ_T)	-1.06 (-0.35)	1.88 (-0.04)	48.72 (0.03)	46.84 (0.03)	-1.06 (0.21)	1.87 (0.04)	48.69 (0.04)	46.83 (0.04)
Automatic stabilizer α *) (OECD/EC)	0.47	0.47	0.43	-0.04	0.47	0.47	0.43	-0.04
Discretionary policy (γ_T)	-0.35 (0.16)	-0.37 (0.16)	-0.30 (0.13)	0.07 (0.14)	.	.	.	.
in upturns (γ_T^+)	.	.	.	.	-0.42 (0.19)	-0.40 (0.19)	-0.43 (0.16)	0.00 (0.17)
in downturns (γ_T^-)	.	.	.	.	-0.04 (0.42)	0.04 (0.44)	-0.11 (0.23)	0.12 (0.15)

Notes: Sample period: 1976-2004; standard deviations in parenthesis

*) Estimated by the OECD and used by the European Commission.

The comparison of this coefficient with the size of the overall budget sensitivity as estimated by the OECD and used by the EC (+0.47) leads to the conclusion that the overall impact of fiscal policy (summing up the automatic and discretionary components) was slightly counter-cyclical in Austria in the past.⁵⁹ Taking into account the fact that the overall budget sensitivity for Austria as estimated by the OECD was lower in earlier publications, this could indicate a slightly stronger counter-cyclicality of overall fiscal policy for recent years.

Figure 4.1 also reveals that the core balance is slightly smoother than the cyclically adjusted budget balance. The driving forces of the core balance were major structural problems of the Austrian economy in the early 1980s; consolidation measures in the second half of the 1980s; a major income tax reform which came into effect in 1990; the implementation of long-term care benefits in 1993; the fiscal impact of EU membership in the mid-nineties; the implementation of further consolidation packages between 1995 to 1997 in order to fulfil the Maastricht fiscal criteria in 1997; and another consolidation package in 2000/2001 to reach a balanced budget.

The first result is confirmed when we use the alternative specification (4.5.1) and look for the “overall” budget sensitivity to the output gap, *i.e.* estimating the automatic and the policy response components in one go. A positive coefficient of 0.15 signals a slightly counter-cyclical behaviour overall.⁶⁰ Repeating the estimations with the primary budget balance gives nearly identical coefficients (see Figures 4.3 and 4.4).

This finding contrasts with Galí and Perotti’s (2003) results. In their country estimates they find a slightly counter-cyclical discretionary fiscal response for Austria for the pre-Maastricht period, which became stronger in the after-Maastricht period (but the coefficients are not statistically different from zero).

A “pro-cyclical fiscal policy response” of the general government is, however, not much of a surprise; on the one hand it can be explained by the federal structure of government in Austria, consisting of the federal government, the nine provinces and the local governments (municipalities). The provincial and local governments’ fiscal policies have traditionally been aimed at balanced budgets – thus undermining the impact of the automatic stabilisers, in particular in downturns.⁶¹ Thus, even if the federal government aims at counter-cyclical responses to cyclical developments, this ambition may be partly counteracted by the provincial and local governments’ fiscal strategy.

Moreover, from the late 1970s to the end of the 1980s the federal government’s strategy was influenced by a budget rule termed the “Seidel formula” (see Katterl and Köhler-

⁵⁹ However, as stated by Alberola *et al.* (2003) (by means of a panel regression) such a result could also signal problems with the estimation of the budget elasticity. They actually find a negative and significant correlation between the output gap and the structural balance which they interpret as an overestimation of the cyclical component. Consequently, in downturns structural balances tend to be overestimated while they are underestimated in expansions.

⁶⁰ In order to filter out the effect of the interest expenditures we estimate the equations also with the cyclically adjusted and unadjusted primary balance as dependent variables.

⁶¹ The resources of the provincial and local governments stem mainly from an elaborate tax sharing system and from federal transfers. The sub-levels mainly participate in cyclically sensitive tax revenues. Own sources of revenues are of less importance for the provincial governments, but of slightly more relevance for the local governments. Without any room for manoeuvre on the revenue side, the provincial and local governments in principle have to adjust their expenditures to the predetermined revenues (see Diebalek *et al.* (2005)).

Töglhofer, 2005), which set a threshold for the cash deficit of the federal government at a level of 2.5% of GDP.

In a next step we ask whether cyclically adjusted spending and revenues (as a share of nominal potential GDP) react in a specific pro- or counter-cyclical manner. Our estimation results indicate a relatively strong pro-cyclical discretionary response of the cyclically adjusted revenues to the cycle (see Figure 4.5 and 4.6).

Figure 4.3 Results for the Primary Balance

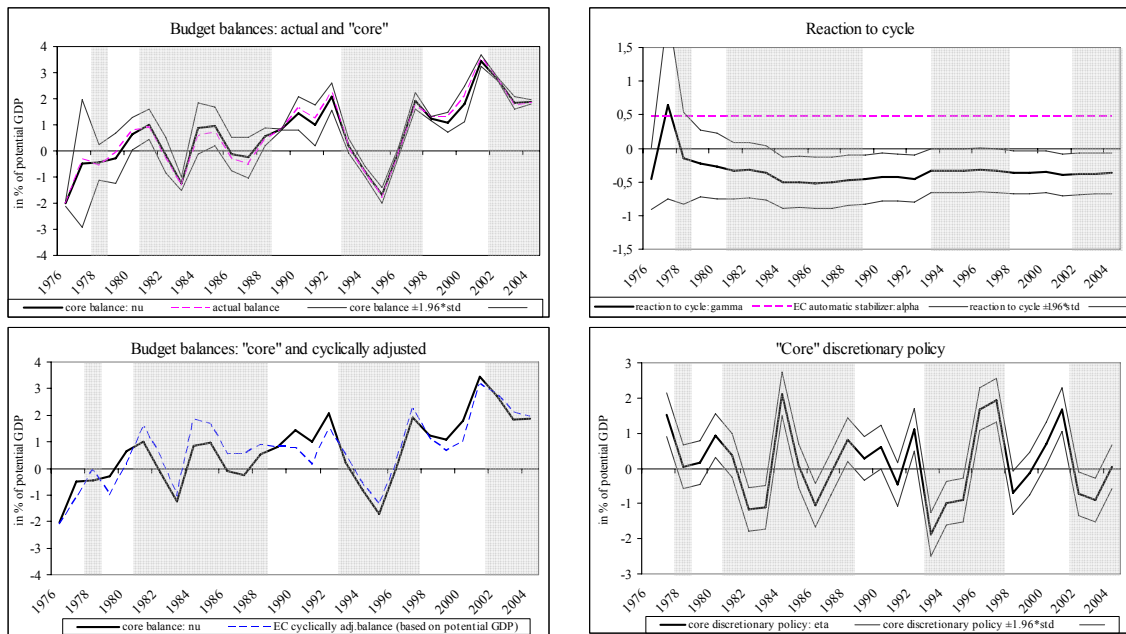


Figure 4.4 Decomposition of the Primary Balance

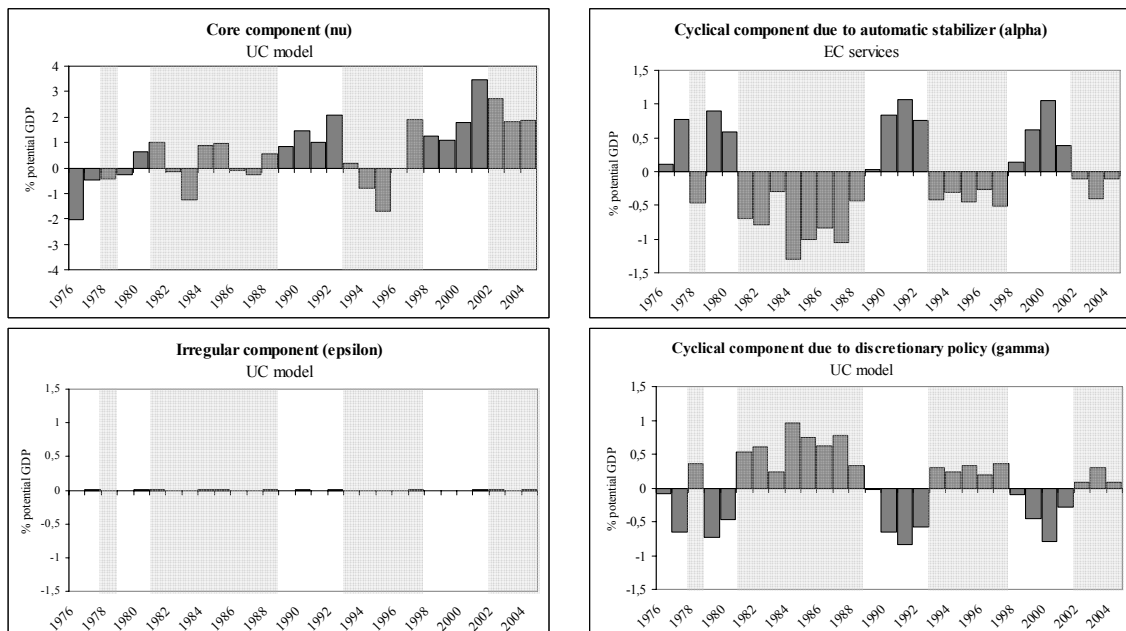


Figure 4.5 Results for the Total Revenues

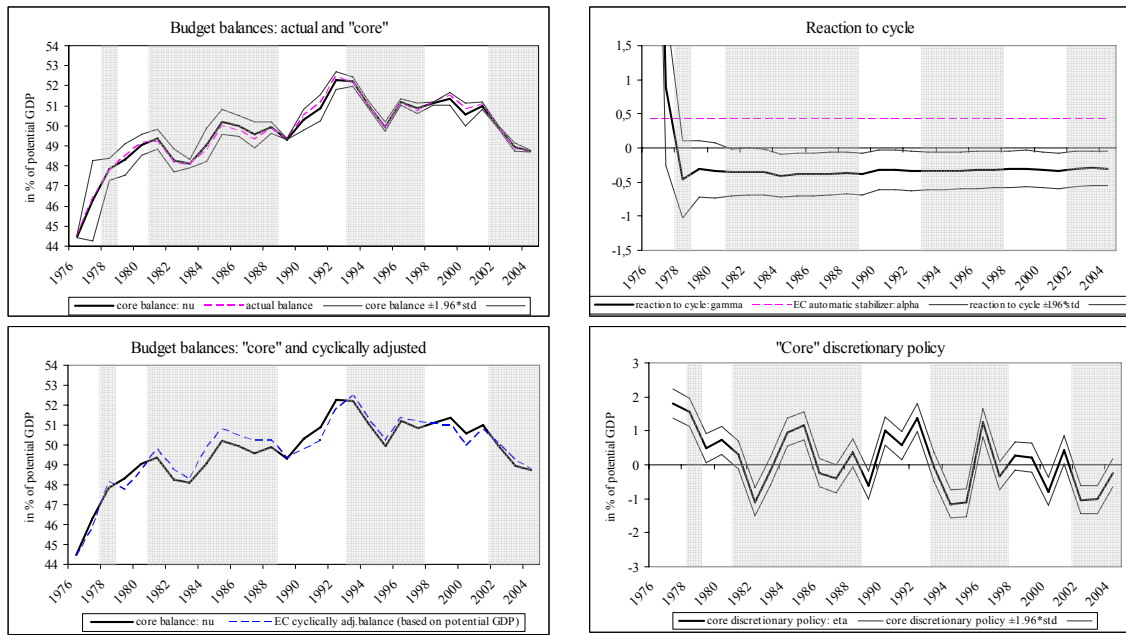


Figure 4.6 Decomposition of the Total Revenues

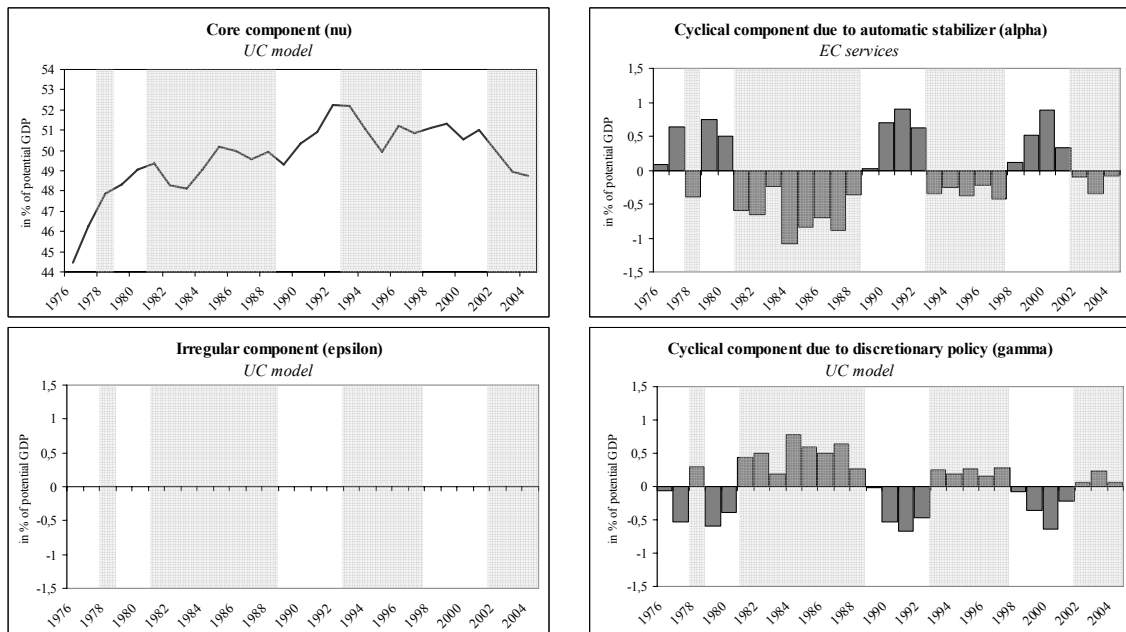


Figure 4.7 Results for the Primary Expenditures

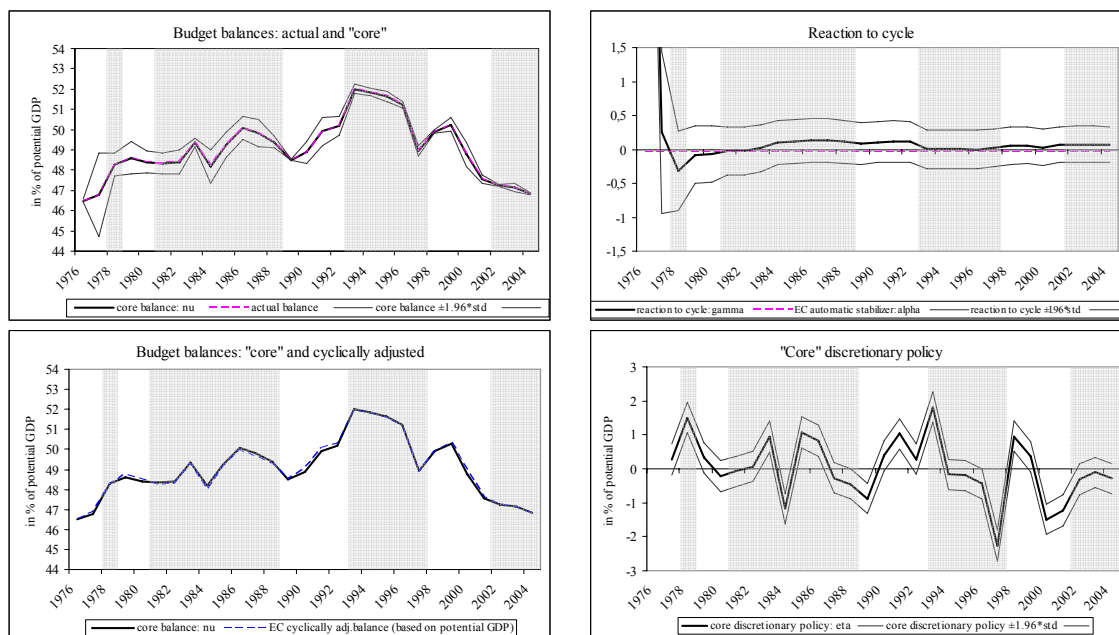
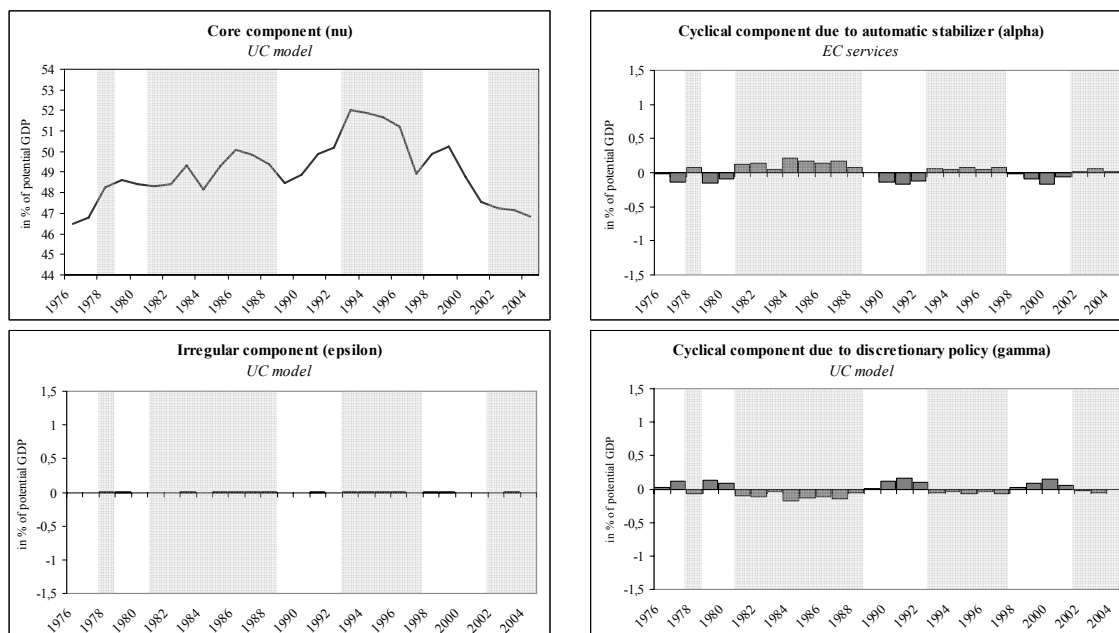


Figure 4.8 Decomposition of the Primary Expenditures



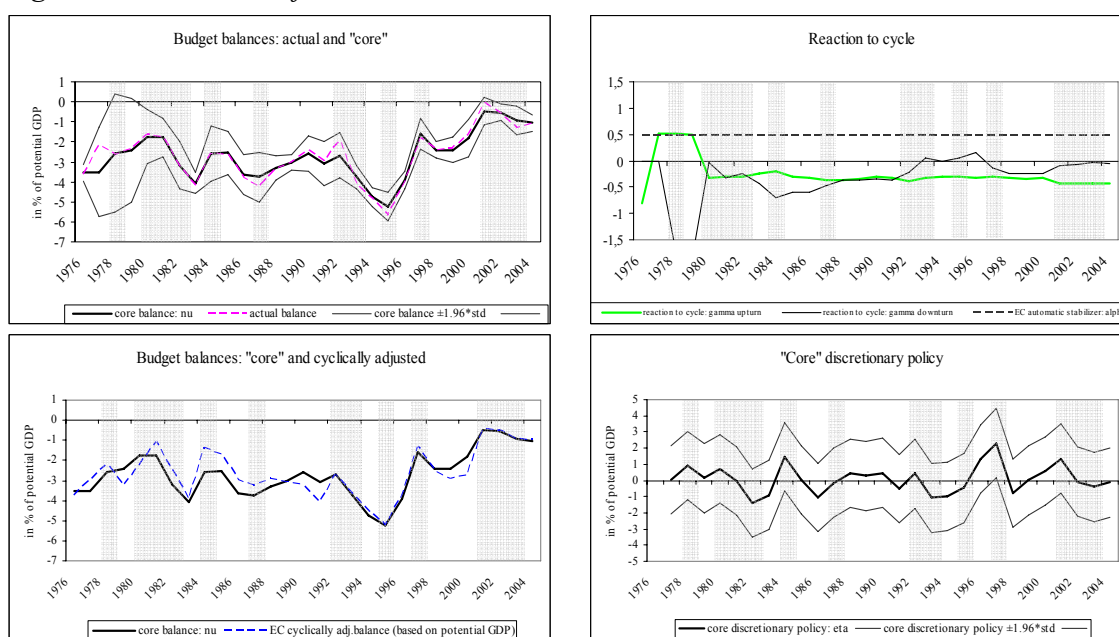
On the expenditure side, the relatively minor impact of the automatic stabilisers related to the unemployment transfers seems to be completely neutralised⁶² (see Figures 4.7 and 4.8).

Next we check for an asymmetric cyclical behaviour in downturns and upturns, *i.e.* taking the cyclically adjusted (primary) budget balance as dependent variable and looking for

⁶² However, if the dependent variables are taken as ratios of the nominal GDP instead of potential nominal GDP we get a pronounced pro-cyclicality of the cyclically adjusted revenues and a pronounced counter-cyclicality of the cyclicity adjusted expenditures.

the discretionary fiscal policy impact in upturns (periods in which the real growth rate is above the potential growth rate) and downturns (periods in which the real growth rate is below the potential growth rate). It appears that in upturns a strong pro-cyclical discretionary policy impact dominates (however, the γ coefficient is slightly smaller than the overall budget sensitivity estimated by the OECD for Austria),⁶³ whereas the pro-cyclical impact in downturns turns out to be negligible. Hence, we can conclude that in Austria overall fiscal policy in downturns is counter-cyclical, whereas in upturns the working of automatic stabilisers is neutralised (see Figure 4.9). This is in principle in line with general findings based on panel regressions for OECD countries (such as those by OECD (2003), Balassone *et al.* (2004) or Forni and Momigliano (2004); these papers provide evidence for counter-cyclical behaviour in downturns and – at least the first two studies – pro-cyclicality in upturns.)

Figure 4.9 Results for the Total Balance



Finally we focus on the evolution of the core balances. Compared to the cyclically adjusted budget balances the core balances exhibits slightly less variability.

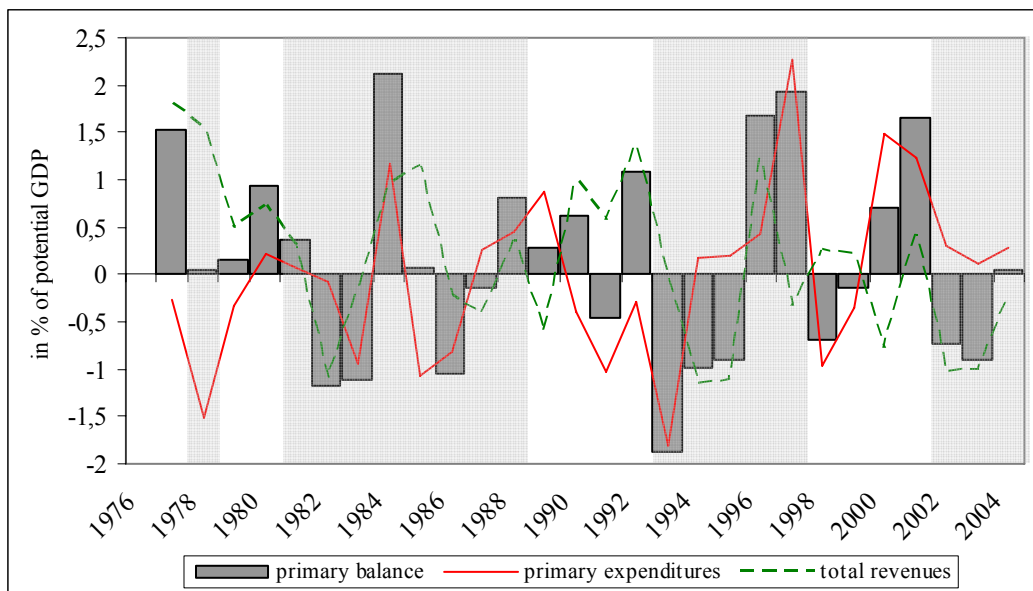
As mentioned in the introduction, the variability of these reflect discretionary measures not related to the cycle, such as permanent consolidation measures, measures aiming at distributional and allocative/structural goals or effects of macroeconomic shocks, demographic changes, etc. Thus Figure 4.10 depicts major episodes of fiscal consolidation on the one hand and the introduction of expenditure measures aiming at further improving the Austrian welfare state on the other hand, as well as the impact of structural changes in the Austrian economy.

For example, in 1984 Austria implemented a sizeable consolidation package, including the increase of the VAT rate and other indirect taxes as well as the contribution rate of the unemployment insurance scheme. Another big consolidation package was implemented

⁶³ However, the coefficient is of the same size as the overall budget sensitivity calculated by the OeNB. Taking the OeNB's value of the overall budget sensitivity would lead to the conclusion that the impact of the automatic stabilizers is completely neutralized in upturns.

in 1996-1997 in order to fulfil the fiscal Maastricht criteria. A further comparatively huge consolidation package was launched in 2000/2001 with the goal of bringing the general government budget to a close to balance position. While these events resulted in an improvement of the core primary balances, they also show up in the core revenue or core expenditure ratio, respectively, or in both, depending on the composition of the consolidation packages.

Figure 4.10 "Core" Discretionary Policy



The tremendous structural crisis that Austria faced at the beginning of the 1980s is also reflected in the development of the core primary balance. The worsening of the primary balance at the beginning of the 1990s was, however, caused, by the implementation of social policy measures, *i.e.* by extending the entitlement period for maternity leave payments from one to two years and in addition by implementing long-term care benefits without adequate financing measures.

4.5 Conclusions

Our estimation results so far highlight that, first of all, the overall effect of fiscal policy (the automatic stabilizer and discretionary policy component) in Austria has been slightly counter-cyclical. However, our estimates also indicate that discretionary policy in response to the business cycle has been pro-cyclical. Given the federal structure enabling the provincial and local governments to implement conflicting fiscal strategies, and given the fact that the central government budget was influenced (at least on average) by the rule that the cash deficit should not exceed the threshold of 2.5% of GDP, this result does not really come as a great surprise. Second, and more interestingly, there is the fact that in particular the revenue side seems to be prone to pro-cyclical responses whereas the relatively minor impact of the automatic stabilizers on the expenditure side seems to be completely neutralised. Finally – and this finding is generally in line with other studies – our estimates imply that during economic downturns the overall impact of fiscal policy seems to be counter-cyclical, whereas in periods of economic upturn the impact of automatic stabilisers is nearly neutralised.

Discussion

*Jonas Fischer**

The chapter by Peter Brandner, Leopold Diebalek and Walpurga Köhler-Töglhofer presents an unobserved component model that decomposes the budget balance into different components, namely a “core”-, an “automatic stabiliser”-, a “discretionary stabilisation”- and a “residual” component. The method has been, for illustrative purposes, applied to Austrian budget data but the model is easily applicable to any country as the necessary budgetary data are readily available across countries. Indeed, the easy applicability is one of the key advantages of the approach.

In terms of the results for Austria, they mainly confirm “conventional wisdom” in particular in that they indicate that discretionary fiscal policy has been pro-cyclical off-setting some of the impact of the automatic stabilisers, especially in up-turns. Below I will concentrate my comments in this area and the implication of decomposing the cyclical part of the budget balance into a component related to the “automatic stabilisers” and a part related to “discretionary stabilisation.” This decomposition allows to study whether budget policies have been counter- or pro-cyclical over and beyond what can be ascribed to the automatic stabilisers. If pro-cyclical budget behaviour is observed, it may be of particular interest to know whether this “bad outcome” is due active government policies or whether it is events outside its control that is to blame? This distinction is important in the context of the application of the revised Stability and Growth Pact where the government's intent carries more weight than before the reform. Equally, it is an important distinction to make when assessing failures/accomplishments of the past budget behaviour with a view to draw conclusions on how to improve budget rules and institutions for the future.

In this context I would like to make some comparisons between the authors decomposition and the most commonly alternative indicator used for the same purposes, namely the cyclically-adjusted budget balance: the CAB.⁶⁴ The CAB is the nominal budget balance adjusted with the (unobservable) estimated budget impact from the cycle. Several international institutions estimate CABs, notably the Commission, the ECB, the OECD and the IMF. Methods vary and the results differ on the margin across compilers but the basic approach is the same. I will first comment on what the author's decomposition and the CAB implies in relation to commonly used budget terms such as the “fiscal stance”, the “structural” budget balance, the “discretionary” policy component and the “fiscal impulse”. These budget concepts are useful to discuss various fiscal policy issues. However, lacking alternatives, the concepts are often captured by using the CAB across the board.

* The views expressed in this chapter are those of the author and are not attributable to the European Commission.

⁶⁴ The CAB is usually estimated as: $CAB = \text{nominal budget balance to GDP} - \text{budget sensitivity to the output gap} * \text{output gap}$.

As a starting point, Figure 4.11 provides a two-dimensional decomposition of the budget balance. Vertically, the budget balance is decomposed into factors which are economy-induced and those which are policy-induced. Horizontally, a distinction is made factors with a temporary impact on the budget as opposed to those which have a permanent impact.

Figure 4.11 *Determinants of the Actual Budget Balance*

	Temporary	Permanent
Economy	A	C
Policy	B	D

Square A would thus include factors related to the temporary state of the economy at given tax and expenditure rules. An example would be unemployment benefit expenditures and temporary higher/lower tax revenues due to tax bases being temporarily higher/lower than their trend values or tax elasticities being temporarily higher/lower than normal. Square B, includes, for example, temporary higher expenditures due to discretionary stabilisation policy measures. Square C would capture, for example, how potential GDP and demographic trends affect the budget balance permanently, while square D includes the impact on the budget from permanent changes to tax and expenditure rules.⁶⁵

On this basis a comparison of the coverage of the authors decomposition can be made to the coverage of the CAB in relation to the different budget concepts. This is done in Table 4.2.

Table 4.2 *What Do the Different Budget Indicators Capture?*

Budget Concept	Determinants of budget balance in Figure 4.11	Corresponding best to which component in authors decomposition:	Use of CAB (or primary CAB)
Structural budget balance (level)	C+D	Core component	CAB (B+C+D)
Fiscal stance (change)	B+C+D	Discretionary component (B)	Change CAB (B+C+D)
Discretionary policy (change)	B+D	Discretionary component (B)	Change CAB (B+C+D)
Fiscal impulse (change)	A+B+C+D	(n.a. change nominal balance)	(n.a. change nominal balance)

Let me go through the concepts in turn. First, if the aim is to capture the permanent budget trend all temporary influences should be taken out. This would correspond to the concept of a “structural budget balance” (C+D). The core component in the authors’ model would then seem most suitable to capture this. When the CAB on the other hand is

⁶⁵ See also Braconier and Forsfalt (2004).

used for this purpose policy induced temporary factors (box B) are not netted out. In fact, this distinction is increasingly recognised and for example the Commission now regularly net out "one-off budget measures" from the CAB and labels this as the "structural budget balance."

Second, the "fiscal stance" relates to whether the budget balance, over and beyond the impact of the automatic stabilisers, contribute or not to smooth the cycle. This would imply netting out the cyclical economy induced component and look at boxes B+C+D. Using the authors model the "discretionary component" would probably be used to assess the fiscal stance. However, the change in the CAB would be better designed for this purpose. While it is straightforward that boxes B and D should be included in a measure of the fiscal stance it may be less clear with box C which takes into account economy induced permanent changes. Ultimately it depends on the precise question to be analysed.

Lastly, if the interest is to identify the impact of discretionary policy decisions, then temporary and permanent economy-induced budget components should not be taken into account (thus look at B+D). Here it is worth noting that if the CAB is used for this purpose it would include also economy induced permanent changes (box C) while the discretionary component in the authors model would not capture policy induced permanent changes (box D). The overall point here is that it is important to be precise in what is the objective of the analysis and what the indicator used actually captures. Conceptually at least, the authors "core component" would be better than the CAB when assessing the structural budget balance while the change in the CAB would be best designed to capture the "fiscal stance" as understood here. To study the "discretionary policy" response of the government the model looks better designed from a conceptual perspective than the change in the CAB.

It is also worth looking a bit closer at some aspects related to what is actually meant by "discretionary policy" when using budget indicators.⁶⁶ One issue relates to budget rules across layers of government. For example, say that a local government (where most of government consumption takes place) runs deficits to cover for higher expenditures, albeit they are forbidden to borrow, but that they are bailed out by the central level through additional grants. This could be regarded as a discretionary measure by the government (box B above), given that a separate decision was taken to this end, but it could also be regarded as "semi-automatic" if it is common practice (box A above). Clearly, how it is counted may make a difference in the policy assessment. Another issue relates to the benchmark used for what is "neutral policy" and then in particular the indexation of expenditures. CAB calculations based on trend GDP estimates use as implicit benchmark that expenditures develop in line with potential GDP. If some expenditures, such as welfare expenditures, are instead indexed to nominal GDP the difference between the two growth rates would not be included in the "cyclical part" and thus be counted as non-cyclical. In fact, to the extent that expenditures are actually indexed, to say inflation, these items could be labelled "automatic destabilisers"! Overall, it is the non-indexation of expenditures which provides most of the cyclical stabilisation from the budget.

My last comment relates to the budget balance itself: observable and the base for most budget indicators. Further work to decompose the nominal balance in sub components allowing better to analyse different budget behaviour is of course very useful to make

⁶⁶ See also Boije and Fischer (2006).

assessments better. Nevertheless, in a setting where the objective is to give short term policy advice based on the latest figures, it should be reminded that the large volatility and uncertainty lies with the revisions to the nominal balance, from the initial estimated to the final outcomes some years later,⁶⁷ and that this uncertainty by far outweighs any difference from using alternative approaches to estimate the cycle or the cyclical component of the budget. However, looking at longer historical time series the issue is quite different and the authors approach will hopefully soon be tested and used also for additional countries.

⁶⁷ See for example Gordo and Nogueira Martins (2007).

5.

The Dynamic Behaviour of Budget Components and Output – the Cases of France, Germany, Portugal, and Spain

*António Afonso and Peter Claeys**

5.1 Introduction

In recent years, we have witnessed a worldwide swing towards fiscal profligacy. In the European Union, this has come somewhat as a surprise as the Maastricht Treaty and afterwards the Stability and Growth Pact seemed to have put in place a set of fiscal rules that guarantee the sustainability of public finances. The difficulty in applying the Pact, first to Portugal and later on to France and Germany, has been followed by a more widespread breach of the 3% deficit limit in several EU countries. A revised version of the Pact was adopted in March 2005, and takes a more flexible approach in terms of curbing excessive deficits over a longer period of time, and pays more attention to sustainability of public finances. As part of the Lisbon Strategy, considerably more attention is given to the composition of budget adjustments with a view to promoting economic growth.

A variety of political and economic factors probably underlie the observed rise in public deficit and debt ratios. We try to uncover any underlying past trends behind the development of public finances that may contribute to explaining recent budgetary outlook in France, Germany, Portugal, and Spain. While the first three countries were subject to several steps of the Excessive Deficit Procedure, Spain on the other hand could be seen as an example of more vigorous fiscal management. We are particularly interested in the underlying causes of the breach of the Pact's rules by looking into adjustments in various budget components. At the same time, we look into how these adjustments contribute to the long-term growth prospects and outlook for the sustainability of public finances.

To that end, we construct a model-based indicator of structural balance by combining insights from the growing empirical literature on the effects of fiscal policy – modelled

* We are grateful to Luís Costa, Arne Gieseck, Michael Thöne, Jürgen von Hagen, Jan in't Veld, seminar participants at the ECB (Frankfurt), at ISEG/UTL (Lisbon), at the 61st European Meeting of the Econometric Society (Vienna), and at the DG ECFIN workshop on Fiscal Indicators for EU Budgetary Surveillance (Brussels) for helpful comments and discussions. Valuable assistance of Renate Dreiskena with the data is highly appreciated. The opinions expressed herein are those of the authors and do not necessarily reflect those of the ECB or the Eurosystem. Peter Claeys thanks the Fiscal Policies Division of the ECB for its hospitality. This research was supported by a Marie Curie Intra-European Fellowship within the 6th European Community Framework Programme. UECE is supported by FCT (Fundação para a Ciência e a Tecnologia, Portugal), financed by ERDF and Portuguese funds.

with structural VARs – with statistical methods for cyclically adjusting fiscal balances. Our approach innovates on extant evidence in using a mixture of short and long-term restrictions to identify economic and fiscal shocks in a small-scale empirical model in economic growth and fiscal variables. This allows for permanent shocks to determine trending behaviour of output and fiscal variables à la Blanchard and Quah (1989). Discretionary fiscal adjustments are captured by filtering out the fiscal balance for cyclical reactions of budget items, following Blanchard and Perotti (2002).

The quantitative indicator that we obtain is best seen in the light of the growing theoretical literature on the qualitative effects of fiscal policy. Dynamic stochastic general equilibrium models with nominal rigidities search for a rationale for fiscal stabilisation policies. At the same time, these New Keynesian models attribute quite some importance to both supply and demand side effects of fiscal policy adjustments. Our indicator is consistent with such a distinction. We take a first step by restricting attention to overall expenditure and revenues, but more elaborate models might incorporate refinements in the compositional adjustments of budget balance. In contrast to statistical models for adjusting fiscal balance, our economic indicator of structural balance has some attractive practical properties. Uncertainty is explicitly quantified, and theoretical assumptions can be explicitly tested. Also, the end-of-sample problem is reduced. The model is not necessarily more demanding in terms of data availability.

The main result of our study is that both pre-EMU consolidations and expansions in recent years are mainly based on revenue changes. The derailing of public finances comes from tax reductions being implemented in good economic times. As total revenues apparently remain constant, spending cuts are not implemented. As a consequence, deficits show up again when economic boom turns into bust. The easy way out of deficits is to reverse previous tax cuts, leading to a ‘ratcheting up’ of spending over the next economic cycle. This procyclical bias in fiscal policies has not been eliminated with the Stability and Growth Pact. Governments still implement bad policies in good times. These policy reversals have negative economic effects. We find fiscal policy to have minor supply but large demand effects. Procyclical policies unnecessarily induce macroeconomic fluctuations.

The remainder of the chapter is organised as follows. In section 5.2, we briefly review some recent fiscal developments in the EU, notably for the cases of France, Germany, Portugal, and Spain. Our structural VAR approach towards disentangling these developments, and the derivation of the fiscal indicator, is discussed in section 5.3. Section 5.4 reports our empirical results, and section 5.5 concludes the chapter.

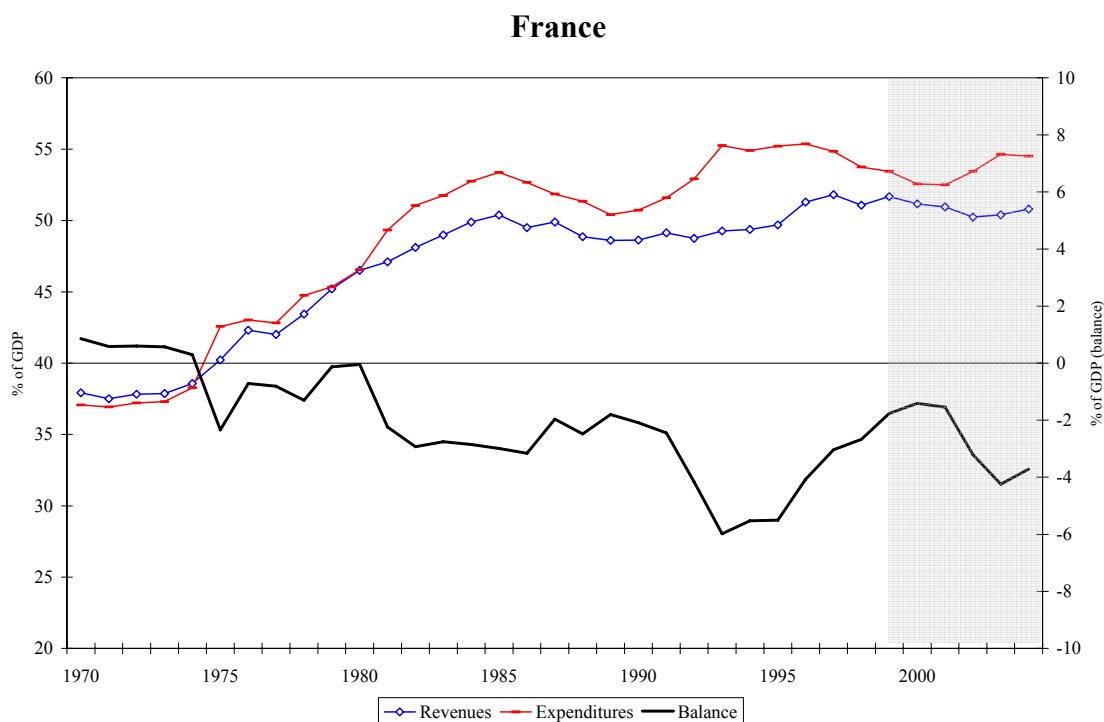
5.2 The Recent Fiscal Imbalances in the EU

The fiscal framework of EMU has been considered a means for implementing fiscal consolidation. However, recent developments in several Euro Area countries raise the question as to whether fiscal sustainability is endangered, in view of rising deficits and debts at a moment when the effects of ageing populations will have a further burdening effect. In 2005, Excessive Deficit Procedures (EDP) have been carried out for both France and Germany, while yet another EDP was launched for Portugal. There are also ongoing procedures for Greece and Italy, while several other EU Member States face a

situation of excessive deficit.⁶⁸ Recent developments cannot be seen without taking into account past actions and trends in public finances.⁶⁹ We focus attention on the evolution of public finances since 1970 in the countries that initially 'sinned' to the Pact (France, Germany and Portugal).

We report in Figure 5.1 the general government balance, and its breakdown in revenue and expenditure ratios. A simple visual inspection shows that expenditure and revenue ratios have been following an increasing trend notably in France, Portugal and Spain. But with revenues lagging the expenditure rises, there has been a continuous deficit bias. There were some good reasons in 1991 to embark on consolidation by enshrining the 3% deficit target in the criteria for EMU-entry. The Maastricht rules have been effective in constraining further buoyant expenditure rises. Less than commensurate rises in revenue intake have led to persistent albeit gradually declining deficits. Since the start of EMU, fiscal positions have started to slip away again. As to the reasons for the breach of the Stability and Growth Pact, further expenditure rises in France and Portugal seem to blame, whereas in Germany large revenue reductions unmatched by expenditure cuts have pushed the deficit beyond the 3% threshold. Spain, on the other hand, stands out for its balanced budget over recent years, which is the result of a sustained reduction in expenditures since 1993 that has levelled off in recent years. We consider Spain as an example of more prudent fiscal behaviour.

Figure 5.1 General Government Spending, Revenue and Deficit (% of GDP)



Note: Left-hand scale – revenue or spending / right-hand scale – deficit.

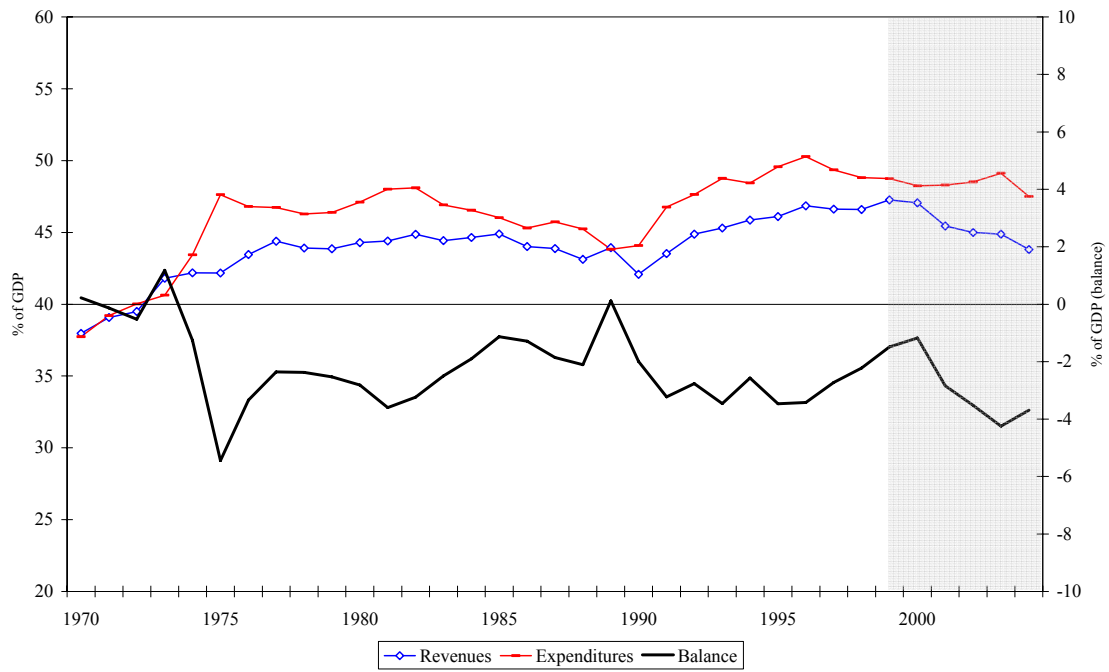
⁶⁸ The other countries that faced an EDP are the Netherlands, Slovakia, Poland, Malta, Hungary, Cyprus and the Czech Republic. For further details see the EC web site at:

http://europa.eu.int/comm/economy_finance/about/activities/sgp/procedures_en.htm.

⁶⁹ Afonso (2005) questions the sustainability of public finances in most EU countries.

Figure 5.1 (continued)

Germany



Spain

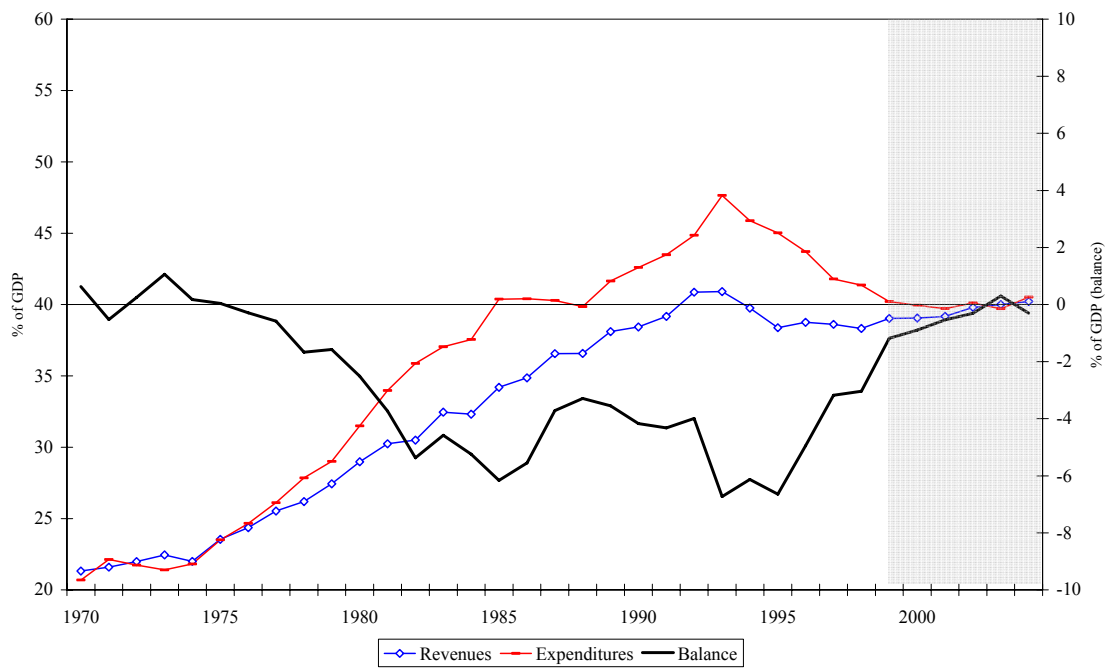
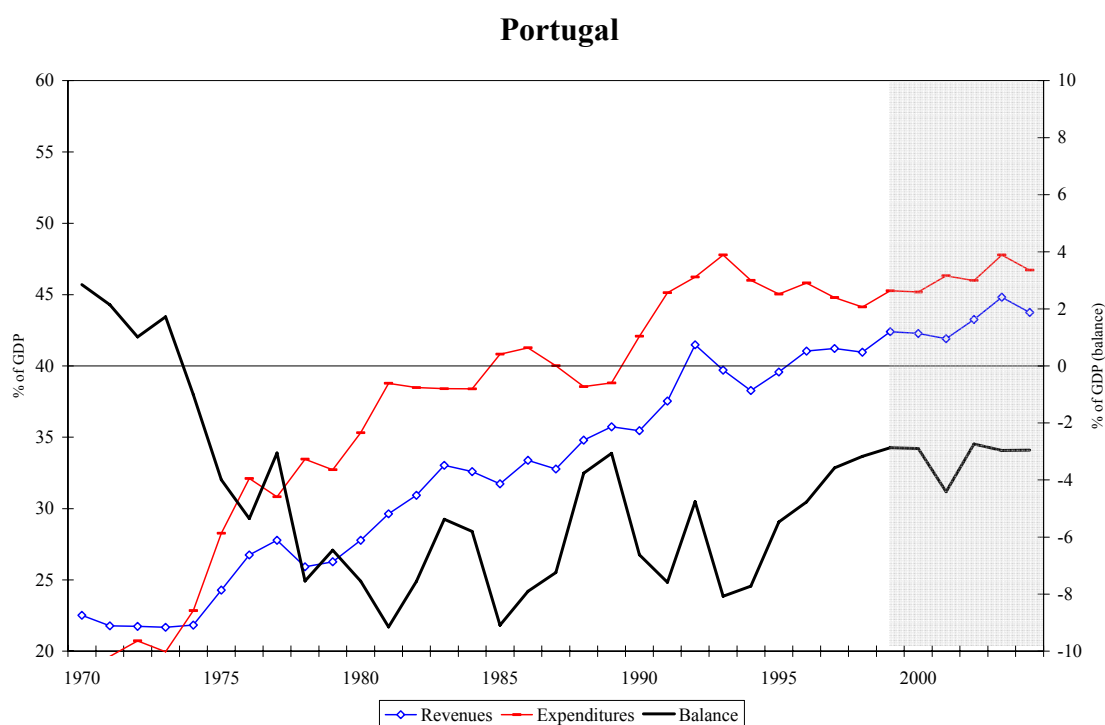


Figure 5.1 (continued)



Source: AMECO database, updated on 4 April 2005. The shaded area indicates the start of EMU.

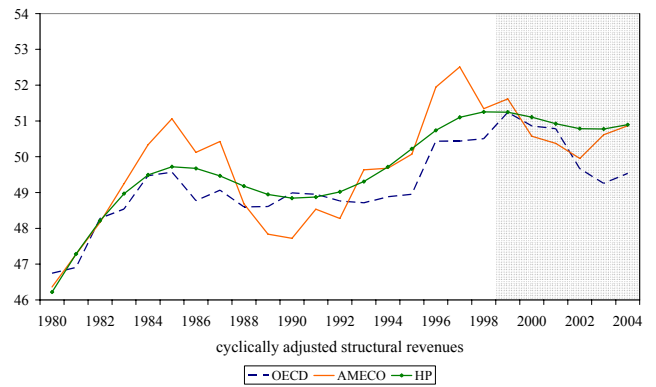
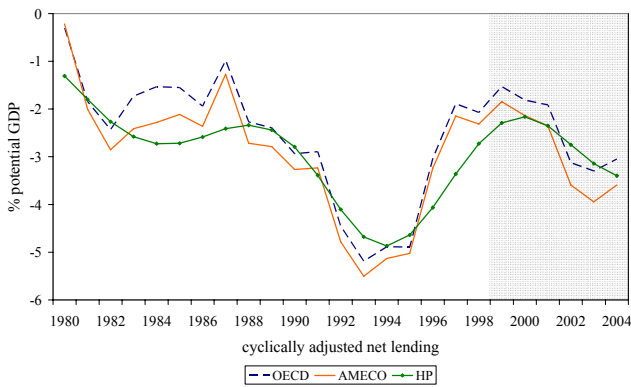
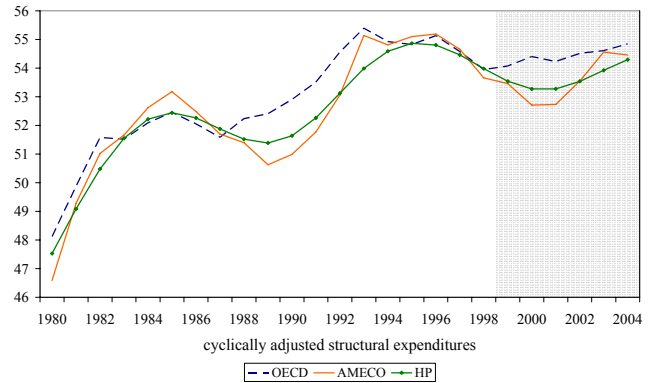
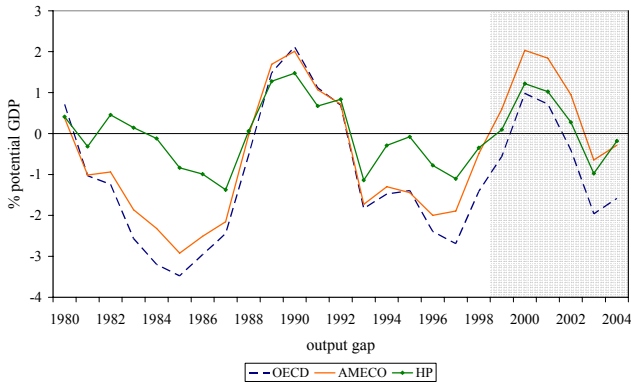
These budget developments cannot be separated from economic conditions. The balance can slip out of the control of fiscal authorities by higher than expected expenses on unemployment benefits and transfers, or less than budgeted revenues, owing to automatic stabilisers. Figure 5.2 compares some measures of the output gap and cyclically adjusted balances computed by the European Commission and the OECD, as well as a trend series retrieved from directly applying a Hodrick-Prescott filter on the raw series.⁷⁰

The start-up of the EDPs to these countries seems justified on account of worsening structural balances. In all countries, economic conditions improved considerably at the onset of EMU and the overall deficit was notably reduced as a result. But the reversal of positive output gaps laid out the structural weakness of the balance in France, Germany and Portugal. Expenditures exceed average revenues over the cycle. In contrast, Spain presents an entirely different picture. The budget has been brought close to balance, and is even in slight surplus. A constant spending share has been matched by gradually rising tax revenues.

⁷⁰ The smoothing parameter has been set at 6.25, adjusting with the fourth power of the observation frequency ratio to the annual frequency of the data (Ravn and Uhlig, 2002).

Figure 5.2 Output Gap, Cyclically Adjusted Net Lending, Spending and Revenue (% of potential GDP)

France



Germany

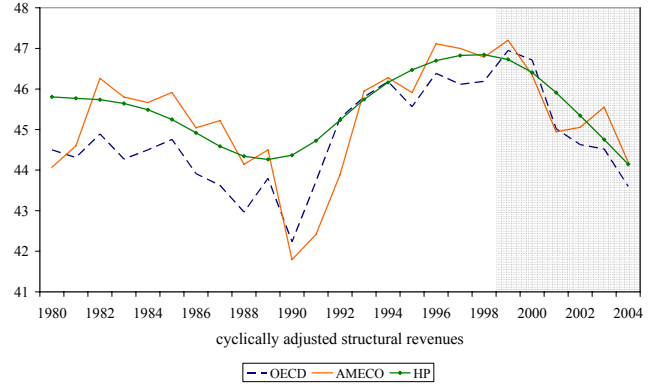
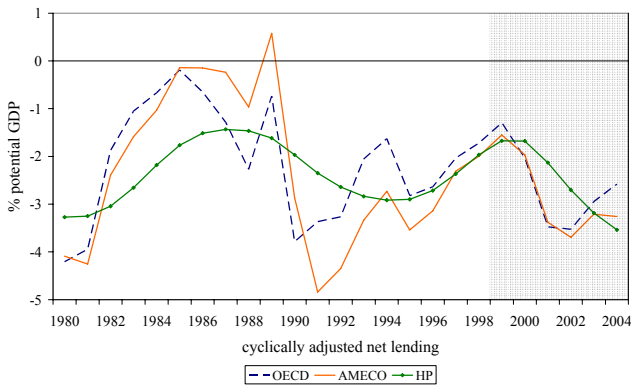
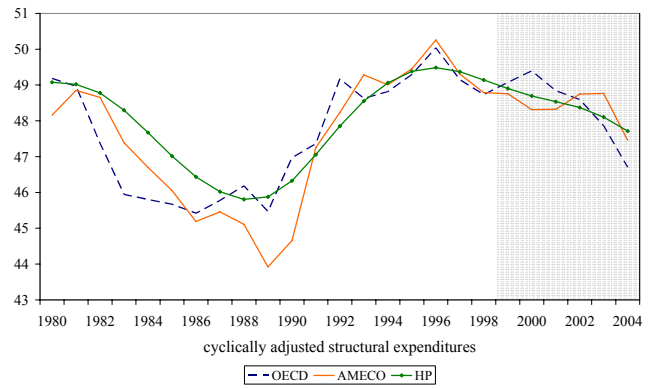
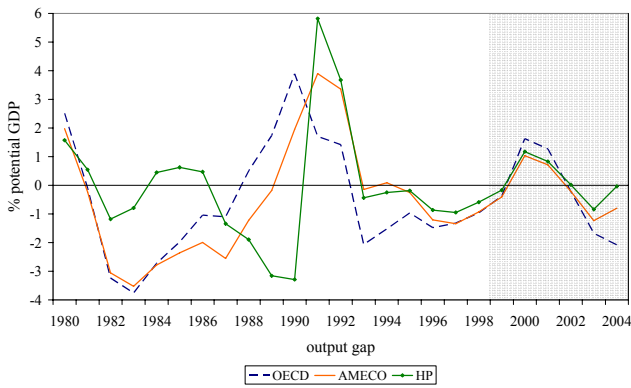
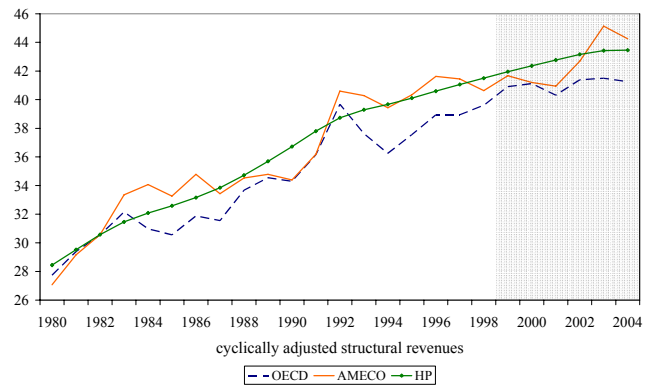
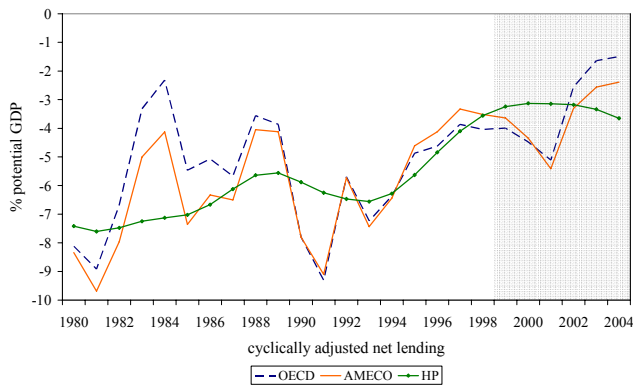
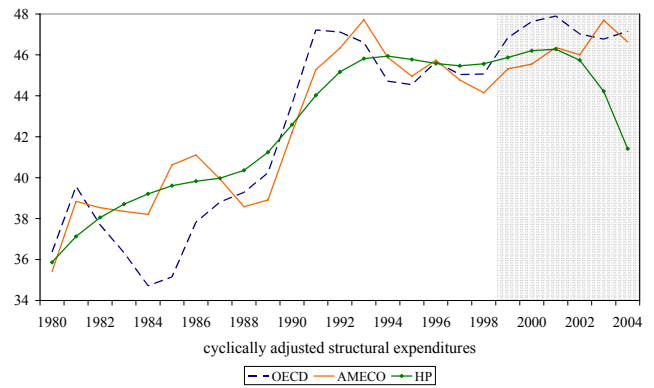
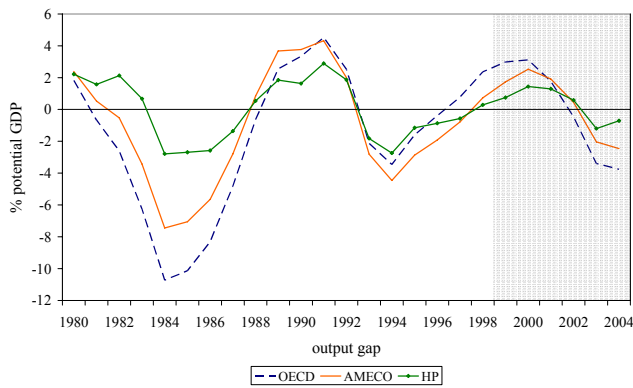
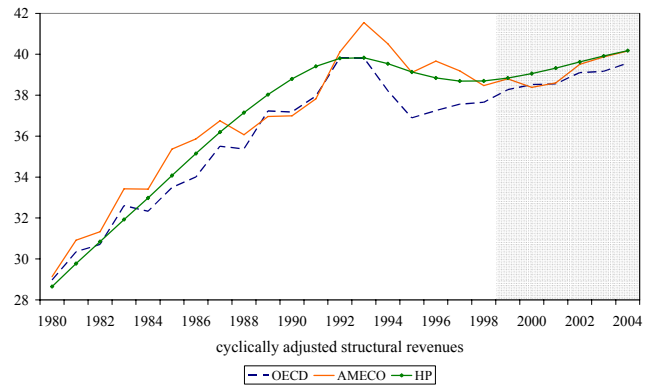
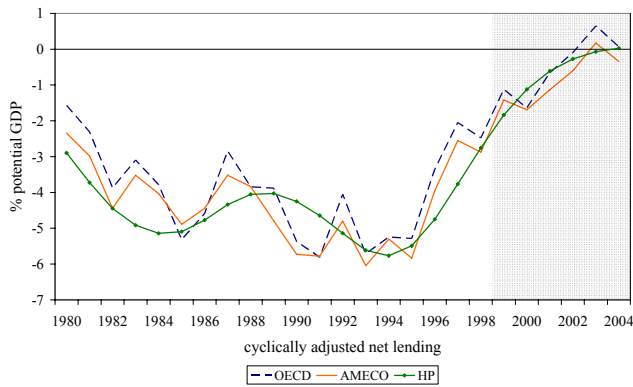
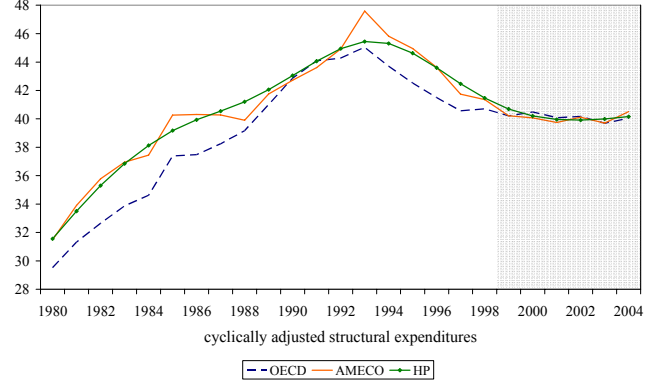
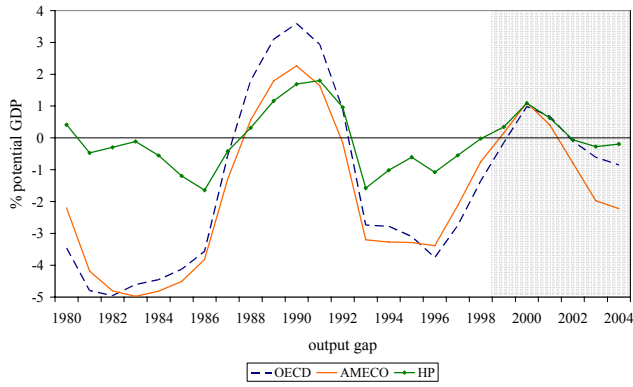


Figure 5.2 (continued)

Portugal



Spain



5.3 A SVAR Model for Gauging Fiscal Indicators

There are a variety of reasons for which the cyclically adjusted balance does not properly reflect discretionary shifts under the control of the government. Its use in assessing fiscal balances is therefore debatable. Some problems are related to the properties of the econometric filters that are being used.⁷¹ More importantly, we believe fiscal policy contributes to the size of economic fluctuations. And it does so by adjusting a variety of spending and revenue items. Recent general equilibrium theories of fiscal policies provide a rationale for real economic effects of fiscal policies, and stress the prevalence of its supply-side consequences over short-term demand effects. This is all the more important for the assessment of the new Stability and Growth Pact. We develop an indicator of discretionary fiscal policy stance that builds on the recent empirical literature on the effects of fiscal policy using structural VARs, and combine this with evidence on the cyclical behaviour of government budget. Next to its favourable properties, the indicator is best seen as a first step in verifying recent theories of fiscal policy as well as giving an instrument for assessing the quality of fiscal adjustments.

Fiscal Indicators

The notion of structural balance is based on the premise that total output fluctuates around some unobserved trend that depends on the long-term potential growth path of the economy. In combination with some assumptions on the cyclical behaviour of fiscal policy, this allows deriving a cyclically adjusted balance. Common practice at the European Commission, IMF or OECD regards the determination of cyclical variation in output and the cyclical variation of the budget as two distinct problems.

First, the output gap usually comes from some trend-extraction procedure with a statistical filter applied directly to real output. This decomposition in trending and cyclical components is usually done with a band-pass filter. Alternatively, the output gap is calculated as the distance from actual to potential output where the latter is based on a production function for the aggregate economy.⁷² Second, a bottom-up approach is adopted for the derivation of the cyclical elasticities of the budget. The output elasticities of government revenues are based on the taxation structure of each main sub-item⁷³ – in some cases accounting for collection lags – and the elasticity of the tax bases to output. The spending elasticity is of relatively minor importance, as only the spending on unemployment benefits is adjusted for the cycle. Other budget components are assumed to be cyclically insensitive. Table 5.1 gathers the elasticities from OECD for the major budget categories in the countries we study.⁷⁴ As in most other European countries, the

⁷¹ Figure 5.2 already illustrates that differences between the various methods are certainly not minor.

⁷² The European Commission backs up a Hodrick-Prescott based decomposition with results from the production function approach (European Commission, 1995). The OECD uses only the production function method (Giorno *et al.*, 1995). The IMF has no uniform strategy but the production function method prevails for industrialised countries (IMF, 1993). Many other approaches abound. Methods that use a Beveridge-Nelson decomposition or track output developments with unobserved components are less common. Blanchard (1993) asks what the primary surplus would have been, had the unemployment rate remained the same as the previous year. Chouraqui *et al.* (1992) compare different moving benchmarks. Cohen and Follette (2000) use spectral analysis to isolate low frequency changes in fiscal policy.

⁷³ The OECD adjusts only social contributions, corporate, personal and indirect taxes.

⁷⁴ Girouard and André (2005) update the elasticities in a previous OECD study by van den Noord (2002).

cyclical elasticity of total net lending varies around 0.50. Most of the variation in the budget comes from procyclical corporate and personal taxes.

Table 5.1 OECD Output Elasticities of Various Budget Items

	France	Germany	Portugal	Spain
Total spending	-0.11	-0.18	-0.05	-0.15
Corporate tax	1.59	1.53	1.17	1.15
Personal tax	1.18	1.61	1.53	1.92
Indirect tax	1.00	1.00	1.00	1.00
Social security contributions	0.79	0.57	0.92	0.68
Net lending	0.53	0.51	0.46	0.44

Source: Girouard and André (2005).

Quite some uncertainty surrounds the computation of structural balances in this two-step procedure. Depending on the skewness of the distribution of the moving-average weights in the filter that is being applied and the phase of the economic cycle, trend output is biased towards actual values especially towards the end of the sample. Another problem is posed by structural breaks. Windfall revenues or unexpected spending are entirely included in the structural balance if they have no economic effects. Filters distribute the effects of a break forward and backward on the trend. But this problem is not limited to statistical methods. Even if we use the production function or consider a deterministic trend a reasonable approximation to potential output, incorporating shifts remains a problematic issue. The production function approach moreover suffers from plenty of assumptions that make cumulative uncertainty rather large.⁷⁵ The various assumptions on budget elasticities are not as crucial for the cyclically adjusted balance, but are nevertheless not less problematic. Implicitly, it is assumed that average budget elasticities have a time-invariant linear relation to changes in the economy. We return to these difficulties in a sensitivity analysis in section 4.4.

Towards an Economic Indicator of Fiscal Policy

The main difficulty in interpreting the structural balance is the absence from economic arguments to underpin the trend/cycle decomposition. There is an implicit assumption in the filtering methods on the frequency of the business cycle and hence on trend output under average economic conditions. And while the production function approach builds upon economic foundations, the dynamics are nonetheless driven solely by the longer-term effects of investment feeding back on changes in the capital stock.⁷⁶

Macroeconomic models that allow for cyclical fluctuations around some steady-state trending growth path can be found in the growing class of Dynamic Stochastic General Equilibrium (DSGE) models with nominal rigidities. These models have by now been extended to include fiscal policy. In the initial Real Business Cycle models, there are only supply-side effects of fiscal policy that transmit through wealth effects and the labour/leisure choice (Baxter and King, 1993). Micro-founded models based on sticky prices provide a rationale for stabilisation policies, but even in the New Keynesian type of models of fiscal policy, the supply side effects still tend to dominate demand side effects of fiscal policy management (Linnemann and Schabert, 2003). A larger role for demand side effects of fiscal policy is only found in models that introduce some further

⁷⁵ These assumptions relate to its functional form, the presence of returns to scale, technological progress, the utilisation rates of production factors and the use of auxiliary estimates.

⁷⁶ Potential output is nevertheless assumed exogeneous in the production function approach.

imperfections via ‘Rule of Thumb’ consumers or a fraction of liquidity constrained consumers (Galí *et al.*, 2005; Bilbiie *et al.*, 2006). The latter models come also closer to replicating the results of the growing empirical literature on the effects of fiscal policy.

The main result of studies that use the VAR-counterparts to DSGE-models is that they can indeed recover significant effects of fiscal expansions on output. These are more in line with a positive ‘Keynesian’ effect on consumption, albeit the eventual multiplier is strongly reduced. The identification of fiscal policy is fraught with difficulties, however.⁷⁷ First, the implementation of announced changes in government policies is subject to lengthy and visible political negotiations that are anticipated in private agents’ behaviour. As a consequence, fiscal shocks need not affect fiscal variables first. This is a problem of the shock being non-fundamental (Lippi and Reichlin, 1994). Second, decisions on fiscal policy affect different groups in the public via a range of different spending and tax instruments. There exists no ‘standard’ fiscal shock: every political discussion considers the trade-off between a range of possible taxation and spending adjustments. The means of financing and the adjustment in expenditures and revenues wrap empirically relevant effects of different budget components in an aggregate fiscal shock without considering the path of public debt. Most studies focus on total spending or revenues, and find small and positive effects of government spending on consumption, but prolonged negative effects of higher taxation. Only a couple of studies consider the dynamic behaviour of some particular budget components.⁷⁸ Third, these identification problems are only exacerbated by the automatic reaction of fiscal aggregates to economic variables.

The seminal contribution of Blanchard and Perotti (2002) lies in using a semi-structural VAR that employs external institutional information on the elasticity of fiscal variables to output. Cleaning out the automatic cyclical reaction of the total fiscal balance leaves shifts to the cyclically adjusted balance as discretionary fiscal shocks. Blanchard and Perotti (2002) additionally impose some timing restrictions on the economic effects of discretionary policy. These timing assumptions avoid to some extent anticipation effects but would not capture these completely if implementation lags are important. Subsequent studies have mainly attempted to verify the original approach of Blanchard and Perotti (2002) with a variety of techniques and usually tend to confirm their findings.⁷⁹

However, the empirical literature has hitherto ignored the supply and demand channels of fiscal policy that are at front-stage of the theoretical DSGE models. Such effects are only implicitly acknowledged in these VAR studies. Changes in tax revenues, for example, are usually found to have lasting effects on output. There are nevertheless two other strands of the empirical fiscal policy literature that attribute a role to supply side variables. First, the literature on non-Keynesian effects of fiscal policy would argue that fiscal

⁷⁷ A full discussion of the problems in identifying the effects of fiscal policy is provided in Perotti (2005).

⁷⁸ Ramey and Shapiro (1998) look into the sectoral reallocation effects following shocks. A particular role in the transmission of fiscal policy shocks is also played by the labour market. A couple of papers compare the effects of consumptive government purchases to increases in public employment (Finn, 1998; Pappa, 2005; Cavallo, 2005). Perotti (2004) and Kamps (2004) examine the output and labour market effects of government investment.

⁷⁹ Mountford and Uhlig (2002) retrieve different types of fiscal shocks among those that conform to some a priori sign restrictions on the entire impulse response or variance decomposition of fiscal variables. Canova and Pappa (2002) select only those shocks that satisfy formal sign restrictions on the conditional cross-correlation of the responses to the orthogonalised shocks of the variables in the model.

consolidation might have positive consequences on output. The composition of the fiscal adjustment thereby plays an important role (Alesina and Perotti, 1995). The effects of consolidation on agents' expectations on the future economic outlook – measured by asset markets' reaction (Giavazzi and Pagano, 1990) – suggests a role for permanent wealth and supply-side effects of fiscal policy. Second, most VAR studies have so far ignored the literature on the long-term growth effects of fiscal policies. The main message of the endogenous growth models that have been developed is that higher taxation unambiguously reduces output, but that these losses may be offset by using the proceeds for productive spending items (Barro, 1990; King and Rebelo, 1990). These seminal models have been made more realistic by allowing endogenous responses of labour (Turnovsky, 2000). Typical tests of these growth models give empirical support to the role of spending and taxes to long-term growth (Kneller *et al.*, 1999). It can be argued that additional government spending in catching-up countries such as Portugal and Spain had rather different effects than further expansions of the budget in France and Germany, for example. This provides an additional argument for including the former countries in our analysis.

The examination of the growth effects is also of substantial policy interest. In the assessment of EU Member States' policies under the revised Stability and Growth Pact, much attention is devoted to the quality of fiscal adjustments and the sustainability of public finances. The implementation of major structural reforms that raise potential growth – and hence have an impact on the long-term sustainability of public finances – can be considered grounds for temporary deviations of budget balance. There is thus need for a framework that assesses changes in fiscal instruments and distinguishes the short-term demand from the longer run supply effects of such policies.

Methodology

We make a first step in setting up an empirical VAR model that allows for fiscal policy having distinct long- and short-term effects on output. The approach in this chapter rests on a combination of long-term restrictions and some assumptions on the short-run elasticities of budgetary items.⁸⁰ For the purpose of gauging a model-based fiscal indicator, we basically take shocks with permanent effects on output to drive long-term trends. Following Blanchard and Quah (1989), potential output is determined by so-called productivity or technology shocks that permanently affect output. This can then be complemented with further assumptions on the short-term behaviour of fiscal policies. Shocks with transitory output effects are classified as either cyclical or fiscal, following the elasticity approach of Blanchard and Perotti (2002).

⁸⁰ There are a few applications of fiscal VARs that use similar restrictions, and are mostly inspired by a practical interest in determining structural balances. See Bouthevillain and Quinet (1999), Dalsgaard and de Serres (2001) or Bruneau and De Bandt (2003) who all specify an SVAR model in output and the deficit ratio. They recover structural deficits from the contribution of fiscal shocks to the variance of deficits. Likewise, a measure of the gap is constructed from the contribution of supply shocks to output variations. Hjelm (2003) is closer to our model as he is interested in simultaneously determining potential GDP and the cyclically adjusted balance. He uses Cholesky ordered long-term restrictions in a model with output, employment and the budget balance to identify economic and labour market shocks. The cyclically adjusted balance then is that fraction of the budget balance that is not explained by business cycle shocks. This leaves only the supply and labour market shocks in determining structural balance, but no separate role for the government is stipulated.

We specify an empirical model of fiscal policy as a small-scale VAR in real output y_t , and the expenditure g_t and revenue side t_t of the government budget. We can summarise the data properties in a VAR-model (5.1), ignoring for ease of notation any deterministic terms:

$$B(L)X_t = \varepsilon_t \quad (5.1)$$

where X_t refers to the vector of variables $[y_t \ g_t \ t_t]$, and ε_t contains the reduced form OLS-residuals. By rewriting the VAR into its Wold moving average form (5.2),

$$X_t = B(L)^{-1} \varepsilon_t \quad \varepsilon_t' \varepsilon_t = \Omega. \quad (5.2)$$

and imposing some structure on the relation between reduced form residuals ε_t and structural shocks η_t via the transformation matrix A (such that $A\varepsilon_t = \eta_t$), we can write the model (5.2) as follows:

$$X_t = C(L)\eta_t = B(L)^{-1} A\varepsilon_t \quad \eta_t' \eta_t = I. \quad (5.3)$$

Any SVAR analysis needs to impose at least as much restrictions as contained in the matrix A to identify the model. By imposing orthogonality of the structural shocks we have already six (*i.e.* the covariance matrix of OLS residuals $\Omega = AA'$). Hence, we need to choose at least three more restrictions. The ones we employ are a combination of long and short-term restrictions. The latter shape the contemporaneous relations among the variables through a direct parameter choice on A . The former impose a long-term neutrality constraint on the effects of a structural shock j on some variable i . That is, the i,j -th element of the infinite horizon sum of coefficients, call it $C(1)_{ij}$, is assumed to be zero. This requires an indirect restriction in (5.3) on the product of the transformation matrix A and the inverted long-run coefficient matrix $B(1)^{-1}$. In other words,

$$[C(1)]_{ij} = [B(1)^{-1} A]_{ij} = 0. \quad (5.4)$$

For the system consisting of government expenditures, revenues and output, we assume three structural shocks to drive output and fiscal variables. The supply shock (η^g) drives the long-term trend rise in output and leads to the unit root behaviour of real output. This shock is isolated by assuming there are two further shocks in the model that both have temporary effects on output. *I.e.*, we assume that $[C(1)]_{12} = 0$ and $[C(1)]_{13} = 0$ in (5.4). These shocks can be interpreted respectively as a generic business cycle shock (η^c) capturing short-term fluctuations around the moving steady state equilibrium for output, and a fiscal shock (η^f) with short-term ‘demand’ effects on output. In order to distinguish the business cycle shock from that to fiscal policy, we employ the elasticity approach advocated by Blanchard and Perotti (2002). We derive a shock to spending and/or revenues from which the cyclical effects have been removed. In other words, the shock with transitory effects on output – but unaffected by short-term variation in output

– is the fiscal policy shock and reflects discretionary changes in the fiscal policy stance.⁸¹ We take elasticities for government expenditures (γ) and revenues (α) with respect to output, and impose these values on the relation in A between the reduced form residuals for output (ε^y) and spending (ε^g) respectively revenues (ε^r).⁸² The fiscal shock thus includes discretionary decisions unrelated to the cycle. Moreover, any government policy that interferes with the workings of automatic stabilisers on a systematic basis is considered as a fiscal intervention. Unlike other VAR studies, we split an overall change in fiscal policy into a part that has a short-term economic effect (the fiscal ‘demand’ shock), and into shocks that may have potentially long-term growth effects (the ‘supply’ shock).⁸³

One important limitation of the current version of the model is that we cannot tell apart the growth effects coming from ‘pure’ technology shocks from those deriving from tax and spending decisions. Our supply shock is thus a combination of all shocks with long-term output effects. The negative effects of distortionary taxation or incentive-distorting spending show up in this shock, as well as the possibly positive effects of government investment. Instead, we isolate in the fiscal ‘demand’ shock only those changes in the discretionary budget stance that have temporary effects on output. A full-fledged analysis of the economic growth effects of fiscal policy would require additional restrictions.⁸⁴ The current identification is sufficient though for the purpose of deriving a fiscal indicator. We summarise our assumptions in (5.5) (see also Table 5.2):

$$C(1) = \begin{bmatrix} \bullet & 0 & 0 \\ \bullet & \bullet & \bullet \\ \bullet & \bullet & \bullet \end{bmatrix} \text{ and } A = \begin{bmatrix} \bullet & \bullet & \bullet \\ \bullet & \gamma & \alpha \\ \bullet & \bullet & \bullet \end{bmatrix}. \quad (5.5)$$

We can not simply set to zero the elasticity γ of government expenditures. Unemployment benefits move over the cycle in EU-countries, even if their contribution to variation in total spending is not large. The parameter γ comes directly from the elasticities calculated by the OECD that we reported in Table 5.1. Instead of multiplying each revenue category by its cyclical elasticity and GDP share, we have subtracted the spending elasticity (row 2 in Table 5.1) – accounting for its share in GDP – from the elasticity of total net lending (row 7 in Table 5.1) so as to obtain the total elasticity of revenues α . The coefficients do not sum to zero as the budget is assumed to be countercyclical. Table 5.3 summarises our parameter assumptions.

⁸¹ This is not a replication of the results in Blanchard and Perotti (2002) as they require additional short-term constraints on the timing of the effects whereas we consider long-term constraints.

⁸² We therefore need to impose two different coefficients γ and α which results in one overidentifying restriction. Blanchard and Perotti (2002) instead net out the cyclically sensitive transfers from spending, and assume a zero elasticity on other spending categories. As the sensitivity analysis in section 4.4 demonstrates, this does not seem to affect our results.

⁸³ For this reason, we do not expect responses to our fiscal shock to be similar to those documented in the empirical literature. Our distinction is more consistent with the theoretical models of fiscal policy.

⁸⁴ We make some suggestions in the concluding section. We considered the effect of loosening the long-term constraint on either government spending or revenues. We could not reject longer-term effects of fiscal shocks, endorsing the hypothesis that supply side effects of fiscal policy decisions affect the ‘supply’ shock.

Table 5.2 Identification in the Long- and Short-term...

effect of shock on	Long-run restrictions		
	Supply shock	Business cycle shock	Fiscal shock
	η^q	η^c	η^f
real GDP	•	0	0
public spending	•	•	•
public revenues	•	•	•
	Short-run restrictions		
	Supply shock	Business cycle shock	Fiscal shock
	η^q	η^c	η^f
ε^y	•	•	•
ε^g	•	•	γ
ε^t	•	•	α

Table 5.3 Parameters γ and α

	France	Germany	Portugal	Spain
total spending γ	-0.11	-0.18	-0.05	-0.15
total revenues α	0.58	0.59	0.47	0.49

Source: author's calculations.

Gauging the Fiscal Indicator

The structural model then permits adopting a unified approach towards contemporaneously uncovering indicators of potential output y^* and the structural balance d^* . Basically, total output and government expenditures and revenues can be decomposed into the contribution of each of the structural shocks. We take the stance that only supply shocks determine potential output y_t^* in the long term. Both fiscal shocks and supply shocks determine structural expenditure g_t^* and revenues t_t^* .⁸⁵ Under this assumption, one can compute the structural deficit as in (5.6):

$$d_t^* = \frac{g_t^* - t_t^*}{y_t^*}. \quad (5.6)$$

This fiscal indicator d^* can be interpreted as reflecting the discretionary stance of the fiscal authority. From the decomposition of the budget, we can then analyse whether such changes usually occur via spending or taxation measures.

This measure cannot directly be compared to the cyclically adjusted balances provided by the European Commission, the OECD or to those derived from some statistical filtering method. First, the output gap we derive need not correspond to the fluctuations around a smooth trend on some assumption on the frequency of the business cycle. The economic shocks that drive potential output reflect changes in productivity – that may derive from a variety of sources – and might vary over time. Our approach is best seen in the line of

⁸⁵ Ultimately, the sustainability of fiscal policy is determined by the overall fiscal balance as well as potential output growth. Alternatively, one may view structural fiscal policy as depending on the decisions of fiscal policy makers only (Bruneau and De Bandt, 2003).

papers that investigate the role of nominal versus technology shocks in economic fluctuations (Nelson and Plosser, 1982; King *et al.*, 1991; Galí, 1992).

Second, the variation in the structural balance is different from that in traditional two-step methods. This discrepancy owes to the definition of structural balance. This is perhaps best illustrated with an example. Consider a tax cut, for a given level of government spending and exogenous output. This would lead to a deficit, *ceteris paribus*. If fiscal policy indeed has real economic effects as the empirical literature suggests, then the tax cut temporarily boosts output. As a consequence, tax revenues will increase and spending on unemployment benefits decrease, and the budget surplus will rise. The traditional measure for cyclical adjustment takes out all cyclical variation, also the one induced by fiscal policy, which leads to an overstatement of the structural balance. In our approach, we control for this economic effect of the tax cut. The SVAR-model excludes that part of the variation in GDP due to discretionary fiscal measures whereas the conventional models take total output variation into account. But our approach goes even one step further. Imagine that the tax cut also raises potential output in the long term. This widens the gap between actual and potential output at the moment the fiscal shock occurs. Structural balance would be improved as the increased tax base (now, and in the future) makes the fiscal position more sustainable. Similar arguments can be made for the effects of spending. As a consequence, our indicator of structural balance does not necessarily display a smaller variation than traditional indicators. This will particularly be true if (a) the indicator is mainly driven by fiscal or supply shocks; or (b) if the underlying economic shocks we retrieve are more volatile than what conventional output gap measures suggest.

Our model-based indicator has some favourable properties in comparison to more conventional measures. First, the long-term constraints hold the promise of imposing fewer contentious restrictions on the short-term effects of the fiscal shocks. Any anticipation effect and the contemporaneous reactions of fiscal balances to economic conditions are not constrained. Second, the simultaneous determination of a measure of cyclical output and fiscal balance is internally more coherent. While the method is definitely more complex, total uncertainty is quantified. We impose a minimal set of economic restrictions and the validity of these assumptions can be discussed. As the empirical model is also consistent with recent DSGE models of fiscal policy, these assumptions can be tested. Sensitivity analysis can make clear the weakness of the model in some specific direction. Moreover, progress in theoretical models of fiscal policy can lead to further refinements of the approach. Third, by adopting an economic – and not a statistical – method, the end-point problem of filters is eliminated. The indicator gives timely information on changes in the fiscal stance.⁸⁶ Finally, our indicator is also more relevant for the assessment of fiscal policy. Our measure indicates better the change in the stance of fiscal authorities, also with a view to growth effects and long-term sustainability.

At the same time, the econometric approach suffers from some weaknesses. First, extensions are difficult as the method is rather data demanding – at least in the time series dimension. The annual frequency of the data may lead to some difficulties in the identification of business cycle shocks, for example. Second, the gains of loosening the constraints of short-run effects of fiscal policy have to be set off against some additional

⁸⁶ The inclusion of structural breaks remains problematic, however. But in contrast to statistical methods, the economic consequences of one-off fiscal events are modeled in our approach.

complications (Sarte, 1999). While both short- and long-term restrictions are sensitive to the exact parameter values imposed, substantially more uncertainty surrounds the estimates of the long-term inverted moving average representation in (5.2), especially in the short samples that we use (Christiano *et al.*, 2006). The basic problem is that no asymptotically correct confidence intervals on $C(1)$ can be constructed. Faust and Leeper (1997) prove that there are no consistent tests for the significance of the long-term response. Specifying *a priori* the lag length of the VAR or choosing the horizon at which the long run effect nullifies can solve this problem. One may also check the consistency of some short-term restrictions with the long-term behaviour of the model, as in King and Watson (1997). Third, there is a possibly large set of underlying shocks from which we extract only a few. As discussed above, we extract a generic supply and cyclical shock, as well as a fiscal shock. This necessarily involves a debatable linear aggregation over shocks. If each shock affects the economy in qualitatively the same way the shocks may be commingled. This is particularly acute for the analysis of fiscal policy, as different expenditure and revenue categories may indeed have different longer run effects on output that are not distinguishable from technology shocks but moreover have similar short-term responses. Fourth, a problem may also occur of high frequency feedbacks. We observe fiscal policy only at an annual frequency. We assume the structural shocks to be orthogonal but if there are mid-year revisions of the budget, this may muddle both economic and fiscal shocks. This only stresses the problem of correctly identifying the timing of shifts in fiscal policies. Finally, a major assumption underlying the VAR-model is parameter constancy. The conclusions of VARs are highly sensitive to the presence of structural breaks. Especially for fiscal policy, there is evidence of non-linear effects (see Giavazzi *et al.*, 2000, for instance). We therefore run some stability tests on the VAR-model.

5.4 Empirical Analysis

Data

All data are annual and come from AMECO.⁸⁷ This database covers the longest available period since 1970 up till 2004 for which fiscal data are available for France, Germany, Portugal and Spain. Fiscal data and output are deflated by the GDP-deflator and are defined in first differences of log-levels. In many studies, the fiscal data are scaled to GDP, but this clouds inference. As economic shocks affect both fiscal variables and GDP, this leads to a spurious negative correlation between the deficit and these shocks. Moreover, we are primarily interested in distilling a fiscal indicator on the basis of the historical decomposition of output. For the same reason, we do not concentrate on the effects of fiscal policy on private output but use total output instead. We also ignore possible cointegration between overall expenditures and revenues, which derives from the intertemporal budget constraint.⁸⁸ This implies that parameter estimates may no longer be efficient albeit still consistent. However, inference on the short-term results of the VAR would hardly be affected by non-stationarity of the data (Sims *et al.*, 1990).

⁸⁷ Details are in Appendix 5.A. A program containing the RATS-code for the SVAR model is available from the authors upon request.

⁸⁸ For such an analysis, see Claeys (2004).

Data are defined following ESA-95 nomenclature. Definitions for the French budget changed in 1978. We linked the former series (going back to 1970) to the ESA-95 series and include an impulse dummy for this data break. We treat the effects of German Reunification in 1991 in a similar way. We further condition the models on these deterministic terms. Before estimating the structural model, we want to check for possibly other breaks in the VAR. We follow the method of Bai *et al.* (1998) and apply the sequential sup Quandt-Andrews likelihood ratio test on the VAR model. Sample size forces us to consider a single break date only, as the optimal search concentrates on the central 70% of the sample and consequently leaves too few degrees of freedom for examining multiple breaks. We correct for a possible change in volatility before and after the break date. As in Stock and Watson (2003), we weigh each period's residuals by their average volatility. The lag length in the VAR is henceforth set to one year (following the Bayesian Information Criterion).

Table 5.4 reports the results. For Germany, we could detect a further break in the data in 1976, related to the large increase in social spending under the Brandt government. For France, Portugal and Spain in contrast, we find a significant break date that is seemingly related to the Maastricht consolidations, albeit the confidence bounds are rather large and span nearly the entire nineties. It is nevertheless suggestive of the change in the conduct of fiscal policy under the effect of the Maastricht rules. Due to this imprecision, we refrained from explicitly modelling these shifts with additional dummy variables.

Table 5.4 VAR Break Date Test (Bai et al., 1998)

France	Germany	Portugal	Spain
1992*** [1989,1996]	1976*** [1974,1978]	1997*** [1995,2001]	1998*** [1996,2003]

Notes: *** denotes significance of the break date at 1%; break date is Sup-Quandt break date, years in brackets are the confidence interval at 33% (Bai, 1997).

The Transmission Channels of Fiscal Policy

We first discuss some general results of our small scale model, and assess the properties of output and fiscal series, and the role of the various structural shocks. The following paragraphs discuss the fit of the model in terms of impulse response functions and the forecast error variance decomposition.⁸⁹ We have summarised all results in Figures 5.3 and 5.4. This prepares the ground for an analysis of the fiscal indicator in section 5.4.

The effect of productivity shocks is to lift up real output permanently (Figure 5.3). The speed of accumulation is rather fast: after five years, the major part of the shock has worked out. In Germany, this happens even faster. The sampling uncertainty around the effect is large, but given the large bounds we have used, the significance of most impulse responses after some years is actually surprising. To what extent are these supply shocks driven by fiscal developments? In France and Portugal, these shocks go hand in hand with positive long-term effects on total expenditures and revenues as well. This effect is also strongly significant.⁹⁰ The difference between revenues and spending responses is not

⁸⁹ Impulse responses follow a one standard shock, and are plotted over a 10 year horizon with 90% confidence intervals, based on a bootstrap with 5000 draws.

⁹⁰ As the long-term elasticity of both spending and revenues is larger than unity, this looks like a 'Wagner' style government expansion owing to economic growth.

significant, hence it is not obvious that this leads to a build up of public debt. In Germany and Spain on the contrary, revenues do not change significantly, but government expenditures shrink considerably, leading to large accumulated surpluses at a horizon of 10 years.

But whether the causality runs from fiscal policy to productivity growth, or vice versa, is not obvious. Recall that the supply shock contains productivity shocks that may emanate from the private as well as the public sector. The significant co-movement of spending and revenues suggests that fiscal ‘supply’ shocks are an important source of the overall productivity shock.⁹¹ If these relations are positive (the case of France and Portugal), this implies higher spending or tax revenues have contributed to economic growth. In the opposite case (Germany or Spain), a reduction of spending – and less so a lower tax burden – would trigger higher potential output growth. But there are a few alternative explanations. Positive economic shocks that enlarge the tax base would – for a given tax rate – automatically lead to a larger revenue intake owing to automatic stabilisers. For reasons of political economy, this could lead the government to directly spend the proceeds of the treasury. This expansion of the budget could consequently get locked in and lead to a permanent rise in government expenditure. This mechanism would work for both permanent and cyclical shocks, if we assume that the government does not systematically react in different ways to permanent or transitory economic shocks. This allows us to get some insight in the importance of the private versus public productivity shocks. The fiscal responses to cyclical shocks, which include business cycle shocks with transitory output effects that are not related to fiscal policy, can give some indication. Surprisingly, the effects of cyclical shocks on output are hardly significant and indicate the small size of temporary economic fluctuations.⁹² As a consequence, there is not always an obvious simultaneous rise in tax revenues. In Germany and Portugal, government revenues do rise in response to a positive output gap, and this effect remains permanent. Moreover, in both countries government expenditures tend to rise as well. This gives some support for the ‘ratcheting up’ effect on spending. In France or Spain instead, government spending does not react in a significant way and tax revenues even tend to decline.

If we consider in some more detail the two countries in which catching-up phenomena may be expected to be important, we cannot clearly distinguish between the two alternative explanations. Both in Spain and Portugal is the reaction of fiscal variables to temporary and permanent shocks similar. This downplays the importance of productive fiscal policy contributing to economic growth. A comparison of the impulse responses shows that only a minor effect would be left in the case of Portugal. Evidence on Spanish public finances presents a slightly different picture. Positive supply shocks are accompanied by a strong decrease in total spending, and this effect is much more pronounced than the reduction in spending after a cyclical shock.

In France and Germany instead, the reaction of fiscal variables to permanent shocks is opposite to the reaction to business cycle shocks and supports the view that fiscal variables driving long-term growth in both countries. That spending and revenues go up

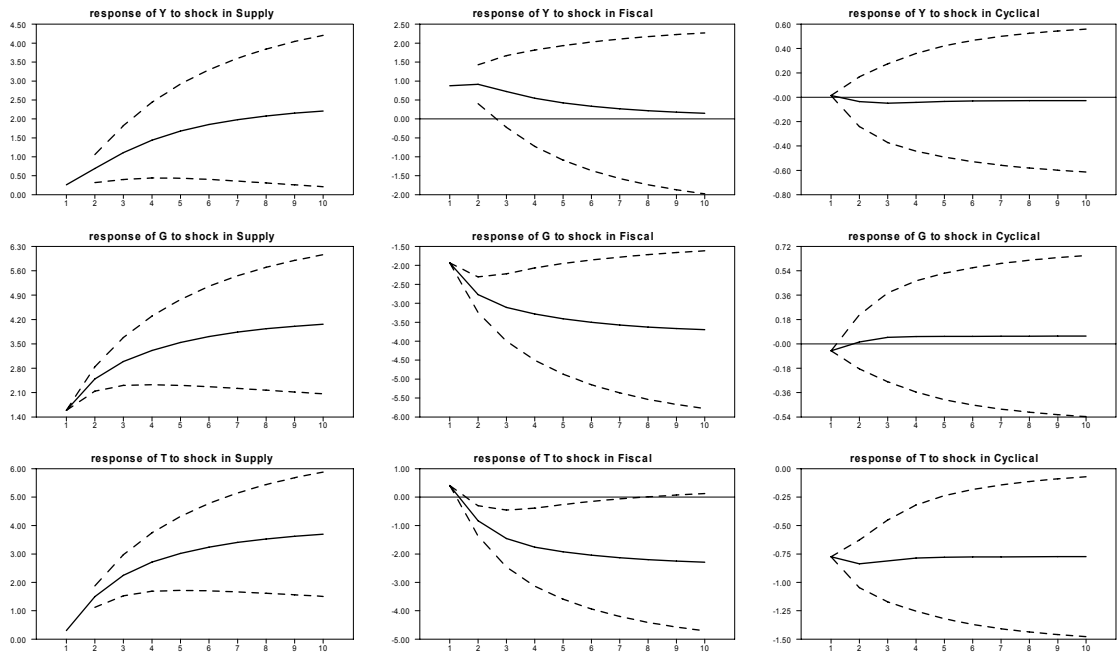
⁹¹ We considered the effect of loosening the long-term constraint on either government expenditures or revenues in extensions of the structural VAR model in 5.3. We could not reject longer-term effects of fiscal shocks, endorsing the hypothesis that supply side effects of fiscal policy decisions are part of the ‘supply’ shock.

⁹² This is a likely consequence of the annual frequency of the fiscal data.

after a positive supply shock, whereas there is a non-significant response or a decline following cyclical shocks, would suggest a larger role for productive public spending in France instead. Evidence for Germany rather seems to indicate a too large size of government. We find that revenues and spending go up permanently after cyclical shocks, but positive supply shocks tend to be associated with reductions in spending.

Figure 5.3 Impulse Responses (response to a 1 standard deviation shock, bootstrapped responses with 5000 draws)

France



Germany

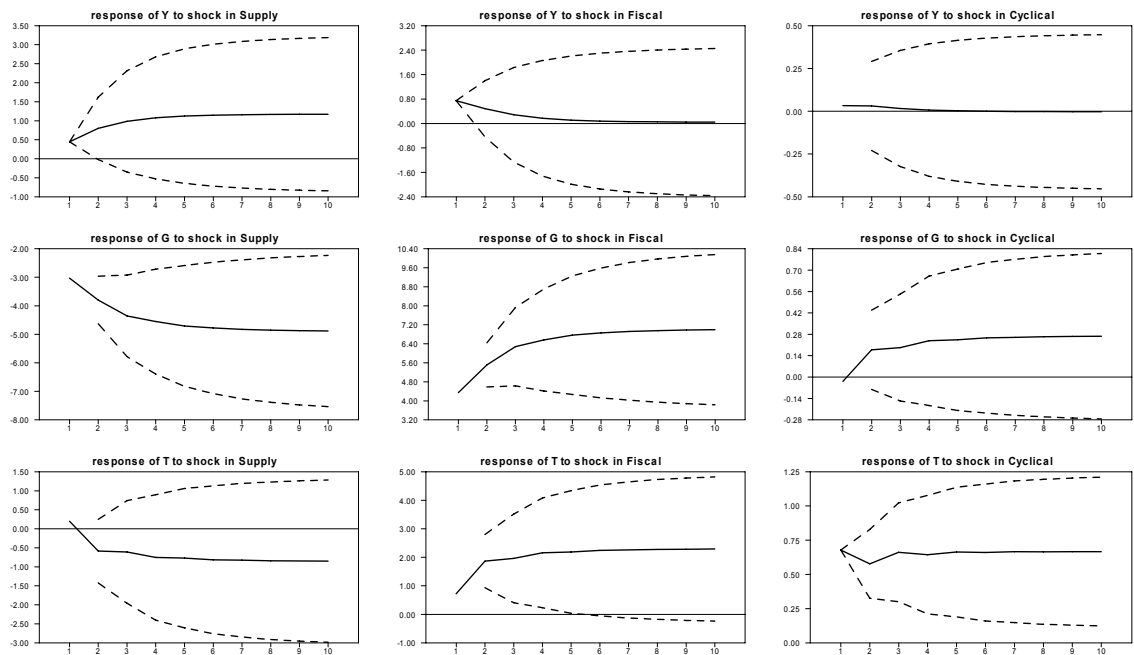
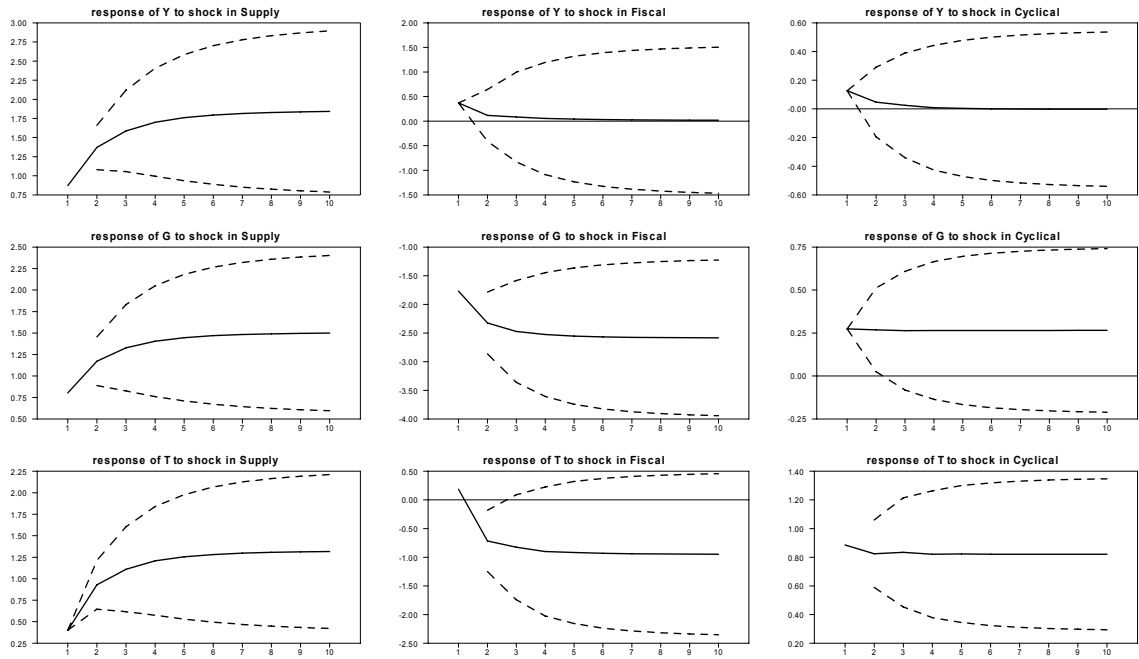
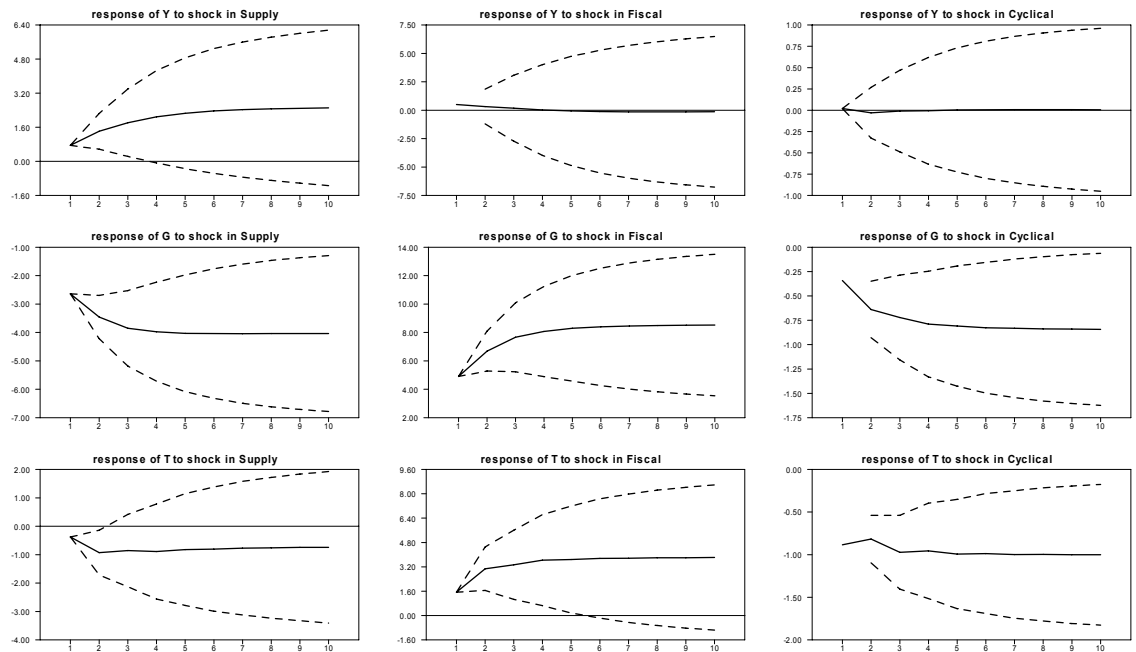


Figure 5.3 (continued)

Portugal



Spain



The fiscal shock then regards all discretionary policy interventions on spending and/or revenues that are not systematically related to the cycle and have only temporary effects on the economy. These discretionary fiscal shocks have somewhat prolonged effects on output. There is a lot of uncertainty around this effect and none of the responses is really significant. We scale the impulse responses in Figure 5.3 such that they always display

positive output effects. We do not find the typical result of small positive Keynesian effects on output in all countries. In Germany and Spain, a typical Keynesian response would follow upon demand boosting deficits. In France and Portugal on the other hand, fiscal contractions would lead to positive short-term effects on output instead. Such different responses likely depend on the composition of the fiscal adjustment or other structural parameters in the respective economies, but cannot be further examined in the current model.

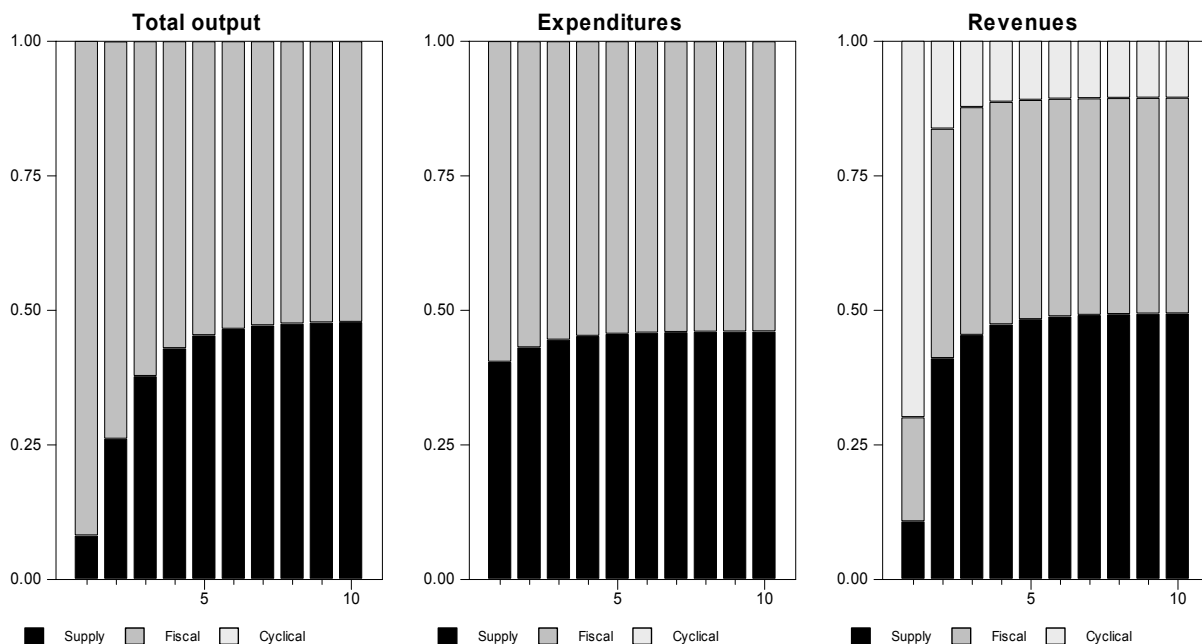
The different responses of spending and revenues to both economic shocks might indicate a delicate issue in the identification of policy. If fiscal policy reacts in a systematic way to economic shocks by changing its discretionary use of spending and/or revenues, this simultaneity blurs the distinction between the economic and the fiscal shock. This might be the case in France and Spain where tax revenues decrease after positive temporary output shocks, for example. But another indication is given by the rise in spending in economic booms in Germany or Portugal. It indicates policies that react in a discretionary way so as to repeal the use of automatic stabilisers. The fiscal indicator captures these policy biases. Our discussion will show how important this policy bias is for understanding fiscal trends in EU countries.

What does this imply for the contribution of fiscal policies to output variation (Figure 5.4)? Supply shocks account for at least 50% of total variance in output at all horizons, and this goes up to 90% in Portugal and Spain. For the latter countries, this was perhaps to be expected given their strong economic growth over the last two decades. Most of the variation in output is thus caused by productivity shocks even at short horizons. As we do not separately identify private and public supply shocks, we cannot really quantify the relative magnitude of both channels. But as pointed out above, we think that productive spending or revenues has contributed to some extent to the variance of output. The demand effects of fiscal policy in France and Germany are at least as large as those of supply effects. In Portugal or Spain instead, only a minor role is played by discretionary fiscal policy. The contribution of cyclical fluctuations to variations in output is negligible, as was to be expected from the results on the impulse responses.

What factors can account for these results? The large role played by fiscal policy in explaining output variation is not inconsistent with previous findings in the literature for large EU countries (De Arcangelis and Lamartina, 2004), but seems on the higher side of the range usually found. If we take the result at face value, it would suggest that the temporary demand effects of fiscal policy are probably much larger than the supply effects in the long-term. This would imply that both RBC and New Keynesian models are missing some aspects of fiscal transmission. But as we cannot precisely quantify the importance of the latter shocks, we would not want to claim validation of any of the theoretical models with our approach. This result nevertheless reveals that models of fiscal policy need to attribute important roles to both demand and supply side effects.

Figure 5.4 Forecast Error Variance Decomposition

France



Germany

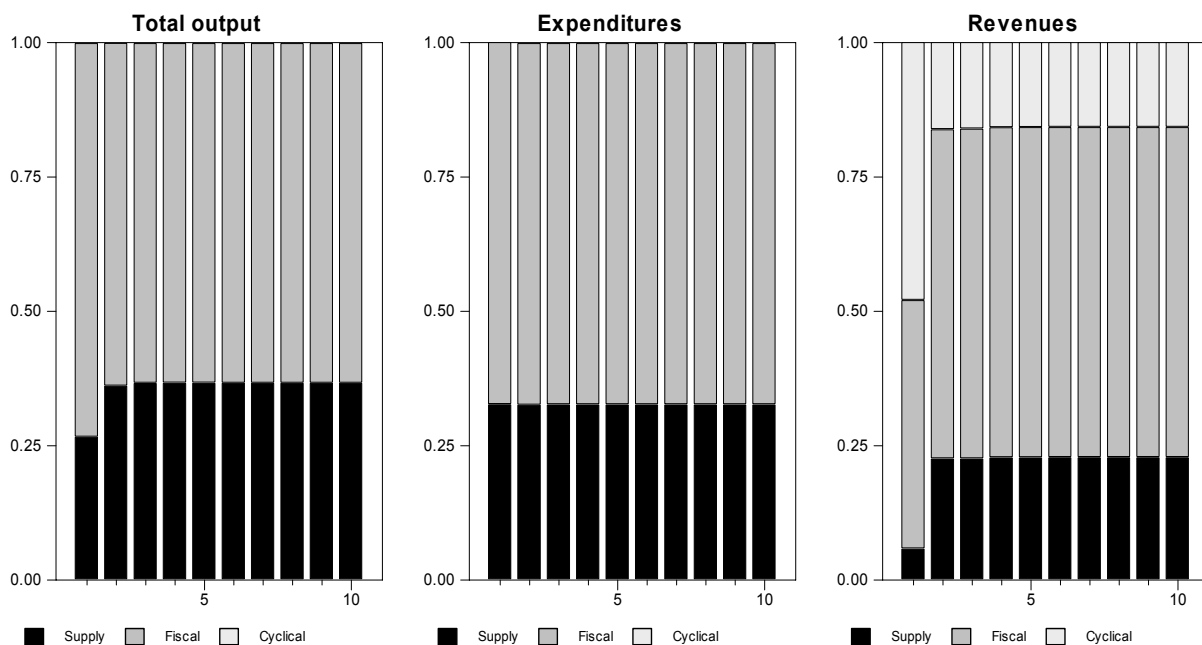
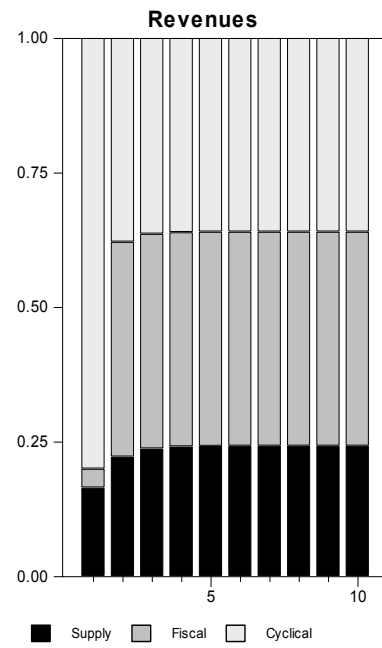
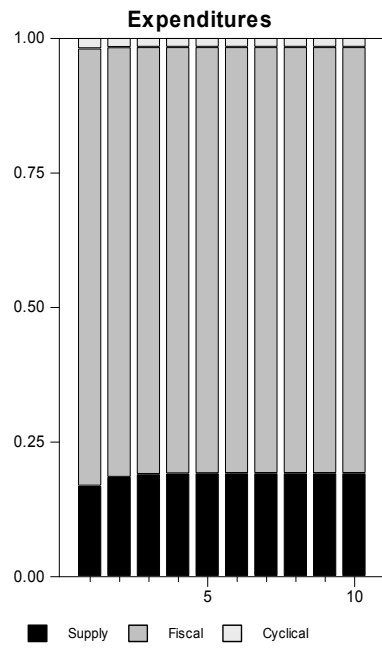
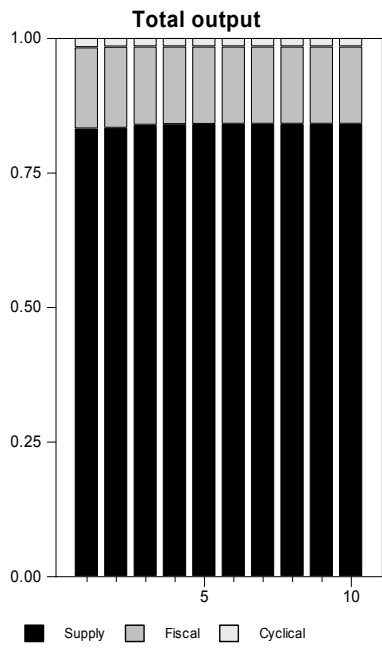
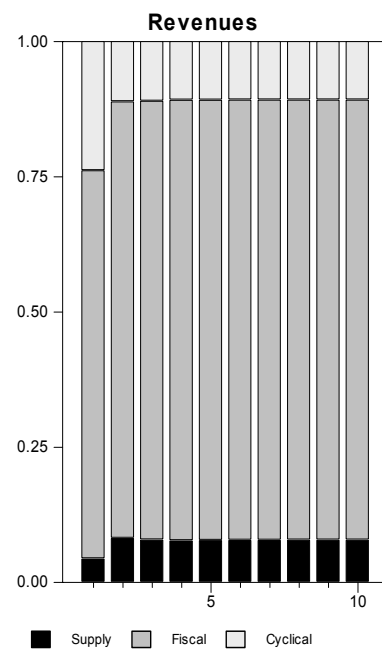
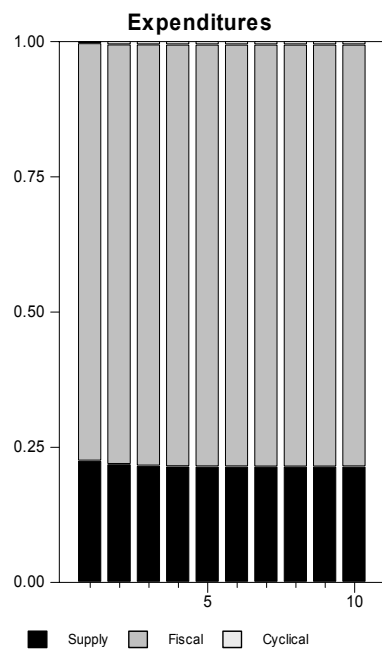
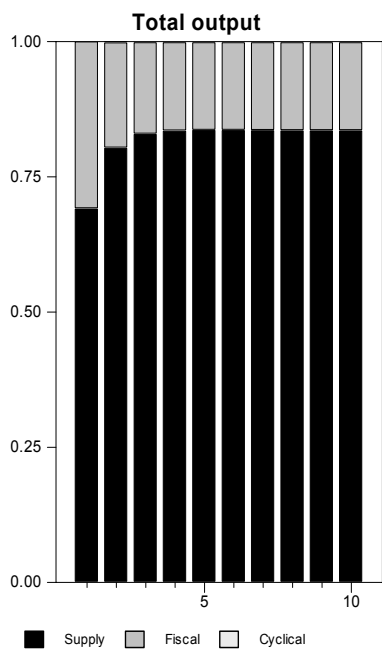


Figure 5.4 (continued)

Portugal



Spain



We think that the reason for the large contribution of fiscal policy is to be found elsewhere. To the extent that automatic stabilisers reduce the volatility of economic fluctuations, the tendency of governments to reduce taxation and/or rise spending in a procyclical way only adds to short-term output fluctuations and brings about aggregate macroeconomic instability. This policy volatility can moreover have negative effects on the long-term growth prospects of the economy.⁹³ The unwinding of previous taxation decisions goes against the principle of ‘tax smoothing’. The procyclicality of budgets implies negative supply-side effects. This explains the surprisingly low contribution of cyclical fluctuations.

Before going deeper into the past trends in fiscal policy, we want to check our model on some other aspects too. We compute the output gap based on the historical decomposition of the output series as actual minus potential output ($y - y^*$). In Figure 5.5 (top left panel),⁹⁴ we have repeated for comparison the output gaps of the European Commission, OECD and the one obtained by applying a Hodrick-Prescott filter. There is a rather close correspondence between these measures and our supply shock based gap for France and Germany. Given that we have used the OECD elasticities only for distinguishing shocks with transitory effects on output, this is all the more remarkable. The smooth gap for Portugal and Spain underlines the importance of supply relative to demand shocks in both countries. This might indeed be expected given the strong economic catch-up that both countries have experienced. We believe that potential output tracked much closer actual output developments in these countries. The usual statistical filtering methods are not adequate to capture this trend behaviour over small samples. Cyclical fluctuations are therefore rather minor. We provide some further robustness checks in the Appendix 5.B.⁹⁵

Overall, in all countries, there definitely was an improvement in economic conditions at the start of EMU. We find that economic conditions have worsened in both France and Germany in recent years. We nevertheless find the crisis in Germany to have set in somewhat earlier and to be more prolonged. As cyclical fluctuations are not large, we do not find much economic slack in recent years in Spain or Portugal.

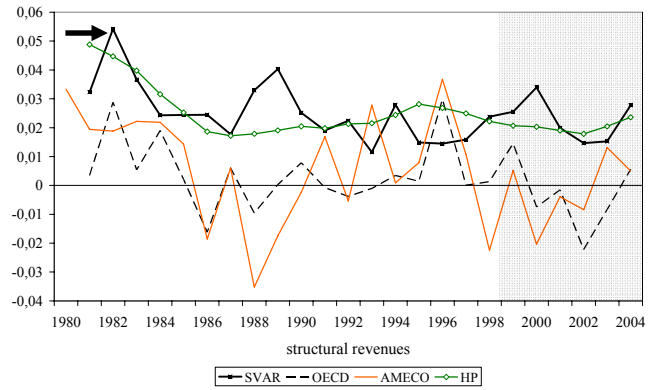
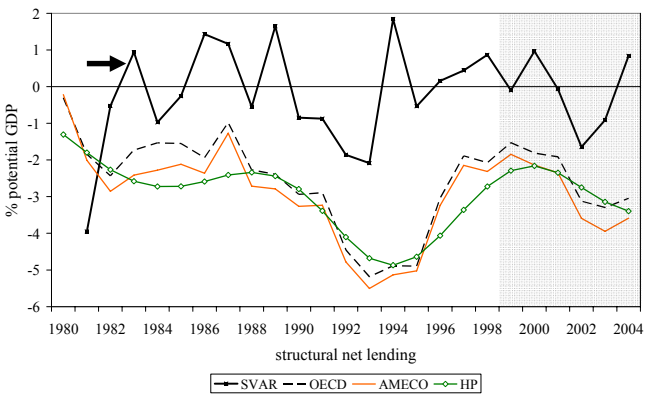
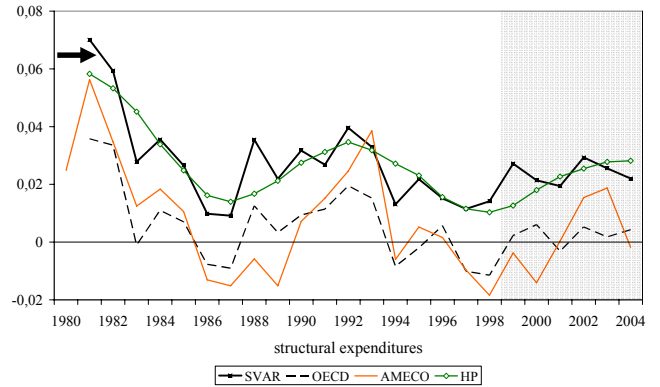
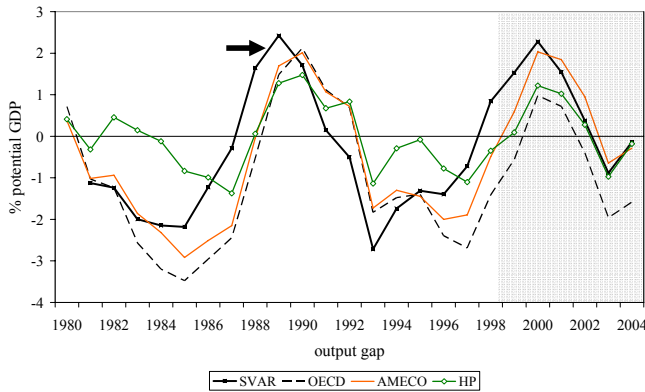
⁹³ We are certainly not the first study to document that European countries have not left automatic stabilisers to work, but instead have overturned these in a procyclical way. We do show however the macroeconomic instability that results as a consequence. With other models, Alesina and Bayoumi (1996) showed how fiscal policy at the US state level rather contributes to macroeconomic instability, and how fiscal rules have been useful in constraining discretion. Similar cross-country evidence is provided by Fatás and Mihov (2003b).

⁹⁴ We plot all series over the period 1980-2004 only.

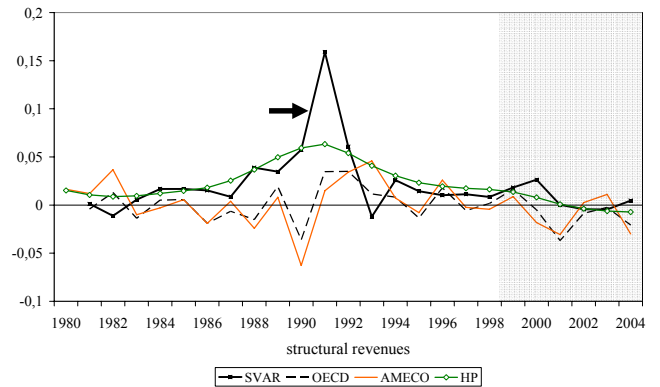
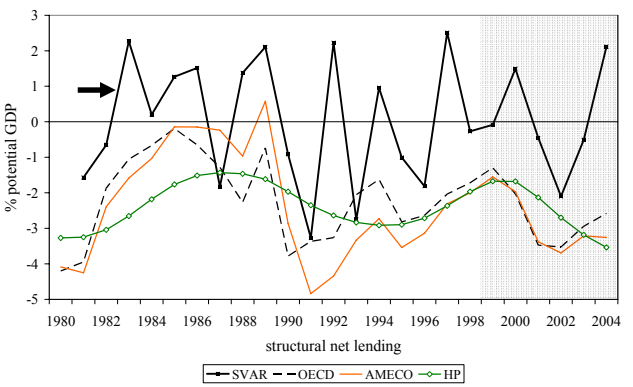
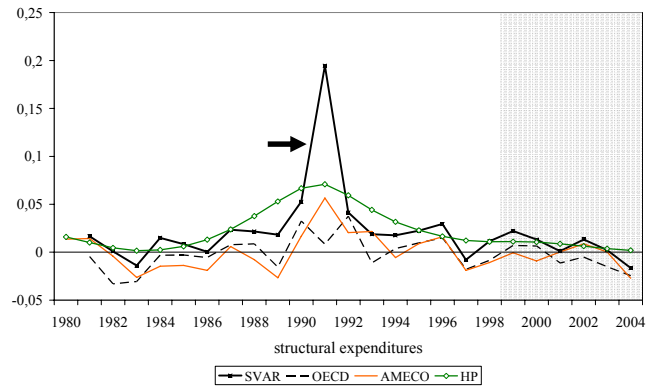
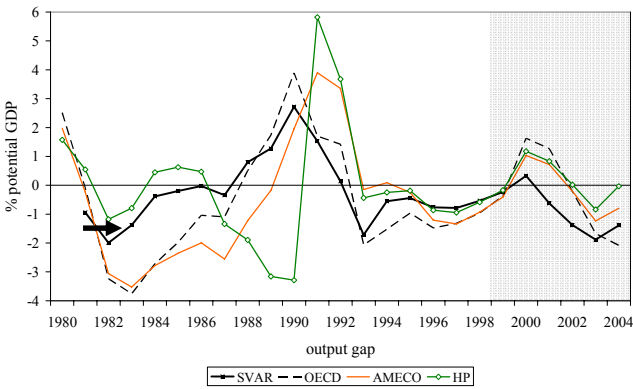
⁹⁵ A rough indication on the robustness of our output gap measure can also be given by the dates of peak and troughs in the business cycle. We plot in Appendix 5.B the first difference of the output gap against the chronology of peak to trough turning points of the growth cycle provided by the Economic Cycle Research Institute (ECRI). These calculations are based on monthly industrial production series. Our measure matches the changes in the output gap in all countries.

Figure 5.5 SVAR-indicator of Output Gap, Structural Net Lending, Expenditure and Revenues (% potential GDP)*

France



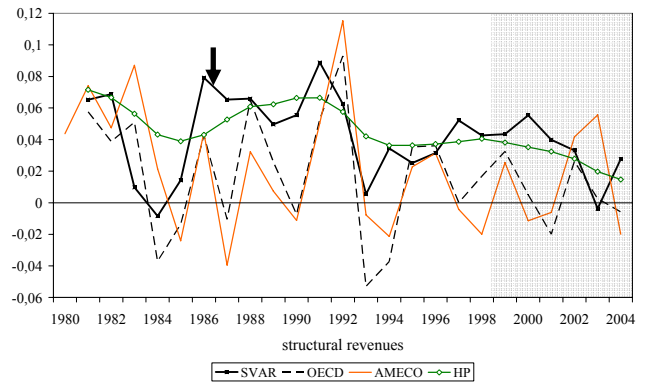
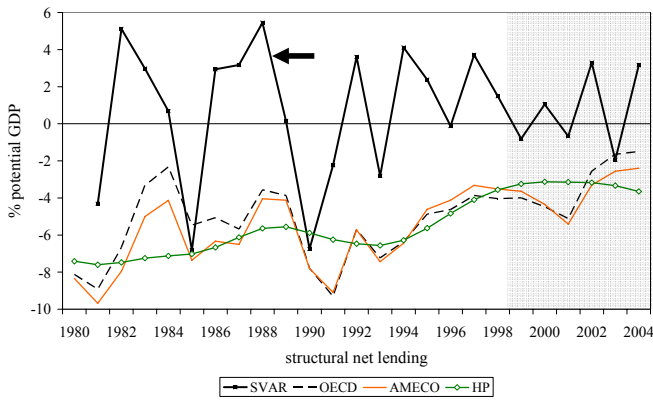
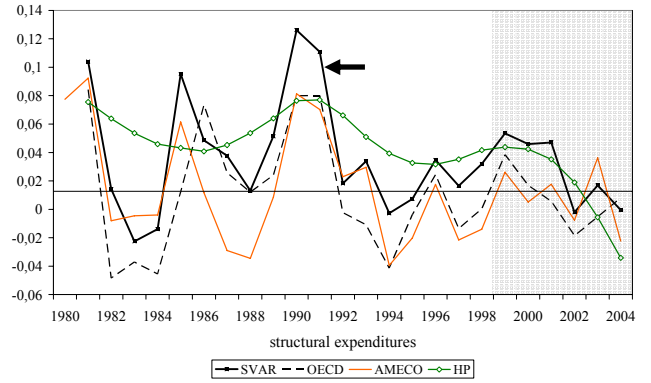
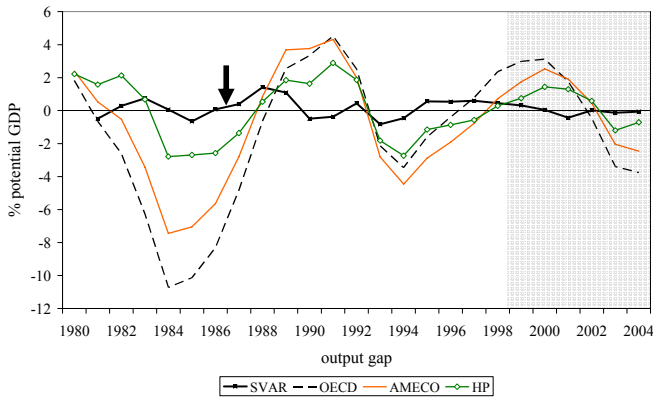
Germany



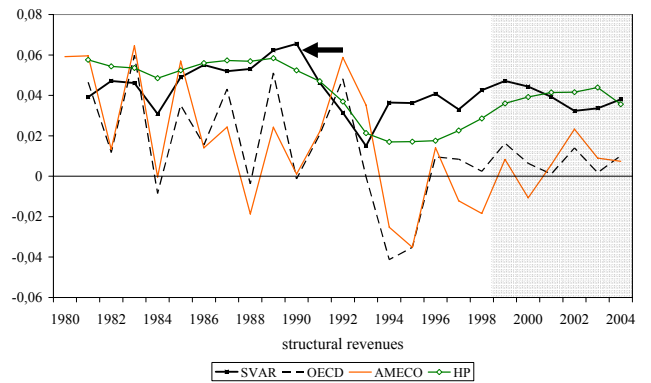
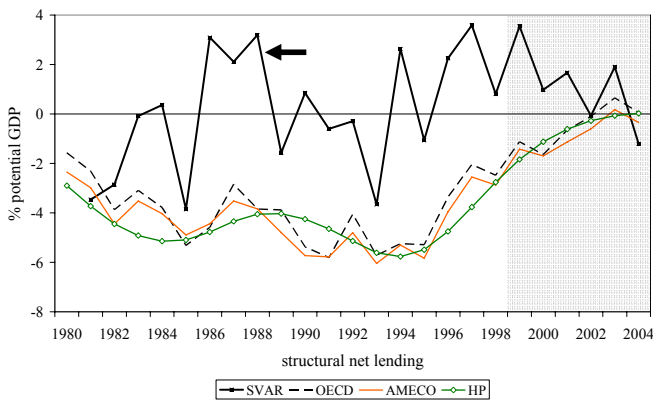
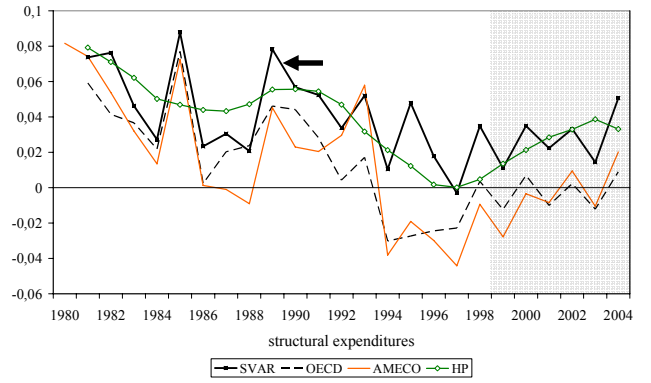
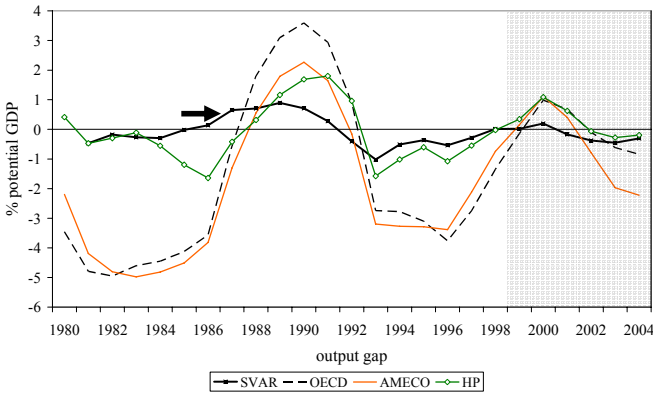
Note: * Indicated by arrows.

Figure 5.5 (continued)

Portugal



Spain



The Fiscal Indicator

We are now ready to discuss the indicator of discretionary fiscal stance. In general, the measure is more volatile than the measures derived with conventional methods (see Figure 5.5, bottom left panel). In many instances, our measure leads the smoothed measures in the direction of change. The fiscal indicator is usually smaller than the cyclically adjusted deficit. This reflects the definition of the structural balance, by which we take out the automatic stabilisers and the induced stabilisation effects caused by fiscal policies. In addition, fiscal policy also affects permanent output and therefore the structural fiscal position fluctuates around balance.

The indicator is also much more volatile. This follows from the major contribution of supply and fiscal shocks to the variation in output, spending and revenues (Figure 5.4). As we discuss below, one of the causes of this strong volatility – apart from the dominant supply side shocks – is the procyclical bias that characterises fiscal policymaking that induces extra variation, especially so in government revenues.

We may then expect our fiscal measure to coincide with some episodes of fiscal laxness or retrenchment. We consider the budget to undergo a strong expansion (contraction) when the cyclically adjusted primary balance falls (increases) by at least 2 percentage points of GDP in one year, or at least 1.5 percentage points on average in the last two years. This is the measure proposed by Alesina and Ardagna (1998). In Table 5.5, we gather those fiscal years in which a strong expansion or adjustment has occurred in our dataset (see Afonso, 2006).

At first sight, the correspondence is rather close. Comparing the changes in Figure 5.5 (bottom left panel) to the years in Table 5.5, we detect all events that the Alesina-Ardagna measure also suggests. For example, we find the budgetary cost of Reunification on German public finances to have been large. The Maastricht rules have also led to considerable fiscal retrenchment in France and Spain. There are a few events in Portuguese fiscal policy over the eighties that we do not date exactly. But we do find a switch between contraction and expansion starting in 1982-83. The Alesina-Ardagna measure does not pick up all expansions and contractions that we find, however. Some of these episodes correspond to well known changes in the fiscal stance (e.g. the ‘Mitterrand’ budgets in France 1981). Another major expansion in France in 1992 follows upon a string of expansionary budgets. Spain equally undergoes major expansions in the early eighties and nineties (1981 and 1993 respectively). Fiscal policy is also lax in Portugal (1990). Prolonged contractions occur over the eighties in France, Germany and Spain too.

Table 5.5 Large Fiscal Expansions and Contractions

	Expansions	Contractions
France	-	1995-96
Germany	1990-91	1982-83
Portugal	1980-81	1982-83, 1986, 1992
Spain	-	1995-96

Source: Adapted from Afonso (2006), following the measure used by Alesina and Ardagna (1998).

Concentrating on the period just before EMU, we can see a substantial shift in discretionary policies towards structurally positive net lending ratios. This is perhaps least visible in Germany, but the initial conditions were probably not such as to urge a strong and prolonged consolidation for reaching the Maastricht deficit limit. A substantial consolidation had already taken place at the end of the eighties. In the other countries, the structural effort was more drawn out. France started consolidation already in 1993, while it gathered pace in Portugal and Spain only in 1995. This also confirms evidence in Fatás and Mihov (2003a).

How has this consolidation been achieved? The right hand side panels of Figure 5.5 plot the growth rates of structural expenditures and revenues. These reveal that structural consolidations in the nineties have been based on a mixture of expenditure and revenue measures. But the combination of adjustments in the policy instruments has changed over time in a remarkably similar fashion in all countries. Initially, we see relatively moderate expenditure growth and in some cases even relevant spending cuts (Germany and Portugal). This strategy is reversed closer to the deadline of EMU. Tax increases start to bear the largest burden for bringing down deficits. Given the urgency of qualifying for the EMU criteria, taxes have seemingly been the easiest instrument to adjust. Notice the rather close match between the VAR-measure of structural spending and revenues and the (difference log of the) HP-trend on unadjusted total expenditure and revenues. The measures of OECD and AMECO display slightly lower growth rates. This owes again to our definition of the structural series. The efforts in reaching EMU led to the levelling off or even moderate declines in debt ratios. A plot of the structural fiscal indicator to the debt ratio shows how well the indicator captures these consolidations in debt (Appendix 5.B).

What went wrong then with the application of the Stability and Growth Pact in France, Germany and Portugal upon entry in EMU? The causes are again rather similar across countries. The increased tax revenues in the years prior to EMU led to a starting point of structural surplus. The persistence in these tax rises improved actual balances thanks to the favourable economic conditions at the time. But this has been exploited to increase expenditures in a commensurate way. Especially in Portugal, the expansion in expenditures seems to have held back an improvement in the structural position. The only exception here is Spain that further brought down expenditure, even in the presence of strong revenue increases. Simultaneously, the tax revenues that stream in during economic boom seem to have been undone by decisions to bring down tax rates in most countries. This considerably worsened the structural balance. As economic boom turned into bust again, the decline in revenues led to a substantial worsening of actual balances, pushing the deficit beyond the 3% threshold. However, the revenue declines have hardly ever been matched by sufficient cutbacks in government spending in the following years. Corrective measures in 2004 have improved the structural deficit. But the measures are mainly taken on the revenue side again, by undoing once more previous decisions to cut tax rates. To avoid further infringement of the budget rules, the adjustment in Germany and France has taken place via the route of tax rises during economic slack. This has once more reinforced the procyclical bias in fiscal policy-making. This also highlights the mechanism by which spending gets locked in, and causes a 'ratcheting up' in the size of government.

The overall situation seems less dramatic in Portugal, as revenue changes have been supported by equivalent spending decisions.⁹⁶ For Spain, the moderate decline in tax revenues in 2001 and 2002 was not entirely matched with spending cuts, leading to a slight deterioration of the structural indicator. The expansionary measures taken in 2004 have led to a breach of a balanced structural budget for the first time since 1995. Unsurprisingly, the expansion of fiscal policies in all countries reflects itself in rising debt ratios in recent years (see Appendix 5.B).

How useful is our indicator for assessing budgetary reform? We have argued above that aggregate spending or revenue measures contribute to long-term growth. Its contribution may perhaps be small relative to productivity rises in the private sector, and part of the effect could be swamped due to procyclical policies that induce macroeconomic fluctuations (and its consequent negative effects on growth). We do not believe this is the final word on the contribution of fiscal policy. A more detailed analysis of different spending/tax items could shed light on their specific growth enhancing effects.

Some Sensitivity Analysis

The results might be influenced by some particular parameter value that we have drawn from the OECD (Girouard and André, 2005) in order to distinguish business cycle and fiscal demand shocks. There are various reasons for considering these aggregate elasticities with some caution.

First, elasticities are assumed to be time-invariant. These are not representative of the tax and spending structures that have prevailed in historical samples, however. In some countries, the expansion of the welfare state has led to gradually larger tax bases and dramatic changes in tax systems (Portugal and Spain). But even in France and Germany, time-variation cannot be neglected. Budget elasticities tend to move over the business cycle as well (Bouthevillain *et al.*, 2001). Changes in elasticities also throw up a more subtle difficulty in the interpretation of the fiscal shocks that we have already discussed in section 5.4. On the revenue side, discrete policy changes involve decisions on the ratio of average to marginal tax rates and the breadth of tax bases rather than on total amounts.⁹⁷ Only if changes in total revenue amounts coincide with these decisions, do we identify correctly shocks on the revenue side of the budget. Second, given the difficulties in identifying all channels through which changes in interest rates and inflation may impinge on various revenues and spending categories, the OECD simply abstains from adjusting interest payments for cyclical variation and assumes the net effect of inflation to be zero.⁹⁸ This only reinforces the argument in favour of our economic approach in which we specify a role for long-term and business cycle fluctuations. However, our use of the OECD numbers can be argued to be inconsistent as these have been derived under these methods. Finally, auxiliary assumptions on the various parts of the calculation of budget elasticities may cumulate into quite some uncertainty in the final estimates of elasticity.

⁹⁶ One should notice that several one-off measures mask the true deterioration in the Portuguese or the Spanish budget in recent years. Under the revised Pact, the deficit net of one-off and temporary measures is considered. Our procedure does not necessarily consider the effects of such measures to be nil.

⁹⁷ Similar arguments can be put forward for various expenditure items.

⁹⁸ Eschenbach and Schuknecht (2004) argue that government revenues and expenditures are also affected by asset prices changes in ways not accounted for by standard cyclical-adjustment methods.

Our first robustness check on the elasticity parameters illustrates the effects of this uncertainty. We conduct a grid search on different values for γ and α that Girouard and André (2005) provide. Table 5.6 shows the wide range of net lending elasticity that is obtained by varying only the elasticity of wages to output two standard errors below and above its point estimate.⁹⁹ For all possible combinations of this revenue elasticity α and for a given spending elasticity γ , we impose the identification scheme as in (5.5) on the VAR. For any of the parameter values in Table 5.6, we always find convergence to a result identical to that obtained with the point estimate of the elasticity.¹⁰⁰ The uncertainty about the elasticity does not seem to play a major role then, and this confirms the findings of Blanchard and Perotti (2002) or Marcellino (2002).

Table 5.6 Parameters γ and α

	France	Germany	Portugal	Spain
Net lending	0.53 [0.46, 0.61]	0.51 [0.39, 0.61]	0.46 [0.42, 0.50]	0.44 [0.38, 0.49]
Total spending, γ	-0.11	-0.18	-0.05	-0.15
Total revenues, α	[0.51, 0.66]	[0.46, 0.68]	[0.44, 0.52]	[0.43, 0.53]

Source: Girouard and André (2005).

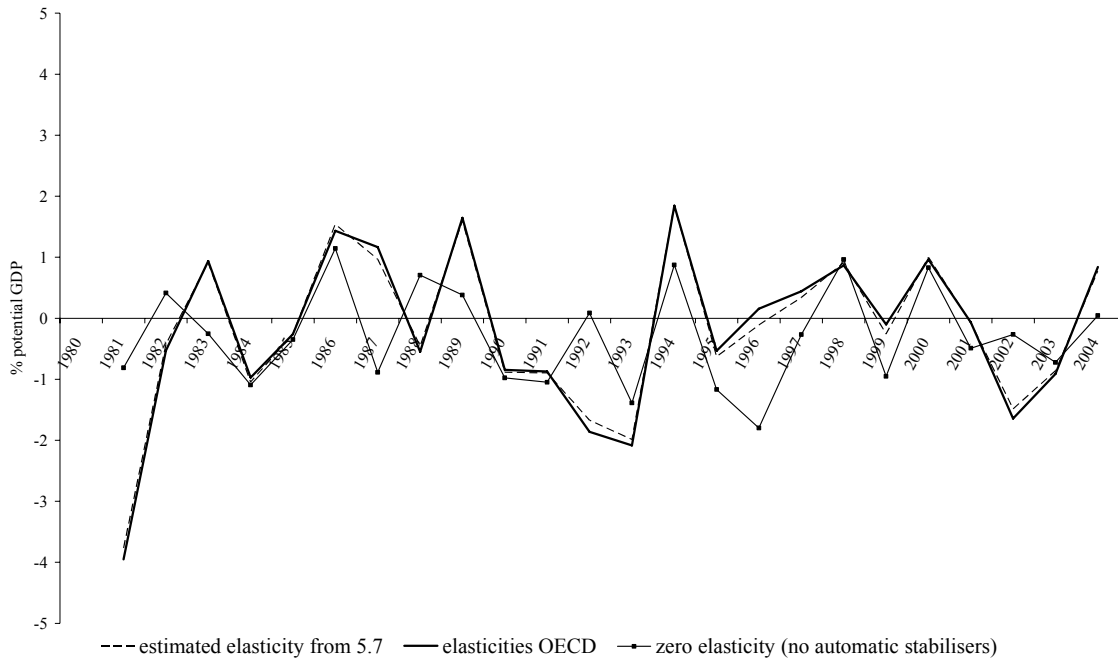
One of the other interesting scenarios is the one in which we switch off the elasticities. By setting γ and α equal to zero, we assume that neither spending nor revenues react to the cycle. This consequently attributes a larger role to discretionary fiscal policies. The effect on the structural indicator depends however on the relative contribution of changes in taxes or spending to fiscal shocks. Figure 5.6 contrasts the structural indicator obtained with the OECD elasticities against the one with zero elasticities. The effect is only marginal. In most periods, the results are rather similar. This reflects again the prevalence of the supply relative to the temporary economic shocks. Oftentimes, there are more prolonged periods of moderate deviations.

⁹⁹ The wage elasticity is used for calculating the elasticity of the income tax. See Girouard and André (2005) for an extensive discussion and a quantification of this uncertainty.

¹⁰⁰ The results of the impulse response analysis are largely unchanged. Effects are estimated slightly less precise, and the effects of the business cycle shock in Portugal are not clear.

Figure 5.6 Sensitivity Analysis: SVAR-indicators of Structural Net Lending (% potential GDP)

France



Germany

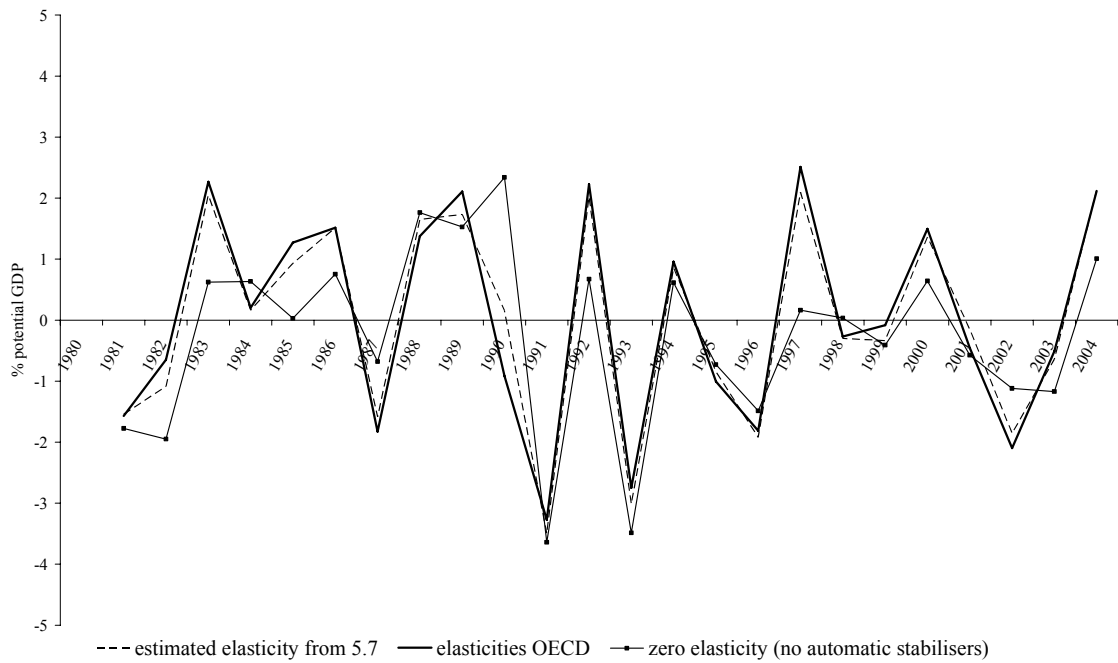
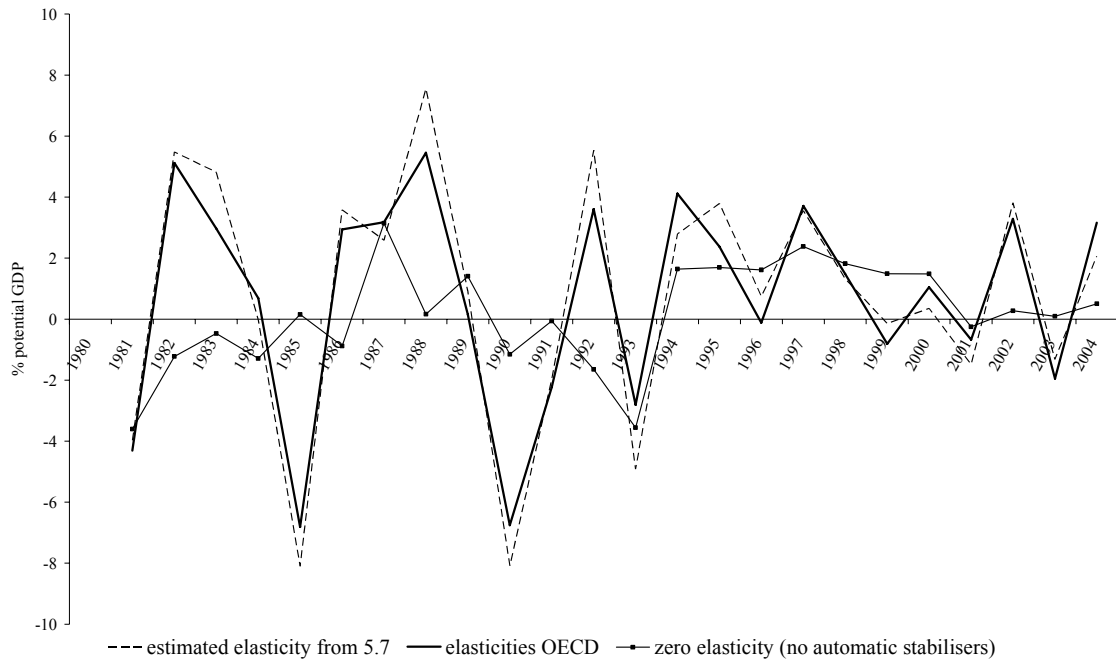
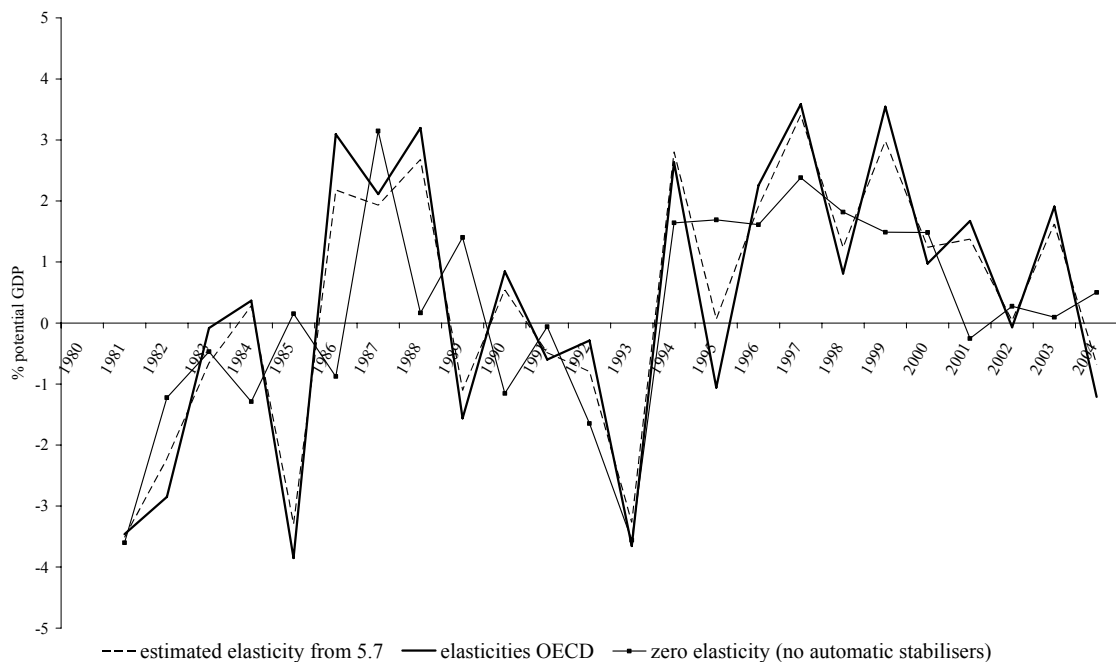


Figure 5.6 (continued)

Portugal



Spain



Fiscal policy might be more seriously biased against automatic stabilisers than our ‘zero-elasticity’ scenario suggests. There is quite some evidence that in European countries, governments have been systematically overturning the working of automatic stabilisers (Galí and Perotti, 2003; Lane, 2003). The true expenditure and revenue elasticities may therefore be biased upward in comparison to observed elasticities. As a consequence, we

would attribute too much of the variation in fiscal policies to the economic cycle and too little to the offsetting systematic discretionary adjustments.

To illustrate this phenomenon for Germany, France, Portugal and Spain, we follow Lane (2003) in estimating the output elasticity of the main budgetary items. *I.e.*, we regress in (5.7) the main budget items on economic growth for the sample period 1970–2004,

$$d \log X_{i,t} = \omega_i + \gamma_i d \log Y_t + \mu_{i,t} \quad (5.7)$$

where $X_{i,t}$ is total spending, government investment, current spending (consumption and wage spending), or interest payments, and Y_t is real output. Likewise, we estimate model (5.7) in which where $X_{i,t}$ contains either total revenues, current revenues or (in)direct tax revenues. The estimates are also repeated for the decades 1970–1980, 1981–1990, and 1991 to 2004, as we have reasons to expect quite some time-variation. Table 5.7 reports the results of an OLS estimation of (5.7), with a correction for first-order autocorrelation.

Table 5.7 Budget Elasticities from OLS on Equation 5.7

	France				Germany			
	1970-2004	1970-1980	1980-1990	1990-2004	1970-2004	1970-1980	1980-1990	1990-2004
Total spending	0.32	-0.47	0.38	-0.09	1.04***	-0.06	1.28***	1.22***
Investment	1.46	-4.09	6.52*	6.13*	3.55**	-1.84	5.06*	4.39*
Current spending	-0.15	-0.07	0.34	-0.55*	0.73***	-0.21	1.00**	0.88***
Consumption spending	0.19	-0.26	0.63	-0.53*	0.98***	-0.24	0.53	1.30***
Wage spending	-0.16	-0.45	0.50	-0.08	1.04***	0.03	0.40**	1.37***
Interest payments	-3.94***	-8.12***	-5.20**	-0.41	0.68**	0.26	-0.49	0.92**
Total revenues	1.73***	1.18	0.56	1.48***	1.47***	2.94***	1.52***	1.24***
Current revenues	1.86***	1.16	0.81	1.97***	1.46***	3.31***	1.48***	1.19***
Total tax revenues	1.18***	0.83	-0.08	1.47**	1.15***	1.87***	1.40***	1.09***
Direct tax revenues	2.07***	1.61	-0.14	3.12**	1.30***	2.50**	1.17***	1.28***
Indirect tax revenues	0.61**	0.81	0.02	0.54	0.94***	1.08***	1.57***	0.87***
	Portugal				Spain			
	1970-2004	1970-1980	1980-1990	1990-2004	1970-2004	1970-1980	1980-1990	1990-2004
Total spending	0.67**	-0.37	1.23**	1.46***	0.03	-0.15	-0.45	0.33
Investment	0.76	-1.39	5.35***	2.67	-0.37	2.60	-4.09	2.83
Current spending	0.76***	-0.16	0.96**	1.14***	0.22	-0.27	0.22	-0.07
Consumption spending	0.77***	0.10	1.40***	1.39***	0.22	-0.10	0.29	0.26
Wage spending	0.60**	-0.39	1.53***	1.54***	0.63	0.00	0.83*	0.33
Interest payments	-1.39	-2.67	-2.35	0.48	-1.31	-0.17	-2.71	-4.56***
Total revenues	1.58***	1.31	2.27**	2.59**	1.36***	0.71	1.36***	2.95***
Current revenues	1.62***	1.30	2.30**	2.90**	1.42***	0.71	1.36***	3.05***
Total tax revenues	1.24***	0.82	1.07	1.70***	0.99**	0.35	0.78	1.81***
Direct tax revenues	1.36***	0.96*	1.31	2.87***	1.08*	-0.26	2.35***	1.43***
Indirect tax revenues	1.02***	0.65	0.74*	1.04**	0.91*	0.99	-0.87	2.15***

Note: ***/**/* denotes significance at the 10/5/1 % significance levels, respectively.

The switch from small negative spending elasticities in OECD (Girouard and André, 2005) to a strongly positive elasticity is very strong in Germany and Portugal, where it is significant for all budget items. Government investment is the most procyclical budget component. But the main category driving this result is – in absolute terms – government consumption. In Germany, a large role is also played by wage spending in the last decade. Fiscal spending expansions under positive economic growth are strongly concentrated in increased wage spending in Portugal. In contrast, Spain, and in particular France, have not been subject to a similar bias. No expenditure item – except for interest payments – shows significant signs of procyclicality.

We have argued before that the procyclical bias in fiscal policy is mainly due to reversals in taxes. We indeed confirm the procyclicality of revenues as in all countries, elasticities are significantly larger than the corresponding elasticities from OECD (see also Table 5.1).¹⁰¹ This is especially pronounced in the nineties in all countries, with the exception of Germany. The changes over decades are quite outspoken and hide quite some adjustments in tax systems. Only in Germany is the response of revenues procyclical in all sub-samples. For France, Portugal and Spain, the elasticities in the seventies are not significant. This must be related to the development of tax systems in the latter two countries; the result for France seems more puzzling.¹⁰²

These results show that latent policy pressures on spending or revenue bring about adjustments that usually reverse the effects of automatic stabilisers. The ‘actual’ elasticities incorporate all cyclical reactions, coming from the automatic adjustments via the underlying tax and spending structure and systematic interventions of fiscal policymakers. If we choose to impose the ‘actual’ elasticity in the VAR model (5.5), the interpretation of the fiscal shock is one that includes all discretionary interventions. The drawback of the approach is that our ‘cyclical’ shock is a mongrel reaction to economic conditions, in which we cannot tell apart the importance of systematic policy and the economic cycle. The difference in the structural indicator – obtained with the OECD elasticities – can then be attributed to the procyclical bias in fiscal policy.

Table 5.8 summarises the elasticities that we have taken from Table 5.7 for the entire sample period for re-estimating the VAR. Figure 5.6 compares the structural indicator. We find convergence to the same solution as in the basic case: there are only some marginal differences for the case of Portugal.

Table 5.8 Elasticities Imposed on Equation 5.5

	France	Germany	Portugal	Spain
Total expenditure, γ	0.32	1.04	0.67	0.03
Total revenue, α	1.73	1.47	1.58	1.36

Source: author's calculations.

What does the insensitivity of the results to assumptions on the budget elasticities tell us? The forecast error variance decomposition reveals nearly equivalent roles for demand effects of fiscal policies and supply shocks in Germany and France, whereas supply shocks tend to dominate in Spain and Portugal. If we recover nearly similar fiscal policy shocks whether correcting for automatic stabilisers, setting them to zero or taking the systematic variation in fiscal policy into account, this is due to the little importance of cyclical economic shocks. This does not mean that the automatic stabilisers are irrelevant. The stabilising effects of the structure of the spending and taxation system will still work

¹⁰¹ If the government decides to raise tax rates in economic crises, this leads to a stronger than expected reaction of revenues in the following economic boom.

¹⁰² The time variation in elasticities is also apparent from a recursive regression of 5.7. Coefficient plots are summarised in Appendix 5.C and further documents some of the problems with constant elasticities. We have not reported the elasticities of interest payments and investment, as these coefficients are much more volatile than those of other budget items. There are relevant breaks associated with major shifts in fiscal policy (e.g. German Reunification, democracy in Portugal and Spain). For most spending categories, we remark a modest decline over time in Germany and a more outspoken one in France, while changes are minor for most revenue categories. Portugal and Spain have seen a large rise in elasticities of all items, owing to the expansion of their welfare states. This rise has pushed elasticities even above those in Germany and France.

their way to economic variables via the longer-term supply-side effects. It does not necessarily mean that ‘letting the automatic stabilisers work’ will lead to superior economic outcomes as such. Fiscal policy that refrains from manipulating spending or taxes at every economic turn shields the economy from further shocks. Fiscal policies ought to focus attention on the longer-term effects of fiscal policy, rather than destabilising it.

5.5 Conclusion

Recent years have seen the launch of excessive deficit procedures to Portugal, France and Germany, and later for several other EU Member States. The reasons for the breach of the deficit rules in recent years are still open to discussion. A variety of political and economic factors probably underlie the increase in public deficit and debt ratios. The revised Pact loosens the numerical limits and leaves more room for a country-specific interpretation of the medium-term budgetary objective. First, it allows for a gradual adjustment effort under unfavourable economic conditions, as long as consolidation continues in good economic times. Second, the revised Pact also attributes more importance to the quality of the budget adjustment. The revised Pact provides for the implementation of structural reforms that carry temporary budgetary costs, but which through positive supply-side effects enhance the structural balance and thus the long-term sustainability of public finances.

This chapter takes a first step in developing an economic indicator of discretionary fiscal stance that takes into account both the cyclical short-term and the long-term supply side aspects of fiscal policy. We analyse the budgetary outlook for France, Germany, Portugal, and Spain by uncovering underlying past trends in revenue and expenditure. Our approach combines insights from the growing empirical literature on the effects of fiscal policy modelled via structural VARs with statistical methods for cyclically adjusting fiscal balances. Our approach innovates on existing evidence in using a mixture of short and long-term restrictions to identify economic and fiscal shocks in a small-scale empirical model in output and fiscal variables. This allows for permanent shocks to determine trending behaviour of output and fiscal variables à la Blanchard-Quah. Discretionary fiscal adjustments are captured by filtering out the fiscal balance for cyclical reactions of budget items following Blanchard and Perotti (2002).

The model-based indicator we develop shows that pre-EMU consolidations have in last instance been based mainly on revenues. The slippages of the recent years owe to the unwinding of these measures without accompanying spending cuts. This showed up in larger deficits when economic conditions worsened, and a ‘ratcheting up’ in the size of government in economic booms. Recent corrective measures seem to rely mainly on increasing revenues again. The procyclical bias in fiscal policies has not been eliminated. Governments implement bad policies in good times. Fiscal policy induces additional economic fluctuations and contributes to aggregate macroeconomic instability. As a consequence, the short-term effects of fiscal policy outweigh supply side effects in the longer term. A Pact that counters these policy reversals can lead to more sensible policies that also focus on the long-term quality of public finances.

The analysis in this chapter is consistent with a growing theoretical literature on the effects of fiscal policy. DSGE models with nominal rigidities offer a rationale for fiscal stabilisation policies. At the same time, these New Keynesian models consider both supply and demand side effects of fiscal policy, and find the former to dominate. We find that both the supply and demand effects of fiscal policy are important. The current version of the model does not allow us quantifying the contribution of supply shocks. The results suggest that the government budget can have long-term growth effects, but mostly so in catching up countries as Portugal or Spain. More elaborate empirical models could incorporate refinements in the compositional adjustment of budget balance. This would allow for an explicit assessment of the channels through which fiscal policy transmits its effects. Allowing for a different reaction of various budget items to demand and supply shocks can be a first step in that direction. We think in particular of spending categories that are considered productive (like government investment). This can verify some endogenous growth theories of fiscal policy (Turnovsky, 2000). A major channel through which fiscal policy acts is also the labour market, either directly – via wage spending or public employment – or indirectly. Finally, instead of specifying a model in output and fiscal policies only, the inclusion of prices and/or interest rates can lead to a more accurate description of the economic shocks.

Appendix 5.A

Data Sources

	Definition	Source
	g_t total expenditure	AMECO
	t_t total revenues	AMECO
	y_t GDP	AMECO
	GDP deflator	AMECO
	potential GDP	
	output gap	
other	cyclically adjusted expenditure (categories)	AMECO/OECD
	cyclically adjusted revenue (categories)	
	cyclically adjusted net lending	
	growth rate cycle peak and through dates	
other	chronology of cycle ^(a)		Economic Cycle Research Institute (ECRI), at www.businesscycle.com, algorithm updated in September 2005

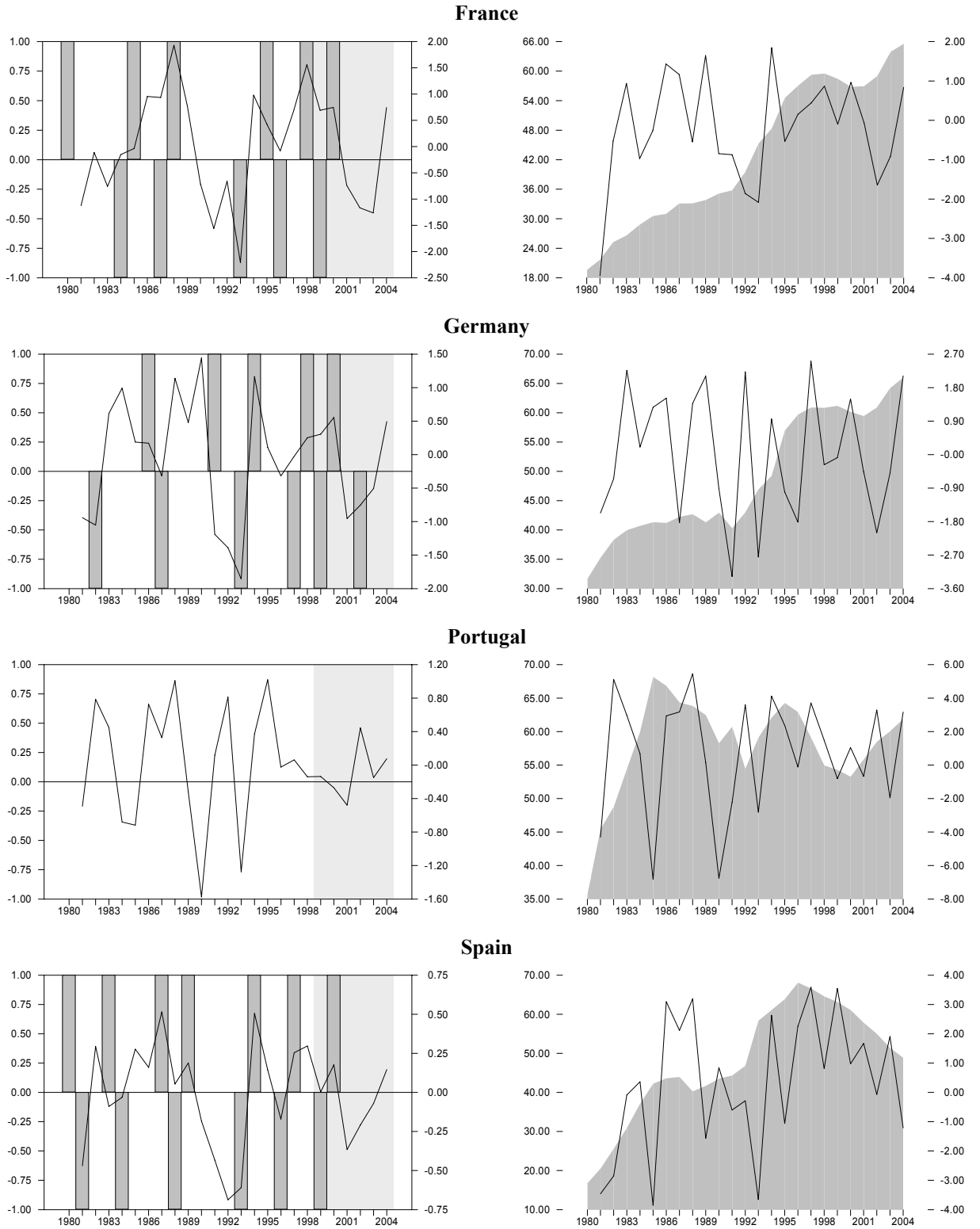
Note: AMECO data are for general government, according to ESA-95, in billion of euro (national currency definition). The UMTS licensing receipts for the year 2000, or following years, are added to total expenditure. Data are from the AMECO database, updated on 4 April 2005. Comparable data definitions hold for OECD data. (a) The measure for Portugal is not available.

Appendix 5.B

The Fiscal Indicator: Some Additional Results

a) SVAR based output gap (line) and ECRI-dating of cycle (bars).

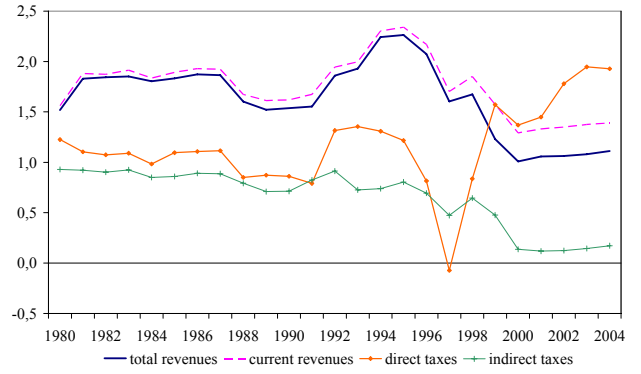
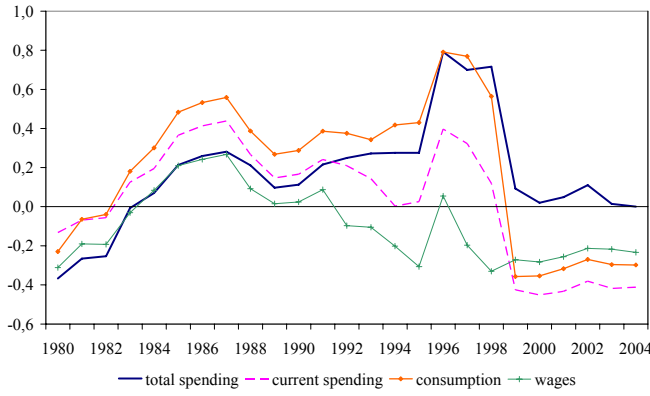
b) SVAR-indicator of fiscal balance (% potential GDP)(line, right-hand scale) versus debt ratio (% of GDP)(shaded area, left-hand scale).



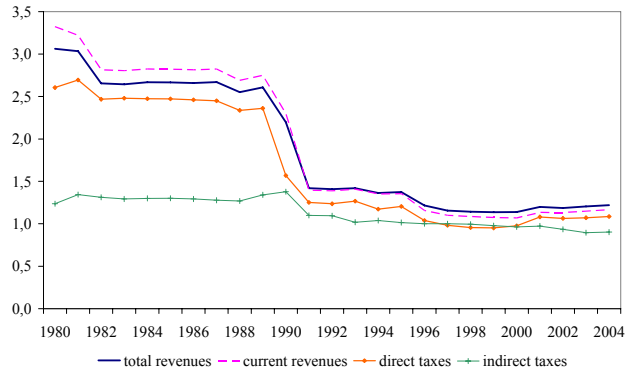
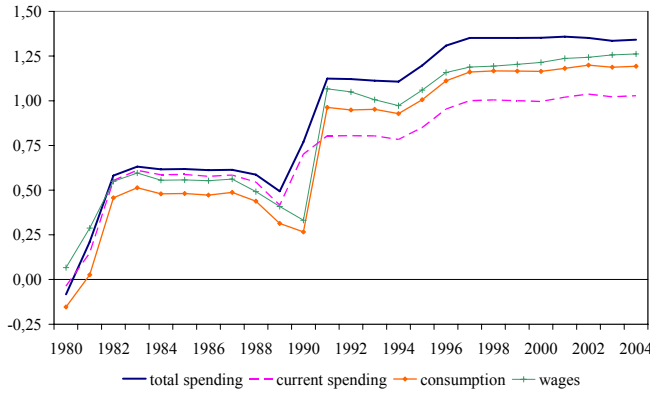
Appendix 5.C

Recursive Estimates of Budget Elasticities

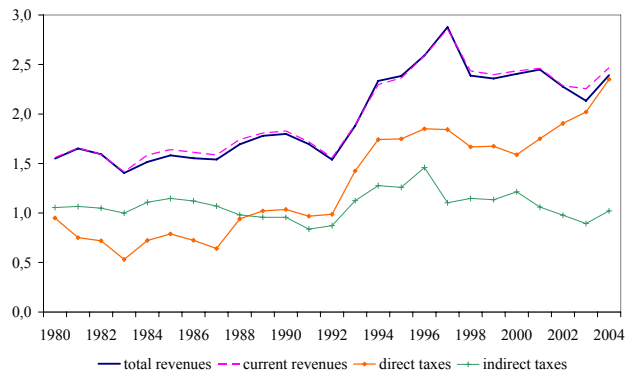
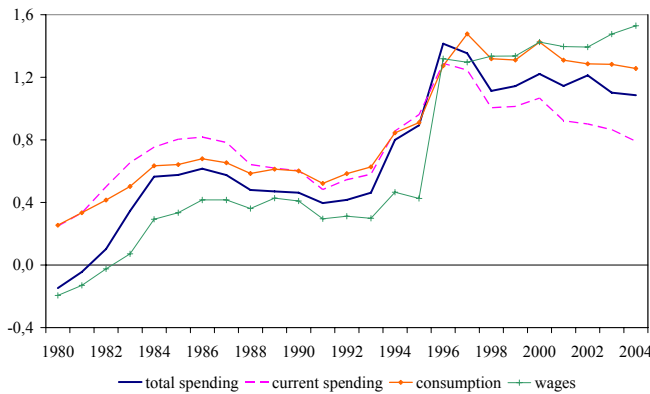
France



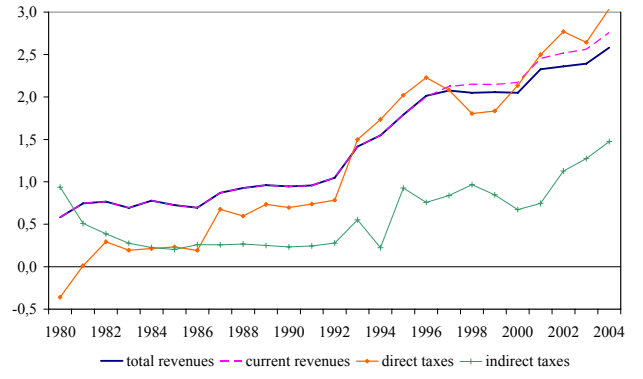
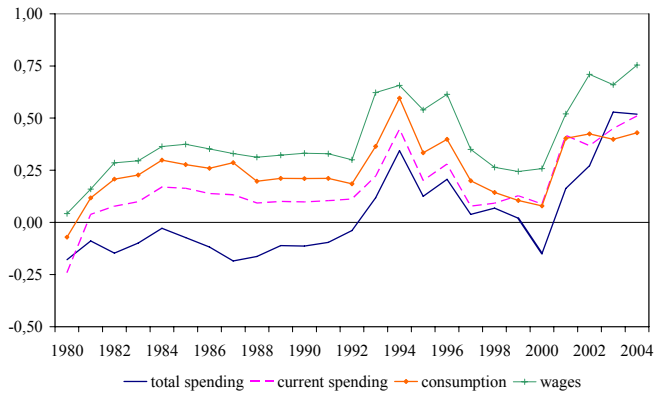
Germany



Portugal



Spain



Discussion

Jan in 't Veld

The chapter by António Afonso and Peter Claeys provides a new method of calculating indicators of fiscal policy. The objective is to uncover any underlying past trends behind developments in public finances that may explain the current budgetary outlook. The authors propose their fiscal indicator as an alternative to the standard method of cyclically adjusting budget balances (CABs), which according to them does not properly reflect discretionary shifts under control of government. They interpret their results in great depth and conclude that a procyclical bias in fiscal policy has resulted in a ratcheting-up in the size of governments. I do not disagree with the general thrust of their analysis of what has gone wrong with fiscal policy in EMU in the recent years. Rather than commenting on the specific aspects of four countries considered, I would like to give here a more general discussion of the method and the resulting indicator with a view to its usefulness for policy evaluation.

The strength of the chapter is in my view that the approach based on structural VARs allows for a simultaneous determination of a measure of cyclical output and fiscal balance. According to the authors their fiscal indicator has as advantage over standard CABs that it captures the so called supply side effects of fiscal policy. It should be pointed out that the criticism the authors put forward to justify their alternative approach, *i.e.* the difficulties in interpreting the structural balance in the absence of economic arguments to underpin the trend-cycle decomposition, applies chiefly to statistical trend extraction procedures and less to the production function approach adopted by the European Commission. Having said that, the proposed VAR-based indicators provide an interesting alternative to the CABs. The production function approach does not take into account the growth effects of fiscal policy due to taxation and productive spending, while this indicator in principle could include this. As the authors point out, it is therefore more consistent with the distinction between supply and demand side effects of fiscal policy adjustments found in recent DSGE models, which unlike earlier RBC models not only incorporate supply side effects through wealth effects and labour/leisure choice but also give a larger role to demand side effects by including financial frictions such as liquidity constraints. (Results from these models suggest fiscal policy has a significant demand side effects and counter-cyclical fiscal policy has reduced output volatility).

A second advantage of the VAR-based indicators that the authors propose is that it allows identification of confidence bands. The standard CABs have large cumulative uncertainty due the various assumptions made in calculating output gaps but this is never shown explicitly. Just like Bayesian-estimated DSGE models (with have a proper structural identification), the SVAR method applied by the authors allows for an explicit assessment of uncertainty.

SVARs are useful tools. However, it is important to be aware of their shortcomings in properly identifying short and long run effects. It has been shown to be difficult to

estimate precisely the long run effects of shocks using a short data sample. Faust and Leeper (1997) show SVARs that achieve identification through long run restrictions may perform poorly when estimated over sample periods typically utilised and various other papers have illustrated this. The authors do not describe the estimation of the SVAR model in great detail, and many of the problems surrounding SVAR identification may not apply to their model, but judging on some of their results the proper identification of cyclical and supply shocks seems problematic.

The authors use a mixture of short and long term restrictions to identify economic and fiscal shocks. They identify three structural shocks: (i) "supply" shocks that drive long term trend rise in output (also including fiscal policy, *i.e.* a combination of shocks); (ii) "cyclical" shocks that capture short term fluctuations around steady state equilibrium (transitory); (iii) "fiscal" demand shocks distinguished by the elasticity approach (the discretionary policy stance, but excluding those policies that have long term growth effect, like productive spending and tax policies). When this identification scheme is applied to the data the resulting IRFs and forecast error variance decomposition seem at first sight somewhat puzzling. The chapter would benefit from further explanation of some of the results: e.g. the negligible contribution of "cyclical" shocks to the variation in output, the persistent contribution of discretionary "fiscal" shocks (although these are restricted to have no long run output effect) to the total variance in output even at longer horizons, and various other features in country specific IRFs like the non-Keynesian effects of fiscal shocks in France and the relation between positive supply shocks and a decline in expenditure in Germany.

I suspect part of the problem of not correctly identifying cyclical, discretionary fiscal and supply shocks is due to the use of annual data by the authors and the estimation of the model with a one year lag structure. The question is whether this allows for the proper identification of cyclical shocks and its distinction from supply shocks and fiscal shocks? It would be interesting to see the results when quarterly data are used instead (like Blanchard and Perotti, 1999 and Perotti, 2005).

Another problem is that the authors do not distinguish compositional detail. Different revenue measures have different long term supply effects, and the same applies for different expenditure measures. Looking at total revenues and total expenditure is not very revealing in this context. This is regrettable, as the authors rightly argue that it is highly desirable that an economic indicator of fiscal policy takes into account supply side effects. In its current form though, without disaggregating expenditure and revenues, it remains something of a black box and one cannot distinguish long term fiscal policy effects from other long term shocks that are included in the "supply" shock.

The resulting structural deficit is defined as structural expenditure minus structural revenues (both driven by discretionary fiscal shocks and supply shocks). The fiscal indicator is smaller than standard CABs and much more volatile. The volatility makes it difficult to interpret the authors' results in any depth and hampers a comparison with the cyclically adjusted balances calculated by the Commission and the OECD. As it appears that the indicator is surprisingly insensitive to assumptions on newly estimated budget elasticities, it seems likely that this volatility is related to the problems in correctly identifying cyclical shocks, as so much is attributed to discretionary fiscal policy shocks. I suspect that if the shock identification problems can be overcome, this method could deliver some very useful insights into the underlying past trends behind developments in public finances. I look forward to seeing future extensions of the authors' approach.

Part III

Reliability of Fiscal Indicators

6.

The Reliability of EMU Fiscal Indicators: Risks and Safeguards

*Fabrizio Balassone, Daniele Franco and Stefania Zotteri**

6.1 Introduction

The effectiveness of any fiscal rule crucially depends on the indicators to which it is geared. The indicators should be resilient to manipulation and opportunistic exploitation. EMU fiscal rules rely on yearly targets set in terms of traditional indicators of deficit and debt. Continued compliance with these targets is expected to ensure long-term fiscal sustainability. Arguably, reference to forward-looking indicators would have been more appropriate. However, such indicators require complex computations, often relying on strong assumptions, and do not lend themselves to be adopted for the enforcement of formal rules, especially in a multinational context where moral hazard issues gain prominence (Balassone and Franco, 2000).

Having dismissed sophisticated indicators for the sake of effective monitoring, the expectation is that EMU fiscal indicators should score high in terms of reliability. However, recent episodes of large upward deficit revisions suggest that this is not always the case. The chapter acknowledges that all fiscal indicators can be manipulated. Therefore, replacing current indicators with new ones would not solve the problem. By highlighting the weak spots of EMU fiscal indicators, the chapter aims at identifying ways to improve monitoring.

The chapter points out that EMU's deficit indicator is particularly fragile in two respects.¹⁰³ First, since it measures *net* borrowing, it draws a line between transactions in financial and non-financial assets, with the latter alone being considered in the computation of deficits. But the distinction between financial and non-financial transactions is not clear-cut, and the available margins of interpretation can be used opportunistically.¹⁰⁴ Second, EMU's deficit indicator is measured on an *accrual* basis,

* The views expressed in this paper are those of the authors and do not commit Banca d'Italia. We thank Marco Buti, João Nogueira Martins and Alessandro Turrini for kindly making available to us the dataset used for their article. We thank João Nogueira Martins also for his valuable discussion and the participants to the European Commission workshop on "Fiscal indicators in the EU budgetary surveillance" for useful suggestions.

¹⁰³ There is also an issue concerning the definition of the public sector whose deficit and debt have to be considered (see Balassone *et al.*, 2006).

¹⁰⁴ This problem is similar to the one arising in the application of the "golden rule", where the deficit measure should only take into account current transactions and exclude capital ones (see Balassone and Franco, 2001).

relying on estimates which are by their nature subject to an element of subjective evaluation.¹⁰⁵

Partly reflecting concerns over these fragilities, since 1994 EU Member States are required to provide the European Commission with a reconciliation account between deficit figures and the corresponding change in debt, the latter being a good proxy of the *cash gross* borrowing (Balassone *et al.*, 2006). Moreover, when reliance on accrual accounting within the European System of Accounts (ESA) increased (with the switch from the 1979 to the 1995 version of the system), Eurostat specified that revenue computed in accrual terms should include only those items that are likely to be actually cashed in and that over the medium-term accrual and cash data should converge.¹⁰⁶

However, in the implementation of the excessive deficit procedure relatively little effort was put in the analysis of consistency between deficit and debt data, thus failing to exploit synergies arising in the joint monitoring of EMU fiscal rules. The problem is witnessed by the tolerance exerted by European institutions towards Member States submitting incomplete reconciliation accounts. It is probably a consequence of the failure to give operational content to the debt rule, and the subsequent focus on the deficit rule.¹⁰⁷

The chapter argues that even simply comparing deficits with changes in debt can help the early detection of inconsistencies in fiscal data. Indeed, changes in general government debt were much larger than initial deficit figures in Greece, Italy and Portugal before the large upward deficit revisions experienced in recent years.

Nevertheless, the chapter points out that consistency checks between deficits and changes in debt must go deeper than the overall difference between the two indicators. Since different items in the reconciliation account (henceforth, SFA for stock-flow adjustment) can offset each other, an underestimated deficit does not necessarily imply a large discrepancy between deficit and change in debt.

The chapter presents a simple model of the incentives to resort to fiscal gimmickry under EMU deficit and debt rules, based on the partition of SFA into two groups.¹⁰⁸ One group includes items that can be used to affect the Maastricht deficit but leave the change in debt unaltered (a “deficit-specific” SFA), the other includes items that can be used to reduce the change in debt but leave the Maastricht deficit unaffected (a “debt-specific” SFA). Econometric estimates based on such model provide evidence that deficit-specific SFA tend to increase with the underlying deficit, and debt-specific SFA tend to offset the impact of such an increase on total SFA. This suggests not only that opportunistic accounting may have taken place to ensure formal compliance with the deficit rule, but

¹⁰⁵ Cash-based deficit measures are by no means exempt from the risk of manipulation. However, contrary to what happens with accrual estimates, manipulation of cash figures obtained by postponing payments and/or demanding anticipated payments find a natural limit in the voice of the interested counterparts.

¹⁰⁶ The Treaty and annexed protocols rely on the ESA for the definition of deficit. When the Treaty was signed in 1992, and until 1999, the ESA79 version of the system was in place, which allowed government accounts to be computed mostly on a cash basis. ESA95 was first implemented in 2000, in the release of fiscal data for 1999. See Eurostat (2000) and Regulations (EC) N° 2516/2000 and 995/2001.

¹⁰⁷ The debt rule demands that, if the debt-to-GDP ratio is above 60 percent, it must be declining at a “satisfactory” pace. However, the meaning of “satisfactory” is yet to be defined.

¹⁰⁸ The model is similar in spirit to Buti *et al.* (2007), but differs in several significant respects.

also that debt-specific SFA may have been used to make the ensuing deficit-debt discrepancy less visible.

Attention to the quality of statistics has increased in recent years, also in the context of the reform of the Stability and Growth Pact (SGP). Based on case studies and econometric evidence, the chapter welcomes this development and argues that that detailed analysis of SFA components is crucial to the full exploitation of the monitoring synergies arising from the presence of two fiscal indicators.

The remainder of the chapter is organised as follows. Section 6.2 briefly reviews the reconciliation account between EMU's deficit and debt indicators. It discusses how the headline deficit can be kept low through increases in some SFA components and how other SFA components can partly offset the ensuing negative effects on debt dynamics. Section 6.3 analyzes large deficit revisions in Greece, Italy and Portugal. Section 6.4 discusses a simple model of fiscal gimmickry and provides econometric evidence suggesting that, indeed, different SFA components have been selectively used to reduce both reported net borrowing and the visibility of deficit-specific fiscal gimmickry. Section 6.5 concludes the chapter.

6.2 The Reconciliation Account (SFA)

For the purpose of EMU fiscal rules, deficit is defined as the general government **net** borrowing computed on an **accrual** basis in accordance with ESA95, and debt is defined as general government **gross** financial liabilities at **face value**.¹⁰⁹ A simplified reconciliation account between the change in Maastricht debt (Δb) and the Maastricht deficit (d^m) can therefore be written as:

$$\Delta b \equiv d^m + CA + FA_a - FA_s - VE \quad (6.1)$$

where:

- a) CA is the difference between cash and accrual valuations (the latter is used to compute the Maastricht deficit d^m , the former determines the actual financing needs and therefore is reflected in changes in liabilities as measured by Δb);
- b) FA_a and FA_s are, respectively, acquisitions and sales of financial assets (which must be added to **net** borrowing $-d^m$ – to obtain a measure of *gross* borrowing, consistent with the change in gross liabilities $-\Delta b$);
- c) VE (*i.e.* valuation effects) is a summary measure of SFA arising from changes in the face value of outstanding liabilities¹¹⁰ and from differences between the face value of a bond and its issue price.¹¹¹

¹⁰⁹ This is not the debt definition provided by ESA95, but the relevant financial instruments and the reference sectors are those specified within that framework.

¹¹⁰ For example, those due to debt restructuring operations or to fluctuations in the exchange rate affecting the value in domestic currency of foreign currency denominated debt.

¹¹¹ The face value of a bond is used to compute Δb while its issue price measures the financing actually received by the government and therefore reflects the financing needs measured by the cash gross borrowing requirement, *i.e.* by $d^m + CA + FA_a - FA_s$.

Identity (6.1) suggests three observations concerning the scope for “opportunistic” accounting:

- a) underestimation (overestimation) of accrued expenditure (revenue) allows reporting a lower Maastricht deficit (d^m) but leaves the change in debt (Δb) unaffected as it is offset by an increase in cash-accrual differences (CA);
- b) similarly, the adoption of loose standards in the identification of payments/receipts reflecting acquisition/sales of financial assets, reduces the reported d^m but leaves Δb unaffected due to the corresponding increase/decrease in FA_d/FA_s ;
- c) sales of financial assets (FA_s) and debt restructuring operations (a component of VE) can be used to reduce the change in debt but have no effect on the Maastricht deficit.¹¹²

Therefore:

- a) a large difference between Δb and d^m should alert towards the possibility that d^m is underestimated;
- b) a small difference between Δb and d^m cannot be taken to exclude an underestimation of d^m since sales of assets and debt restructuring can be used to offset inflated cash-accrual differences and net acquisition of financial assets.

This suggests rewriting (6.1) in order to partition total SFA into two groups. One group includes items that can be used to affect the Maastricht deficit but leave the change in debt unaltered (a “deficit-specific” SFA, x), the other includes items that can be used to reduce the change in debt but leave the Maastricht deficit unaffected (a “debt-specific” SFA, z):¹¹³

$$\Delta b \equiv d^m + x - z \quad (6.2)$$

Mapping identity (6.1) into identity (6.2), however, is not a straightforward exercise. First, there are items in the reconciliation account that do not belong to either x or z (this is the case of valuation effects arising from fluctuations in the value of foreign currency-denominated debt and because of bonds issued above/below par).¹¹⁴ Second, some of the individual items in identity (6.1) may be affected by attempts at reducing d^m as well as Δb (this is the case of asset sales, FA_s , whose total can be lowered by an opportunistic classification of transactions aimed at lowering d^m , and can be increased by privatization programs undertaken to reduce Δb).

¹¹² Importantly, such operations may leave the government’s net asset position unaffected or even worsen it. In this respect, one should also control the extent of one-off measures affecting directly d^m (Milesi-Ferretti, 2003). There is of course no implication here that privatizations are by definition bad policy. However, if they are undertaken with the sole purpose of reducing gross debt – regardless of the economics underlying the transaction – then the operations can be questioned.

¹¹³ See also Buti *et al.* (2007).

¹¹⁴ Note, however, that by issuing bonds above par, a government could reduce the change in debt associated with a given deficit.

For the purpose of this chapter, we use the following definitions:

$$z = \text{PRIV} + \text{VE} \quad (6.3)$$

$$x = \text{CA} + \text{FA}_a - \text{OFA}_s$$

where *PRIV* indicates revenues from the sale of assets arising in the context of privatization programs and *OFA_s* indicates other revenue from the sale of financial assets.

The proposed treatment of *VE* and *FA_s* reflects data availability constraints and carries some costs. First, based on these definitions, *z* includes all valuation effects (*VE*), irrespective of whether they can or cannot be controlled by the fiscal authorities. This is likely to introduce considerable noise in *z* and may impede the detection of any systematic pattern in “debt-specific” SFA. Second, it is implicitly assumed that sales of financial assets different from privatization do not reflect debt reduction motives. This may somewhat blur the distinction between “deficit-specific” and “debt-specific” SFA components, making it more difficult to detect a systematically selective use of SFA items.

Table 6.1 reports the average values of total, deficit-specific, and debt-specific SFA, according to the definitions in (6.3) for the countries which were EU members over 1994-2004 (excluding Luxembourg). The table shows that the discrepancy between changes in debt and deficits has been by no means negligible over the period considered (the average for the EU as a whole amounts to 0.6 percent of GDP). The table also highlights a much higher value for the deficit-specific SFA component (1.0 percent of GDP), and the offsetting role of debt-specific SFA (averaging at 0.3 percent of GDP).

Table 6.2 reports similar information, but it is based on the original data releases by Greece, Italy, and Portugal (*i.e.* before the revisions which have occurred since 2002). The overall SFA averages at 0.9 percent of GDP for the EU countries considered. This is the net result of a deficit-specific component of 1.2 percent of GDP, partly offset by the debt-specific component (0.3 percent of GDP on average).

Table 6.1 Total SFA and Its Components (% of GDP) after Revisions

	Deficit-specific SFA (x)	Debt-specific SFA (z)	Total SFA
Belgium	-0.3	0.3	-0.6
Denmark	0.8	0.7	0.1
Germany	0.7	0.0	0.7
Greece	3.2	0.0	3.2
Spain	0.3	-0.3	0.7
France	0.5	0.0	0.5
Ireland	2.0	0.5	1.5
Italy	1.1	0.9	0.2
The Netherlands	-0.1	0.3	-0.5
Austria	1.2	0.5	0.7
Portugal	0.9	1.3	-0.3
Finland	1.4	-0.9	2.3
Sweden	1.5	1.0	0.5
United Kingdom	0.4	0.4	0.1
EU average	1.0	0.3	0.6

Note: average values over 1994-2004, data after revisions occurred since 2002.

Table 6.2 Total SFA and Its Components (% of GDP) before Revisions

	Deficit-specific SFA (x)	Debt-specific SFA (z)	Total SFA
Belgium	-0.3	0.3	-0.6
Denmark	0.8	0.7	0.1
Germany	0.7	0.0	0.7
Greece	5.0	-0.9	5.9
Spain	0.3	-0.3	0.7
France	0.5	0.0	0.5
Ireland	2.0	0.5	1.5
Italy	1.4	0.7	0.7
The Netherlands	-0.1	0.3	-0.5
Austria	1.2	0.5	0.7
Portugal	1.5	1.3	0.1
Finland	1.4	-0.9	2.3
Sweden	1.5	1.0	0.5
United Kingdom	0.4	0.4	0.1
EU average	1.2	0.3	0.9

Note: average values over 1994-2004, data before revisions occurred since 2002.

6.3 Deficit Revisions in Italy, Portugal, and Greece

Evidence supporting the usefulness of crosschecking fiscal data is provided by three case studies of significant deficit data revisions. These revisions concerned the 2001 deficit outcome in Italy and Portugal and the 2003 deficit outcome in Greece. In all three cases, the initial deficit figure was consistent with the forecasts by international organisations. This seems to indicate that by looking at the ESA95 deficit in isolation all parties involved can get a biased view of fiscal trends.¹¹⁵

Italy: the 2001 Deficit Outcome

In March 2002, the Italian Statistical Office (Istat) released the first statistics concerning the 2001 net borrowing. Back then, the deficit was estimated to be 1.4 percent of GDP. The outcome was very close to the range of forecasts published by international organisations. After several revisions, the 2001 deficit is currently estimated to be 3.1 percent of GDP.

Changes to the 2001 net borrowing figures took place between June 2002 and March 2006. In particular, in June 2002 Istat raised its estimate from 1.4 to 1.6 percent of GDP, primarily on account of higher healthcare expenditure. One month later, Eurostat announced its decision on the accounting treatment for the purposes of the excessive deficit procedure of securitisations carried out by governmental authorities. This implied an upward revision of Italy's deficit to 2.2 percent of GDP. In February 2003, Istat again published a higher figure for the 2001 deficit: 2.6 per cent of GDP. This new estimate was due to the availability of more complete information on the different government tiers' economic accounts. Two years later, in March 2005, Istat once more revised upwards the 2001 deficit, to 3.0 percent of GDP, because of the reclassification of capital transfers from the general government to the Ferrovie dello Stato (the state-owned

¹¹⁵ This section is a summary and update of the analysis conducted in two earlier papers (Balassone *et al.*, 2004 and 2006).

railway company) from financial to real transactions. Two months later, in May 2005, the 2001 deficit was estimated to be 3.2 percent of GDP mainly because of the upward revision of transfers to firms. Finally, in March 2006, due to a GDP upward revision, the 2001 deficit was indicated to be 3.1 percent of GDP.

The overall revision can be interpreted in terms of the deficit-specific SFA component (x) considered in the previous section: x was initially overestimated. More specifically, the deficit revision reflects a reduction of the cash-accrual adjustment by 0.6 percentage points of GDP, an increase in the sale of assets by 0.6 points (the reclassification of securitization), and a reduction in acquisitions of financial assets by 0.5 points (mainly, the reclassification of capital injections in the railway company).

The decline initially reported for the deficit between 2000 and 2001 (from 1.7 percent to 1.4 percent of GDP) was in sharp contrast with the dynamics of the change in debt. According to the data available in March 2002, the latter rose from 1.6 percent of GDP in 2000 to 3.5 percent in 2001. This indicator turned out to be more stable than ESA95 net borrowing: overall, it was revised upwards by 0.7 percentage points of GDP; moreover, revisions took place only up to March 2003.

Figure 6.1 Italy: Net Borrowing and Change in Debt (millions of euro)

A – The picture taken in March 2002

B – The picture taken in March 2006

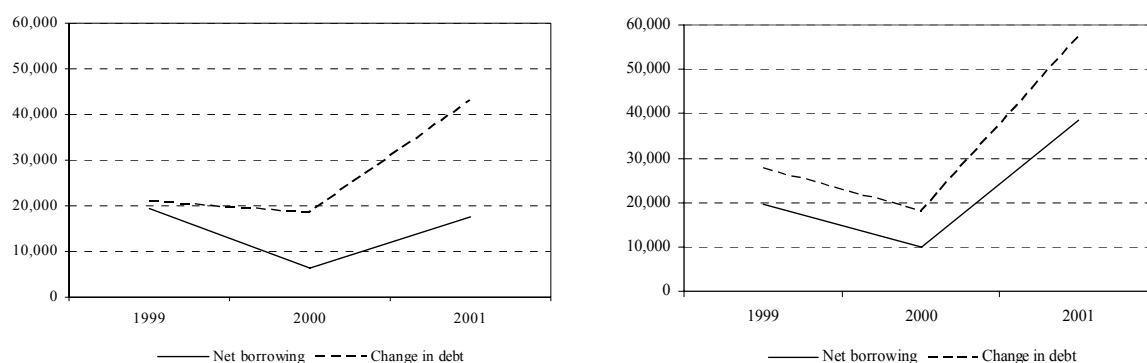


Figure 6.1 shows the divergence between the ESA95 deficit and the change in debt as it first appeared in March 2002 (Panel A) and as it appears now (Panel B). After the revisions, the dynamics of the ESA95 deficit is clearly closer to that of the change in debt. The joint examination of the indicators could have provided an early warning of the likely forthcoming revisions. Banca d'Italia in its Annual Report released in May 2002 in fact carried out this comparative exercise.¹¹⁶

Portugal: the 2001 Deficit Outturn

In March 2002 – in its first notification about the 2001 fiscal outcomes – Portugal estimated the general government deficit to be 2.2 percent of GDP as against 1.5 percent in 2000. At that time, the most up-to-date deficit forecasts by international institution were somewhat more favourable.

Eurostat stated that it was not in a position to certify the Portuguese figures due to, among other reasons, the lack of information on capital injections to public corporations – which

¹¹⁶ The Report also included an analysis of the composition of total SFA.

had been treated as acquisition of shares and other equities with no effect on the government deficit. Moreover, Eurostat stressed that – as some of these capital injections might be reclassified as transfers – the notified deficit was to be considered as provisional and likely to be increased.

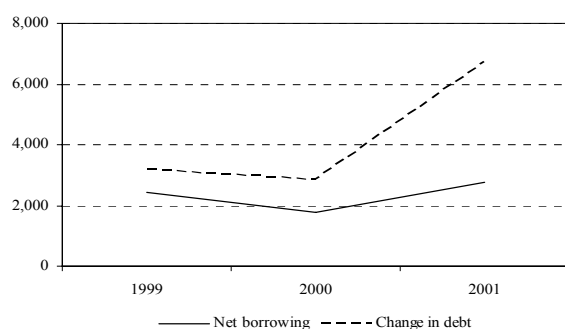
In the spring of 2002 a commission headed by the Banco de Portugal and also composed of representatives of the Ministry of Finance and the National Statistical Institute was set up with the mandate of analysing and updating the government accounts. In September, the figure for the 2001 deficit was revised upwards to 4.1 percent of GDP. This revision was due to a number of factors: new data on the accounts of the local authorities; the inclusion in the budget accounts of some injections of capital into publicly-owned companies; changes to the methods used to account for expenditure carryovers and revenue connected with the EU structural funds; and the expiration of a derogation regarding the methods of recording tax and social contribution receipts accruing in the year.

Between September 2002 and September 2004 the deficit was slightly revised upwards twice, to 4.4 percent of GDP. In September 2004, Eurostat stressed that there were still ongoing discussions with the Portuguese authorities concerning the consistency between accrual and cash data for the period 2001-04. One year later, the 2001 deficit-to-GDP ratio was revised downwards to 4.2 because of an upward revision of GDP. At that time, Eurostat said that it intended to clarify reported cases of capital injections undertaken between 2001 and 2004 by various governments, including Portugal. At present, according to the European Commission 2006 spring forecasts, the Portuguese 2001 deficit is estimated to be 4.3 per cent of GDP. Therefore, the overall revision with respect to the original data release amounts to 2.1 percent of GDP.

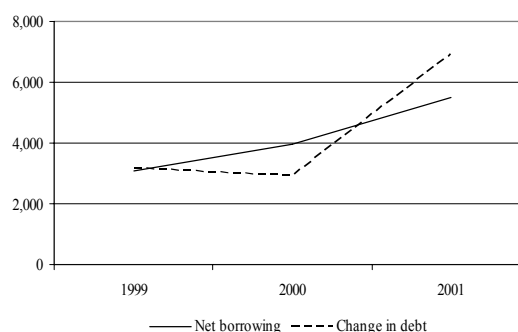
The initially reported increase in the deficit between 2000 and 2001 (from 1.5 to 2.2 percent of GDP) was markedly smaller than the one observed for the change in debt. The latter rose from 2.5 percent of GDP in 2000 to 5.5 percent in 2001. Over time, the 2001 change in debt was revised only slightly and mostly because of GDP revisions. According to the most recent European Commission data – the change in debt increased from 2.4 in 2000 to 5.3 in 2001. Panel A of Figure 6.2 shows the initial divergence between ESA95 deficit and the change in debt; Panel B shows the same variables after the revisions.

Figure 6.2 Portugal: Net Borrowing and Change in Debt (millions of euro)

A – The picture taken in March 2002



B – The picture taken in April 2006



Greece: the 2003 Deficit Outturn

At the beginning of March 2004, in its first notification of the 2003 fiscal outcome, Greece estimated the general government deficit at 1.7 percent of GDP, as against 1.4 percent in 2002. At that time, the most up-to-date forecasts by international institutions were broadly in line with the data notified by Greece. After several revisions, the 2003 deficit is currently estimated to be 5.8 percent of GDP.

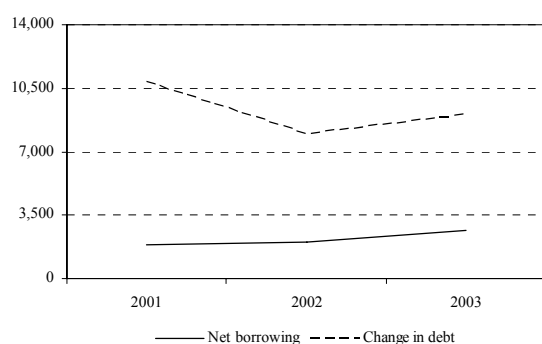
Revisions occurred between March 2004 and March 2006. Indeed, already by the end of March 2004 Greece sent updated data to the European Commission, revising upwards the 2003 deficit to 3.0 percent of GDP. In April, in publishing the Spring forecasts, the Commission took into account the latter notification. It stressed that “the data for 2003 are not yet validated by Eurostat and do not therefore provide a reliable basis for assessing the budgetary situation at this stage”. The Commission also noted that “[a] fact-finding mission is being prepared for the end of April in order to have more information about the budgetary situation in this country and decide on steps to be taken”.

At the beginning of May, following an additional notification, Eurostat verified that in 2003 the general government deficit was 3.2 percent of GDP. In September, the deficit and debt figures for the years 2000-03 were significantly revised. In particular, the 2003 deficit was estimated at 4.6 percent of GDP and the 2003 debt was indicated at 109.9 percent of GDP.

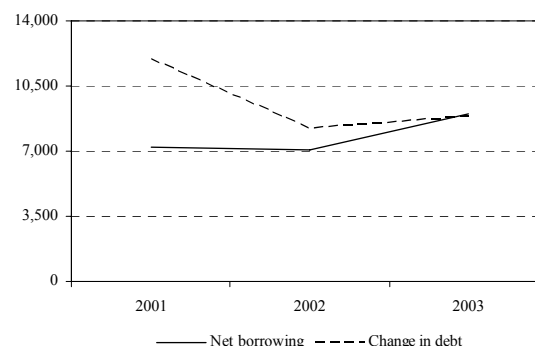
Both in the March 2005 Notification and in the September 2005 one, Greece revised the 2003 deficit upwards by more than half a percentage point of GDP (to 5.2 and 5.7 percent of GDP, respectively). In March 2006 the 2003 deficit was estimated to be 5.8 percent of GDP.

Figure 6.3 Greece: Net Borrowing and Change in Debt (millions of euro)

A – The picture taken in March 2004



B – The picture taken in April 2006



As to the deficit, the overall revisions were essentially due to: lower tax revenue (mainly VAT); lower payments received from EU institutions in the context of structural funds programmes; the reclassification, as a financial transaction, of a payment from the Saving Postal Bank to government; upward revisions of military expenditure and of interest payments; lower than expected surpluses of social security funds; and incorrect recording of hospitals' expenditure.

With reference to the debt, the revisions were due to the previous underestimation of bonds with capitalised interests and to the overestimation of consolidating assets of social security.

The initially reported increase in deficit between 2002 and 2003 (from 1.4 percent to 1.7 percent of GDP) was in line with that observed for the change in debt, the latter rising from 5.6 percent of GDP in 2002 to 5.9 percent in 2003. However, the level of the two indicators was markedly different (Panel A of Figure 6.3). Panel B shows how revisions have completely cancelled the 2003 discrepancy and significantly reduced those for previous years.

6.4 Fiscal Rules and Fiscal Gimmickry: a Simple Model

An econometric analysis of SFA in EU member countries was first provided by von Hagen and Wolff (2005). Their paper refers to the theoretical framework developed in von Hagen and Harden (1995, 1996) and Milesi-Ferretti (2003), where governments have an incentive to circumvent fiscal rules by hiding the budgetary implications of fiscal policies in less visible accounting items (that is, in the SFA). The likelihood of this type of window dressing decreases with the costs associated with detection. The authors argue that binding deficit rules were introduced only with the start up of the European Economic Monetary Union (EMU) – *i.e.* the SGP – and therefore focus their analysis on differences in the correlation between reported deficits and SFA before and after EMU. They find no such correlation before 1998, but a negative one (large and significant) thereafter, suggesting that SFA were in fact substituting for other transactions which would have had an impact on deficits.

Buti *et al.* (2007) develop a model where total SFA is split into two components (one that can be used to reduce reported deficits and the other to impact debt figures). In this way they can separately analyze the interaction between each of the Maastricht fiscal rules and fiscal gimmickry. They assume that governments minimize a quadratic loss function whose arguments are the deviation of output from its optimal level (influenced by the “true” deficit), deviations of reported deficit and debt from the respective fiscal rule, and the size of accounting gimmicks. The model suggests that both the deficit-specific and the debt-specific components of SFA are positively related to the “true deficit”, and that only the debt-specific component also depends on the debt level (though the sign of the relation is ambiguous *ex ante*). The empirical results are partly in line with the theoretical predictions of the model.¹¹⁷ Notably, the authors find that the introduction of the SGP had an (increasing) impact on the deficit-specific component of the SFA, but none on the debt-specific component.

In this section, following Buti *et al.* (2007) we provide separate econometric analysis of deficit-specific and debt-specific SFA components. However, we refer to a different model as the basis for our estimating equations. We assume that governments derive utility (U) from running primary deficits (p): $U=U(p)$. This can be justified either by assuming that governments are short sighted and only care about the short-term output gains that can be attained through higher deficits, or by reference to the political gain directly attainable by increasing transfers targeted to specific groups. In either case, the

¹¹⁷ The authors find no statistically significant relationship between the two components of SFA and “true deficits”. They find evidence of a positive relationship between reported deficits and deficit-specific SFA and of a negative relationship between reported deficits and debt-specific SFA. Only debt-specific SFA are found to be affected (negatively) by the debt level.

assumption is consistent with the rationale for having a fiscal rule specifying a maximum threshold for the deficit, suggesting the need to counteract an asymmetric deficit bias.¹¹⁸

Governments' utility maximization is constrained by compliance with Maastricht's debt and deficit rules. The debt rule mandates that the debt-to-GDP ratio (b) must be lower than 60 percent and, if higher than such threshold to begin with, it must be declining towards 60 percent at a satisfactory pace. As we have noted earlier, the "satisfactory pace" has never been defined, therefore we model this rule as requiring:

$$\Delta b = p + rb - yb - z \leq W \quad (6.4)$$

where $W=0$ if $b>60$, $W=60-b$ if $b<60$

i.e. the change in the ratio of debt to GDP (Δb) – as determined by the "true deficit" ($d=p+rb$ where rb indicates interest payments), the reducing effect of output growth (yb), and the debt-specific SFA (z) – must be negative if b is above 60 percent to start with.¹¹⁹ The change in the debt ratio can be positive if $b<60$ to start with, but it cannot bring b above 60 percent of GDP.¹²⁰

The deficit rule requires that reported deficits (d^m) be lower than 3 percent of GDP. Similarly to what happens for the debt ratio, if the reported deficit ratio is above 3 percent to start with, a gradual reduction is expected. Without loss of generality, and by analogy with the debt rule, we assume that in this case the reported deficit, as a minimum, must not increase further. The deficit rule is therefore modelled as:

$$d^m = p + rb - x \leq H \quad (6.5)$$

where $H=3$ if $d^m<3$, $H=d^m$ if $d^m>3$

where x denotes the deficit-specific SFA component.¹²¹

Finally, we assume that the opportunistic use of deficit and debt-specific SFA (x and z , respectively) carries a cost $C=C(x,z)$, with $C'>0$ and $C''\geq 0$. Following Buti *et al.* (2007) the costs can be thought of as deriving from the risk of being caught (higher x and z are more visible) as well as from suboptimal allocation of resources (not all spending items lend themselves to classification as transactions in financial items) and financial asset/liability management.

In sum, the maximization problem facing the authorities can be described as follows:

$$\begin{aligned} \text{Max}_{p,x,z} \quad & U(p) - C(x,z) && (6.6) \\ \text{s.t.} \quad & p + rb - yb - z \leq W && \text{where } W=0 \text{ if } b>60, W=60-b, \text{ if } b<60 \\ & p + rb - x \leq H && \text{where } H=3 \text{ if } d^m<3, H=d^m \text{ if } d^m>3 \end{aligned}$$

¹¹⁸ The quadratic loss function adopted in Buti *et al.* (2007) is symmetric in deviations from the optimal real output growth where real output growth depends linearly on the "true deficit".

¹¹⁹ With respect to the analysis in Section 6.2, scaling the variables by GDP requires the consideration of the reducing effect exerted by output growth on the debt ratio.

¹²⁰ In this way we explicitly model the constraint also for countries where $b<60$ (Buti *et al.*, 2007, assume $z=0$ for $b<60$).

¹²¹ This formulation allows differentiating the constraints applying to countries with reported deficits above and below 3 percent of GDP, rather than use dummy variables at the estimation stage.

whose Lagrangean is:

$$U(p) - C(x,z) - \lambda_1 [p + rb - yb - z - W] - \lambda_2 [p + rb - x - H] \quad (6.7)$$

with first order conditions:

$$U' - \lambda_1 - \lambda_2 = 0 \quad (6.8a)$$

$$-C_x + \lambda_2 = 0 \quad (6.8b)$$

$$-C_z + \lambda_1 = 0 \quad (6.8c)$$

$$\lambda_1 \geq 0 \quad p + rb - yb - z - W \leq 0 \quad \lambda_1 [p + rb - yb - z - W] = 0 \quad (6.8d)$$

$$\lambda_2 \geq 0 \quad p + rb - x - H \leq 0 \quad \lambda_2 [p + rb - x - H] = 0 \quad (6.8e)$$

Since $C_x, C_z > 0$ by assumption, from (6.8b) and (6.8c) it follows that $\lambda_1, \lambda_2 > 0$, which in turn we use in (6.8d) and (6.8e) to get:

$$z = p + rb - yb - W \quad (6.9)$$

$$x = p + rb - H \quad (6.10)$$

We use these equations as the basis for our econometric analysis and estimate the following two regressions:

$$z_t = \alpha_0 + \alpha_1 d_t + \alpha_2 y_t b_{t-1} + \alpha_3 W_t + \varepsilon_a \quad (6.11)$$

$$x_t = \beta_0 + \beta_1 d_t + \beta_2 H_t + \varepsilon_b \quad (6.12)$$

where $d = p + rb$ is the “true deficit”; $W_t = 0$ if $b_{t-1} > 60$, $W_t = 60 - b_{t-1}$, if $b_{t-1} < 60$; and $H_t = 3$ if $d_{t-1}^m < 3$, $H_t = d_{t-1}^m$ if $d_{t-1}^m > 3$.

From the signs in (6.9) and (6.10), we expect:

$$(a) \quad \alpha_1 > 0; \quad \alpha_2, \alpha_3 < 0$$

$$(b) \quad \beta_1 > 0; \quad \beta_2 < 0$$

We expect both types of SFA to be positively related to the level of the “true deficit” ($\alpha_1, \beta_1 > 0$): the higher the “true deficit”, the higher the x and z values required for formal compliance with the rules (see also Buti *et al.*, 2007).

The debt level plays no direct role, and it only affects the debt-specific SFA through the “growth effect” (*i.e.* the reduction of the debt ratio determined by GDP growth, which is larger the larger the debt). The use of z to keep debt dynamics under control becomes less necessary when the growth impact is higher, hence the negative sign expected for α_2 .

The constraints determined by the deficit and debt fiscal rules enter directly the corresponding estimating equations. We expect the levels of z and x to be negatively correlated with, respectively, the maximum allowed change in debt and the maximum

allowed deficit ($\alpha_3, \beta_2 < 0$). In other words, the more binding the fiscal rule the higher the incentives to resort to fiscal gimmickry.

Since x , z , and p (and therefore d) are simultaneously determined, we report results obtained using two stage least squares. We present two sets of estimates: one uses the most recent data releases, the other one considers the values first reported by Greece, Italy, and Portugal over the period 1998-2004 (that is data published before the statistical revisions discussed in Section 6.3). We also introduce a dummy variable to test for structural breaks after 1998.

The sample includes data for fifteen countries over 1994-2004. We also run regressions on the sub-sample of euro-area members. Deficit-specific SFA are obtained from the Buti *et al.* (2007) dataset as the sum of cash-accrual differences and of net acquisitions of financial assets, excluding privatization, following the discussion in Section 6.2. The “true deficit” is obtained by summing the deficit-specific SFA to deficit data used in the context of the excessive deficit procedure (EDP) as reported in the AMECO database. The “growth effect” is computed using data from the AMECO database. Finally, and again in line with the discussion in Section 6.2, debt-specific SFA are obtained residually by subtracting from total SFA the deficit-specific SFA component and the growth effect.

Tables 6.3 and 6.4 report the estimation results, which are in line with expectations from the model. All coefficients are correctly signed, statistically significant and exerting quantitatively large effects on the dependent variables. There is no significant difference between results for the EU15 and those for the euro area. Using the original data releases for Greece, Italy, and Portugal induces an improvement in the regression fit for the deficit-specific equation, but not for the debt-specific one, possibly reflecting the limited extent of revisions to changes in debt compared to revisions in deficits.

The deficit-specific SFA is positively correlated with the “true deficit”. For each one percent of GDP increase in the true deficit there is an estimated 0.3 percent of GDP increase in deficit-specific SFA. The deficit-specific SFA is also negatively correlated with the maximum allowed deficit (H). The increase in deficit-specific SFA associated with a one percent of GDP increase in the allowed maximum deficit is estimated at 0.2-0.25 percent of GDP, using the data set which includes recent revisions to data for Greece, Italy, and Portugal, and to almost 0.5 percent of GDP, excluding such revisions.

The debt-specific SFA is positively correlated with the “true deficit”. For each one percent of GDP increase in the true deficit, there is an increase by about 0.3 percent of GDP in debt-specific SFA, enough to offset the corresponding estimated increase in deficit-specific SFA. The debt-specific SFA is negatively correlated with the “growth effect”. For each one percent of GDP increase in the growth effect, there is a 0.30-0.35 percent of GDP decrease in debt-specific SFA. Finally, the debt-specific SFA is also negatively correlated with the maximum allowed change in debt (W). For each one percent of GDP increase in the allowed maximum change in debt, there is an estimated 0.2 percent of GDP decrease in debt-specific SFA.

Table 6.3 Determinants of Deficit- and Debt-specific SFA – EU15

EU15 – 1994-2004 – 2SLS fixed effects estimation (1)				
Dependent Variable	Deficit SFA (x)	Deficit SFA (x)	Debt SFA (z)	Debt SFA (z)
Data set	Current Values (2)	Original Values (3)	Current Values (2)	Original Values (3)
Constant	0.5 <i>0.94</i>	1.28* <i>2.32</i>	1.63** <i>2.62</i>	1.39* <i>2.04</i>
Dummy 1999	0.97** <i>3.29</i>	1.09** <i>3.54</i>	0.38 <i>1.25</i>	0.19 <i>0.57</i>
“True deficit”	0.31** <i>5.97</i>	0.33** <i>6.11</i>	0.33** <i>5.62</i>	0.31** <i>4.94</i>
Growth effect			-0.34** <i>2.89</i>	-0.29* <i>2.19</i>
Deficit rule (H)	-0.27* <i>2.43</i>	-0.45** <i>3.97</i>		
Debt rule (W)			-0.2** <i>5.72</i>	-0.18** <i>4.76</i>
Number of observations	<i>134</i>	<i>134</i>	<i>129</i>	<i>129</i>
R ² : within	0.276	0.339	0.385	0.329
between	0.353	0.398	0.446	0.348
overall	0.299	0.346	0.203	0.159

Notes: (1) Adjusted T- statistics in italics. *, ** indicate coefficient significance at the 95% and 99% level, respectively. "True Deficit" and "h" are instrumented by their lagged values.

(2) Data as in the latest releases available.

(3) 1998-2004 data for Greece, Italy, and Portugal are those from first official releases

Table 6.4 Determinants of Deficit- and Debt-specific SFA – Euro area

Euro area – 1994-2004 – 2SLS fixed effects estimation (1)				
Dependent Variable	Deficit SFA (x)	Deficit SFA (x)	Debt SFA (z)	Debt SFA (z)
Data set	Current Values (2)	Original Values (3)	Current Values (2)	Original Values (3)
Constant	0.27 <i>0.46</i>	1.5* <i>2.27</i>	1.65** <i>2.13</i>	1.39* <i>1.62</i>
Dummy 1999	0.87** <i>2.8</i>	0.98** <i>2.91</i>	1.71 <i>0.5</i>	-0.05 <i>0.13</i>
“True deficit”	0.29** <i>4.78</i>	0.32** <i>4.83</i>	0.30** <i>3.97</i>	0.28** <i>3.38</i>
Growth effect			-0.35** <i>2.68</i>	-0.29* <i>1.99</i>
Deficit rule (H)	-0.21 <i>1.68</i>	-0.48** <i>3.67</i>		
Debt rule (W)			-0.2** <i>4.69</i>	-0.18** <i>3.83</i>
Number of observations	101	101	99	99
R ² : within	0.258	0.349	0.330	0.269
between	0.451	0.408	0.467	0.378
overall	0.345	0.340	0.195	0.151

Notes: (1) Adjusted T- statistics in italics. *, ** indicate coefficient significance at the 95% and 99% level, respectively. "True Deficit" and "h" are instrumented by their lagged values.

(2) Data as in the latest releases available.

(3) 1998-2004 data for Greece, Italy, and Portugal are those from first official releases

Similar to von Hagen and Wolff (2005) and to Buti *et al.* (2007) we find a structural break around 1998. In line with the result in Buti *et al.* (2007), the break appears to affect only the equation for deficit-specific SFA. There are two possible explanations for this. One is the usual argument that the introduction of the SGP has made the deficit rule more stringent and increased the incentive to use SFA. The other is that with the switch to the accrual-based ESA95 in 1999, a further channel of deficit-specific SFA opened, namely cash/accrual differences, which was previously not available.

6.5 Conclusions

The reliability of EMU's fiscal indicators has been questioned by recent episodes of large upward deficit revisions. This chapter points out that EMU's deficit indicator is particularly fragile in two respects: the identification of transactions in financial assets and the assessment of accrued revenue and expenditure. It argues that margins for opportunistic accounting mainly arise from these two weak spots.

Even the simple comparison between deficit and change in debt can help early detection of inconsistencies in fiscal data. Evidence from three case studies of significant deficit data revision suggests the usefulness of crosschecks between deficit and changes in gross debt to reduce the scope for fiscal gimmickry.

Changes in general government debt were much larger than initial deficit figures in Greece, Italy, and Portugal, before the large upward deficit revisions experienced in recent years. In Italy, the revision process was gradual and lasted four years. Although the initial discrepancy between the change in debt and the deficit was more than 2 percent of GDP, the highest annual revision amounted to only 0.8 points. In Greece, a large discrepancy between the two indicators was present for several years before the process of statistical revisions abruptly started in 2004.

Nevertheless, since different items in the reconciliation account between deficit and change in debt can offset each other, consistency checks must go deeper than the overall difference between the two indicators. Italy provides an interesting example. In 2001 total SFA amounted to 4.3 percent of GDP, as against "only" 1.2 percent in 2000. However, deficit-specific SFA were higher in 2000 than in 2001 (3.4 vs. 3.0 percent of GDP), and the increase in total SFA in 2001 reflected the decline in the offsetting debt-specific SFA.

Econometric estimates discussed in Section 6.4 provide evidence that deficit-specific SFA tend to increase with the underlying deficit and debt-specific SFA tend to offset the impact on total SFA of such an increase. This suggests not only that opportunistic accounting may have taken place to ensure formal compliance with the deficit rule, but also that debt-specific SFA may have been used to make the ensuing deficit-debt discrepancy less visible.

Attention to the quality of statistics has increased in recent years also in the context of the reform of the SGP. Since 2004, notifications include more detailed information, which now refer to the various sub-sectors of the general government. In addition, some steps have recently been taken to improve statistical governance at the EU and national level.

The regulation concerning the statistics used for the excessive deficit procedure has been amended. The role of Eurostat as the statistical authority in the context of the excessive

deficit procedure has been reinforced by introducing formal requirements of completeness and internal consistency of fiscal data reported to the Commission and by disciplining Eurostat's interaction with member states through "dialogue" and "methodological" visits. In order to improve transparency and accountability of national statistical authorities, the Regulation mandates the public availability of data reported by Member States as well as of inventories describing the methods, procedures and sources used by member states, and requires the publication by Eurostat of regular reports on the quality of data. To bolster the operational capacity of the Commission, Eurostat has conducted an internal redeployment of staff in order to reinforce the activities linked to the validation of economic and fiscal accounts and created a dedicated unit. Finally, the directors of national statistical institute and Eurostat adopted a European Statistics Code of Practice, defining standards for the independence of the national and community statistical authorities. The Code lists a set of indicators to be used to review the implementation of the Code itself. The Commission is setting up a reporting system to monitor adherence to the Code of Practice by the national statistical authorities and Eurostat.

The analysis of SFA along the breakdown suggested in the chapter may enhance the effectiveness of these reform efforts. To this end, the reconciliation account between deficit and change in debt reported in the notifications should identify all financial assets and therefore there should be no residual item labelled as "other assets". Moreover, national authorities should routinely provide justification for cash-accrual differences in annual data for individual accounting items. In due time Member States should also be requested to provide a full set of government accounts covering both deficit formation and its financing. Such a set of accounts should include both cash and accrual figures.

Given the unavoidable information asymmetry between the community and Member States, ensuring the independence of the national statistical institutions is crucial. This is not just an issue of enforcement of fiscal rules; it is an issue of accountability to the public and of good management of public resources.

Table 6.5 *General Government Net Borrowing/Lending, 2000-04**

	2000			2001			2002			2003			2004				
	Spring of			Spring of			Spring of			Spring of			Spring of				
	2001	2002	2003	2004	2002	2003	2004	2005	2003	2004	2005	2006	2004	2005	2006	2005	2006
Belgium	0.0	0.1	0.1	0.2	0.2	0.4	0.5	0.6	0.0	0.1	0.1	0.0	0.2	0.4	0.1	0.1	0.0
Denmark	2.5	2.5	2.6	2.6	2.7	3.1	3.1	3.2	1.9	1.7	1.7	1.2	1.5	1.2	1.0	2.8	2.7
Germany	1.3	1.2	1.1	1.3	-2.7	-2.8	-2.8	-2.8	-3.6	-3.5	-3.7	-3.7	-3.9	-3.8	-4.0	-3.7	-3.7
Greece	-0.9	-0.8	-1.9	-2.0	0.1	-1.4	-1.4	-3.6	-1.2	-1.4	-4.1	-4.9	-1.7	-5.2	-5.8	-6.1	-6.9
Spain	-0.3	-0.3	-0.8	-0.9	0.0	-0.1	-0.4	-0.5	-0.1	0.0	-0.3	-0.3	0.3	0.3	0.0	-0.3	-0.1
France	-1.3	-1.3	-1.4	-1.4	-1.4	-1.5	-1.5	-1.5	-3.1	-3.2	-3.2	-3.2	-4.1	-4.2	-4.2	-3.7	-3.7
Ireland	4.5	4.5	4.3	4.4	1.7	1.1	1.1	0.9	-0.1	-0.2	-0.4	-0.4	0.2	0.2	0.2	1.3	1.5
Italy	-0.3	-0.5	-0.6	-0.6	-1.4	-2.6	-2.6	-3.0	-2.3	-2.3	-2.6	-2.9	-2.4	-2.9	-3.4	-3.0	-3.4
Luxembourg	5.3	5.8	6.1	6.3	5.0	6.4	6.3	6.2	2.6	2.7	2.3	2.0	-0.1	0.5	0.2	-1.1	-1.1
Netherlands	2.0	2.2	2.2	2.2	0.2	0.1	0.0	-0.1	-1.1	-1.9	-1.9	-2.0	-3.0	-3.2	-3.1	-2.5	-1.9
Austria	-1.1	-1.5	-1.5	-1.5	0.1	0.3	0.2	0.3	-0.6	-0.2	-0.2	-0.5	-1.1	-1.1	-1.5	-1.3	-1.1
Portugal	-1.4	-1.5	-2.8	-2.8	-2.2	-4.2	-4.4	-4.4	-2.7	-2.7	-2.7	-2.9	-2.8	-2.9	-2.9	-2.9	-3.2
Finland	6.7	7.0	6.9	7.1	4.9	5.1	5.2	5.2	4.7	4.3	4.3	4.1	2.3	2.5	2.5	2.1	2.3
Sweden	4.0	3.7	3.4	5.1	4.7	4.5	2.8	2.5	1.2	0.0	-0.3	-0.2	0.7	0.2	0.1	1.4	1.8
UK	2.1	1.8	3.9	3.8	1.0	0.8	0.7	0.7	-1.4	-1.6	-1.7	-1.6	-3.2	-3.4	-3.3	-3.2	-3.3
Euro area **	0.3	0.2	0.1	0.1	-1.3	-1.6	-1.6	-1.7	-2.3	-2.3	-2.4	-2.6	-2.7	-2.8	-3.1	-2.8	-2.9

Notes: * Spring notifications' initial estimates and subsequent revisions (as a percentage of GDP). A negative sign indicates a deficit; a positive sign indicates a surplus. UMTS proceeds are included.

** Excluding Greece in 2000.

Table 6.6 *General Government Debt, 2000-04**

	2000			2001			2002			2003			2004				
	Spring of			Spring of			Spring of			Spring of			Spring of				
	2001	2002	2003	2004	2002	2003	2004	2005	2003	2004	2005	2006	2004	2005	2006	2005	2006
Belgium	110.9	109.3	109.6	109.1	107.5	108.5	108.1	108.0	105.4	105.8	105.4	103.2	100.5	100.0	98.5	95.6	94.7
Denmark	47.3	46.8	47.4	50.1	44.4	45.4	47.8	47.8	45.2	47.2	47.2	46.8	45.0	44.7	44.4	42.7	42.6
Germany	60.2	60.3	60.2	60.2	59.8	59.5	59.4	59.4	60.8	60.8	60.9	60.3	64.2	64.2	63.8	66.0	65.5
Greece	103.9	102.8	106.2	106.2	99.7	107.0	106.9	114.8	104.9	104.7	112.2	110.7	102.4	109.3	107.8	110.5	108.5
Spain	60.6	60.4	60.5	61.2	57.2	56.9	57.5	57.8	54.0	54.6	55.0	52.5	50.8	51.4	48.9	48.9	46.4
France	58.0	57.4	57.2	57.2	57.2	56.8	56.8	57.0	59.1	58.6	59.0	58.2	63.0	63.9	62.4	65.6	64.4
Ireland	39.1	38.9	39.3	38.4	36.6	36.8	36.1	35.8	34.0	32.3	32.6	32.1	32.0	32.0	31.1	29.9	29.4
Italy	110.2	110.6	110.6	111.2	109.4	109.5	110.6	110.7	106.7	108.0	108.0	105.5	106.2	106.3	104.2	105.8	103.8
Luxembourg	5.3	5.6	5.6	5.5	5.5	5.6	5.5	7.2	5.7	5.7	7.5	6.5	4.9	7.1	6.3	7.5	6.6
Netherlands	56.3	56.0	55.8	55.9	53.2	52.8	52.9	52.9	52.6	52.6	52.6	50.5	54.8	54.3	51.9	55.7	52.6
Austria	62.8	63.6	66.8	67.0	61.7	67.3	67.1	67.1	67.9	66.6	66.7	66.0	65.0	65.4	64.4	65.2	63.6
Portugal	53.8	53.4	53.3	53.3	55.6	55.6	55.6	55.9	58.0	58.1	58.5	55.5	59.4	60.1	57.0	61.9	58.7
Finland	44.0	44.0	44.5	44.6	43.6	43.8	43.9	43.8	42.7	42.6	42.5	41.3	45.3	45.3	44.3	45.1	44.3
Sweden	55.6	55.3	52.8	52.8	56.0	54.4	54.4	54.3	52.4	52.6	52.4	52.0	51.8	52.0	51.8	51.2	50.5
UK	42.9	42.4	42.1	42.1	39.0	39.0	38.9	38.8	38.6	38.5	38.3	37.6	39.8	39.7	39.0	41.6	40.8
Euro area **	70.0	70.0	70.2	70.4	71.6	69.2	69.4	69.6	71.3	69.2	69.5	69.8	70.4	70.9	71.2	74.1	74.5

Notes: * spring notifications' initial estimates and subsequent revisions (as a percentage of GDP)

** Excluding Greece in 2000.

Table 6.7 *General Government Change in Debt, 2000-04**

	2000			2001			2002			2003			2004	
	Spring of			Spring of			Spring of			Spring of			Spring of	
	2001	2001	2003	2002	2003	2004	2003	2004	2005	2004	2005	2006	2005	2006
Belgium	0.3	0.4	0.2	2.0	1.9	1.6	-0.1	0.3	0.3	-2.1	-2.1	-2.0	0.5	0.8
Denmark	-2.5	-2.6	-2.6	-0.5	-0.4	-0.6	1.0	0.7	0.7	-1.2	-1.3	-1.3	-0.4	0.0
Germany	0.8	0.6	0.6	0.5	0.5	0.5	2.4	2.4	2.4	3.9	3.9	4.1	3.3	3.2
Greece	6.4	6.3	8.7	4.0	8.3	8.3	5.7	5.6	5.8	5.9	5.8	5.7	9.1	8.9
Spain	1.8	1.8	2.0	0.7	0.3	0.4	0.5	0.6	0.8	-0.3	-0.2	-0.2	1.0	0.8
France	1.4	1.4	1.4	1.8	1.8	1.8	3.8	3.7	4.0	5.5	6.0	5.8	4.3	4.5
Ireland	-3.8	-3.8	-3.6	1.6	1.4	1.7	0.5	0.3	0.3	1.1	1.0	1.0	0.4	0.3
Italy	1.5	1.6	1.5	3.5	3.8	4.2	0.5	1.0	1.1	1.6	1.6	1.9	3.5	3.6
Luxembourg	0.1	0.3	0.2	0.2	0.1	0.2	0.2	0.3	0.5	-0.6	0.0	0.2	0.9	0.6
Netherlands	-2.7	-2.8	-2.9	0.2	0.5	0.5	1.6	1.6	1.6	3.3	2.7	2.6	2.7	2.0
Austria	1.0	1.3	2.6	0.0	2.0	2.0	1.8	1.2	1.2	0.1	0.4	0.2	2.0	1.9
Portugal	2.2	2.5	2.5	5.5	5.5	5.5	5.2	5.2	5.2	2.5	2.5	2.3	3.8	3.7
Finland	0.9	1.0	1.2	0.9	1.1	1.1	0.2	0.1	0.2	3.7	3.8	3.6	1.7	1.7
Sweden	-6.8	-6.8	-6.5	2.4	3.2	3.2	-0.2	0.1	0.1	1.3	1.4	1.7	1.3	1.0
UK	-0.7	-0.8	-0.8	-1.4	-1.4	-1.4	1.4	1.4	1.4	3.4	3.4	3.4	3.8	3.7
Euro area **	0.9	0.9	1.0	1.6	1.7	1.8	2.1	2.1	2.2	2.9	3.1	3.2	3.3	3.3

Notes: * Spring notifications' initial estimates and subsequent revisions (as a percentage of GDP)

** Excluding Greece in 2000.

Discussion

*João Nogueira Martins**

The fiscal convergence criteria of the Maastricht Treaty and the Stability and Growth Pact have stimulated a large strand of economic literature. Most of this literature is on how to interpret the available data, how to perform cyclical adjustments, how to identify the underlying budgetary position and the discretionary behaviour of government, etc. The infrastructure of indicators (how the deficit is defined; how it is compiled; how reliable and accurate it is; should it be compiled on a cash or on an accrual basis, should it cover a narrowly defined government or a wider public sector) has received much less attention. Balassone, Franco and Zotteri are among the rare authors that have devoted attention to these issues. And they have done it with quite a provocative spirit, even daring to consider that the indicators that are relevant for fiscal surveillance in the EU have been a “misleading compass”, as they put it in a previous and related paper (Balassone *et al.*, 2004).

The effectiveness of fiscal rules depends crucially on the quality of the fiscal indicators. The quality of statistical indicators can be generically defined as “fitness for use”. It is, in fact, a complex multidimensional concept; it covers relevance, timeliness, coherence, completeness, comparability across time and space, accuracy, reliability, transparency, etc. The topic of the chapter is on reliability; in technical terms, reliability refers to the closeness of the initial values to the subsequently revised figures. The authors note that the EU fiscal indicators do not score high in terms of reliability. This is worrying for two reasons: First, in the implementation of the EU fiscal framework, the most relevant decisions – such as deciding whether an excessive deficit exists or has been corrected, if a given country is complying with Council recommendation, or even if a country has fulfilled the criteria to enter the euro area, or ultimately whether the Council will have to impose sanctions – are taken on the basis of the first outcomes. The subsequently revised data – though of better quality – appear too late to have any decisive impact on the policy decisions. So if the first outcomes are subject to large revisions afterwards, important decision will be taken on the basis of wrong data. A second reason to be worried is that, as the authors point out, given that the fiscal rule is based on a rather simple indicator, one would expect it to be reliable. Presumably, other more complex fiscal indicators were rejected (implicitly if not explicitly) because the government deficit would be simple, easy to compile and reliable.

Balassone *et al.* establish a link between lack of reliability and opportunistic manipulation, *i.e.* political pressure to get data that are rosier than the reality, at least the first outcomes even if these are revised afterwards. If the lack of reliability is directly connected with opportunistic manipulation, then the solutions the authors propose seem to be quite appropriate: (i) increase the scrutiny of the government accounts and (ii)

* The views expressed in this chapter are those of the author and are not attributable to the European Commission.

strengthen the status of the data compilers, by giving more independence and accountability to the national statistical institutes. In the latest two or three years, the Commission has taken several steps in this direction, including all the suggestions by the authors. Obviously, it is very early to say how fruitful such steps are.

But are political pressures and opportunistic behaviour the main cause of the lack of reliability of fiscal data in the EU? Or are there other causes? If the lack of reliability of government accounts was directly and decisively connected with political pressures, one would expect the countries with less reliable data to be those that have had more problems with the respect of the EU fiscal reference values, and vice versa. The three countries that the authors use in their case studies (Greece, Italy and Portugal) would confirm the conjecture. Yet, we could also expect similar problems with the French and German figures. Now, if we consider data reported by Member States since 1994, France and Germany have the most reliable deficit data in the EU.¹²² So the question is: what do the French and German have that avoids them to resort to the same gimmickries of Greece, Italy and Portugal. (Or, do they resort to other tricks?) If I now apply the model proposed in the chapter, I am led to conclude that France and Germany bear larger costs (Cx) for entering in data manipulations with the purpose of hiding their deficits. Why? Is this because of institutional reasons? Are the French and German statistical institutes more independent than in other Member States? It would be interesting to research on what can be done to increase the reputation costs for producing unreliable data in Greece, Italy and Portugal.

If we try identifying what are EU Member States with the less reliable accounts we get some surprising results. Among the countries that have reported the less reliable data, we find not only Greece, Portugal and Italy, but also Sweden, Luxembourg and Denmark. Now, these are among the countries that have had less trouble in complying with the EU fiscal framework. Of course, the data revisions in Sweden and Denmark did not catch the public opinion, as the ones in Italy and Portugal, not to say Greece, but the magnitudes are not dissimilar. My point here is that the opportunistic manipulation of data certainly has an implication of the reliability of data, but there are other factors at play. It may be the reputation of the data compilers, irrespective of their status of independence, or the resources, competence or expertise available to each statistical institute, or even the more or less complex institutional arrangements in each country, or because some countries enter into more complex transactions than others. Or perhaps, the reliability difficulties would simply reflect the fact that our accounting rules are excessively complex and unreliability is somewhat inevitable, or very costly to avoid. We do not know. We would also need more research on this.

The authors identify two fragilities of the deficit indicator: (i) the fact that it is measured in an accrual basis and (ii) the fact that it is measured net of financial transactions. Do the authors believe that these two fragilities are such that the deficit definition should be changed? Would a cash deficit including some financial transactions be a better, and more reliable, definition? My understanding is that the authors believe that the current deficit definition is still preferable to any other, and they simply want to pinpoint the areas that need to be closely scrutinised by Eurostat.

¹²² For an analysis of the reliability of government deficit and debt statistics in most EU countries, see Gordo and Nogueira Martins (2007).

7.

Uncertainty Bounds for Cyclically Adjusted Budget Balances

Ray Barrell, Ian Hurst and James Mitchell

7.1 Introduction

This chapter addresses issues concerning the uncertainty surrounding estimates of the output gap and, in turn, the cyclically adjusted budget deficit. Uncertainty about the size of the output gap is likely to be reflected in uncertainty about the size of the cyclical adjustment to be applied to the budget deficit. Our main objective in this chapter is to evaluate the uncertainty associated with a commonly used estimate of the output gap and to demonstrate how this should be reflected in uncertainty about the cyclically adjusted budget deficit. The degree of uncertainty associated with the estimate of the output gap for a period in the past, when computed now, is noticeably less than that associated with the estimate of the current (or real-time) gap. Since typically policy-makers are concerned about the current gap, we focus on evaluation of real time estimates and their uncertainty. Uncertainty about the cyclically adjusted budget deficit is further compounded by uncertainty over the link between the output gap and the budget deficit. If the gap were to be caused by tax rich elements of demand, such as consumption, then the impact of a given gap on the deficit would be larger than when the gap is caused by changes in a tax poor component of demand, such as exports. We therefore undertake a further analysis of the sources of shocks and study their impact on the uncertainty surrounding the budget deficit.

In the second section of the chapter we discuss methods of estimating the output gap and the associated uncertainty. We focus on the Harvey-Trimbur (2003) estimator, which approximates a parametric version of the ideal band pass filter discussed in Baxter and King (1999). We utilise this estimator in part because it allows an analytical derivation of its standard deviation, which we present in this section. We then present and evaluate real time estimates of the output gap and the associated uncertainty for the UK, Germany, France, Italy, Spain, the Netherlands and Belgium. In the third section we calculate the cyclically adjusted budget deficits from the real time output gap data and present uncertainty bands around these estimates. The fourth section looks at the sensitivity of our results, by applying different coefficients from a model-based analysis of multipliers to the output gap in the calculation of the cyclically adjusted deficit. The final section draws conclusions about the difficulties associated with producing reliable estimates of the cyclically adjusted budget deficit.

7.2 Estimating the Output Gap and Its Uncertainty

Model Uncertainty

The output gap, the difference between actual and potential output, has an importance in the popular debate which can tend to run ahead of the problems in measuring it; the output gap is not observable. The choice of what measure, or estimator, of the output gap to use is more than a dry academic issue. As the analysis of Canova (1998) showed, for example, inference can be sensitive to measurement. In this chapter we largely abstract from issues concerning model uncertainty and consider just one leading output gap estimator – the Harvey-Trimbur cycle. This is sufficient to make our point that use of the output gap in real-time can be problematic since it is often measured imprecisely. The Harvey-Trimbur cycle is a model-based estimator based on unobserved components (UC). It is a generalisation of the class of Butterworth filters that have the attractive property of allowing smooth cycles to be extracted from economic time series - indeed ideal band pass filters emerge as a limiting case; see Harvey and Trimbur (2003).

Statistical and Parameter Uncertainty: Estimation in Real-time

An additional source of uncertainty associated with output gap estimates derives from the fact that policy makers do not have the luxury of being able to wait before deciding whether the economy is currently lying above or below its trend level. They have to decide, without the benefit of hindsight, whether a given change to output in the current period is temporary or permanent, that is whether it is a cyclical or trend movement. As discussed by Mitchell (2003) their problem can be interpreted as a forecasting one, since these real-time output gap estimates are forecasts, in the sense that they are expectations of the output gap conditional on incomplete information. Only with the arrival of additional information, such as revised historical data and data not available at the time, do the output gap estimates eventually settle down at their ‘final’ values.¹²³ These real-time or end-of-sample output gap (point) estimates have been found to be unreliable, in the sense that there is a large and significant revision or forecasting error; see Orphanides and van Norden’s (2002) application to the US economy and Mitchell’s (2003) to the Euro-area.

Since in the absence of data revisions, revisions to real-time output gap estimates are explained by forecasting errors, it is important when de-trending in real-time to produce good forecasts of the (log) level of the underlying series. Application of an UC model can be seen implicitly to forecast future values optimally. This follows from the fact that for a correctly specified model, application of the one-sided Kalman filter is equivalent to application of the two-sided filter (smoother) to the underlying series extended infinitely into the future with optimal forecasts. These optimal, minimum mean square error, forecasts are derived via the Kalman filter, exploiting the state-space representation for a given output gap estimator. There is therefore no need for forecast extensions.

We note that when computing the cyclically adjusted budget deficit the European Commission in fact rely on a production function approach to measuring the output gap; see Denis *et al.* (2006). But since TFP is de-trended with a Hodrick- Prescott filter there remains an end-of-sample problem. Future values of TFP are therefore forecast prior to

¹²³ Values are never truly final because data revisions and the arrival of new data are a continuous process.

application of the de-trending filter in an attempt to improve the reliability of the real-time estimates. But as mentioned above reliability will only be improved if ‘good’ forecasts are produced. Indeed, since the Hodrick-Prescott filter implicitly assumes the data are generated by an IMA(2,2) model, if future values are forecast using an alternative model, this then raises concerns about why the Hodrick-Prescott filter is itself used if an IMA(2,2) model is not believed to be the ‘true’ model. In any case, given that the European Commission must be uncertain about the accuracy of their measure and also still expect revisions to their real-time output gap estimates they should, as we consider below, produce a measure of uncertainty associated with it and in turn the cyclically adjusted budget deficit. Even if the estimates are not revised, they are not known with certainty, and hence must have a sampling distribution. As the Hodrick-Prescott filter is a mechanical device it is possible that the uncertainty of the estimates would have to be bootstrapped from the data, but it is still possible to estimate uncertainty measures.

Real-time and ‘Final’ Estimates of the Output Gap in the Euro-area

To investigate the unreliability of real-time output gap point estimates for Euro-area economies the following experiment is undertaken. Full sample or final estimates of the output gap are derived using data available over the (full) sample-period using data up to 2006q1. Real-time output gap estimates are computed recursively from 1980q1. We use data from the 1960s to 1980q1 to provide a real time estimate of the output gap for 1980q1.¹²⁴ Then data up to 1980q2 are used to re-estimate the output gap (that involves re-estimation of the parameters of the models used to measure the output gap) and obtain real-time estimates for 1980q2.¹²⁵ This recursive exercise, designed to mimic real-time measurement of the output gap, is carried on until data for the period up to 2006q1 are used to estimate the real-time output gap for 2006q1. These last estimates are the ‘final’ values, where real time and full sample estimates converge.

Throughout we use only the latest vintage of GDP data. What we call the real-time estimate is strictly the quasi-real estimate of Orphanides and van Norden (2002). If we considered real-time data we should expect to find an even greater degree of unreliability associated with the real-time estimates. Nevertheless revisions to published GDP data were found by Orphanides and van Norden (2002) to be less important than so-called statistical revisions. Statistical revisions are explained by the arrival of new data helping macroeconomists, with the advantage of hindsight, better understand the position of the business cycle, and also perhaps revising what model they use to identify and estimate it.

¹²⁴ We ignore the fact that GDP data are published with, at least, a one-quarter lag.

¹²⁵ In the notation of Harvey and Trimbur (2003) we set $m=n=2$ in each recursive sample, although for the UK we consider also increasing n to $n=3$. The models are not subjected to standard goodness-of-fit tests to help identify potential weaknesses/model mis-specification. Future work should consider this.

Table 7.1 *Real-time and Final Output Gaps as Yearly Averages*

	Germany		UK		France		Italy		Spain		Netherlands		Belgium	
	Final	Real-time	Final	Real-time	Final	Real-time	Final	Real-time	Final	Real-time	Final	Real-time	Final	Real-time
1990	2.47	1.41	2.70	0.62	2.38	0.43	2.15	0.44	-0.21	-0.58	1.80	0.36	1.44	0.05
1991	3.16	1.50	-0.86	-0.07	1.92	0.55	1.71	-0.62	0.56	-0.31	1.71	-0.03	1.10	-0.39
1992	1.80	-0.03	-3.02	-1.43	1.30	0.17	0.59	-1.01	0.14	-0.33	0.40	-0.37	0.41	-0.58
1993	-0.48	-1.50	-3.15	-0.91	-0.88	0.13	-1.93	-2.12	-0.86	-0.73	-1.26	-0.64	-2.07	-0.90
1994	-0.34	-1.91	-1.54	-0.52	-1.41	-0.96	-1.28	-1.45	0.41	0.34	-1.56	-0.39	-0.94	0.08
1995	-0.31	-1.10	-0.92	0.58	-1.47	-0.72	-0.02	-0.27	0.14	0.50	-1.41	0.01	0.81	0.71
1996	-0.94	-1.14	-0.85	0.50	-2.29	-0.53	-1.00	-0.30	-0.11	0.14	-1.21	0.14	-0.76	-0.03
1997	-0.72	-1.01	-0.37	0.61	-2.12	-0.74	-0.66	-0.33	-0.04	0.17	-0.39	0.29	0.24	0.35
1998	-0.74	-0.62	0.20	0.81	-1.06	-0.41	-0.88	0.07	-0.12	0.27	0.76	0.48	-0.38	0.08
1999	-0.30	-0.69	0.73	0.83	0.11	-0.02	-0.59	-0.05	-0.04	0.03	1.94	0.39	0.06	0.12
2000	1.48	0.01	1.66	1.03	1.83	0.30	1.63	0.95	0.28	0.16	2.80	0.30	1.33	0.42
2001	1.52	0.19	1.28	0.91	1.81	0.99	1.94	0.88	0.07	-0.32	2.19	-0.04	0.47	-0.28
2002	0.46	-0.37	0.55	0.28	0.93	0.54	1.03	-0.22	-0.15	-0.26	0.64	-0.53	0.05	-0.54
2003	-0.58	-0.95	0.49	-0.04	0.37	0.13	0.00	-0.81	-0.09	-0.09	-0.70	-0.87	-0.72	-0.54
2004	-0.75	-0.93	0.76	0.16	0.35	-0.15	-0.22	-0.86	-0.03	0.09	-0.93	-1.09	-0.12	-0.02
2005	-0.63	-0.68	-0.13	-0.09	-0.09	-0.08	-1.12	-1.08	0.07	0.13	-0.91	-0.79	-0.35	-0.09

Notes: Output gaps as a % of trend GDP; real time estimates based on a sample from the start of data to the date where the gap is recorded; full sample uses all data. German GDP data was 'spliced' at unification so that the GDP of united Germany moved in line with West Germany before unification and with total Germany thereafter.

Table 7.1 gives an indication of what the real-time and final output gap estimates look like. It lists the average real-time and final output gaps over a calendar year. Consistent with previous research, these figures indicate how unreliable real-time output gap estimates can be. They often paint a different picture to the final estimate, and clearly illustrate how one can misjudge the position of the business cycle in real-time. In general the full sample estimates are more ‘long period’ volatile than are the real time estimates. The latter tend to track actual output more closely, suggesting that perhaps too much signal is read into the current data.

We can draw out further relevant differences between the real-time and final estimates shown in Table 7.1. The German output gap estimates suggest that it was difficult to estimate the degree of excess capacity in the period after German unification and that data at the time may have been interpreted as suggesting trend growth had risen, when it probably had not. The same could be said of the mini-boom around 2000, when perceptions of the subsequent period of slow growth were absent.

The lack of cyclicity in the real time output gap estimator is also apparent in the outturns for France and Italy, but in both cases the ‘short period’ volatility of the real time estimator is apparent. The strength of the early 2000s boom in France is only really apparent with hindsight, and the same is true in Italy, although subsequent below capacity growth may be apparent there. The correlation of the real time and final estimates is stronger in Italy than for the other countries.

The Spanish output gap, measured either in real time or over the full sample appears to be much less ‘long term’ volatile than the other estimates presented here. This may reflect too little quarterly noise in the data, or the generally smooth evolution of actual output. Conversely the Netherlands shows long and large cycles which evolve in a smooth way whichever technique is used, whilst Belgian data show much more ‘short period’ volatility in the estimates of the cycle.

The real-time unreliability of output gap (point) estimates is summarised more fully in Table 7.2, both for full sample and real-time estimates. The table also examines the filtered estimates or the quasi-final estimates in the parlance of Orphanides and van Norden (2002). UC models use the data in two ways in the sense that first they estimate the parameters of the model, denoted by the vector Θ , and secondly they use these estimates to obtain the filtered and smoothed estimates of the output gap, namely the quasi-final and final estimates of the output gap, respectively. The filtered and smoothed estimates are the expected value of the output gap conditional on information available at time t ($t=1,2,\dots,T$) and T , where $T \geq t$, respectively. Let us denote the real-time estimates, based on recursively updated estimates of the parameters of a given UC model Θ , by $y_{t|t}$; let $y_{t|T}$ denote the final estimates of the output gap at time t , that use full-sample information T to estimate Θ , and then let $y_{t|t}(\hat{\Theta}_T)$ denote the filtered estimates of the output gap at time t using these full-sample based parameter estimates.

Table 7.2 indicates that as the future becomes the present output gap estimates are revised. Real-time point estimates of the output gap in the Euro area are unreliable, in the sense that there is a large and important revision error. This is reflected by the correlation coefficients against the final estimates being on average only 0.44. Reflecting the importance of ex post information in re-defining the parameter values, the filtered estimates are more reliable than the real-time estimates: correlation is higher averaging 0.66. Parameter uncertainty appears to be a dominant source of the unreliability of real-

time estimates. We note that while one might consider an output gap estimator for which there is no parameter uncertainty (such as the Hodrick-Prescott filter), so that the filtered and real-time estimates are equivalent, our experience suggests that there remains a significant difference between the real-time and ‘final’ output gap estimates; e.g. see Mitchell (2003).

Table 7.2 The Unreliability of Real-time Output Gap Point Estimates

		mean	min	max	s.d.	correlation vs. ‘final’	RMSE
Belgium	‘final’	-0.042	-2.353	2.117	0.958	1	0
	filtered	-0.025	-1.526	1.029	0.555	0.51	0.827
	real time	-0.016	-1.265	0.975	0.492	0.391	0.89
France	‘final’	-0.15	-2.516	2.496	1.44	1	0
	filtered	-0.405	-1.541	1.165	0.691	0.773	1.038
	real time	-0.231	-1.768	1.161	0.555	0.59	1.203
Germany	‘final’	-0.083	-2.399	3.533	1.423	1	0
	filtered	-0.212	-2.187	2.432	1.033	0.644	1.103
	real time	-0.299	-2.402	1.852	1.064	0.485	1.317
Italy	‘final’	-0.048	-3.732	3.659	1.597	1	0
	filtered	-0.388	-2.661	1.455	1.029	0.726	1.156
	real time	-0.316	-2.499	1.67	1.064	0.614	1.291
Netherlands	‘final’	-0.158	-3.275	2.877	1.491	1	0
	filtered	-0.124	-1.718	0.954	0.647	0.687	1.148
	real time	-0.079	-1.227	0.716	0.536	0.232	1.465
Spain	‘final’	0.001	-1.139	0.842	0.337	1	0
	filtered	0.021	-0.86	0.743	0.285	0.467	0.325
	real time	0.039	-1.005	1.228	0.371	0.385	0.396
UK	‘final’	-0.438	-4.998	4.868	2.461	1	0
	filtered	0.481	-2.181	3.136	1.207	0.84	1.835
	real time	0.317	-2.9	2.474	1.071	0.405	2.375

Notes: s.d. is the standard deviation of the output gap; correlation vs. ‘final’ is the correlation of the filtered or real-time output gap estimate against the full-sample estimate; RMSE is the root mean squared error of the filtered or real-time estimate against the ‘final’ estimate.

Uncertainty Associated with Output Gap Estimates

It is not simply a question of this output gap forecast proving to be right and another forecast proving to be wrong. Point forecasts are better seen as the central points of ranges of uncertainty. A forecast of 2% must mean that people should not be surprised if the output gap turns out to be a little larger than that. Moreover perhaps they should not be very surprised if it turns out to be much larger or indeed nothing at all. Therefore, consistent with recent developments in the forecasting literature, it is important to provide a description of the uncertainty associated with real-time output gap estimates via interval or density forecasts. Indeed, the ‘optimal’ real-time estimate of the output gap need not equal the mean or conditional expectation. It can be ‘rational’ to use biased real-time estimates. Furthermore, measures of uncertainty are useful in their own right if interested in analysing and communicating, for example, risk and volatility, or the probability of a downturn. Our concern in this chapter is with producing measures of uncertainty associated with the cyclically adjusted budget deficit estimate, as measured in real-time.

Measuring the Uncertainty Associated with the Output gap

We consider a simple approach to measure uncertainty that relies on a state-space representation for the output gap estimator. Conditional on Gaussianity (of the disturbances driving the components of the state vector) and knowledge of the covariance matrix of the estimated state vector confidence intervals around the output gap can be presented, and density estimates derived.¹²⁶ Other distributions could be considered although we confine attention to the Gaussian case since this both has the advantage of simplicity/familiarity and is sufficient to illustrate the role of forecasting uncertainty.

Let $P_{t|t}$ denote the Kalman filter based variance of the output gap at time t , $y_{t|t}$, using information available up to time t ; the output gap is one of the elements of the state vector in the UC model. Then conditional on Gaussianity, the density is $N(y_{t|t}, P_{t|t})$, from which the 95% confidence interval around the point estimate, for example, can be extracted. Note that we are considering filter uncertainty only and ignoring parameter uncertainty. Accounting for parameter uncertainty should be expected to increase the width of the confidence bands around the point estimates.

With known and constant parameters, uncertainty is greater around the real-time (strictly the ‘filtered’ estimate) than the ‘final’ estimate. This is seen as follows. Denote the revision between the real-time and final estimates by $R_{t|T} = y_{t|T} - y_{t|t}$. With known and constant parameters (*i.e.* for the filtered rather than real-time estimates of Table 7.1), this variance $P_{t|t}$ decreases as t increases; $P_{t|t} = P_{t|T} + \text{Var}(R_{t|T}^*)$. The variance of the filtered (or one-sided) estimate is therefore greater than that of the smoothed (or two-sided) estimate, $P_{t|T}$, by a positive scalar equal to the variance of the revisions between the filtered and smoothed estimates $R_{t|T}^*$ where $R_{t|T}^* = y_{t|T} - y_{t|t}(\hat{\Theta}_T)$. This is the familiar result that the variance of the filtered (forecasted) estimate is equal to the variance of the outturn, $P_{t|T}$, plus the square of the bias, $\text{Var}(R_{t|T}^*)$. This assumes the revision process has mean zero so that $\text{Var}(R_{t|T}^*) = E(R_{t|T}^*)^2$.

Just as point estimates of the output gap forecast in real-time can be evaluated ex post against the final estimates (as in Tables 7.1 and 7.2), the accuracy of real-time measures of uncertainty can and should be evaluated ex post; see Mitchell (2003) for further details. This is possible since a “good” interval forecast, as defined by Christoffersen (1998), should both have correct *unconditional* coverage (in the sense that on average observations fall in the interval to the predicted degree) and secondly be such that observations fall inside the interval in a random manner which is not clustered. Below we focus on how the uncertainty estimates associated with the output gap can be used to produce a measure of uncertainty associated with the cyclically adjusted budget deficit.

We detail the uncertainty concerning output gap estimates for selected years in Table 7.3. Although recursive, real time, estimates give less ‘long term’ volatility, they are in general noticeably less certain than full sample estimates. Hence even if we think, in real time, that the economy has an output gap of around zero, we cannot be at all certain about that. In 1990 six out of seven countries have real time estimates that were 30 to 100 per cent less certain than the full sample estimate. A similar pattern is clear in 1995 as well,

¹²⁶ The Kalman filter recursions automatically return estimates of the covariance matrix of the state vector. The diagonal elements of these matrices then can be used to construct the confidence intervals and density estimates. This approach has also been followed, for example, by Orphanides and van Norden (2002).

with only the Netherlands having a real time estimate that is more certain than the full sample estimate. Full sample uncertainty rises over the time period and approaches that of the real time estimate. Only in Spain are both estimates of the uncertainty in the gap low and stable.

Table 7.3 Standard Deviations of Output Gap Estimates in Selected Years – Full Sample and Recursive Compared

		1990	1995	2000	2005
Belgium	Full-sample	0.881	0.881	0.887	1.069
	Recursive	1.145	1.380	1.283	1.261
France	Full-sample	2.169	2.184	2.192	2.686
	Recursive	3.956	2.996	3.057	2.822
Germany	Full-sample	1.018	1.021	1.043	1.448
	Recursive	1.309	1.605	1.976	1.557
Italy	Full-sample	1.067	1.071	1.089	1.472
	Recursive	1.645	1.800	1.691	1.680
Netherlands	Full-sample	1.718	1.722	1.738	2.043
	Recursive	1.164	1.373	1.422	2.078
Spain	Full-sample	0.430	0.430	0.431	0.522
	Recursive	0.799	0.503	0.649	0.625
UK	Full-sample	1.393	1.431	1.470	2.226
	Recursive	2.526	2.740	2.521	2.363

7.3 Cyclically Adjusting the Budget Deficit

The patterns of evolving uncertainty detailed above should be reflected in our uncertainty about the scale of the cyclically adjusted budget deficit. The relationship between the deficit as a percent of GDP (BUD) and the cyclically adjusted deficit as a per cent of GDP (CABUD) depends on the sensitivity of revenues and expenditure to the cycle. The links between output and the budget deficit are discussed, for instance in Méltitz (2000), Blanchard and Perotti (2002) and Wyplosz (2003). It is common to assume that an increase in the output gap of 1.0 per cent of GDP (more use of capacity) reduces the deficit by 0.5 per cent of GDP; we discuss this assumption further in section 7.4 below. We may write the cyclically adjusted budget deficit (CABUD) for the UK, for example, as dependent on the observed deficit (BUD) and the output gap (OG)

$$\text{UKCABUD} = \text{UKBUD} - 0.5 * \text{UKOG} \quad (7.1)$$

Given the uncertainty in the output gap, and on the assumption that the budget deficit and the cyclical coefficient are known, then we may write the standard deviation SD of the CABUD as a function of the standard deviation of the output gap:

$$\text{SD}(\text{UKCABUD}) = 0.5 * \text{SD}(\text{UKOG}) \quad (7.2)$$

We apply this formula across seven European countries, applying the time varying estimates of the standard deviation of the output gap to produce bounds of uncertainty around budget deficits. The SD of the full sample estimate has generally settled down by 1990, but the real time estimates of the SD vary noticeably over time.

We focus here on estimating the real time cyclically adjusted deficits. These are of concern to policy-makers, who have to make decisions in real-time. In Barrell *et al.*

(2006) we also plotted the cyclically adjusted deficits, based on final estimates of the output gap and its uncertainty (SD). Unsurprisingly these indicate less uncertainty about the central estimate than the real-time estimates. In any case, Figures 7.1-7.7 below plot alongside the real-time cyclically adjusted budget deficit and the predicted degree of uncertainty, the final (point) estimate for the cyclically adjusted budget deficit. Differences between this and the real-time estimates indicate further the potential for making policy-mistakes in real-time. In each chart we also plot the outturn for the deficit.

Our budget deficit data have not been adjusted for any of the myriad of one-off measures we have seen in the last decade in Europe; hence we include mobile phone receipts in the deficit. This explains why most countries go into surplus around 2000. After 2002, when these receipts fade away, Germany and Italy show cyclically adjusted deficits that are more than 2 standard deviations away from zero, suggesting it is very unlikely that they could ever be judged to have been 'in balance or surplus'. France on the other hand has a cyclically adjusted deficit that just about includes zero within its 95% confidence bounds; but this reflects the noticeably greater uncertainty about the French output gap than that in the other countries. The Netherlands, Belgium and Spain are all close to balance or in surplus in a cyclically adjusted way in the last few years. The UK has been in a statistically significant deficit position for some years, but this judgement is both marginal, and less pressing than for France, for instance, because the UK is not a member of EMU.

Inspection of Figures 7.1 to 7.7 also shows that the actual deficit falls within the confidence bands, which could have been computed in real-time, around the cyclical adjusted budget deficit. This is not surprising, and perhaps not a source of great relief, given how wide the degree of uncertainty associated with the real-time estimates is.

The real time estimates of the CAB for France suggest that the country was in sustained deficit with little chance of achieving its commitments. However, there was a sustained improvement in the run up to EMU, with zero being well inside the uncertainty bounds for some years. After the formation of EMU, fiscal discipline appears to have been reduced, and zero drops out of the bounds.

Figure 7.1 Germany – Budget Deficit Cyclical Adjustment – Real Time

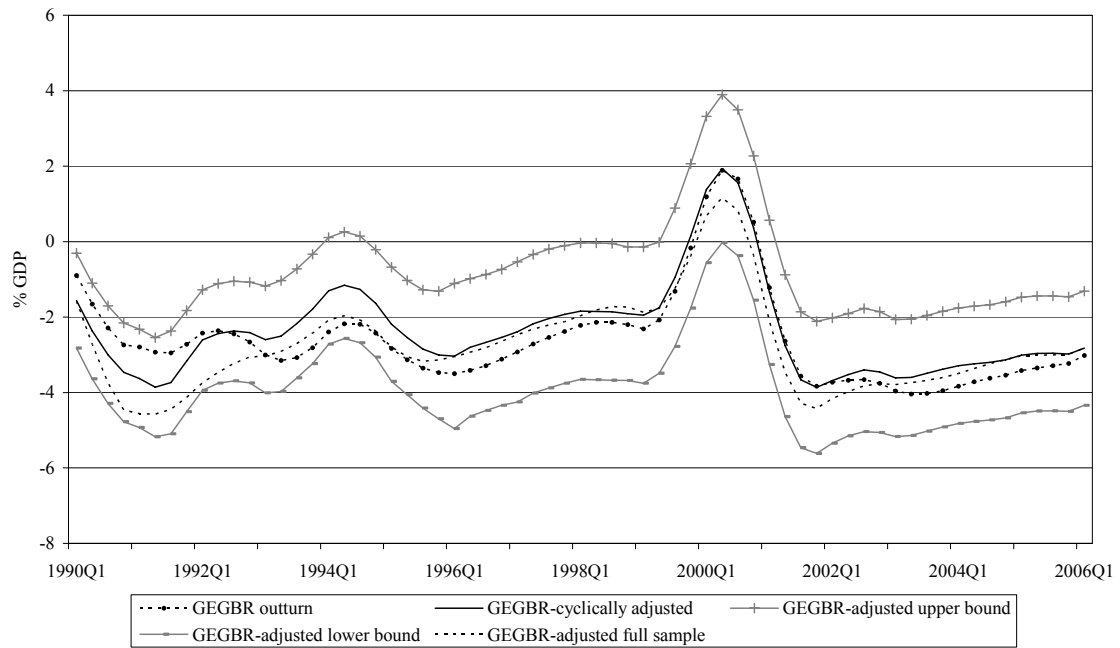


Figure 7.2 UK – Budget Deficit Cyclical Adjustment – Real Time

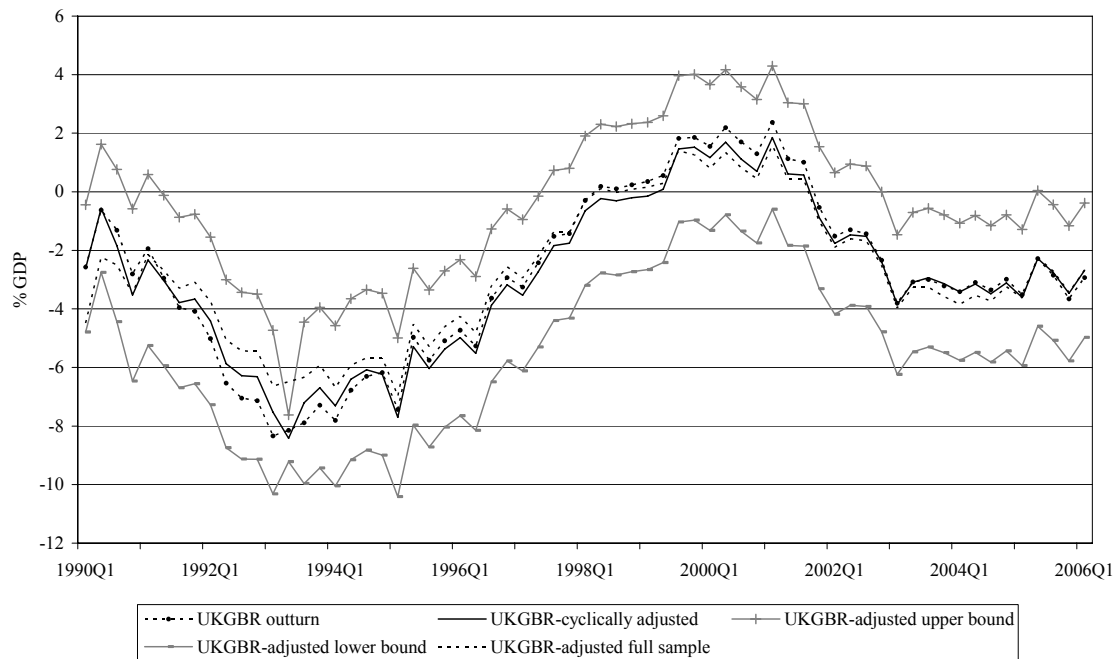
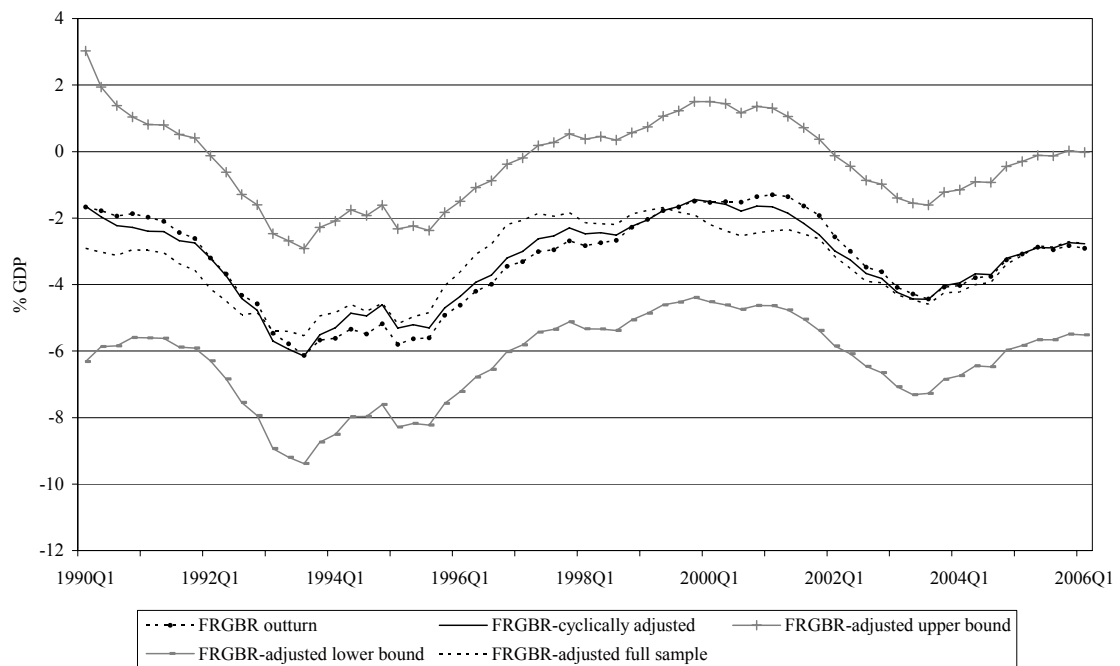
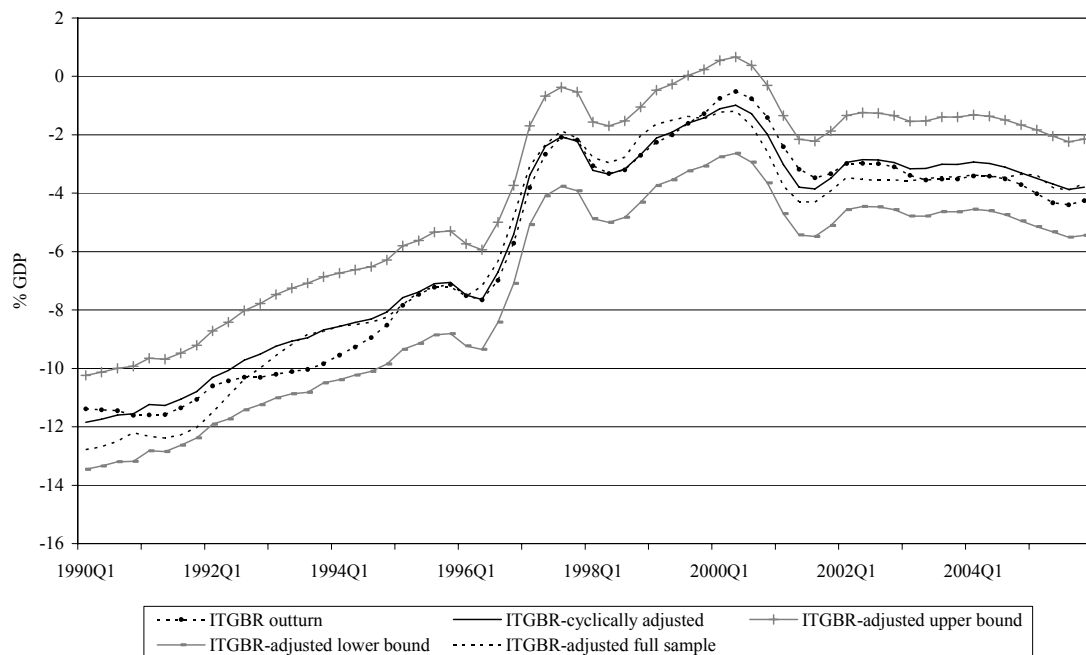


Figure 7.3 France – Budget Deficit Cyclical Adjustment – Real Time



The Italian budget position improved markedly between 1990 and 1996, and by 1997 the target of zero appears to be temporarily at least within the bounds of probability. Special measures between 1997 and 2001 gave a plausible looking outturn, but the central estimates and the bounds have recently moved away from zero.

Figure 7.4 Italy – Budget Deficit Cyclical Adjustment – Real Time



The low level of uncertainty around the Spanish budget deficit reflects the low uncertainty around the output gap estimates using our estimator of the output gap. However, these narrow bands leave the budget well within the bounds of close to zero over the last 3 years. The bounds using this estimate still suggest that the underlying position is strong, but the estimator is not the only one available, and an alternative estimator would help shed light on the position.

Figure 7.5 Spain – Budget Deficit Cyclical Adjustment – Real Time

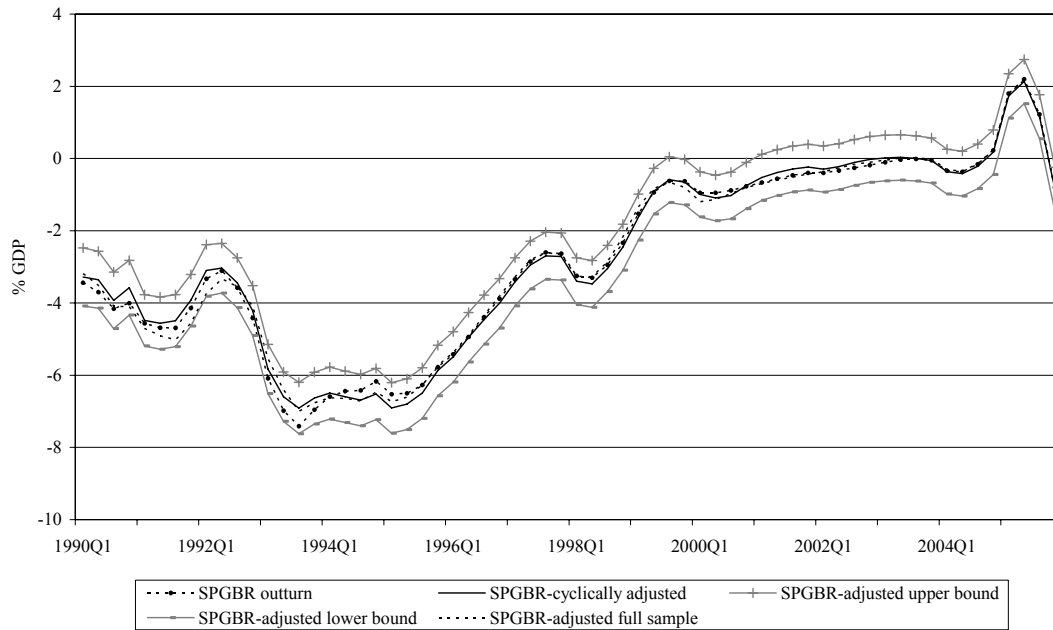
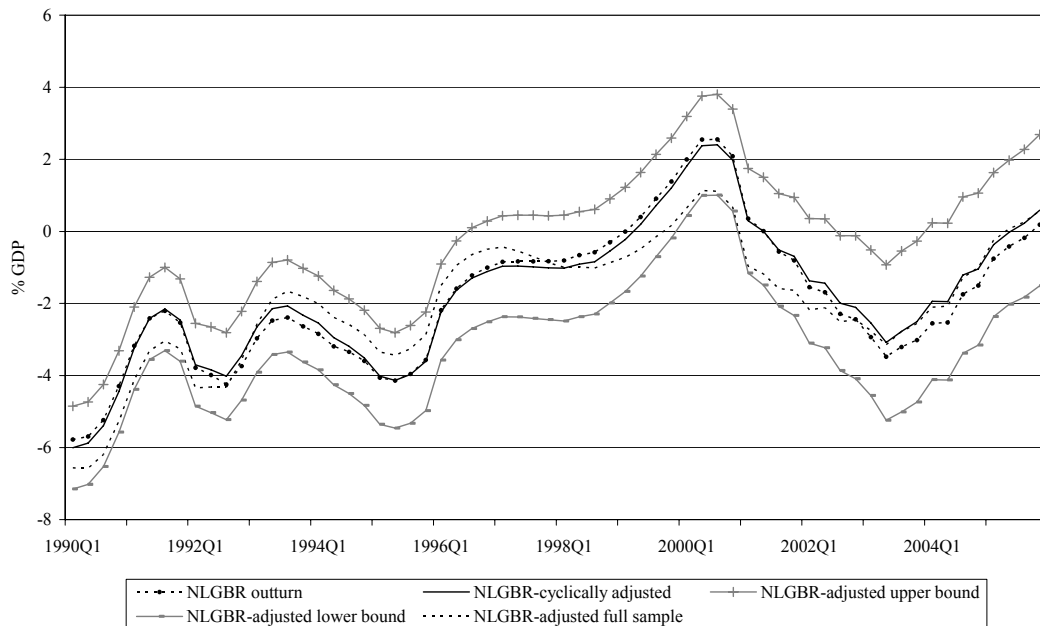


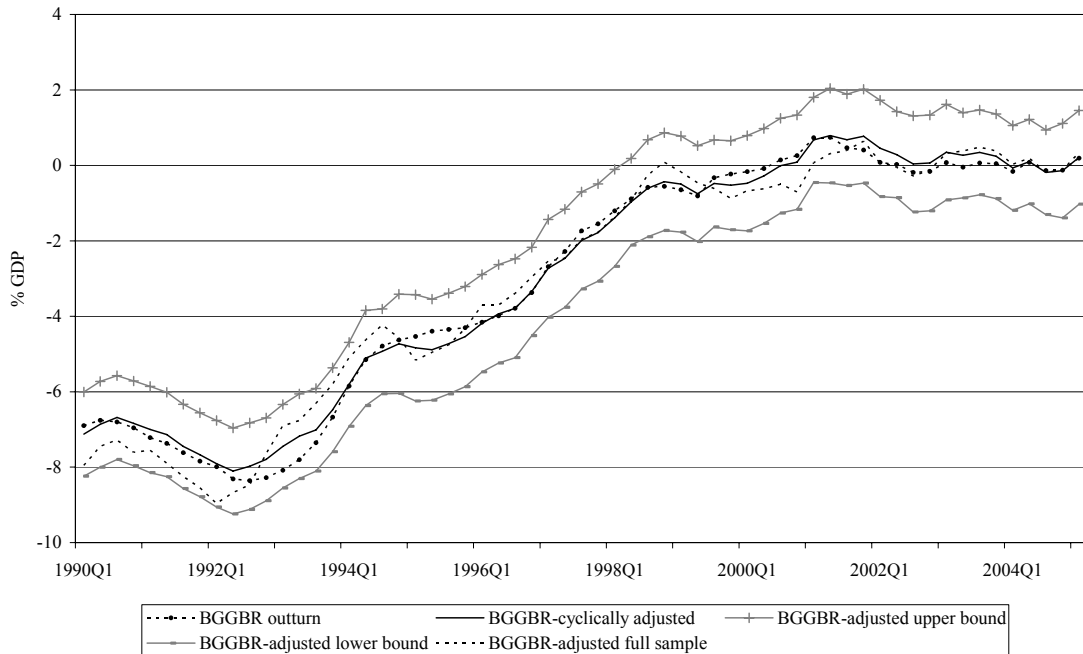
Figure 7.6 Netherlands – Budget Deficit Cyclical Adjustment – Real Time



The Netherlands is the only country to include both zero and 3 per cent within the real time 95 per cent confidence interval in the last 5 years of our sample. It is hence the only country where we are statistically unable to see whether or not it is likely to meet one or both of its treaty and Council commitments. However, even given the uncertainty about the current cyclical position, which is greater here than in most other countries (except perhaps France) we can be reasonably sure that the surplus we currently see has some structural component and is unlikely, at the 95 per cent confidence level, to involve an underlying deficit position in breach of the 3 per cent floor. However, in 2003 for a period the budget deficit was sufficiently large that it is unlikely that it could be explained by cyclical factors, in that the bounds did not include zero.

The uncertainty surrounding the output gap estimate in Belgium is noticeably lower than in the Netherlands, and we can be relatively sure, at the 95 per cent level, that the current position represents a structurally adjusted budget deficit of somewhere between -1.5 and +1.5 per cent of GDP.

Figure 7.7 Belgium – Budget Deficit Cyclical Adjustment – Real Time



7.4 Uncertainty in the Adjustment

The cyclical adjustment of the budget deficit is not just subject to uncertainty over the output gap, but also to uncertainty over the impact of the output gap on revenues and on spending and we should take account of both of these at the same time.¹²⁷ Tax revenues tend to fall with the cycle and at least some items of expenditure can be regarded as cyclically sensitive¹²⁸. Transfers to individuals in relation to their employment state are clearly cyclically sensitive, and this sensitivity varies across countries. In our sample it is low in Italy and high in Germany for instance, and hence we would expect the German budget deficit to be more cyclically sensitive than that of Italy. Expenditure and taxes generally move less than one for one with the level of spending, although in some countries, such as Germany, tax rates are higher on cyclically sensitive variables. A slow down in activity in Germany driven by weak consumption would reduce tax revenues rather more than it would in the UK, for instance. Income taxes also fall less than in proportion to the output gap because of the existence of thresholds and higher rates. As we can see, the details of individual countries benefit and tax system should affect the relationship between budgets and cycles.

There has been considerable debate about the scale of changes in revenues and spending in relation to the cycle. It is widely thought that a 1% deviation in GDP from its trend might cause a 0.5 percent of GDP change in the budget deficit. This figure is perhaps a little high and it should differ noticeably between countries and will also depend on the causes of the cyclical movement. A slowdown in activity driven by falling export demand is likely to have noticeably less impact on revenues than one driven by weak consumer spending, as the latter is more tax rich than the former. It is clear from this that producing a single gross measure of the sensitivity of the budget to the cycle is at best misleading. Although a single measure is simple and transparent, the trade off with information about the causes of the shift in the budget may be too great.

Discerning discretionary fiscal policy moves is difficult, as it involves the detailed analysis of budgets and their impacts. Changes in tax rates and the definition of tax bases must be seen as discretionary movements in the government position, as must changes in plans for expenditure on goods services and transfers. In general an improvement in the budgetary position made by a conscious discretionary policy might be expected to have a contractionary impact on the economy in the short term, although it might lead to lower long-term real interest rates, and these might offset the contractionary impact of the policy.

It is important not to assume that any non-cyclical movement in the budget represents discretionary policy. Random variations in tax receipts or in spending may push the budget outturn well away from its predicted level without there being a cyclical explanation or a discretionary policy driving the change. Economic models cannot encompass all of the factors driving the economy, and models explaining tax receipts are

¹²⁷ More formally, if $\text{cabud} = \text{adj} * \text{OG}$ and the adjustment factor and the output gap were independent then $\text{var}(\text{cabud}) = \text{var}(\text{adj}) * \text{var}(\text{OG}) + \text{mean}(\text{adj})^2 * \text{var}(\text{OG}) + \text{mean}(\text{OG})^2 * \text{var}(\text{adj})$. It would be possible for us to utilise this formulae, but OG and adj may not be independent, and hence it would be misleading. Calculating the joint distribution of OG and adj is possible, but would be time consuming, and we leave it to a later project.

¹²⁸ Although we may be able to find a statistical relation between other items of expenditure and the cycle, we regard such movements as discretionary, and we would not include them in our adjustments.

bound to be incomplete descriptions. Tax receipts may change even when both the tax base and the tax rate do not move. A change in tax paying behaviour after the introduction of self assessment in the UK in the 1990s could not have been picked up by any model. A shift in the pattern of consumption away from taxed to untaxed goods may not be picked up in equations for indirect tax receipts unless we have very detailed models. Both of these events will look like random (but explicable) elements in our analysis of taxes.

Modelling the Economy

We use the National Institute Global Model, NiGEM, to scale the relationship between output gaps and the budget deficit. It is an estimated world model, which uses a ‘New-Keynesian’ framework in that agents are presumed to be forward-looking but nominal rigidities slow the process of adjustment to external events¹²⁹. Economies are linked through the effects of trade and competitiveness and are fully simultaneous. There are also links between countries in their financial markets as we model the structure and composition of wealth, emphasising the role and origin of foreign assets and liabilities. We have forward-looking wages, forward looking consumption, forward-looking exchange rates and long-term interest rates are the forward convolution of short-term interest rates.

Each country has a description of its domestic economy that can be broken up into sectors: the government, the labour market, consumption behaviour, the supply side of the economy and financial markets. We need to ensure that interest rates, r_t , are set to stabilise the economy. We use a policy of nominal aggregate targeting and inflation rate targeting, or the two pillar strategy advocated by the European Central Bank

$$r_t = \gamma_1 (P_t Y_t - (P_t Y_t)^*) + \gamma_2 (\Delta P_t - \Delta P_t^*) \quad (7.3)$$

All variables are in logs, PY is (the log of) nominal GDP, P is (the log of) the Consumer Price Index (CPI) inflation rate, and a * denotes a target.

We have models of direct and indirect taxes, and of government spending. We consider the financing of the government deficit (BUD), and we allow either money (M) or bond finance (DEBT).

$$BUD = \Delta M + \Delta DEBT \quad (7.4)$$

Current fiscal revenues can be disaggregated. Personal taxes (TAX, which includes both personal income tax and social security contributions) depend on personal incomes. Corporate taxes (CTAX) depend on longer term profitability. Indirect taxes (MTAX) depend on consumer expenditure. Transfers to individuals (TRAN) depend upon prices and on unemployment, and hence these vary with the economic cycle. Government consumption and investment (GC and GI) which are assumed to be on plan except for random fluctuations, and they are not influenced by the cycle. As GC and GI are in constant prices, we convert them to nominal terms using the private consumption CED deflator. Government interest payments (GIP) are modelled as the income on a perpetual

¹²⁹ The structure and the simulation properties of NiGEM are described in, Barrell *et al.* (2003).

inventory, the change in the debt stock each period paying the long interest rate in the issue period until it is replaced.¹³⁰ The budget balance thus reads:

$$\text{BUD} = \text{TAX} + \text{MTAX} + \text{CTAX} - \text{TRAN} - \text{GIP} - \text{GC} * \text{CED} - \text{GI} * \text{CED} \quad (7.5)$$

We normally assume budget deficits are kept within bounds in the longer term, and taxes rise to do this. We can describe the simple fiscal rule as

$$\text{Tax}_t = \text{Tax}_{t-1} + \phi [\text{GBRT} - \text{GBR}] \quad (7.6)$$

where Tax is the direct tax rate, GBR is the government surplus target and actual surplus. The feedback parameter ϕ is designed to remove an excess deficit in less than five years. If fiscal solvency is 'off', it is turned back on again after our experiment.

Brunila *et al.* (2002) use the Commission model QUEST to quantify the impacts of output on the budget deficit, and we can evaluate the properties of our model similarly. In general, output effects on the budget increase with the size of the government sector and the share of cyclically sensitive components of taxation and spending, and hence we would expect them to vary across countries. Country specific factors such as the degree of openness and the flexibility of the labour market will also matter. Blanchard (2000) and Barrell and Hurst (2003) suggest that supply shocks are different from demand shocks in their impacts, and hence we only analyse the relation between output and the deficit in response to shocks to demand. In order to do this we evaluate the impact of demand changes on the economy and on tax revenues, and then look at the effects of tax changes on output.

We may write the shock multiplier as (where tax is direct taxes, itax is indirect taxes, ctax is corporation, tran is transfers, C is consumption, I is investment, X is exports and Y is GDP):

$$\begin{aligned} Dy / DS = & dy / dtax * dtax / dS + dy / ditax * ditax / dS + dy / dctax * dctax / S \\ & + dy / dtran * dtran / dS \\ & + dy / dC * dC / dS + dy / dI * dI / dS + dy / dX * dX / dS \end{aligned} \quad (7.7)$$

The left hand side of this expression is the shock multiplier, which we evaluate for consumption, investment and exports, and the last three terms represent the shock multipliers if there were no automatic stabilisers. If we have a consumption shock then dI/dS and dX/dS are set to zero by definition, and similarly for investment and export shocks. In order to evaluate the impacts of shocks on the deficit we need to evaluate the first four terms of the right hand side of this expression. This requires that we calculate the impact of each shock on tax revenues and on transfer spending, and that we calibrate the effect of an unanticipated change in tax revenues on output.

We first look at the impact of 1% of GDP changes in consumption, investment and export volumes sustained for 1 year, when they return to baseline for one quarter and subsequently the dynamics of the model are allowed to work. We assume that there is no

¹³⁰ The perpetual inventory attempts to take account of countries like Italy and Belgium where there are large proportions of short-term public debt.

interest rate response in this year, but after the year the monetary authorities respond. The fiscal authorities are assumed to leave tax rates unchanged for the year and then adjust direct taxes to achieve their budget target. The model is run with forward looking financial markets, and exchange rates and long rates jump in the first period.¹³¹ These multipliers are generally below those for discretionary changes in government spending on goods and services, but these multipliers are also likely to be below 1.0. Barrell *et al.* (2004) discuss standard fiscal simulations on NiGEM and suggest reasons why Germany has the largest multipliers on this table. The average of these three demand shocks is taken by evaluating the estimation variance of the equations, reflecting the uncertainty in our understanding of them, and weighting the multipliers by these variances, multiplied by the shares each has in GDP, and rescaled so that the weights add to one. Hence a larger component (consumption) may have a more similar weight to a more uncertain component (investment) than GDP shares would suggest.

Table 7.4 Multiplier Effects of a 1% of GDP Impulse for One Year

	Consumption	Investment	Exports	Average
France	0.70	0.62	0.67	0.68
Germany	0.89	0.77	0.89	0.89
Italy	0.60	0.53	0.58	0.59
UK	0.64	0.60	0.64	0.64
Spain	0.80	0.73	0.85	0.83
Euro Area	0.72	0.65	0.73	0.72

Notes: UK in EMU. Interest rates fixed for the first year. No fiscal feedbacks for the first year. The ECB uses a two-pillar strategy. The exchange rate and the long rate are forward looking. Average uses the variance of the errors on the structural equations weighted by the share of GDP for the component.

The impact of the shocks on the public finances will depend upon the importance of the three types of tax we model (direct, indirect and corporate) as well as the significance of transfers in the economy. We would expect shocks to consumption to have a much more significant impact on the budget as consumers expenditure is a significant part of the indirect tax base. However, the significance of indirect taxes varies between countries, and hence the impacts of the consumption shock also vary. Investment and export shocks are likely to be less tax rich.

The impact of any shock on the economy affects the Government budget directly and indirectly through either spending or tax receipts. If the output effect of the shock is small then the impact on income and corporate tax revenues will be smaller, as will the impact on transfer payments. Output effects will be smaller the more open the economy and the more consumption smoothing or rather the smaller are liquidity constraints. The generosity of transfer payments differs significantly between countries, and is probably least important in Italy for instance. Hence small open financially liberalised economies with low multipliers will have lesser effects from shocks onto the budget, and large countries with generous social security systems will have larger effects. In addition the impacts of a shock on the budget depend on whether the item being shocked is taxed heavily. We can see from Table 7.5 that the impacts of consumption shocks on the budget is markedly higher than investment or export shocks, as we would expect, and in general export shocks have slightly more budgetary impacts than do investment shocks.

¹³¹ Multipliers are always less than one in these models, and are generally less than those given in unstructured VAR analyses such as that of Blanchard and Perotti (2002).

Table 7.5 Effects on Budget as a % of GDP of a 1% of GDP Impulse for One Year

	Consumption	Investment	Exports	Average
France	0.46	0.14	0.15	0.31
Germany	0.58	0.27	0.31	0.45
Italy	0.47	0.18	0.20	0.28
UK	0.36	0.18	0.20	0.27
Spain	0.59	0.24	0.28	0.42
Euro Area	0.51	0.19	0.22	0.34

Notes: UK in EMU. Interest rates fixed for the first year. No fiscal feedbacks for the first year. The ECB uses a two-pillar strategy, the exchange rate and the long rate are forward looking. Budget effects from shocks are rescaled to give the impacts of a 1% change in GDP.

Table 7.6 records the rescaled impact of the shocks on budget deficits, so that we can see the tax richness of each shock when GDP changes by 1% as a result. We utilise these estimates in the analysis of uncertainty over the budget deficit, and we attribute the probabilities from Barrell and Hurst (2003) to each source of shocks in order to produce an average effect. Our analysis suggests that the impact of the cycle on the budget should be closer to 0.45 than the 0.50 used above and in other studies. But if we are clear on the source of the shocks that have driven the output gap then we can be more accurate in our assessment of the cyclically adjusted budget position.

Table 7.6 Effects on Budget as a % of GDP when GDP Changes by 1% as a Result of Shocks

	Consumption	Investment	Exports	Average
France	0.67	0.23	0.22	0.45
Germany	0.66	0.35	0.35	0.51
Italy	0.79	0.35	0.34	0.48
UK	0.57	0.30	0.30	0.42
Spain	0.74	0.33	0.32	0.52
Euro Area	0.73	0.29	0.29	0.46

Notes: UK in EMU. Interest rates fixed for the first year. No fiscal feedbacks for the first year. The ECB uses a two-pillar strategy. The exchange rate and the long rate are forward looking.

If receipts have different sensitivities to the output gap, then the nature of the shock facing the economy will determine whether the downturn is budget rich or not. Given the frequency of different types of shocks in the 1990s to the five economies we look at, we can say that the average adjustment for demand shocks should be 0.52 for Spain, 0.51 for Germany, 0.48 for Italy, 0.45 for France and 0.42 for the small government UK. We can see that if shocks are from exports or from investment then the impacts on the deficit are noticeably smaller than the multipliers associated with consumption shocks, with an average impact of 0.33 for investment shocks in the large Euro Area countries and 0.32 for export shocks in the same group. Consumption shocks have more impact on tax revenues, and the average impact is 0.66 for France and Germany, and 0.75 for Italy and Spain. Hence we need to look at the source of demand shocks in order to evaluate the cyclical adjustment that would be appropriate in a given situation. This parameter uncertainty increases the uncertainty bounds involved in evaluating deficits, but it may not be an insurmountable problem to decide whether a downturn in demand is driven by domestic or by foreign factors.

In Table 7.7 we set out the upper and lower bounds for budget deficits in both real time and over the full sample for 1992 and for 2004 for the UK, France and Germany using estimates of the impacts of the gap on the deficit. We use 0.33 to represent the impact of external shocks on deficits, 0.66 to estimate the impact of domestic demand shocks. We also include estimates based on a sensitivity of 0.45, which is the shocks weighted average from Barrell and Hurst (2003).

Table 7.7 *Cyclically Adjusted Budget Deficits**

		Full sample				Real time		
		GBR	Cyclically adjusted	Upper bound	Lower bound	Cyclically adjusted	Upper bound	Lower bound
UK	1992	-6.433	-4.923	-3.538	-6.308	-5.720	-2.871	-8.570
	b=0.5 2004	-3.211	-3.590	-1.680	-5.501	-3.289	-0.956	-5.623
UK	1992	-6.433	-5.436	-4.522	-6.351	-5.963	-4.082	-7.843
	b=0.33 2004	-3.211	-3.462	-2.201	-4.723	-3.263	-1.723	-4.803
UK	1992	-6.433	-5.074	-3.828	-6.321	-5.792	-3.227	-8.356
	b=0.45 2004	-3.211	-3.552	-1.833	-5.272	-3.282	-1.181	-5.382
UK	1992	-6.433	-4.440	-2.612	-6.268	-5.492	-1.731	-9.254
	b=0.66 2004	-3.211	-3.712	-1.190	-6.234	-3.314	-0.234	-6.395
Germany	1992	-2.474	-3.376	-2.378	-4.374	-2.457	-1.131	-3.783
	b=0.5 2004	-3.679	-3.305	-2.130	-4.480	-3.216	-1.684	-4.747
Germany	1992	-2.474	-3.069	-2.411	-3.728	-2.463	-1.587	-3.338
	b=0.33 2004	-3.679	-3.432	-2.657	-4.208	-3.373	-2.363	-4.384
Germany	1992	-2.474	-3.286	-2.388	-4.184	-2.459	-1.265	-3.652
	b=0.45 2004	-3.679	-3.343	-2.285	-4.400	-3.262	-1.884	-4.640
Germany	1992	-2.474	-3.665	-2.348	-4.982	-2.452	-0.701	-4.202
	b=0.66 2004	-3.679	-3.186	-1.635	-4.737	-3.068	-1.046	-5.089
France	1992	-3.945	-4.595	-2.465	-6.726	-4.032	-0.908	-7.155
	b=0.5 2004	-3.710	-3.887	-1.480	-6.295	-3.633	-0.859	-6.407
France	1992	-3.945	-4.374	-2.968	-5.780	-4.002	-1.941	-6.064
	b=0.33 2004	-3.710	-3.827	-2.238	-5.416	-3.659	-1.829	-5.490
France	1992	-3.945	-4.530	-2.613	-6.448	-4.023	-1.212	-6.834
	b=0.45 2004	-3.710	-3.870	-1.703	-6.036	-3.641	-1.144	-6.137
France	1992	-3.945	-4.803	-1.991	-7.616	-4.059	0.064	-8.183
	b=0.66 2004	-3.710	-3.944	-0.766	-7.122	-3.608	0.053	-7.270

Note: * Changing the effect (b) of OG on CABUD.

We are particularly interested in whether or not a set of bounds around a cyclically adjusted deficit might for instance include a possibility that the country was close to balance or in surplus in a cyclically adjusted sense. We can see from the table that only France saw itself in this position, and then only in 2004 if shocks were predominantly from consumption and the real time estimate was to be used. In this table no country and coefficient pair, either in real time or over the full sample could be said to be clearly in line with a Treaty commitment not to breach a deficit floor of 3 per cent of GDP, even in a probabilistic sense of being 95% certain that this is not the case. This suggests that even if we include all the one-off measures in the last 5 years it is very unlikely that the UK, France and Germany have been running a structural surplus. Thus it is very likely that they have breached a reasonable level of borrowing of 3 per cent of GDP.¹³²

¹³² The UK uses a different set of guidelines, and sets its borrowing to be no greater than the level of public investment over a cycle. Given this has not exceeded 2 per cent of GDP we could make a

7.5 Implications and Conclusions

Monetary Union requires some form of fiscal pact, and although it is in the interests of all to follow that pact, it is in the interests of each country to find special reasons why the pact constraints may not apply to it in a particular year. The pact was designed to set limits to borrowing, with penalties available for sustained breaches of the targets. These penalties are supposed to take account of the impacts of the cycle on the deficit, but these impacts are uncertain. We have investigated one representative estimator of the output gap and derived its distribution, giving us a simple way of evaluating its uncertainty. This in turn allows us to put uncertainty bounds around the budget deficit given an estimate of the output gap on the deficit. We then discuss the uncertainties involved in the relationship between the output gap and the deficit, showing that the source of shocks impacts on the uncertainty surrounding a deficit projection.

All estimates of the output gap are uncertain, and ours is probably no worse than others. Even those that are not revised are not known with certainty at the point when they are made. There is a strong case for using production function based estimates of the output gap, as in Denis *et al.* (2006), but these are more difficult to calculate than our measure, and it is more complex, but not impossible, to evaluate the associated uncertainty. Even if we know with certainty the parameters of the production function we still have to estimate trend hours, trend productivity and the equilibrium level of employment. If these are estimated using a filter, which is common, then it is possible to evaluate directly their uncertainty and feed this into the gap. If they are the result of reduced form calculations, then a more complicated process of looking at the error variance on the reduced form has to be gone through.

It is our contention that the error bounds around any estimate of the output gap are wide. Given these uncertainties it will always be possible to put bounds around the cyclically adjusted deficit. We strongly advocate that this should be done by all official bodies involved with the evaluation of deficits in Europe as well as by the scientific community. It would be more prudent to accept that we are ignorant rather than argue about gaps; hence we should evaluate budget deficits in probabilistic terms. This would involve asking whether a budget target is within the 95 per cent (or 64 per cent) bounds around the cyclically adjusted deficit. In undertaking this analysis it is also useful to discuss the source of weak demand that has caused the output gap and then use an appropriate coefficient (perhaps not 0.5) in the adjustment. In all cases humility over our ignorance and strength about the obvious, such as the scale of recent deficits in France and Germany, are important characteristics of sensible debate.

simple adjustment to our figures of this magnitude; hence we can say that the balance of probabilities is that it has not been meeting its target over the last four years; e.g. see Kirby and Mitchell (2006).

Discussion

*György Kopits**

The chapter by Barrell, Hurst and Mitchell constitutes an excellent analytical exercise. It was a pleasure to read it. The chapter is a rigorous attempt at gauging the degree of uncertainty associated with the measurement of the cyclically adjusted budget (CAB) balance (and of the underlying output gap) in major EU member economies. Apart from the solution of analytical and computational challenges, my interest in this work is primarily from the standpoint of the policy maker.

When reading the chapter I was reminded of the book by former U.S. Treasury Secretary Rubin (2003) about his approach to decision-making during his years in government and in investment banking. The essential point was that he took policy decisions or business decisions always with a view to assessing and weighing in real time the uncertainties surrounding those decisions – without the benefit of any formal gauge. In particular, the conduct of fiscal policy for stabilization purposes presupposes real-time estimates of the output gap. At the supranational EU level, output gap estimates are necessary for surveillance to ascertain whether a member country's underlying fiscal position is in line with the requirements of the Stability and Growth Pact. Beyond the realm of fiscal policy, reliable output gap estimates are also a key ingredient in the formulation of monetary policy, not only by central banks that follow a Taylor rule, but even by those that target inflation alone. Yet the reliability of such estimates is viewed with widespread scepticism – as expressed for example recently by Rogoff (2006, p. 320). Therefore, in this broad context, the experiment reported in this chapter is most welcome from the perspective of multiple users.

The chapter contributes to a clearer understanding of the cyclically adjusted budgetary position in real time. It makes a quantitative assessment of the uncertainty surrounding point estimates of the output gaps, by comparing real-time estimates with full-sample measures of the gap. It applies a model-based approach, drawing on unobserved components. The resulting output gap measures and the respective uncertainty bands are then translated into CAB measures on the basis of stylized budgetary sensitivity parameters. By this measure, the authors find that in Italy, France, Germany and to a lesser extent UK, the general government accounts have not been close to balance or in surplus position in recent years. On the other hand, for Spain, the Netherlands and Belgium fiscal balance is obtained. These results can be examined on the basis of four criteria: robustness, sensitivity, versatility, and usefulness.

* The views expressed in this chapter are those of the author and are not attributable to the National Bank of Hungary.

On *robustness*, in principle, the calculations seem reasonable, although it is surprising that the uncertainty bands are rather wide for most countries. Less surprising is that the real-time bands are larger than the full-sample bands. However, on this criterion, the jury is still out until further testing with alternative methodologies (as done to some extent for the United Kingdom). Furthermore, the capacity of this approach to capture structural shifts is questionable, and more important, there remains an end-point problem. A possible solution of this problem may lie in the application of the trend-cycle filter developed by Mohr (2005) that combines an HP-filter with an unobserved-components model-based approach.

A closely related criterion is the *sensitivity* to alternative budgetary parameters. Obviously, the entire computational chain cannot be stronger than the weakest link. In this regard, the sensitivity test conducted on the budgetary impact of various GDP components is persuasive. And, of course, future application of this approach could be fine-tuned to specific countries and specific periods.

As regards *versatility*, the results for Spain and the Netherlands give rise to some scepticism. It would be worth probing deeper whether the narrow uncertainty bands for Spain are attributable to some peculiar structural characteristic, model specification, or virtual absence of statistical error. In the case of the Netherlands the estimates are counter-intuitive in that the real-time bands are somewhat narrower than the full-sample bands. Perhaps this is due to unusually large revisions of the underlying data.

Research on the uncertainty of real-time estimates of the output gap should be *useful* for policy-making purposes. A retrospective assessment of the cyclically adjusted budgetary position has considerable value added for fiscal policy analysis.¹³³ Specifically, this should provide more reliable information for national policy decisions, as well as for surveillance by EU authorities under the Pact, especially in assessing performance under the excess deficit procedure.

However, a pending question, to be tackled by future researchers, concerns the forward-looking application of the estimated uncertainty around real-time output gaps. In other words, this would involve inquiring into the extent to, and manner in, which past estimates of uncertainty bands can be extrapolated to the period ahead with a view to better capturing, and possibly to counteracting, the impact of cyclical fluctuations around trend output. Beyond fiscal policy, as anticipated in my opening remarks, this line of research is potentially useful for monetary policy as well. Estimates of the uncertainty in real-time measures of the output gap should be helpful for the preparation of increasingly accurate growth forecasts, including through fan charts that presuppose a reliable point estimate for the current time period.¹³⁴

¹³³ In a way, this is analogous to the to the analysis in Chapter 2, regarding the reaction of fiscal policy for restoring sustainability

¹³⁴ At present relatively few central banks prepare fan charts for growth along with the usual fan charts for inflation. Among the exceptions, the Bank of England and the National Bank of Hungary publish them in their periodic inflation reports.

Finally, estimates of the uncertainty around real-time output gaps underscore the importance of exercising caution and transparency in actual policy formulation. Indeed, by and large, these findings should discourage governments from relying on optimistic macroeconomic projections, and EU entities from accepting them. In this respect, my favourite is Canada's rule-of-thumb approach, whereby the government builds fiscal forecasts on macroeconomic projections generated by private sector (mostly think-tanks) consensus, subject to a small conservative safety margin.

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