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In 2007 all ECB publications feature a motif taken from the €20 banknote.

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Abstract

The main focus of this paper is the relation between the cyclical components of total revenues and expenditures and the budget balance in France, Germany, Portugal, and Spain. We try to uncover past trends behind the development of public finances that contribute to explaining 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 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 Stability and Growth Pact has not eradicated these procyclical policies. Bad policies in good times also contribute to aggregate macroeconomic instability.

Keywords: fiscal indicator, structural balance, SGP, SVAR, short and long-term restrictions.
JEL Classification Numbers: E62, E65, E66, H61, H62.

Non-technical summary

In recent years, we have witnessed a worldwide swing towards fiscal profligacy. In the US, budget deficits have suddenly widened since 2001 after the tax cuts of the Bush Administration. In the European Union, mounting budget deficits have 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 tight fiscal rules. A combination of a 3% deficit rule, a commitment to keep structural deficits close to balance or even in surplus, together with a peer revision of fiscal stance through the Excessive Deficit Procedure were considered as a guarantee for the sustainability of public finances. After the initial application of the Excessive deficit Procedure to Portugal, France and Germany, there was a breach of the 3% deficit limit in several other EU countries. A revised version of the Stability and Growth Pact was negotiated in March 2005.

A variety of political and economic factors probably underlie the observed rise in public deficit and debt ratios. We try to uncover underlying past trends behind the development of public finances that may contribute to explaining the recent budgetary outlook in France, Germany and Portugal. These countries were subject to several steps of the Excessive Deficit Procedure as deficits rose above the 3% limit. We are particularly interested in the underlying causes of the breach of the Pact's rules by looking into adjustments in both spending and revenues. 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. For this reason, we also consider Spain, as it kept the budget close to balance. We are interested in the economic reasons of such a vigorous fiscal management.

To that end, we construct a model-based indicator of structural balance by combining insights from two different strands of the empirical VAR literature. There is a growing empirical literature on the effects of fiscal policy, which is modelled with structural VARs (Blanchard and Perotti, 2002). The basic approach in this literature is to capture discretionary fiscal adjustments by filtering out the fiscal balance for cyclical reactions of different budget items. A recent theoretical literature argues on the importance of long-term growth effects of both taxation and specific spending items. The main message of endogenous growth models with fiscal policy is that higher taxation unambiguously reduces output, but that such losses may be offset, by using the proceeds for productive spending items (Barro, 1990; King and Rebelo, 1990, Turnovsky, 2000). Our approach innovates on existing evidence of the fiscal SVAR models 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). Like Blanchard and Perotti (2002), we filter the fiscal balance for cyclical reactions of spending and revenues to obtain the discretionary fiscal shock. In this paper, we examine aggregate spending and revenues. More elaborate models might incorporate refinements of the composition of budget balance.

Our indicator of structural fiscal balance is determined by the effect of permanent output and discretionary fiscal shocks. Cyclical fluctuations are due to temporary economic shocks. This stands in contrast to statistical methods for cyclically adjusting fiscal balances where the cyclical elasticity of the budget is multiplied with an independently derived measure of the output gap. The quantitative 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. But these New Keynesian models attribute a major role to the supply side effects of fiscal policy adjustments. Our indicator is consistent with such a distinction. In contrast to statistical models for adjusting fiscal balance, our economic indicator of structural balance has also some attractive practical properties. Uncertainty on the stance of fiscal policy is explicitly quantified. The theoretical assumptions underlying the model can be explicitly tested. Also, the end-of-sample problem is reduced. The application of the model is not necessarily more demanding in terms of data availability.

The main result of our study is that both the fiscal consolidations undertaken after Maastricht and the mounting deficits since the start of the EMU are due to insufficient adjustments in revenues. Governments generally cut tax rates during economic boom, but do not curtail spending equally. The overall budget position seems in balance, but structural deficits build up. As a consequence, deficits surface again when economic boom turns into bust. Governments then reverse previous tax cuts to avoid mounting deficits. Over the period 1999-2001, we observe this behaviour in all countries that sinned to the rules of the Pact. Governments implement bad policies in good times. These policies have some negative side effects. First, it leads to a 'ratcheting up' of spending over the economic cycle. Second, these procyclical switches in fiscal policy induce macroeconomic fluctuations. We indeed find that fiscal policy has minor supply but rather large demand effects.

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. After the initial nuisance in applying the Pact to Portugal, France or Germany, there was a breach of the 3% deficit limit in several other EU countries. A revised version of the Pact was negotiated in March 2005. The new budget rules offer a more flexible approach for curbing excessive deficits over a longer period of time, and put the emphasis on the 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 underlying past trends behind the development of public finances that may contribute to explaining the 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 can 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 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). As a first step, we examine total spending and revenues. More elaborate models might incorporate refinements of the composition of budget balance.

The quantitative 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. But these New Keynesian models attribute a major role to the supply side effects of fiscal policy adjustments. Our

indicator is consistent with such a distinction. In contrast to statistical models for adjusting fiscal balance, our economic indicator of structural balance has some attractive practical properties. Uncertainty is explicitly quantified; 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 the fiscal consolidations undertaken after Maastricht and the mounting deficits since the start of the EMU are due to adjustments in revenues. Governments cut tax rates during economic boom, but do not curtail spending equally. As a consequence, deficits surface again when economic boom turns into bust. Governments then reverse previous tax cuts to avoid large deficits. This leads to a 'ratcheting up' of spending over the 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 and this unnecessarily induces macroeconomic fluctuations. We indeed find that fiscal policy has minor supply but rather large demand effects.

The remainder of the paper is organised as follows. In section two, we briefly review 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 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. Recent developments cannot be seen without taking into account past actions and trends in public finances. We focus attention on the evolution of public finances since 1970 in the countries that initially 'sinned' to the Pact (France, Germany and Portugal). For comparison, we consider Spain as an example of a more prudent fiscal management.

We report in Figure 1 the general government balance, and its breakdown in revenue and expenditure ratios. Visual inspection shows that expenditure and revenue ratios have been

following an increasing trend since the early seventies, notably in France, Portugal and Spain. But the increases in spending have outdone the growth in revenues by far. Hence, there has been a continuous deficit bias. There were some good reasons in 1991 to embark on consolidation by establishing a 3% deficit target. 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.

[INSERT FIGURE 1 HERE]

These budget developments cannot be separated from economic conditions. The budget balance can slip out of control owing to automatic stabilisers. In economic bust, revenues are smaller than budgeted as tax bases contract. Similarly, expenses on unemployment benefits and transfers are higher than expected. Figure 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 deficit series.[1]

[INSERT FIGURE 2 HERE]

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. 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 a quite different picture. The budget has been brought close to balance, and is even in slight surplus. A constant spending to GDP ratio has been matched by a gradual rise in tax revenues.

[1] 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).

3. An SVAR model for gauging fiscal indicators

There are a variety of reasons for which the cyclically adjusted balance does not properly reflect the stance of fiscal policy. Its use in assessing fiscal balances is therefore debatable.

3.1. 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 cyclicality 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.[2] Second, a bottom-up approach is adopted for the derivation of the cyclical elasticities of several budget items. The output elasticity of government revenues is based on the properties of each tax item (viz. social security contributions, corporate, personal and indirect taxes) and the elasticity of the tax bases to output. The cyclical variability in spending is of relatively minor importance: only unemployment benefits are adjusted for the cycle. Other budget components are assumed to be cyclically insensitive. Table 1 gathers the elasticities from OECD for the major budget categories in the countries we study. As in most other European countries, the 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 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).

[2] 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). Several alternative approaches abound.

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 nothing else than 'accounting' 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 on parameters and functional forms that make cumulative uncertainty rather large. 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 come back to this in a sensitivity analysis in section 4.4.

3.2. 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.[3]

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 trade off (Baxter and King, 1993). Micro-founded models based on sticky prices provide a rationale for fiscal 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 imperfections via 'Rule of

[3] Potential output is nevertheless assumed exogeneous in the production function approach.

Thumb' consumers or a fraction of liquidity constrained consumers (Galí et al., 2005; Bilbiie et al., 2006).

The main result of studies that use the VAR-counterparts to DSGE-models is the significant positive effect of fiscal expansions on output. The evidence is 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 (Perotti, 2005). First, the implementation of announced changes in government policies is subject to lengthy and visible political negotiations that are largely anticipated by private agents. 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, these identification problems are only exacerbated by the automatic reaction of fiscal aggregates to economic variables. Finally, 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. 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.

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. By sorting out the automatic cyclical reaction of the total fiscal balance, discretionary shocks to fiscal policy are nothing else than shifts to the cyclically adjusted balance. 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.

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. Some other strands of the empirical fiscal policy literature have attributed a role to supply side developments. First, the literature on the effects of fiscal consolidation would argue that large adjustments in fiscal policy that contribute to restoring sustainability of public debt, might reverse the usual effects of fiscal policy. The composition of the fiscal adjustment plays an important role in bringing about this

'non-Keynesian' output response (Alesina and Perotti, 1997). 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 ignored the literature on the long-term growth effects of fiscal policies. The main message of endogenous growth models with fiscal policy is that higher taxation unambiguously reduces output, but that such losses may be offset, by using the proceeds for productive spending items (Barro, 1990; King and Rebelo, 1990, Turnovsky, 2000). 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 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. At the same time, the Pact's account for business cycle fluctuations, and allow for variations in the budget over the cycle. Our framework distinguishes the longer run supply effects from this short-term variation in the budget

3.3. 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 paper rests on a combination of long-term restrictions and some assumptions on the short-run elasticities of budgetary items.[4] 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).

[4] A few other papers use similar restrictions for fiscal VARs, and are mostly inspired by a practical interest in determining structural balances (Bouthevillain and Quinet, 1999; Dalsgaard and de Serres, 2001; Bruneau and DeBandt, 2003; Hjelm, 2003).

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 (1), ignoring for ease of notation any deterministic terms:

$$B(L)X_t = \varepsilon_t \tag{1}$$

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

$$X_t = B(L)^{-1}\varepsilon_t \qquad \varepsilon_t'\varepsilon_t = \Omega. \tag{2}$$

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 (2) as follows:

$$X_t = C(L)\eta_t = B(L)^{-1}A\varepsilon_t \qquad \eta_t'\eta_t = I. \tag{3}$$

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. Those 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 (3) on the product of the transformation matrix A and the inverted long-run coefficient matrix $B(1)^{-1}$. In other words,

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

For the system consisting of government expenditures, revenues and output, we assume there are three structural shocks that drive output and fiscal variables. The supply shock

(η^q) 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 (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 the one to fiscal policy, we take up the elasticity approach advocated by Blanchard and Perotti (2002). We derive a shock to spending and/or revenues from which the cyclical variation has 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. 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^t). The fiscal shock includes discretionary decisions that are 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 short-term economic effects (the fiscal 'demand' shock), and into shocks that may have potentially long-term growth effects (the 'supply' shock).[5] An 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 a combination of all shocks with long-term output effects. The negative effects of distortionary taxation or incentive-distorting spending contribute to 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.[6] The current identification is sufficient though for the purpose of deriving a fiscal indicator. We summarise our assumptions in Table 2:

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

[5] 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 theoretical models of fiscal policy.
[6] We make further suggestions for identifying 'fiscal supply' shocks in the concluding section.

spending is not large. The parameter γ comes directly from the elasticities calculated by the OECD that we reported in Table 1. In order to obtain the total elasticity of revenues α, we subtract the spending elasticity (row 2 in Table 1) – accounting for its share in GDP – from the elasticity of total net lending (row 7 in Table 1) instead of multiplying each revenue category by its cyclical elasticity and GDP share. The coefficients do not sum to zero as the budget is assumed to be countercyclical. Table 3 summarises our parameter assumptions.

Table 2. Identification in the long- and short-term

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

Table 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

3.4. 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^*.[7] Under this assumption, one can compute the structural deficit as in (5):

$$d_t^* = \frac{g_t^* - t_t^*}{y_t^*}. \qquad (5)$$

[7] 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 DeBandt, 2003).

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, OECD or those obtained with statistical filtering methods. Its size and variability depends on the properties of shocks, which in our SVAR model carry an economic interpretation. 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 technology. As these supply shocks derive from a variety of sources, they likely vary over time. Our approach is therefore best seen in the line of papers that investigate the role of nominal versus technology shocks and give an economic interpretation to business cycle 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 best illustrated with an example. Consider a cut in tax rates, 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, spending on unemployment benefits decrease while the effect of lower tax rates is to some extent offset by a larger tax base. Hence, revenues will increase 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 standard 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 (i.e., the tax cut is a positive supply shock). 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. Hence, our indicator is more relevant for the assessment of the stance of fiscal authorities, with a view to the growth effects and long-term sustainability of fiscal policy.

Our model-based indicator moreover has some favourable econometric properties in comparison to more conventional measures. First, the simultaneous determination of a measure of cyclical output and fiscal balance is more coherent. We only need to impose a minimal set of economic restrictions to identify the model. These constraints are consistent with recent DSGE models of fiscal policy that have at their core the supply and demand effects of spending and tax decisions (Linnemann and Schabert, 2003; Galí et al., 2005). The validity of these assumptions can be tested. While the method is definitely more complex, total uncertainty is quantified. 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. Second, 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.[8]

This has to be traded off against some weaknesses of the SVAR approach. 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 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. However, the gain of loosening the restrictions on the short-run effects of fiscal policy, have to be set off against some additional 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 (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. 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.

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

Fourth, there is a problem of high frequency feedback. 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. 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.

4. Empirical analysis

4.1. Data

All data are annual and come from AMECO.[9] This database covers the longest available period since 1970 up till 2004 for which fiscal data are available for France, Germany, Portugal and Spain. Budget data and output are deflated by the GDP-deflator and are 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. If fiscal policies are sustainable, the intertemporal budget constraint implies that total spending and revenues are cointegrated.[10] As identification via the intertemporal constraint implies quite a different interpretation of fiscal policy (i.e., as a shock to fiscal solvency), we ignore this possibility. As a result, 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).[11]

Data are defined following ESA-95 nomenclature. As these series are not always available since 1970, AMECO links the ESA-95 series to earlier data. Definitions for the French budget changed in 1978. We 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 model on these deterministic terms. We also want to check for possibly other structural breaks in the VAR. We recursively estimate the VAR and test for a break with the sequential sup Quandt-Andrews likelihood ratio test (Bai et al., 1998). We correct for a possible change in volatility in the residuals before and after the break date, following Stock and Watson (2003). Sample size forces us to consider a single break date only. The optimal search concentrates on the

[9] Details are in Appendix 1. A program containing the RATS-code for the SVAR model is available from the authors upon request.
[10] See Afonso (2005) for an example.
[11] For such an analysis, see Claeys (2004).

central 70% of the sample and consequently leaves 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 break but it is rather imprecisely estimated. The confidence bounds are rather large and cover nearly the entire nineties. This is nevertheless suggestive of a 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 4. VAR break date test (Bai et al., 1998) [(a), (b)]

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

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

4.2. 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.[12] We have summarised all results in Figure. This prepares the ground for an analysis of the fiscal indicator in section 4.3.

The effect of productivity shocks is to lift up real output permanently (Figure 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 strict 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.[13] As the difference between revenue and spending responses is not significant, it is not obvious that this leads to a deficit. In Germany and Spain on the contrary, revenues do not change significantly, but government expenditures shrink considerably. This leads to large accumulated surpluses at a horizon of 10 years.

[12] 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.
[13] 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.

But whether the causality runs from productivity growth to fiscal policy, 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.[14] If these relations are positive (in 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 is an alternative explanation. All 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. As there is little reason to believe the government systematically reacts in different ways to permanent or transitory economic shocks, this mechanism works for both shocks. The difference in response allows us to get some insight in the importance of the private versus public productivity shocks.

Surprisingly, the cyclical shock causes little variation in output and indicates the small size of temporary economic fluctuations. As a consequence, there is not always an obvious simultaneous rise in tax revenues. In France or Spain, tax revenues even tend to decline. Government spending does not react in a significant way at all. In Germany and Portugal in contrast, 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.

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 are the reaction of fiscal variables to temporary and permanent economic shocks similar. This downplays the importance of productive fiscal policy contributing to economic growth. Instead, the reaction of fiscal variables to permanent shocks is opposite to the business cycle response in France and Germany. This rather

[14] We considered the effect of loosening the long-term constraint on either government expenditures or revenues in extensions of the structural VAR model in (3). We could not reject longer-term effects of fiscal shocks. This endorses the hypothesis that fiscal policy does affect the 'supply' shock.

supports the view that fiscal variables drive long-term growth in both countries. But while in France an expansion of public spending has positive supply effects on output, evidence for Germany rather seems to indicate a too large size of government. Reductions in spending would increase productivity.

[INSERT FIGURE 3 HERE]

The different responses of spending and revenues to both economic shocks indicate an intricate problem 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. Another indication is given by the rise in spending in economic booms in Germany or Portugal. It indicates a bias in fiscal policy to repeal the use of automatic stabilisers.

The fiscal shock concerns 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. We scale the impulse responses in Figure 3 such that they always display positive output effects. These discretionary fiscal shocks have somewhat prolonged effects but as there is a lot of uncertainty, none of the responses is really significant. We do not confirm 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.

What does this imply for the contribution of fiscal policies to output variation? 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 is 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 either channel. But as pointed out above, we think that productive spending or revenues have 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 minor impact of the temporary economic shock.

What factors can account for these results? The large role played by fiscal policy in explaining output variation is not inconsistent with previous findings on in the literature (De Arcangelis and Lamartina, 2004). It nevertheless seems on the higher side of the usual range in EU countries. 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. 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 implies that both RBC and New Keynesian models are missing some aspect of fiscal transmission. Models of fiscal policy need to attribute important roles to both demand and supply side effects.

One reason for the large contribution of fiscal policy is the policy bias mentioned before. To the extent that automatic stabilisers reduce the volatility of economic fluctuations, the propensity 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 volatility can moreover have negative effects on the long-term growth prospects of the economy.[15] The unwinding of previous taxation decisions goes against the principle of 'tax smoothing' and thus introduces distortions. This also 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 4 (top left panel), 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 only used the OECD elasticities 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 was 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

[15] We are certainly not the first study to document that European countries have not left automatic stabilisers to work. But the VAR model allows us to demonstrate the effects on macroeconomic instability.

usual statistical filtering methods are not adequate to capture this trend behaviour. Cyclical fluctuations are therefore rather minor. We provide some further robustness checks in the Appendix 2.[16]

Overall, there was an improvement in economic conditions at the start of EMU in all countries. We find that economic conditions have worsened in both France and Germany in more 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.

[INSERT FIGURE 4 HERE]

4.3. 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 4, bottom left panel). In many instances, our measure leads the smoothed measures in the direction of change. The fiscal indicator is usually smaller than conventional measures of 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. One of the causes of this strong volatility – apart from the dominant supply side shocks – is the procyclical bias that characterises fiscal policymaking. This induces extra variation, especially so in government revenues.

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) argue a strong expansion or adjustment to have occurred in these countries. For the sample period that overlaps with their study (till 1995), the correspondence is indeed close. Comparing the changes in Figure 4 (bottom left side) to the years in 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,

[16] 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 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). Our measure matches the changes in the output gap in all countries.

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.

Table 5. Large fiscal expansions and contractions

	Strong expansion	Strong consolidation
France	1981,1992	-
Germany	1990	1989
Portugal	1981,1983, 1987	1980,1982,1984,1989
Spain	1982	1986,1987

Source: Alesina and Perotti (1997). Note: a strong expansion (adjustment) occurs if Blanchard's Fiscal Impulse exceeds 1.5% (-1.5%) of GDP.

In Figure 4, we can see a substantial shift in discretionary policies towards structurally positive net lending ratios in the period just before EMU. 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 (2003).

How has this consolidation been achieved? 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. 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 2).

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 comparable spending decisions.[17] 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).

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.

[17] 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.

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 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. Changes in elasticities also throw up a more subtle difficulty in the interpretation of the fiscal shocks that we have already discussed in section 4.2. 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. 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. 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.

Our first robustness check on the elasticity parameters illustrates the effects of this uncertainty. Table 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.[18] We conduct a grid search on different values for γ and α that Girouard and André (2005) provide. For all possible combinations of this revenue elasticity α and for a given spending elasticity γ, we impose the identification scheme as in Table 2 on the VAR. For any of the parameter values, we always find convergence to a result identical to that

[18] 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.

obtained with the point estimate.[19] The uncertainty about the elasticity does not seem to play a major role then, and this confirms the findings by Blanchard and Perotti (2002) or Marcellino (2002).

Table 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]

Another interesting scenario 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. The contrast between the structural indicator obtained with the OECD elasticities against the one with zero elasticities is only marginal. In most periods, the results are identical. This reflects again the prevalence of the supply relative to the temporary economic shocks. Oftentimes, there are more prolonged periods of moderate deviations.

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 (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 (6) the main budget items on economic growth for the sample period 1970-2004,

$$d\log X_{i,t} = \omega_i + \gamma_i d\log Y_t + \mu_{i,t} \qquad (6)$$

where $X_{i,t}$ is total spending, government investment, current spending (consumption and

[19] 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 (results not reported).

wage spending), or interest payments, and Y_t is real output. Likewise, we estimate model (6) 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 7 reports the results of an OLS estimation of (6), with a correction for first-order autocorrelation.

Table 7. Budget elasticities from OLS on (6)

	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 % level respectively.

The switch from small negative spending elasticities in OECD (Table 1) 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 1).[20] 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.

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 (4), 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 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 as in the basic case: there are only some marginal differences for the case of Portugal.

Table 8. Elasticities imposed on VAR model

	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

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 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 their way to

[20] 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.

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. 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 3% deficit limit 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 some temporary budgetary costs but that through positive supply-side effects enhance the structural balance and thus the long-term sustainability of public finances.

This paper 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 paper 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 public employment – or indirectly via the labour/leisure trade-off. 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.

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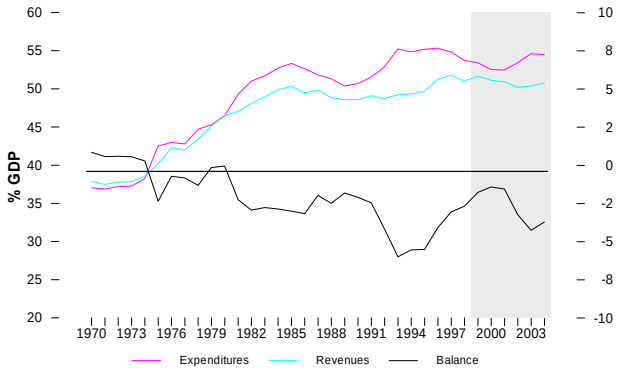
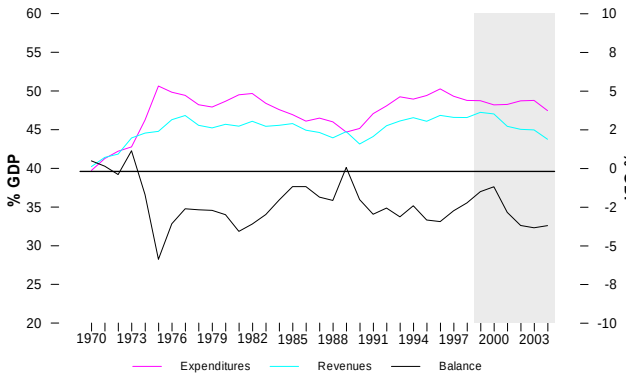
Figures

Figure 1 – General government spending, revenue and deficit (% of GDP)
left-hand scale – revenue or spending / right-hand scale – deficit

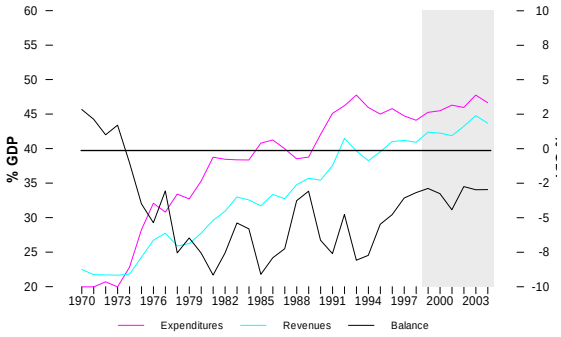
France



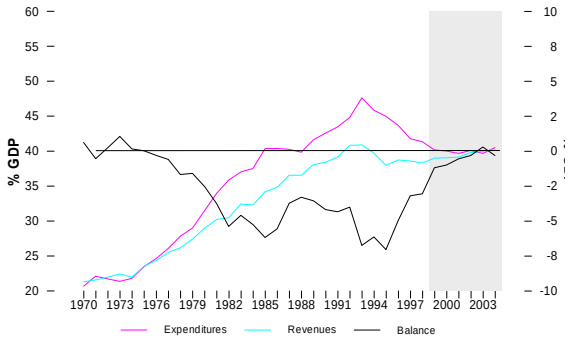
Germany



Portugal



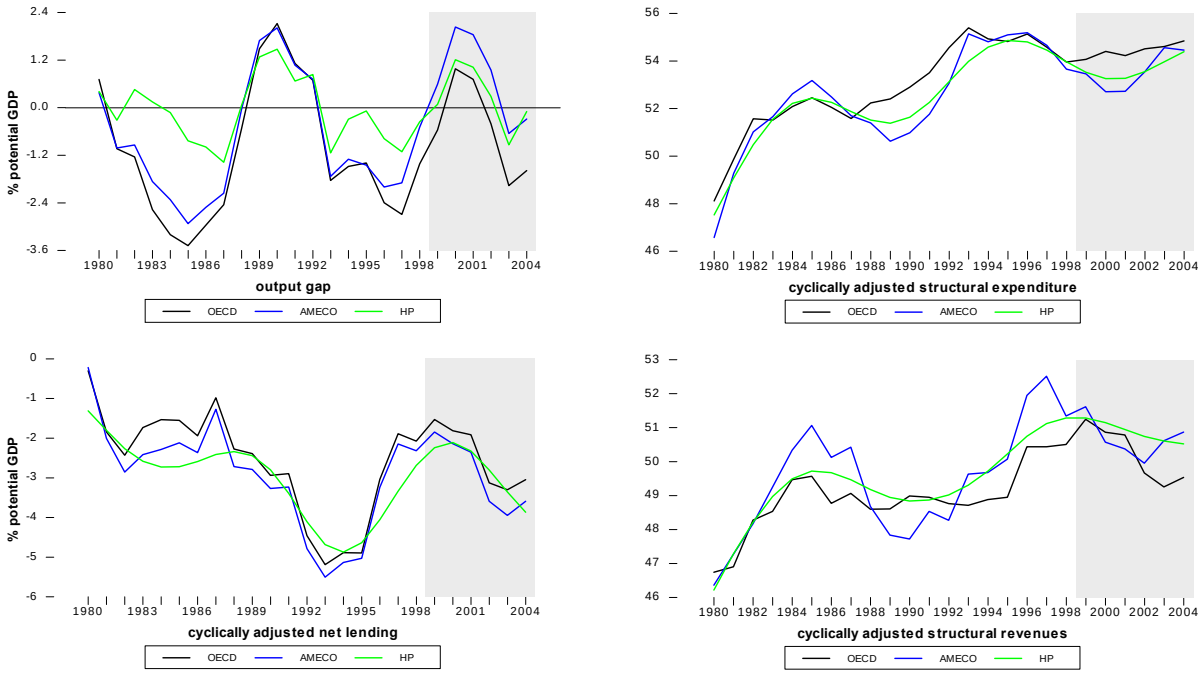
Spain



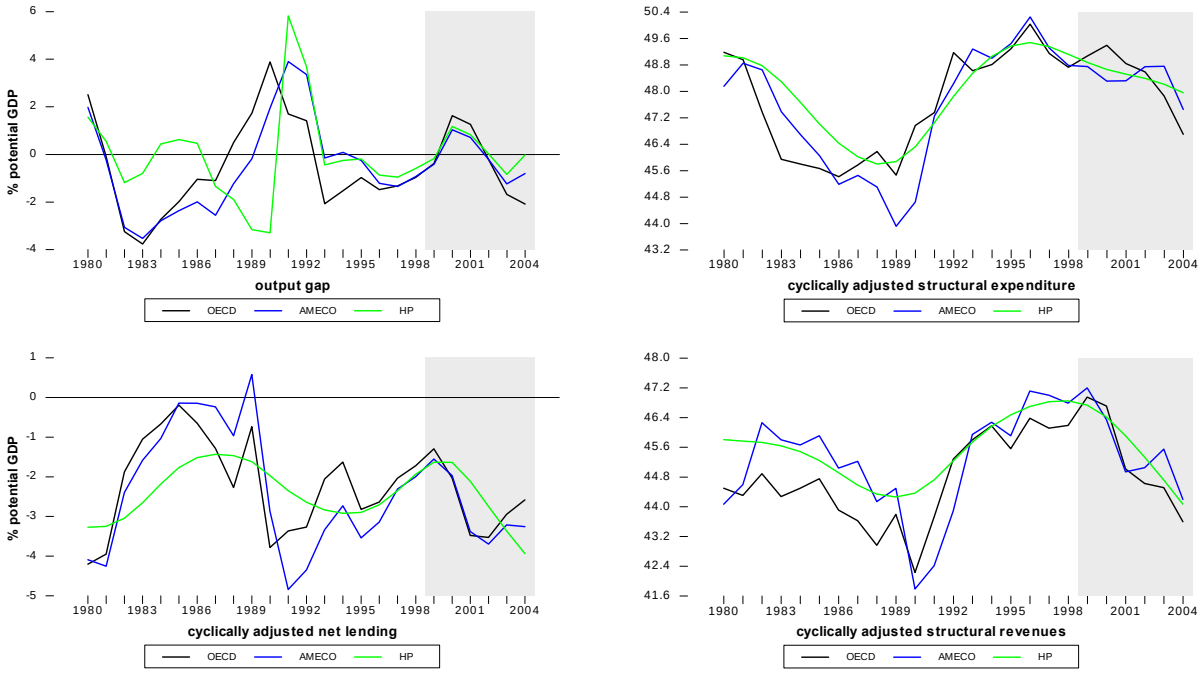
Source: AMECO database, updated on 4 April 2005. The shaded area indicates the start of the EMU.

Figure 2 – Output gap, cyclically adjusted net lending, spending and revenue (% of potential GDP)

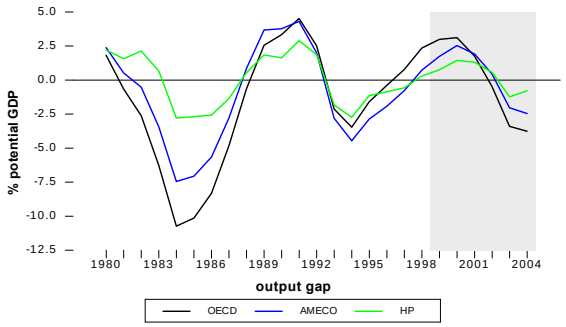
France

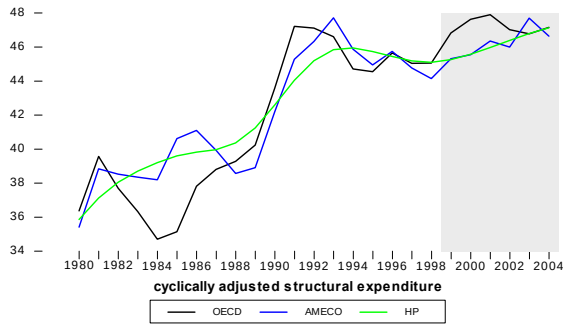


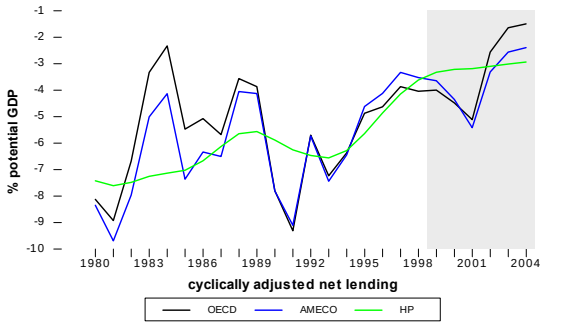
Germany

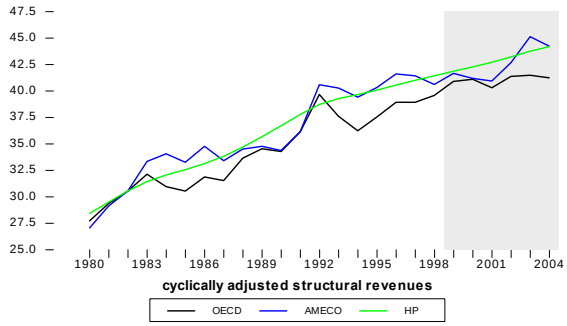


Portugal









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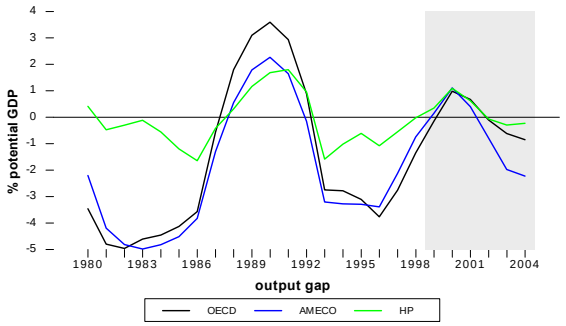
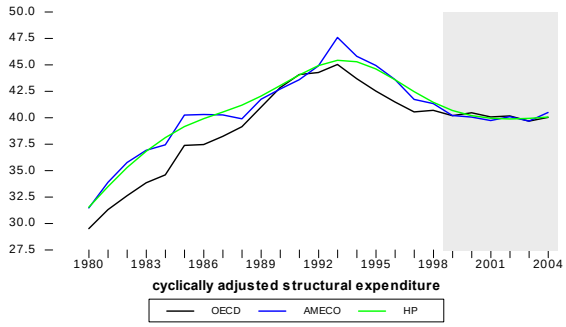
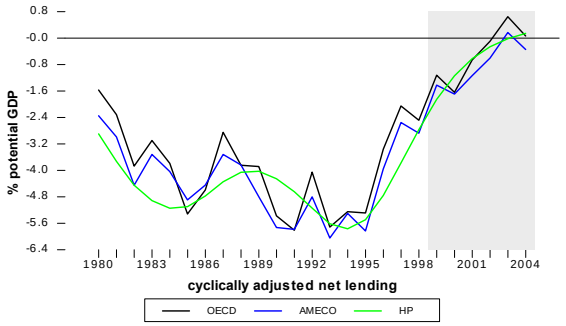






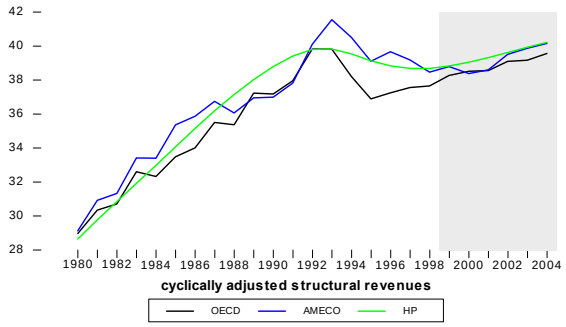
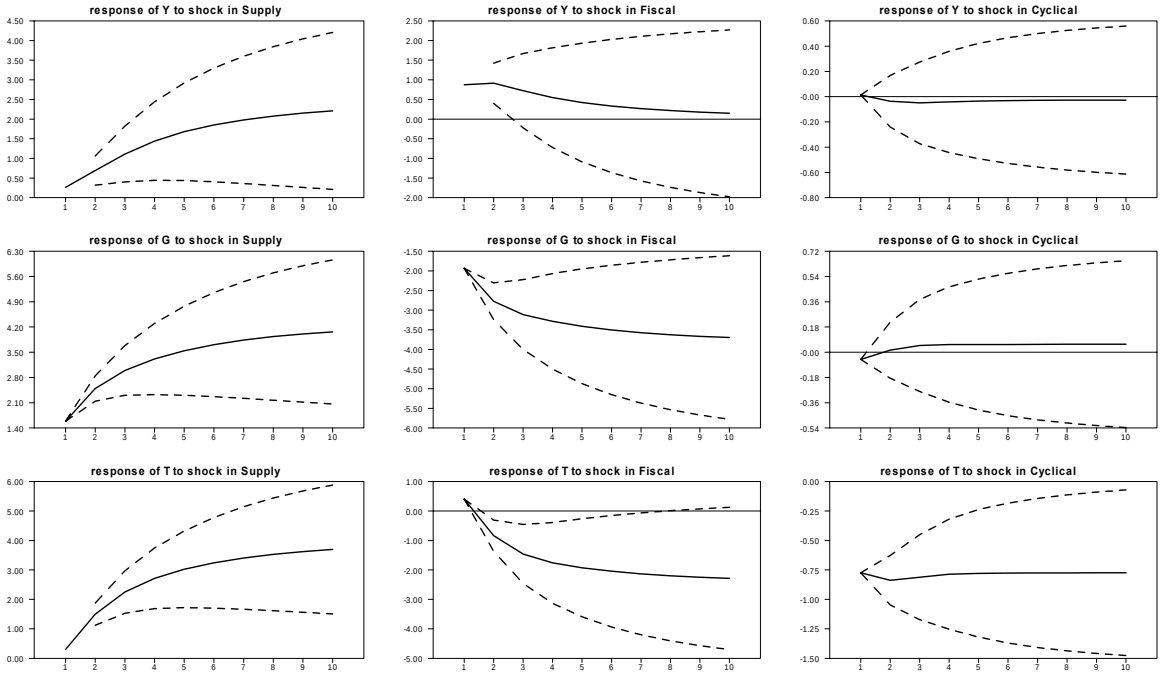
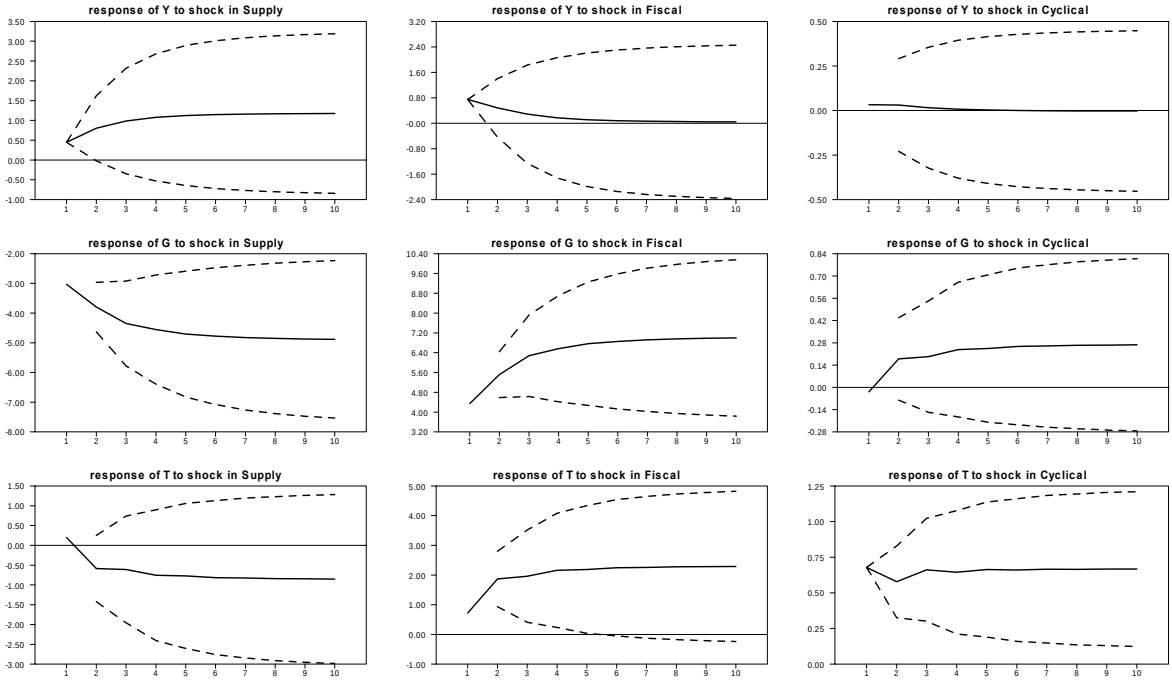


Figure 3 – Impulse responses
(response to a 1 standard deviation shock, bootstrapped responses with 5000 draws)

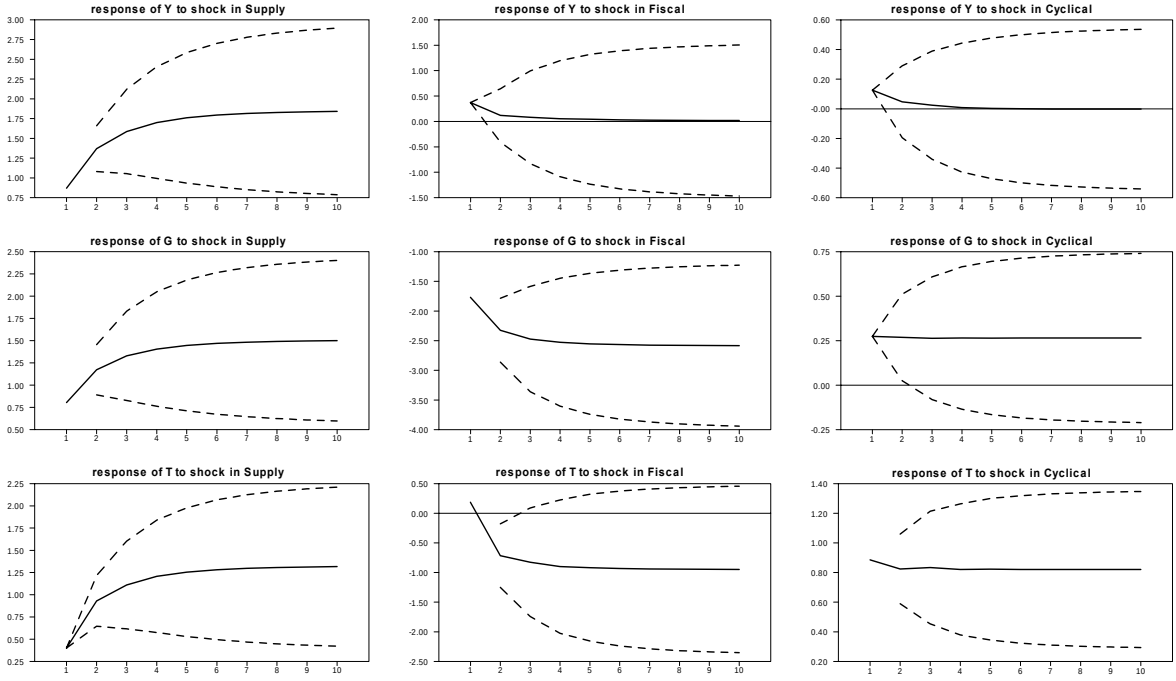
France



Germany



Portugal



Spain

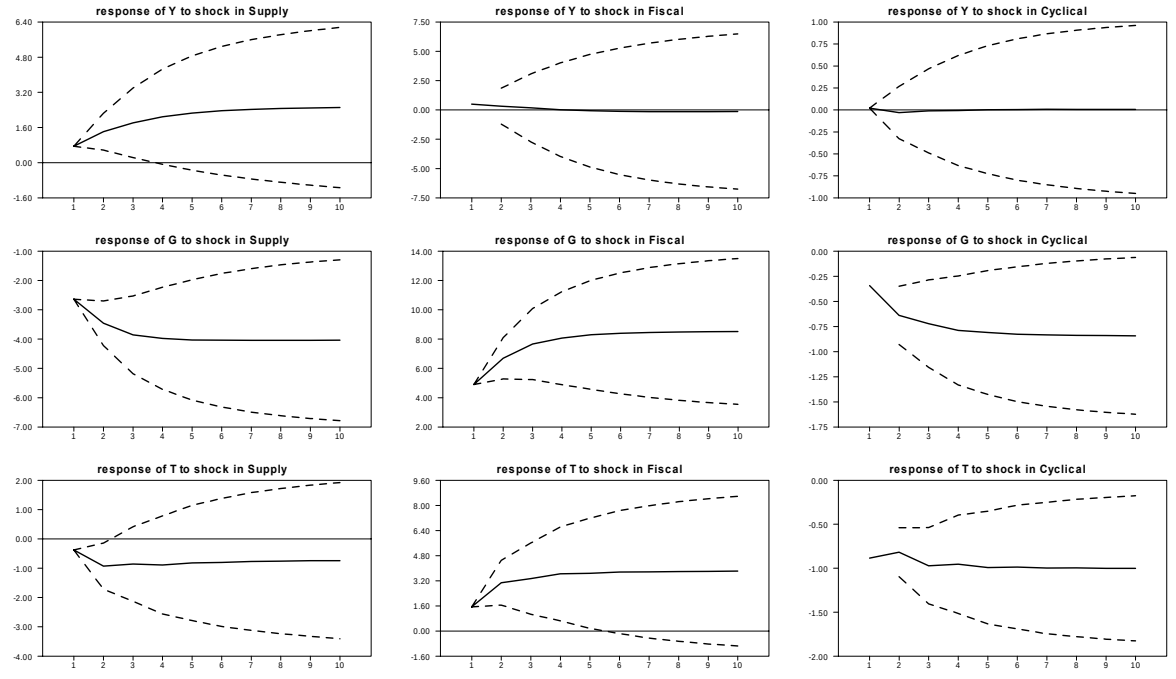
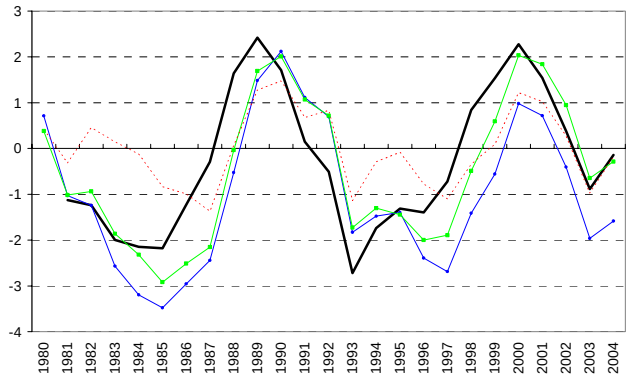


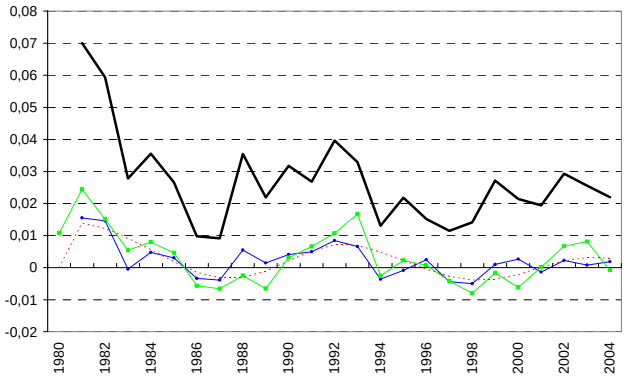
Figure 4 – SVAR-indicator (% potential GDP)

France

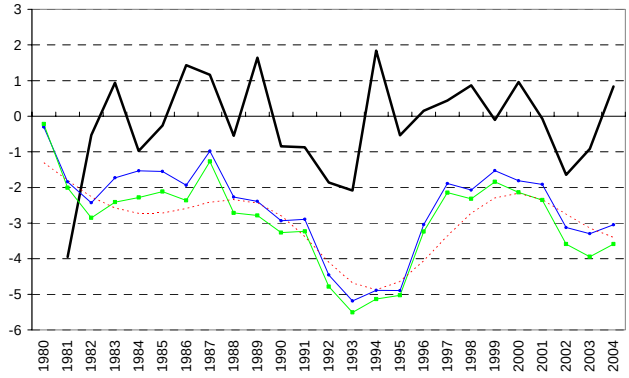
Output gap



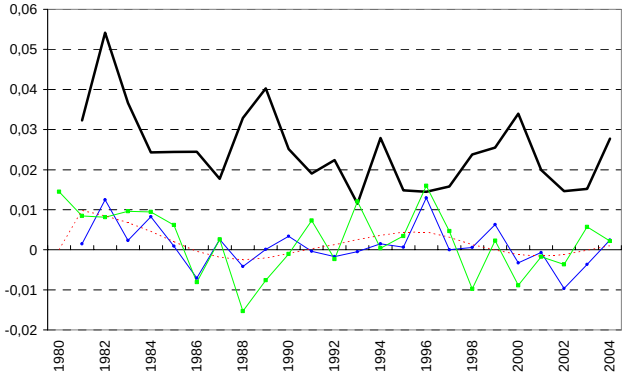
Expenditure



Structural net lending

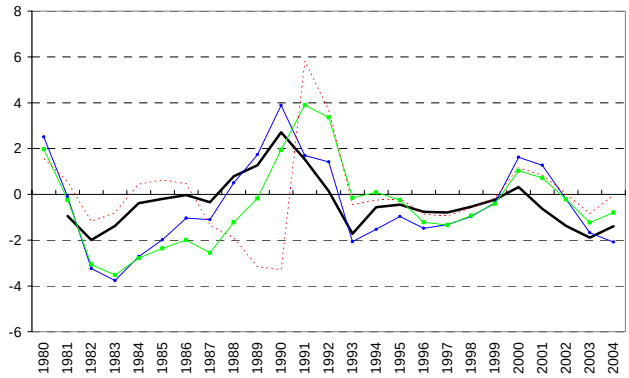


Revenues

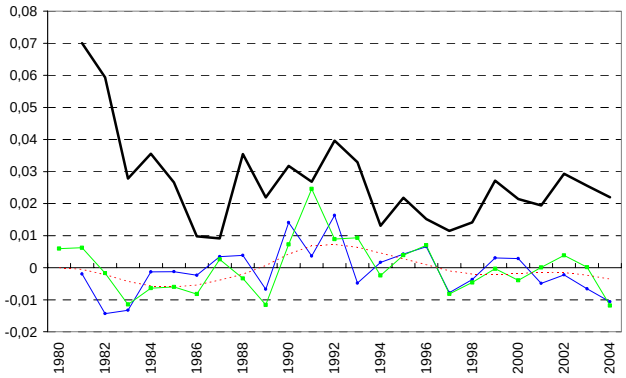


Germany

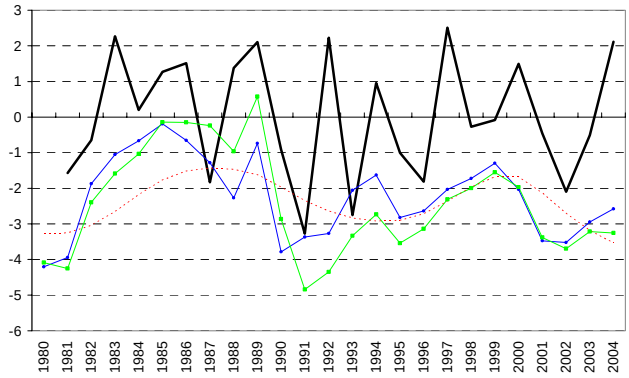
Output gap



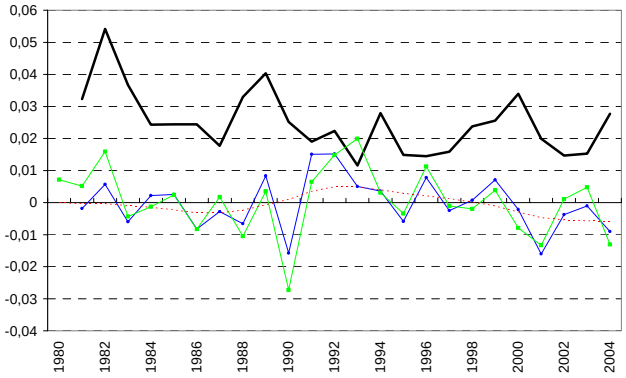
Expenditure



Structural net lending



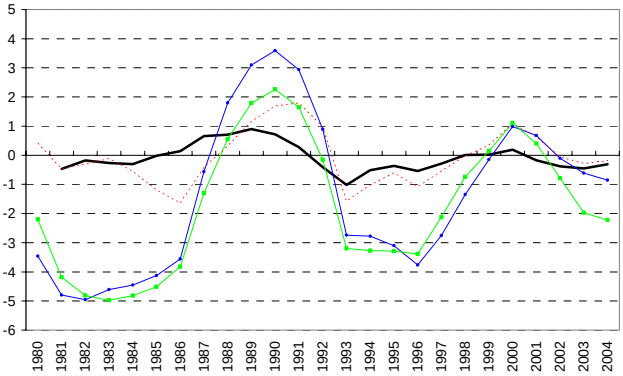
Revenues



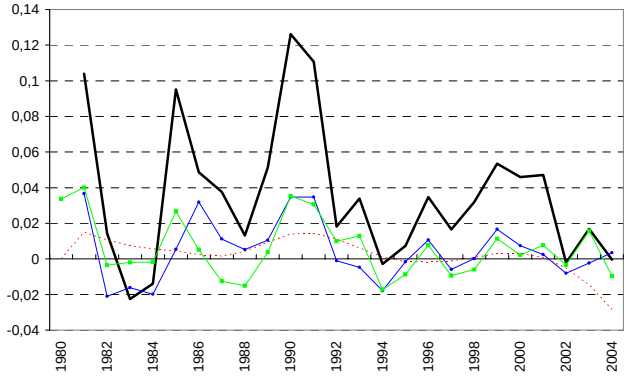
SVAR OECD AMECO HP

Portugal

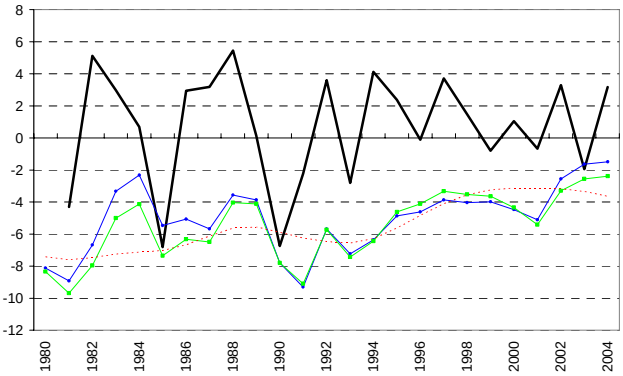
Output gap



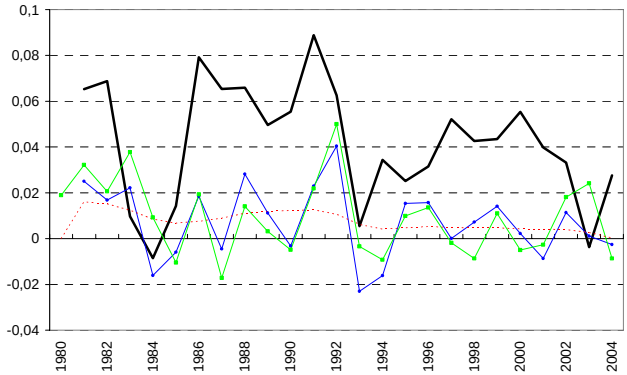
Expenditure



Structural net lending

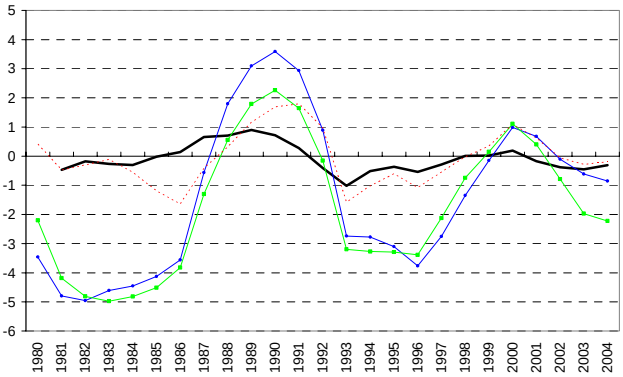


Revenues

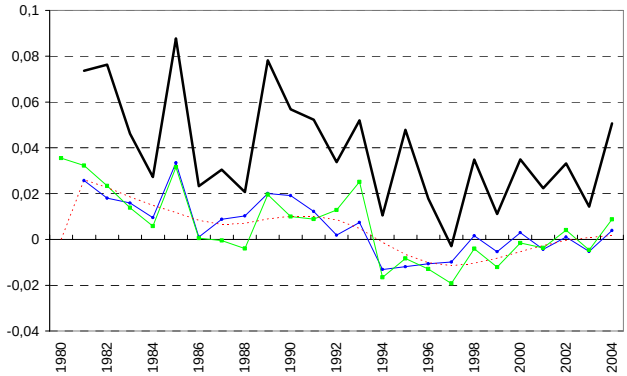


Spain

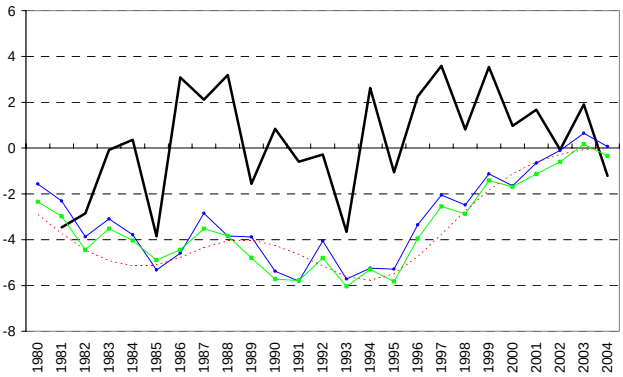
Output gap



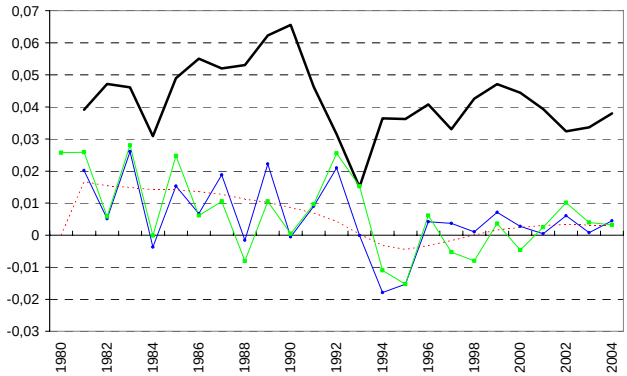
Expenditure



Structural net lending



Revenues



SVAR — OECD —●— AMECO —■— HP --------

Appendix 1. Data sources

	Definition		Source
g_t	total expenditure		AMECO
t_t	total revenues		AMECO
y_t	GDP		AMECO
other	GDP deflator potential GDP output gap cyclically adjusted expenditure (categories) cyclically adjusted revenue (categories) cyclically adjusted net lending		AMECO AMECO/OECD
other	chronology of cycle[(a)]	growth rate cycle peak and through dates' chronology are determined by two consecutive quarters of negative growth in smoothed industrial production. The series is based on monthly industrial production series.	Economic Cycle Research Institute (ECRI), at www.businesscycle.com, algorithm updated in September 2005

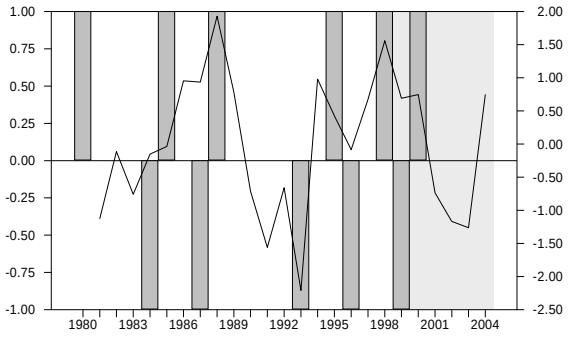
Note: AMECO data are for general government, according to ESA-95, in billions of euro (national currency definition). The UMTS licensing receipts for the year 2000, or following years, are added to total expenditure. Data are from the AMECO database, updated on 4 April 2005. Comparable data definitions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

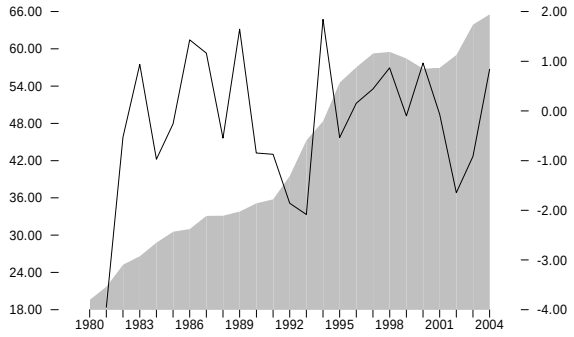
Appendix 2. The fiscal indicator: some additional results

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).

France





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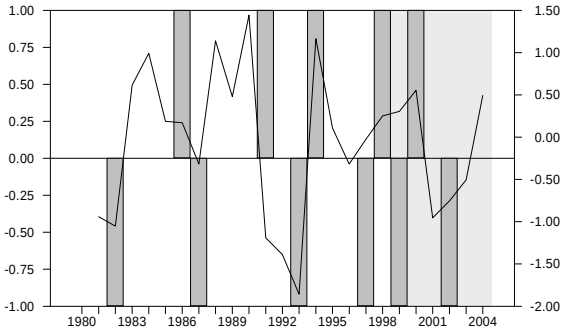

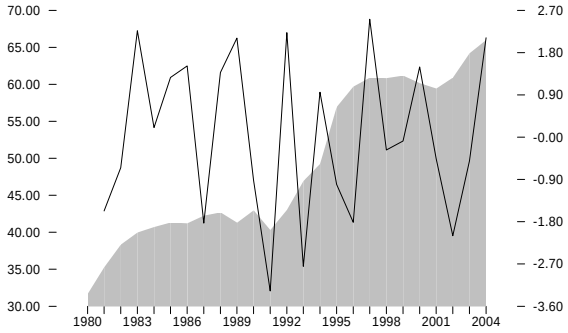

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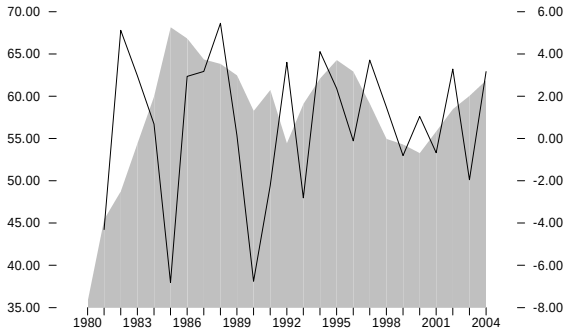

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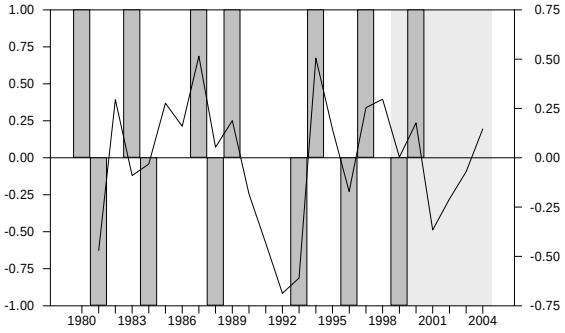

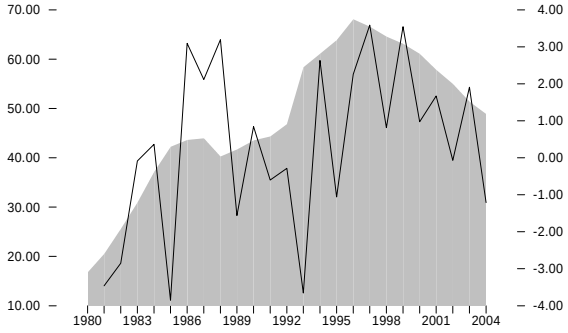

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