The dynamic behaviour of budget components and output – the cases of France, Germany, Portugal, and Spain

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Abstract

The main focus of this study is the relation between the cyclical components of main budget items – total revenues and expenditures in the current version – and the budget balance in France, Germany, Portugal, and Spain. We try to uncover past trends behind the development of public finances that may contribute to explain the current stance of fiscal policy. The disaggregate analysis of fiscal policy in an SVAR that mixes long and short-term constraints allows us to look into the transmission channels of fiscal policy, and to derive a model-based indicator of structural balance. The main conclusions are that the fiscal slippages in recent years are due to revenue shortfalls, unmatched by expenditure cuts. The Stability and Growth Pact has not eradicated procyclical policies.

Keywords: fiscal indicator, structural balance, output gap, SGP, EMU, SVAR, long-term restrictions.


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1. Introduction

In recent years, we have witnessed a worldwide swing towards fiscal profligacy. In the
European Union, this came 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 could guarantee the sustainability of public finances. The difficulty in applying the Pact,
first to Portugal, and later on to France and Germany has led to a more widespread breach
of the deficit limit in several EU countries by now. A revised version of the Pact was adopted
in March 2005. The new Pact takes a more flexible approach in terms of curbing excessive
deficits over a longer period of time. Considerably more attention is also given to the
composition of budget adjustments.

A variety of political and economic factors probably underlie the 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 explain the current budgetary outlook in France, Germany,
Portugal, and Spain. While the first three countries were among the ones that were subject
to several steps of the Excessive Deficit Procedure, Spain on the other hand could be seen
as an example of a more sound fiscal management. We are particularly interested in the
underlying causes of the breach of the deficit rules by looking into adjustments in various
budget components.

We construct a model-based indicator of structural balance by combining 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 economic growth and fiscal variables.
This allows for permanent shocks to determine trending behaviour of output and fiscal
variables. Discretionary fiscal adjustments are captured by filtering out the fiscal balance for
cyclical reactions of budget items, following Blanchard and Perotti (2002).

The indicator that we obtain is best seen in the light of the growing theoretical literature on
the effects of fiscal policy. Dynamic stochastic general equilibrium models with nominal
rigidities offer 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 model is consistent with such a distinction. In the current
analysis, attention is restricted to overall expenditure and revenues, but more elaborate
models might incorporate refinements in the compositional adjustments of budget balance.
The indicator has some attractive practical properties in comparison to statistical models for adjusting fiscal balance. Uncertainty is explicitly quantified, and theoretical assumptions can be explicitly tested. Also, the end-of-sample problem is reduced. Of course, the model is definitely more complex, and data availability is a limitation.

The main result of our study is that both pre-EMU consolidations and expansions in recent years are mainly based on revenues. The derailing of public finances comes from tax decreases being implemented in good economic times. As total revenues remain seemingly constant, spending cuts are not implemented. As a consequence, deficits show up when good times turn into economic bust. The easy way out of deficits is to reverse previous tax cuts, leading to ratcheting up spending in the next economic boom. The procyclical bias in fiscal policies has not been eliminated with the Stability and Growth Pact. Governments still seem to implement bad policies in good times. These policy reversals must have negative economic effects, as we find fiscal policy to have equally important demand and supply effects.

The remainder of the paper is organised as follows. In section two 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 three. Section four reports our empirical results, and section five concludes the paper.

2. The recent fiscal imbalances in the EU

The fiscal framework as established in the Treaty on the European Union, and in the Stability and Growth Pact is a necessary support of the Economic and Monetary Union (EMU) and key in anchoring a sound fiscal stance. However, recent developments in fiscal policies 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) are being carried out for both France and Germany, while another EDP was launched for Portugal. In the latter case, this was the second time since the end of 2002, when Portugal was the first EU Member State ever to breach the 3% deficit threshold. Portugal was shortly followed by Germany in the same year, and by France in 2003. While the first EDP for Portugal was abrogated in May 2004, the EDP for France and Germany are held in abeyance since November 2003.
Additionally, also in 2005, there are ongoing procedures for two other members of the euro area, Greece and Italy, while several other EU Member States face an excessive deficit situation. However, current developments in public finances cannot be seen without taking into account past actions and trends, since long-term sustainability is paramount. Let us focus attention on the evolution of public finances since 1970 in the first and most visible ‘sinners’ to the Pact, France, Germany and Portugal. For comparison, we consider also Spain as an example of a more sound fiscal management.

We report in Figure 1 the general government balance, and its breakdown in revenue and expenditure ratios. From a simple visual inspection one sees that expenditure and revenue ratios have been following an increasing trend notably in France, Portugal and Spain. But with revenues lagging behind on expenditure rises, there has been a constant deficit bias, which has only been closed in Spain in recent years. This is also true for Germany: the large rise in spending in 1975 exceeds that in the other countries, but the deficit had been curbed just before Reunification. There were some good reasons to embark on consolidation by enshrining the 3% deficit target in the criteria for EMU-entry in 1991. The effect of the Maastricht rule has indeed been to brake further buoyant expenditure rises. In some cases, and especially in Spain, there are even relevant expenditure cut backs in the run up to EMU. Less than commensurate rises in revenue intake have led to persistent yet gradually declining deficits.

Since the start of EMU – indicated by the shaded area in the graph – fiscal positions have slipped away in France, Germany and Portugal, leading to the start up of the EDP in these countries. As to the reasons for the breach of the Stability and Growth Pact, further expenditure rises in France and Portugal seem to blame. In the case of France, belated and modest revenue increases have pushed the deficit beyond the 3% threshold, while in Portugal expenditure rises have kept up with revenues in the last years. Germany presents a somewhat different picture, with revenues drastically declining by up to 3 percentage points of GDP, and in combination with rather modest expenditure cuts. On the other hand, Spain stands out for its balanced budget, and only in 2004 a slight deterioration is observable, but this still falls below the 3% limit by far.

1 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.

2 Afonso (2005) studies the sustainability of public finances in the EU and reports some unpleasant results for most countries.
However, these developments cannot be considered separately 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 forecasted revenues, owing to automatic stabilisers built in the taxation and spending structure. The revised Pact is still understood as bringing cyclically adjusted budgets close to balance, such that the government deficit limit is not breached when automatic stabilisers are left to work completely. Exceptions can only be granted

“if the excess over the reference value results from a negative annual GDP volume growth rate or from an accumulated loss of output during a protracted period of very low annual GDP volume growth relative to its potential”.3

Figure 2 compares the output gap and cyclically adjusted balances computed by the European Commission and the OECD, as well as the trend retrieved from directly applying a Hodrick-Prescott filter on the unadjusted series.4 The filter provides a smoother trend than other measures that recompose the final measure from adjusting various budget components. Differences between the various methods are certainly not minor, at least if, for example, we consider divergences of the indicator ranging between 0.5 and 1% large relative to the 3% limit of the Stability and Growth Pact.

[INSERT FIGURE 2 HERE]

In all countries, economic conditions improved considerably at the onset of EMU, leading to an improvement in the overall balance. The positive output gap reversed, however, in the course of 2002. For Germany, the worsening of the balance through falling revenues – also in adjusted terms – has been tempered by more modest expenditure cuts. Economic windfall revenues seem to have propelled up expenditure in Portugal instead, as structural balances deteriorated under favourable economic circumstances. The adjustment in the period 2002-2004 takes place mainly through an increase in revenues. This seems to have improved the balance in structural terms. But this probably owes much to one-off and temporary measures, and would therefore not qualify under the rules of the new Pact. There are some divergent opinions on the deterioration of the French budget. As far as OECD numbers are concerned, revenue declines are responsible for the upswing in deficits. The European

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4 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).
Commission attributes it to expenditure rises that are not completely offset by measures on the taxation side instead. The start-up of the EDPs to these countries seems justified then, also on the basis of the worsening structural balances. Spain presents an entirely different picture. The budget has been brought closer to balance, and is even in slight surplus. This has been achieved mainly by raising tax revenues. The decline in government expenditures has levelled off in recent years.

3. An SVAR model for gauging fiscal indicators

The usefulness of the cyclically adjusted balance for interpreting changes in discretionary policy is debatable. There are a variety of reasons for which it does not properly reflect discretionary shifts under the control of the government. Most importantly, fiscal policy contributes to the size of economic fluctuations. It does so by adjusting a variety of spending and revenue items that also have non-negligible supply-side effects. Recent general equilibrium theories of fiscal policies provide a rationale for fiscal stabilisation policies, as well as stressing the prevalence of these supply-side effects. In the assessment of the new Stability and Growth Pact, the implementation of major structural reforms that raise potential growth, and have a verifiable impact on the long-term sustainability of public finances can be considered grounds for temporary deviations of budget balance. 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 evidence on the cyclical behaviour of government budget. Next to its favourable properties, it is best seen as a first step in verifying newer theories of fiscal policy, as well as giving an instrument for assessing the quality of fiscal adjustments.

3.1. Fiscal indicators

The concept of a 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, and is fundamentally driven by shocks with a permanent output effect. The cyclical swings around this path are induced by shocks with a transitory impact on output. Together with some assumptions on the cyclical behaviour of fiscal policy, this allows deriving a structural balance. Common practice at the European Commission, IMF or OECD in deriving cyclically adjusted fiscal balances is to consider the fluctuations of output and the cyclicality of the budget as two separate problems.

With this methodology, the output gap usually comes from trend-extraction with a statistical
filtering method applied directly to real output. This decomposition in trending and cyclical components is usually done with a band-pass filter, of which the Hodrick-Prescott filter is a special case. 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. The European Commission backs up Hodrick-Prescott decomposition with results from the production function approach (European Commission, 1995). The IMF has no uniform strategy for all countries, but the production function method prevails for industrialised countries (IMF, 1993). The OECD uses only the latter method (Giorno et al., 1995).\(^5\)

Quite some uncertainty surrounds the decomposition of trend and cyclical output. Especially towards the end of the sample, the trend is biased towards actual values, depending on the skewness of the distribution of the moving-average weights in the applied filter and the phase of the cycle. This end-point bias is solved by the European Commission by adding forecasts to the series, arguably adding to the uncertainty. This has serious implications in terms of budget control. Another problem is posed by structural breaks. One-off factors are entirely in the structural balance if they have no economic effects. Filters distribute forward and backward on the trend the effects of a break. But this problem is not limited to statistical methods. Even if we use the production function or consider a deterministic trend a reasonable approximation, incorporating shifts remain a problematic issue.

A bottom-up approach is usually adopted for the derivation of the cyclical budget elasticities. The output elasticities of various revenue items are based on the taxation structure of each main subitem\(^6\) – in some cases accounting for collection lags – and the elasticity of tax bases to output. For expenditures, only unemployment benefits are corrected for the cycle. The inverse of the Okun coefficient is multiplied by the elasticity of total benefits to unemployment. Other components are assumed to be cyclically insensitive. Table 1 gathers elasticities recently provided by the OECD for the major budget categories. The cyclical elasticity of total net lending varies around 0.50, as in most OECD countries. As only spending on unemployment is adjusted and this is a relatively small component, current spending elasticity contributes little to cyclical variations.\(^7\) Most of the variation comes from

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\(^5\) The Beveridge-Nelson decomposition, or methods that track output developments using unobserved components are less common. Many other approaches abound. 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) make a comparison of moving benchmarks. Cohen and Follette (2000) use spectral analysis to isolate low frequency changes in fiscal policy. Bouthevillain et al. (2001) capture the effect of compositional changes in aggregate demand and national income on various components of government revenues and unemployment-related expenditures.

\(^6\) The OECD adjusts only social security contributions, corporate, personal and indirect taxes.

\(^7\) The elasticity is only higher for Germany as unemployment benefits are a larger spending item.
especially procyclical corporate and personal taxes. The elasticity of indirect taxes is simply assumed to be unity.

Table 1. OECD output elasticities of various budget items

<table>
<thead>
<tr>
<th></th>
<th>France</th>
<th>Germany</th>
<th>Portugal</th>
<th>Spain</th>
</tr>
</thead>
<tbody>
<tr>
<td>Current spending</td>
<td>-0.11</td>
<td>-0.18</td>
<td>-0.05</td>
<td>-0.15</td>
</tr>
<tr>
<td>Corporate tax</td>
<td>1.59</td>
<td>1.53</td>
<td>1.17</td>
<td>1.15</td>
</tr>
<tr>
<td>Personal tax</td>
<td>1.18</td>
<td>1.61</td>
<td>1.53</td>
<td>1.92</td>
</tr>
<tr>
<td>Indirect tax</td>
<td>1.00</td>
<td>1.00</td>
<td>1.00</td>
<td>1.00</td>
</tr>
<tr>
<td>Social security contributions</td>
<td>0.79</td>
<td>0.57</td>
<td>0.92</td>
<td>0.68</td>
</tr>
<tr>
<td>Net lending</td>
<td>[0.53, 0.61]</td>
<td>[0.51, 0.61]</td>
<td>[0.46, 0.49]</td>
<td>[0.44, 0.49]</td>
</tr>
</tbody>
</table>

Source: Girouard and André (2005).

The various assumptions on these elasticities are not as crucial for the cyclically adjusted balance as those on detrending output, but are nevertheless not less problematic. We return to these difficulties in a sensitivity analysis in section 4.4. The last row of Table 1 gives already an indication on the range of net lending elasticities obtained by varying only the elasticities of wages to output two standard errors below and above its point estimate.8

3.2. Towards an economic indicator of fiscal policy

The main difficulty in interpreting the structural balance is the absence from a theoretical argument underpinning the trend/cycle decomposition. There is an implicit assumption in the filtering methods on the frequency of the business cycle, and thus on what trend output is under average economic conditions. The production function approach in contrast builds upon explicit economic foundations. Nevertheless, the dynamics are solely driven by the longer-term effects of investment feeding back via changes in the capital stock. Typical economic fluctuations are moderate as the economy does not perform out of the possible production frontier. The further assumptions on its functional form, the presence of returns to scale, technological progress, the utilisation rates of production factors, as well as the need for plenty of auxiliary estimates make cumulative uncertainty rather large.

Macroeconomic models that allow for cyclical behaviour 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 micro-founded models based on sticky prices have been extended to include fiscal policy. In the initial neo-classical Real Business Cycle models, there are only supply-side effects of fiscal policy that transmit through wealth effects and labour choices. But even in the New-Keynesian type of models, the supply side effects

8 See Girouard and André (2005) for an extensive discussion, and a quantification of this uncertainty.
of fiscal policy still tend to dominate demand side effects of fiscal policy management. Models that introduce some imperfection via ‘Rule of Thumb’ consumers or a fraction of liquidity constrained consumers come already closer to 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 that are more in line with Keynesian effects, albeit the eventual multiplier is strongly reduced.

The SVAR can provide a small empirical model to investigate the effects of fiscal interventions. Initially, studies on the effects of fiscal policy followed traditions in the analysis of monetary policy (see for instance Bernanke and Mihov (1998)), but identification of discretionary fiscal policy shocks is fraught with difficulties. The narrative approach examines some highly visible historical events with large fiscal adjustments on its economic consequences. These studies look into the large rises in military spending such as the Korea or Vietnam War, or more recently the Afghan and Iraq war. Such occasional expansions of the government budget may not be entirely unforeseen, however. While the reverse causality is probably implausible, the economic effects of changes in fiscal policy may nevertheless be anticipated in private agents’ behaviour. The implementation of announced policy changes is moreover subject to lengthy and visible political negotiations. 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).

For instance, shocks to military spending are rather peculiar. Decisions on fiscal policy affect different groups in the public via a range of spending and tax instruments. There exists no ‘standard’ fiscal shock: every political discussion considers the composition of tax and spending adjustments. The means of financing and the adjustment in the composition of expenditure and revenues wrap empirically relevant effects of different components in an aggregate fiscal shock. A couple of studies consider the dynamic behaviour of some particular budget components. 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. Kamps (2004) examines the output and labour market effects of government investment.

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9 A full discussion of the problems in identifying the effects of fiscal policy is provided in Perotti (2005).
The identification problems are only exacerbated by the automatic reaction of fiscal aggregates to economic variables. It is hard to disentangle the effects of discretionary fiscal policy from the workings of automatic stabilisers in response to the economic cycle. For that reason, a recursive cholesky ordering that assumes some prior beliefs on the exogeneity and the mutual influence of the variables in the system can hardly find a robust ordering of the variables, as in Fatás and Mihov (2001). The seminal contribution of Blanchard and Perotti (2002) lies in using a semi-structural VAR that employs 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. This requires a substantial amount of external information and the estimation of a number of parameters. Blanchard and Perotti (2002) additionally impose some timing restrictions on the economic effects of discretionary policy, as well as on the order of spending and revenues (De Arcangelis and Lamartina, 2004) These timing assumptions avoid to some extent anticipation effects but would not capture these completely if implementation lags are important.12

The empirical literature has hitherto ignored the supply and demand channels of fiscal policy that are at front-stage of the theoretical models. Such effects are only implicitly acknowledged in studies that look into the short-term adjustments in fiscal policy. Revenue shocks, for example, are usually found to have lasting effects on output.

The connection with a separate literature on the long-term growth effects of fiscal policies has actually never been made (see e.g. De La Fuente (1997)). It can indeed be argued that additional government spending in catching-up countries as Portugal and Spain in the eighties, had rather different effects than further rises in France and Germany. This provides an additional argument for including these different countries in the analysis. The examination of such effects is also of much practical interest. In the assessments of EU Member States’ policies under the new Stability and Growth Pact, much attention is devoted to the quality of fiscal adjustments and the sustainability of public finances. The implementation of structural reforms that raise potential growth 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.

12 Subsequent studies have mainly attempted to verify the original approach of Blanchard and Perotti (2002) with a variety of techniques. 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.
We make a first step in setting up an empirical model that allows for both effects of fiscal policy to play a separate role. To that end, we need to take a stance on the long-term properties of the economic series. The standard approach, following Blanchard and Quah (1989), is to let potential output be determined by shocks with permanent effects on output, so-called productivity or technology shocks. This can then be complemented with further assumptions on the short-term behaviour of fiscal policies. Only a few applications exist for fiscal policy, mostly inspired by a practical interest in determining structural balances. We follow the same lead by analysing the dynamic behaviour of budget components in France, Germany, Portugal and Spain.

3.3. Methodology

The approach in this paper rests on a combination of long-term restrictions, and some assumptions on the short-run elasticities of budgetary items. For the purpose of gauging a model-based fiscal indicator, we basically take shocks with permanent effects on output to drive long-term trends. Shocks with transitory output effects are classified as either cyclical or fiscal. We therefore 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 (Model 1). We can summarise the data properties in a VAR-model (1), ignoring for notational simplicity any deterministic terms:

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

where $X_t$ now refers to the vector of variables $[y_t, g_t, t_t]$, and $\varepsilon_t$ contains the reduced form OLS-residuals. By rewriting the VAR into its Wold moving average form (2),

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13 See Bouthevillain and Quinet (1999) or Dalsgaard and de Serres (2001) who use a similar model to determine the probability of some EU countries breaching the deficit limits of the Pact. Bruneau and DeBandt (2003) specify an SVAR model in output, the deficit ratio and also add inflation and interest rates. Deficits are assumed not to have long-term effects on output, and neither is the demand or monetary shock. The two policy shocks are believed not to affect output contemporaneously. Fiscal policy further has no direct impact on interest rates either. Interestingly, they also 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 close to this paper, seeing as that he is interested in simultaneously determining potential GDP, the NAIRU and cyclically adjusted balances. 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.

14 See Appendix 4 for an overview of all models.
\[ X_t = B(L)^{-1} \varepsilon_t, \quad Var(\varepsilon) = \Omega \]

and imposing some structure on the relation between reduced form residuals \( \varepsilon_t \) and structural shocks \( \eta_t \) via the transformation matrix \( A \), such that \( A \varepsilon_t = \eta_t \), we can identify the model as in (3)

\[ X_t = C(L)\eta_t = B(L)^{-1} A \varepsilon_t, \quad Var(\eta) = I. \]

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 (i.e. the covariance matrix of OLS residuals \( \Omega = A A' \)), we need to choose at least three more restrictions to just identify the model. 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 of the elements in \( A \). The former impose a long-term neutrality constraint on the effects of a structural shock \( i \) on some variable \( j \). 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 on the product of the transformation matrix \( A \) and the inverted long-run coefficient matrix \( B(1)^{-1} \). In other words,

\[
[C(1)]_{ij} = [B(1)^{-1} A]_{ij} = 0. \tag{4}
\]

For the system consisting of government expenditures, revenues and output, we assume three structural shocks to drive output and fiscal variables. One supply shock \( (\eta^q) \) drives the long term rise in output. This leads to the unit root behaviour of real output. In the current version of the model, we cannot tell apart the effects coming from ‘pure’ technology shocks, from those deriving from tax and spending decisions. The supply shock is thus a combination of all shocks with long-term effects. Negative effects of distortionary taxation, incentive distorting spending or capital-stock building of government investment all show up here.

This shock is isolated by assuming there are two further shocks in the model that have only temporary effects on output, and no long-term effects, i.e. \([C(1)]_{12} = 0\) and \([C(1)]_{13} = 0\) in (4). These shocks can be interpreted as a generic business cycle shock \( (\eta^c) \) capturing
short-term fluctuations around the moving steady state equilibrium for output, and a fiscal demand shock ($\eta^f$). In order to distinguish business cycle shocks from temporary effects of fiscal variables, we employ the elasticity approach advocated by Blanchard and Perotti (2002). I.e., we construct elasticities for government expenditures ($\gamma$) and revenues ($\alpha$) with respect to output, and impose these values on the relation between the reduced form residuals in $\eta$. We thus derive a shock to a deficit from which the cyclical effects have been removed. In other words, the shock with transitory effects on output but unaffected by output is the fiscal policy shock. The fiscal shock reflects discretionary changes in fiscal policy stance. This includes discretionary decisions unrelated to the cycle, but also any systematic policies that overturn the workings of automatic stabilisers. Summarising our assumptions, we impose values on matrix $C(1)$ and $A$, such that (see also Table 2):

$$C(1) = \begin{bmatrix} 0 & 0 \\ \vdots & \vdots \\ \vdots & \vdots \\ \end{bmatrix}$$ and $$A = \begin{bmatrix} \vdots & \gamma & \alpha \\ \vdots & \vdots & \vdots \\ \end{bmatrix}.$$ 

(5)

<p>| Table 2. Identification in long and short term for Model 1 |
|---------------------------------|----------|----------|----------|</p>
<table>
<thead>
<tr>
<th>Effect of shock on</th>
<th>Supply shock $\eta^q$</th>
<th>Business cycle shock $\eta^c$</th>
<th>Fiscal shock $\eta^f$</th>
</tr>
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<tbody>
<tr>
<td>Real GDP</td>
<td>\bullet</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Public spending</td>
<td>\bullet</td>
<td>\bullet</td>
<td>\bullet</td>
</tr>
<tr>
<td>Public revenues</td>
<td>\bullet</td>
<td>\bullet</td>
<td>\bullet</td>
</tr>
<tr>
<td>$A$</td>
<td>$\varepsilon^y$</td>
<td>$\varepsilon^g$</td>
<td>$\varepsilon^f$</td>
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<td>Fiscal shock $\eta^f$</td>
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<td>$\gamma$</td>
<td>$\alpha$</td>
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<tr>
<td>Business cycle shock $\eta^c$</td>
<td>\bullet</td>
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</tbody>
</table>

We can not simply set to zero the elasticity of government expenditures, as unemployment benefits affect importantly spending in EU-countries. The parameter $\gamma$ comes directly from the elasticities calculated by the OECD (Girouard and André, 2005), as reported in Table 1. For the cyclical elasticity of total revenues, we have subtracted the spending elasticity –

---

15 Blanchard and Perotti (2002) net out from spending the cyclically sensitive transfers, and assume zero elasticity on the rest.
16 This is not a replication of the results in Blanchard and Perotti (2002) for they require additional short-term constraints, while we consider long-term constraints.
17 This study is an update from the results in Vandenoord (2002).
multiplied by its GDP-share – from the elasticity of the total balance. As the budget is too some extent countercyclical, the coefficients do not sum to zero. We therefore need to impose two different coefficients $\gamma$ and $\alpha$, resulting in one overidentifying restriction. Table 3 summarises our parameter assumptions.

<table>
<thead>
<tr>
<th>Table 3. Parameters $\gamma$ and $\alpha$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total spending $\gamma$</td>
</tr>
<tr>
<td>Total revenues $\alpha$</td>
</tr>
</tbody>
</table>

3.4. Gauging the fiscal indicator

The structural model permits adopting a unified approach towards contemporaneously uncovering indicators of the structural balance $d^*$ and potential output $y^*$. 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 output in the long-term: $y^*$. Both fiscal shocks and supply shocks determine structural expenditure $g^*_t$, and revenues $t^*_t$, as in Hjelm (2003).  

$$d^*_t = \frac{g^*_t - t^*_t}{y^*_t}$$  \hspace{1cm} (6)

where potential output $y^*$ is the fraction not determined by transitory shocks ($\eta^q$). Given the identification scheme, this fiscal indicator $d^*$ can be interpreted as reflecting the discretionary stance of the fiscal authority. We can then analyse whether such changes usually occur via spending or taxation measures from the decomposition of the budget.

The measure cannot directly be compared to the cyclically adjusted balances provided by the European Commission, 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

18 Alternatively, one may view structural fiscal policy as depending on the decisions of fiscal policy makers only, regardless of the evolution of potential output (Bruneau and DeBandt, 2003).
sources – and might vary over time. Second, the variation in the structural balance is different from that in the traditional two-step methods. This discrepancy owes to the definition of structural balance. The SVAR-model excludes that part of the variation in GDP due to unsystematic discretionary fiscal measures whereas the conventional models take total output variation into account, also affected by fiscal policies. This need not result in a smaller variation in structural balances. Underlying economic shocks might be more volatile. Alternatively, fiscal policies may not be countercyclical such that variations in output are not offset.

3.5. Properties of the fiscal indicator

There are some favourable properties of a model-based indicator. In the first place, these 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 can play freely. The simultaneous determination of a measure of cyclical output and fiscal balance is internally more coherent.\(^\text{19}\) While the method is definitely more complex – but not less so than the production function approach, for example – total uncertainty is quantified, and made explicit. We impose a minimal set of restrictions, and the validity of these assumptions can be discussed. The empirical model is also consistent with recent DSGE models of fiscal policy. As the model has a counterpart to some theory of fiscal policy, the assumptions can be tested. A sensitivity analysis on the final result can make clear the deviation of the model in some specific sense. In addition, progress in theoretical models of fiscal policy can lead to further refinements of the approach.

This is at the same time a weakness of the approach. Extensions are difficult as the method is rather data demanding – at least in the time series dimension. The effects of loosening the constraints of short-run effects of fiscal policy indeed have to be set off against some additional complications. While both short- and long-term restrictions are sensitive to the exact parameter values imposed (Sarte, 1999), substantially more uncertainty surrounds the estimates of the long-term inverted MA representation, even in large samples. 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

\(^{19}\) We actually combine the two steps in one, as we jointly determine potential output and structural balances. A one-step method is used by the ESCB, which consists in mechanically filtering the components of the fiscal balance (Bouthevillain et al., 2001).
which the long run effect nullifies can solve this problem. One may check the consistency of some short-term restrictions with the long-term behaviour of the model, as in King and Watson (1997).20

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. Only if each shock affects the economy in qualitatively the same way will the shocks not 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 alternative short term responses. There may also occur a problem of high frequency feedbacks with the annual frequency at which we observe fiscal policy. We assume the structural shocks are orthogonal but if there are mid-year revisions of the budget, we may mess up both economic and fiscal shocks. This only stresses the problem of correctly identifying the timing of shifts in fiscal policies.

Another implicit assumption of 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, for instance, Giavazzi et al. (2000)). Therefore, we perform some stability tests on the VAR-model.

4. Empirical analysis
4.1. Data

All data are annual and come from AMECO.21 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 defined in first differences of log-levels, and are deflated by the GDP-deflator. We ignore the possibility of cointegration between overall expenditures and revenues that derives from the intertemporal budget constraint.22 This implies that parameter estimates are no longer efficient – albeit still consistent. However, inference on the short-term results of the VAR would hardly be affected by non-stationarity of the data. We might alternatively express the fiscal data as a ratio to GDP. But as we are primarily interested in distilling a fiscal indicator on the basis of the historical decomposition

20 We considered the effect of loosening the long-term constraint on either government expenditures 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 ‘productivity’ shock. The sensitivity analysis failed as the model does not converge.
21 Details are in Appendix 1. A program containing the RATS-code used in the paper is available from the authors upon request.
22 For such an analysis, see Claeys (2004).
of the series, and scaling to GDP, this would have clouded inference. For the same reason, we do not concentrate on the effects of fiscal policy on private output but use total output in the VAR instead.

Data are defined following ESA-95 nomenclature. Data 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 the 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 a suitable correction, following Stock and Watson (2003). I.e., we apply the sequential sup Quandt-Andrews likelihood ratio test that corrects for the change in volatility before and after the breakdate. The sample size forces us to consider a single breakdate only, as the optimal search concentrates on the central 70% of the sample, thereby leaving too few degrees of freedom for examining multiple breaks. Lag length in the VAR is set to 1, following the Bayesian Information Criterion. Table 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 breakdate that is seemingly related to the Maastricht consolidations, albeit the confidence bounds are rather large, spanning nearly the entire nineties. It is nevertheless suggestive of the change under the effect of the Maastricht rules. Due to this imprecision, we refrained from explicitly modelling these shifts with additional dummies.

Table 4. VAR breakdate test (Bai et al., 1998) \(^{(a),(b)}\)

<table>
<thead>
<tr>
<th></th>
<th>France</th>
<th>Germany</th>
<th>Portugal</th>
<th>Spain</th>
</tr>
</thead>
</table>

Notes: (a) *** denotes significance of the breakdate at 1%; (b) breakdate is Sup-Quandt breakdate, years in brackets are the confidence interval at 33% (Stock and Watson, 2003).

4.2. Evidence on the transmission channels

We have summarised the results in Figures 3.a and 3.b. The following paragraphs discuss the fit of the model in terms of impulse response functions, \(^{23}\) and the forecast error variance decomposition. A comparison of the model’s output gap to more common indicators of the business cycle then prepares the ground for an analysis of the fiscal indicator.

\(^{23}\) Impulse responses follow a one standard shock, and are plotted on a 10 year horizon with 90% confidence intervals, based on a bootstrap with 5000 draws.
The effect of supply shocks is to lift up real output permanently (Figure 3.a). The speed of accumulation is rather fast: after 5 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. In France and Portugal, supply shocks go hand in hand with long-term effects on total expenditures and revenues as well. This effect is also strongly significant, and leads to a rather large accumulated deficit after 10 years. In Germany and Spain on the contrary, revenues do not change significantly, but government expenditures shrink considerably, leading to a large accumulation in surplus.

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. The impulse responses have been scaled to display positive output effects. In Germany and Spain, a typical Keynesian response would follow upon demand boosting deficits, whereby on net, expenditures exceed revenues. In France and Portugal, fiscal contractions would lead to positive short-term effects on output instead.

The effects of cyclical shocks on output are hardly significant. For business cycle shocks, there is not always an obvious simultaneous rise in tax revenues. Only in Germany and Portugal does this occur. The effect usually remains permanent. In addition, government expenditures tend to rise, except in Spain. The responses of government expenditure are usually insignificant. This result nevertheless suggests some ratchet effects of positive economic shocks leading to more revenues being quickly spent.

As pointed out above, each structural shock is affected by different parts and effects of fiscal policy. As a consequence, the interpretation of the forecast error variance decomposition is a bit murky (Figure 3.b). The supply shock contains productivity shocks, emanating from the private as well as the public sector. The fiscal shock regards all discretionary policy interventions on spending and/or revenues that are not systematically related to the cycle. Cyclical shocks include business cycle shocks with transitory output effects that are not related to fiscal policy.

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. Most of the variation in output is thus caused by
productivity shocks, even at short horizons. The demand effects of fiscal policy in France and Germany are at least as large as those of supply effects. In Portugal or Spain, only a minor role is played by discretionary fiscal policy. This could probably reflect the productive nature of further government expenses in these converging economies over the period 1970-2004. In mature economies that have already converged to their long-term steady state growth path, the short-term demand effects of fiscal policy are relatively larger. We cannot really quantify the relative magnitude of both channels, as we do not separately identify private and public supply shocks.\textsuperscript{24} This result nevertheless reveals that models of fiscal policy need to attribute important roles to both demand and supply side effects.

[INSERT FIGURE 3.b HERE]

In Figure 4, we plot the output gap based on the historical decomposition of the output series. For comparison we have repeated the output gaps of the European Commission and OECD, displayed in Figure 2. There is a rather close correspondence between these measures and the supply shock based gap in 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. We agree then with the worsening economic conditions 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. The smooth gap for Portugal and Spain underlines the larger importance of supply than demand shocks in both countries. The deviation from potential output is not large: most of the shocks reflect supply-side changes. We do not find much economic slack in recent years. There was definitely an improvement in economic conditions at the start of EMU, but cyclical fluctuations are not large.\textsuperscript{25}

[INSERT FIGURE 4 HERE]

4.3. The fiscal indicator

We can now discuss the indicator of discretionary fiscal stance. In general, the measure is more volatile than the measures derived with conventional methods (see Figure 4). In many instances, our measure leads the smoothed measures in the direction of change. In some

\textsuperscript{24} We cannot discard the hypothesis that the supply effects of fiscal policy are small.
\textsuperscript{25} 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 2 also 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. We actually mark most of the changes in output gaps in all countries.
In cases, it is as persistent as the cyclically adjusted balance. We may expect the measure to coincide with some episodes of fiscal laxness or retrenchment. In Table 5, we gather the fiscal years in which Alesina and Perotti (1997) consider a strong expansion or adjustment to have occurred. For the sample period that overlaps with their study (till 1995), the correspondence is indeed close. Comparing Figure 4 to Table 5, we would detect nearly always the same events. For Germany, the expansion that precedes Reunification also shows up as a structural worsening of the deficit in our model. We only have some problems in finding back the switches in Portuguese fiscal policy early eighties, but would definitely have dated the expansion of 1987 and the ensuing consolidation of 1989. We pick out the French expansion of 1992 too, but see it as following on a string of expansionary budgets. The fiscal indicator is usually smaller than the cyclically adjusted deficit, and much more volatile. This reflects the definition of the balance, by which we take out the variation in output caused by fiscal policies. I.e., we do not account for total output variation, as with the traditional methods.

<table>
<thead>
<tr>
<th>Country</th>
<th>Strong expansion</th>
<th>Strong consolidation</th>
</tr>
</thead>
<tbody>
<tr>
<td>France</td>
<td>1981,1992</td>
<td>-</td>
</tr>
<tr>
<td>Germany</td>
<td>1990</td>
<td>1989</td>
</tr>
<tr>
<td>Spain</td>
<td>1982</td>
<td>1986,1987</td>
</tr>
</tbody>
</table>

Table 5. Large fiscal expansions and contractions

Note: a strong expansion (adjustment) occurs if Blanchard’s Fiscal Impulse exceeds 1.5% (-1.5%) of GDP.

Concentrating on the period 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. 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 confirms evidence in Fatás and Mihov (2003).

The right hand side panels of Figure 4 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. The combination of measures has changed over time in a remarkably similar fashion in all countries. First, we observe a relatively low 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
carry the largest burden for bringing down deficits. These increased tax revenues are also followed by commensurate rises in structural expenditures. 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 brought further down expenditure, even in the presence of strong revenue increases. Notice also the rather close match between the VAR-measure of structural spending and revenues and 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 moderate declines in debt ratios. A plot of the structural fiscal indicator to the debt ratio (Figure 2b, Appendix 2) shows how well the indicator captures these consolidations in debt.

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 starting point of structural surplus is due to persistence in the tax rises in the years before EMU. In most countries, the increasing tax revenues seem to have been consequently undone by decisions to bring down tax rates. However, this was hardly ever matched by sufficient cutbacks in government spending. In France, the revenue increase seems to have fuelled further increases in spending. But the decline in revenues in the meantime worsened the structural balance considerably. The German government likewise decreased its revenue intake without cutting back expenditures adequately enough to keep structural balance. Corrective measures in 2004 have improved the structural deficit. In both countries, the measures are mainly taken on the revenue side, by undoing once more previous taxation decisions. A rather similar situation has occurred in Portugal. The overall situation seems less dramatic, as revenue declines have been followed by spending reductions. The new EDP started up in 2005 does not seem justified on the basis of revenue rises in 2003 and 2004, matched by spending cuts in 2004.26 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 2).

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26 One should notice that several one-off measures mask the true deterioration in the Portuguese 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.
We can only hypothesize as to why governments decreased the revenue intake. In reference to Figures 1 and 2 that display total and cyclically adjusted balances, the opportunity was probably taken to decrease the tax burden without affecting total revenues, owing to favourable economic conditions. As soon as economic conditions worsened over 2002, the budget turned out to be unbalanced, owing to moderate spending cuts. To avoid further infringement of the budget rules, the adjustment in Germany and France has taken place via the easy route of tax rises in crisis. Expenditure has not been allowed to come down. In the next economic upswing, the current taxation decisions are likely to quickly improve the fiscal outlook. But there is the danger that spending will get locked in, and ratchet up the size of government. The procyclical bias is a sign of ‘bad policy in good times’. Extra revenues that flow to the Treasury under favourable economic conditions easily lead to additional spending. The ensuing deficit builds up when revenues turn out not to be structural.

The decision to bring down revenues in 2001 might nevertheless reflect some genuine will of budgetary reform. Recall that such measures would also entail positive supply-side effects in our model. However, the unwinding of previous taxation decisions undoes these positive effects, and this also goes against the principle of ‘tax smoothing’. The procyclicality of budgets would imply negative supply-side effects.

4.4. Some sensitivity analysis

The results might be influenced by some particular parameter value that we have drawn from the OECD in order to distinguish business cycle and fiscal demand shocks. There are various reasons for considering these elasticities with some caution. First, elasticities are assumed to be time-invariant. Recall that we have used the most recent values from Girouard and André (2005). 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 changes in tax systems. Portugal and Spain are definitely examples of this phenomenon. But even in other countries, time-variation cannot be neglected. Blanchard and Perotti (2002) acknowledge these problems and look into the sensitivity of their main results to different tax elasticities. They find no qualitative differences, nor is the significance of the effect of a revenue shock affected.

Changes in elasticities also throw up a second difficulty in the interpretation of the fiscal shocks. On the revenue side – but similar arguments can be put forward for various expenditure items – 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. For the purpose of identification, we have assumed the elasticities to be constant over the sample. Only if changes in total revenue amounts coincide with these decisions, do we identify correctly shocks on the revenue side of the budget. For that reason, the rest of the model should not be misspecified. In other words, we need to identify correctly the economic shocks. However, effects of other economic variables on the budget elasticities are usually assumed constant. Fluctuations in interest rates are not taken into account. Probably for that reason, interest payments are not included among the adjusted variables. The effects of inflation are ignored. Indexation of expenditure and revenues to different inflation measures can also create a divergence in the overall balance. Marcellino (2002) specifies a VAR model containing interest rates and inflation to correct the misspecification. He checks and confirms convergence to a global optimum, and robustness of the impulse responses, for different starting values of the initial parameters. Finally, auxiliary assumptions on the various parts of the calculation may cumulate into quite some uncertainty in the final estimates of elasticity.

We first conduct a grid search on the range of revenue elasticities provided by OECD (Girouard and André, 2005), already reported in Table 1. This range displays the variation of the elasticities of wages to output two standard errors below and above the point estimate. For all possible combinations of this revenue elasticity $\alpha$, for a given spending elasticity $\gamma$, we impose the identification scheme as in (5) on the VAR. For any of the parameter values in Table 6, we always find convergence to a result identical to that obtained with the point estimate of the elasticity. The uncertainty about the elasticity does not seem to play a major role then, confirming the findings of Blanchard and Perotti (2002) and Marcellino (2002).

<table>
<thead>
<tr>
<th>Table 6. Parameters $\gamma$ and $\alpha$</th>
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</thead>
<tbody>
<tr>
<td></td>
</tr>
<tr>
<td>Total spending, $\gamma$</td>
</tr>
<tr>
<td>Total revenues, $\alpha$</td>
</tr>
</tbody>
</table>

One of the other interesting scenarios is the one in which we switch off the elasticities. By setting $\gamma$ and $\alpha$ equal to zero, we assume that neither spending nor revenues react to the cycle. This 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 sets off the structural indicator obtained with the OECD elasticities,

27 The results of the impulse response analysis are largely unchanged. Effects are estimated slightly less precise, and the effects of business cycle shock in Portugal are not clear.
against the indicator with zero elasticities. The effect is only marginal. In most periods, the results are rather similar to those obtained with the OECD elasticities. This reflects again the prevalence of the supply relative to the temporary shocks. Oftentimes, there are more prolonged periods of moderate deviations.

The bias could be more serious than this. 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.

We follow Lane (2003) in estimating the output elasticity of the main budgetary items to illustrate this phenomenon for Germany, France, Portugal and Spain. I.e., we regress in (7) the main budget items on economic growth by OLS, with a correction for first-order autocorrelation, for the sample period 1970-2004,

\[ d \log X_{ij} = \omega_i + \gamma_i d \log Y_t + \mu_{ij} \]  

where \( X_{ij} \) is total spending, government investment, current spending (consumption and wage spending), or interest payments, and \( Y_t \) is real output. Likewise, we estimate

\[ d \log Z_{ij} = \omega_i + \alpha_i d \log Y_t + \mu_{ij} \]  

with \( Z_{ij} \) containing either total revenues, current revenues and (in)direct tax revenues. The estimates are also repeated for the decades 1970-1980, 1981 to 1990, and 1991 to 2004, as we have reasons to expect quite some time-variation. Table 7 reports the estimation results from (7) and (8).

The reversal of the small negative spending elasticities suggested by OECD 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. Procyclicality of revenues is also confirmed for the eighties and nineties in both Germany and Portugal. Fiscal spending expansions under positive economic growth are strongly concentrated in increased wage spending in Portugal. 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. Less surprising is the procyclicality of all revenue items. Only in Spain is the response of indirect tax income slightly less significant. The changes over decades are nevertheless outspoken, and hides quite some adjustments in tax systems. Only in Germany is the response procyclical in all subsamples. 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.28

Table 7. Budget elasticities from OLS on (7) and (8)

<table>
<thead>
<tr>
<th></th>
<th>France</th>
<th>Germany</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total spending</td>
<td>0.32 -0.47 0.38</td>
<td>0.09 1.04*** -0.06</td>
</tr>
<tr>
<td>Investment</td>
<td>1.46 -4.09 6.52*</td>
<td>6.13* 3.55** -1.84</td>
</tr>
<tr>
<td>Current spending</td>
<td>-0.15 -0.07 0.34</td>
<td>-0.55* 0.73*** -0.21</td>
</tr>
<tr>
<td>Consumption spending</td>
<td>0.19 -0.26 0.63</td>
<td>-0.53* 0.98*** -0.24</td>
</tr>
<tr>
<td>Wage spending</td>
<td>-0.16 -0.45 0.50</td>
<td>-0.08 1.04*** 0.03</td>
</tr>
<tr>
<td>Interest payments</td>
<td>-3.94*** -8.12***</td>
<td>-5.20** -0.41</td>
</tr>
<tr>
<td>Total revenues</td>
<td>1.73*** 1.18 0.56</td>
<td>1.48*** 1.47*** 2.94***</td>
</tr>
<tr>
<td>Current revenues</td>
<td>1.86*** 1.16 0.81</td>
<td>1.97*** 1.46*** 3.31***</td>
</tr>
<tr>
<td>Total tax revenues</td>
<td>1.18*** 0.83 -0.08</td>
<td>1.47** 1.15*** 1.87***</td>
</tr>
<tr>
<td>Direct tax revenues</td>
<td>2.07*** 1.61 -0.14</td>
<td>3.12** 1.30*** 2.50**</td>
</tr>
<tr>
<td>Indirect tax revenues</td>
<td>0.61** 0.81 0.2</td>
<td>0.54 0.94***</td>
</tr>
<tr>
<td>Portugal</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Spain</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total spending</td>
<td>0.67*** -0.37 1.23**</td>
<td>1.46*** 0.03 0.15</td>
</tr>
<tr>
<td>Investment</td>
<td>0.76 -1.39 5.35***</td>
<td>2.67 -0.37 2.60</td>
</tr>
<tr>
<td>Current spending</td>
<td>0.76*** -0.16 0.96**</td>
<td>1.14*** 0.22 0.27</td>
</tr>
<tr>
<td>Consumption spending</td>
<td>0.77*** 0.10 1.40***</td>
<td>1.39*** 0.22 0.10</td>
</tr>
<tr>
<td>Wage spending</td>
<td>0.60*** -0.39 1.53***</td>
<td>1.54*** 0.63 0.00</td>
</tr>
<tr>
<td>Interest payments</td>
<td>-1.39 -2.67 -2.35</td>
<td>0.48 -1.31 -0.17</td>
</tr>
<tr>
<td>Total revenues</td>
<td>1.58*** 1.31 2.27**</td>
<td>2.59*** 1.36*** 0.71 1.36***</td>
</tr>
<tr>
<td>Current revenues</td>
<td>1.62*** 1.30 2.30**</td>
<td>2.90*** 1.42*** 0.71 1.36***</td>
</tr>
<tr>
<td>Total tax revenues</td>
<td>1.24*** 0.82 1.07</td>
<td>1.70*** 0.99** 0.35 0.78</td>
</tr>
<tr>
<td>Direct tax revenues</td>
<td>1.36*** 0.96* 1.31</td>
<td>2.87*** 1.08* -0.26 2.35***</td>
</tr>
<tr>
<td>Indirect tax revenues</td>
<td>1.02*** 0.65 0.74*</td>
<td>1.04*** 0.91* 0.99</td>
</tr>
</tbody>
</table>

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

28 The time variation in elasticities is also apparent from a recursive regression of (7) and (8). Coefficient plots are summarised in Appendix 3. We have not reported the elasticities of interest payments and investment, as these coefficients are larger and much more volatile than those of other budget items. It documents some of the problems with elasticities. There are relevant breaks associated with major shifts in fiscal policy, for example, German Reunification, and the changes to 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. For most revenue categories, changes are minor in France and Germany before and after the break. 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.
These results show that latent policy pressures on spending or revenue bring about adjustments that usually overturn 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 (5), the interpretation of the fiscal shock is one that includes all discretionary interventions, that may also be related to the cycle. 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 8 summarises the elasticities that we have taken from Table 7 for the entire sample period for re-estimating the VAR. Figure 5 compares the structural indicator. We find convergence to the same solution: there are only some marginal differences for the case of Portugal.

<table>
<thead>
<tr>
<th>Table 8. Elasticities imposed on (5)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
</tr>
<tr>
<td>Total expenditure γ</td>
</tr>
<tr>
<td>Total revenue α</td>
</tr>
</tbody>
</table>

What does the insensitivity of the results to assumptions on the budget elasticities tell us? The forecast error variance decomposition showed nearly equivalent roles for demand effects of fiscal policies and supply shocks and in Germany and France, whereas supply shocks tend to dominate in Spain and Portugal. If we recover nearly similar fiscal policy shocks when correcting for automatic stabilisers, setting them to zero or taking the systematic variation in fiscal policy into account, this probably means that automatic stabilisers themselves add little to short-term variation in output or fiscal variables. This does not mean that the automatic stabilisers are irrelevant. The stabilising effects of the structure of the spending and taxation system will mainly work their way to economic variables via the longer-term supply-side effects, however. It does not necessarily mean that ‘letting the automatic stabilisers work’ will lead to superior economic outcomes as such. It only implies the absence of further shocks to the economy. The result also implies refocusing attention on the longer-term effects of fiscal policy.

4.5. A decomposition of government expenditure

Fiscal budgets are not a decision on an aggregate balance. In practice, different components of the budget are decided jointly. Trade-offs between different budget items are
made as a result of political bickering. At most, the overall budget is decided under an external numerical constraint. This composition has effects on different economic agents, and may make the end effect of fiscal policy adjustments differ, even under an unchanged overall balance.

It is relatively easy to extend the framework of Model 1 to a variety of budget components. This allows a more refined approach towards identification. There is a trade-off, however. Availability of budgetary data limits the size of the model. The number of additional identifying restrictions quickly outgrows the data sample.

For any of the categories of government expenditures or revenues, a separate literature has built up. The combination we consider more interesting is the division of total expenditure into current and capital spending. We can use identical short-term elasticity restrictions to filter both spending and revenues for the cycle (see Appendix 5). This makes us infer on discretionary spending and revenue shocks separately. As Table 1 revealed, there are quite some different elasticities for various budget categories. We use the same elasticity of OECD for current spending as before (see Table 9), and assume the elasticity of government investment to be zero (as does the OECD). To infer on the spending shock, we further set to zero the contemporaneous reaction of taxes to output. Similarly, we filter revenues with the total revenue elasticity, and assume no reaction of spending items contemporaneously. The supply shock is still isolated by assuming no long-term effects of any fiscal variable on output.

Table 9. Elasticities imposed on (5)

<table>
<thead>
<tr>
<th></th>
<th>France</th>
<th>Germany</th>
<th>Portugal</th>
<th>Spain</th>
</tr>
</thead>
<tbody>
<tr>
<td>Current expenditure $\gamma_1$</td>
<td>-0.11</td>
<td>-0.18</td>
<td>-0.05</td>
<td>-0.15</td>
</tr>
<tr>
<td>Investment expenditure $\gamma_2$</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>Total revenue $\alpha$</td>
<td>0.58</td>
<td>0.59</td>
<td>0.47</td>
<td>0.49</td>
</tr>
</tbody>
</table>

Appendix 6 summarises the main results. The indicator that we derive does not have much resemblance to the structural balances derived before. We can think of two reasons for that. First, government investment has been a rather small and volatile component of the overall budget, rather often than not the first item to be cut in consolidations. Second, government investment is usually considered as augmenting productivity. It does not have negligible effects on long-term output then. The long-term zero constraint probably makes us pick up an insignificant shock with transitory economic impact then. Other decompositions of the budget, such as government consumption, wage spending or social transfers may have
different implications. With a view to the importance of revenue-based adjustments, differences in tax structure offer an interesting case too.

5. Conclusion

Recent years have seen the launch of Excessive Deficit Procedures, initially to Portugal, France and Germany, and later on in 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 increasing public deficit and debt ratios. The revised Pact loosens the numerical limits and leaves more room for interpretation – differentiated according to the country - of the medium-term budgetary objective. It allows for a more limited adjustment effort under unfavourable economic conditions, as long as consolidation continues under good economic times. The Pact also leaves more room for the implementation of structural reforms that carry temporary budgetary costs.

This paper gives a framework for analysing both aspects of fiscal policy. We consider both the cyclical short-term and the long-term supply side effects of fiscal policy. We analyse the budgetary outlook for France, Germany, Portugal, and Spain by uncovering underlying past trends in revenue and expenditure. This 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. Discretionary fiscal adjustments are captured by filtering out the fiscal balance for cyclical reactions of budget items, following Blanchard and Perotti (2002). We develop a model-based indicator that reflects the discretionary stance of fiscal policy.

We find that both the supply and demand effects of fiscal policy are important. The revised Pact seems to be in line with this result: reforms that have positive supply-side effects enhance the structural balance, and their implementation should be favoured. We can also find another rationale for the reform of the Stability and Growth Pact. The consolidations pre-EMU have in last instance been based mainly on revenues. The slippages of the recent years owe to the unwinding of these measures without adequate spending cuts being implemented. This showed up in larger deficits when economic conditions worsened. 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. A Pact that counters such reversals can lead to more sensible policies that focus on the long-term quality of public finances.

The analysis in this paper is also 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. More elaborate empirical models could incorporate refinements in the compositional adjustment of budget balance. This would allow for an explicit assessment of the supply and demand 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. 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 can lead to a more accurate description of supply shocks.
References


### Appendix 1. Data sources

<table>
<thead>
<tr>
<th>Definition</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>$g_t$ total expenditure</td>
<td>AMECO</td>
</tr>
<tr>
<td>$t_t$ total revenues</td>
<td>AMECO</td>
</tr>
<tr>
<td>$y_t$ GDP</td>
<td>AMECO</td>
</tr>
<tr>
<td>Other</td>
<td></td>
</tr>
<tr>
<td>GDP deflator</td>
<td>AMECO</td>
</tr>
<tr>
<td>potential GDP</td>
<td></td>
</tr>
<tr>
<td>output gap</td>
<td></td>
</tr>
<tr>
<td>cyclically adjusted</td>
<td></td>
</tr>
<tr>
<td>expenditure (categories)</td>
<td></td>
</tr>
<tr>
<td>cyclical adjustment revenue</td>
<td>AMECO/ OECD</td>
</tr>
<tr>
<td>(categories)</td>
<td></td>
</tr>
<tr>
<td>cyclically adjusted net lending</td>
<td></td>
</tr>
<tr>
<td>Other</td>
<td></td>
</tr>
<tr>
<td>chronology of cycle(^{(a)})</td>
<td>Economic Cycle</td>
</tr>
<tr>
<td></td>
<td>Research Institute (ECRI), at</td>
</tr>
<tr>
<td></td>
<td><a href="http://www.businesscycle.com">www.businesscycle.com</a>, algorithm</td>
</tr>
<tr>
<td></td>
<td>updated in September 2005</td>
</tr>
</tbody>
</table>

Note: AMECO data are for general government, according to ESA-95, in billions 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 2. The fiscal indicator: additional results

a) SVAR based output gap (with ECRI-dating of cycle)(% potential GDP).

b) SVAR-indicator of debt ratio (% of GDP) and structural balance (% potential GDP).
Appendix 3. Recursive estimates of budget elasticities

France

Total spending
Current spending
Consumption
Wages

Germany

Total spending
Current spending
Consumption
Wages

Portugal

Total spending
Current spending
Consumption
Wages

Spain

Total spending
Current spending
Consumption
Wages
Appendix 4. Models

Model 1
Real GDP
Real government spending
Real public revenues

Model 2
Real GDP
Real government current spending
Real government investment
Real public revenues

Appendix 5. VAR identification for Model 2

4 shocks – demand, supply, spending, revenues ($\eta^q, \eta^c, \eta^G, \eta^T$)

<table>
<thead>
<tr>
<th>$C(1)$</th>
<th>Long-run restrictions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Effect of shock on</td>
<td>supply shock</td>
</tr>
<tr>
<td>real GDP</td>
<td>$\eta^q$</td>
</tr>
<tr>
<td>public spending (category 1)</td>
<td>•</td>
</tr>
<tr>
<td>public spending (category 2)</td>
<td>•</td>
</tr>
<tr>
<td>public revenues</td>
<td>•</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>$A$</th>
<th>Short-run restrictions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Supply shock $\eta^q$</td>
<td>$e^y$</td>
</tr>
<tr>
<td>Shock to spending $\eta^G$</td>
<td>•</td>
</tr>
<tr>
<td>Shock to revenues $\eta^T$</td>
<td>•</td>
</tr>
<tr>
<td>Business cycle shock $\eta^c$</td>
<td>•</td>
</tr>
</tbody>
</table>
Appendix 6. Fiscal indicators from Model 2
(indicated by arrows)

France

Germany

38
Portugal

Output Gap

Net Lending

Structural Expenditure

Structural Revenues

Spain

Output Gap

Net Lending

Structural Expenditure

Structural Revenues
Figure 1 – General government spending, revenue and deficit (% of GDP)
Left-hand scale – debt-to-GDP ratio; Right-hand scale – deficit ratio.

<table>
<thead>
<tr>
<th>Country</th>
<th>Expenditures</th>
<th>Revenues</th>
<th>Balance</th>
</tr>
</thead>
<tbody>
<tr>
<td>France</td>
<td>-10</td>
<td>-8</td>
<td>-5</td>
</tr>
<tr>
<td>Germany</td>
<td>-2</td>
<td>0</td>
<td>-2</td>
</tr>
<tr>
<td>Portugal</td>
<td>-8</td>
<td>-5</td>
<td>-2</td>
</tr>
<tr>
<td>Spain</td>
<td>-10</td>
<td>-8</td>
<td>-5</td>
</tr>
</tbody>
</table>

Source: AMECO database, updated on 4 April 2005.
Figure 2 – Output gap, cyclically adjusted net lending, spending and revenue (% of potential GDP)

France

Germany
Figure 3.a – Impulse responses for Model 1
(response to a 1 standard deviation shock, bootstrapped responses with 5000 draws.)

**France**

response of Y to shock in Supply  
response of Y to shock in Fiscal  
response of Y to shock in Cyclical  
response of G to shock in Supply  
response of G to shock in Fiscal  
response of G to shock in Cyclical  
response of T to shock in Supply  
response of T to shock in Fiscal  
response of T to shock in Cyclical

**Germany**

response of Y to shock in Supply  
response of Y to shock in Fiscal  
response of Y to shock in Cyclical  
response of G to shock in Supply  
response of G to shock in Fiscal  
response of G to shock in Cyclical  
response of T to shock in Supply  
response of T to shock in Fiscal  
response of T to shock in Cyclical
Figure 3.b – Forecast Error Variance decomposition

France

Germany
Figure 4 – SVAR-indicator of output gap, structural net lending, expenditure and revenues (indicated by arrows)

France

Germany
Figure 5 – SVAR-indicators of structural net lending

France

Germany

... estimated elasticity from (7) and (8)  
elasticities OECD  
zero elasticity (no automatic stabilisers)