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 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.

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1. Introduction

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

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

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

The quantitative indicator that we obtain is best seen in the light of the growing theoretical literature on the qualitative effects of fiscal policy. Dynamic stochastic general equilibrium models with nominal rigidities search for a rationale for fiscal stabilisation policies. At the same time, these New Keynesian models attribute quite some importance to both supply

and demand side effects of fiscal policy adjustments. Our indicator is consistent with such a distinction. We take a first step by restricting attention to overall expenditure and revenues, but more elaborate models might incorporate refinements in the compositional adjustments of budget balance. In contrast to statistical models for adjusting fiscal balance, our economic indicator of structural balance has some attractive practical properties. Uncertainty is explicitly quantified, and theoretical assumptions can be explicitly tested. Also, the end-of-sample problem is reduced. The model is not necessarily more demanding in terms of data availability.

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

The remainder of the 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 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.[1] Recent developments cannot be seen without taking into account past actions and trends in public finances.[2] We focus attention on the evolution of public finances since 1970 in the countries that initially 'sinned' to the Pact (France, Germany and Portugal). We report in Figure 1 the general government balance, and its breakdown in revenue and expenditure ratios. A simple visual inspection shows that expenditure and revenue ratios have been following an increasing trend notably in France, Portugal and Spain. But with revenues lagging the expenditure rises, there has been a continuous deficit bias. There were some good reasons in 1991 to embark on consolidation by enshrining the 3% deficit target in the criteria for EMU-entry. The Maastricht rules have been effective in constraining further buoyant expenditure rises. Less than commensurate rises in revenue intake have led to persistent albeit gradually declining deficits. Since the start of EMU, fiscal positions have started to slip away again. As to the reasons for the breach of the Stability and Growth Pact, further expenditure rises in France and Portugal seem to blame, whereas in Germany large revenue reductions unmatched by expenditure cuts have pushed the deficit beyond the 3% threshold. Spain, on the other hand, stands out for its balanced budget over recent years, which is the result of a sustained reduction in expenditures since 1993 that has levelled off in recent years. We consider Spain as an example of more prudent fiscal behaviour.

[INSERT FIGURE 1 HERE]

These budget developments cannot be separated from economic conditions. The balance can slip out of the control of fiscal authorities by higher than expected expenses on unemployment benefits and transfers, or less than budgeted revenues, owing to automatic stabilisers. Figure 2 compares some measures of the output gap and cyclically adjusted balances computed by the European Commission and the OECD, as well as a trend series retrieved from directly applying a Hodrick-Prescott filter on the raw series.[3]

[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 and the overall deficit was notably reduced as a result. But the reversal of positive output gaps laid out the structural weakness of the balance in France, Germany and

[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) questions the sustainability of public finances in most EU countries.
[3] 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).

Portugal. Expenditures exceed average revenues over the cycle. In contrast, Spain presents an entirely different picture. The budget has been brought close to balance, and is even in slight surplus. A constant spending share has been matched by gradually rising tax revenues.

3. An SVAR model for gauging fiscal indicators

There are a variety of reasons for which the cyclically adjusted balance does not properly reflect discretionary shifts under the control of the government. Its use in assessing fiscal balances is therefore debatable. Some problems are related to the properties of the econometric filters that are being used.[4] More importantly, we believe fiscal policy contributes to the size of economic fluctuations. And it does so by adjusting a variety of spending and revenue items. Recent general equilibrium theories of fiscal policies provide a rationale for real economic effects of fiscal policies, and stress the prevalence of its supply-side consequences over short-term demand effects. This is all the more important for the assessment of the new Stability and Growth Pact. We develop an indicator of discretionary fiscal policy stance that builds on the recent empirical literature on the effects of fiscal policy using structural VARs, and combine this with evidence on the cyclical behaviour of government budget. Next to its favourable properties, the indicator is best seen as a first step in verifying recent theories of fiscal policy as well as giving an instrument for assessing the quality of fiscal adjustments.

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

[4] Figure 2 already illustrates that differences between the various methods are certainly not minor.

the aggregate economy.[5] Second, a bottom-up approach is adopted for the derivation of the cyclical elasticities of the budget. The output elasticities of government revenues are based on the taxation structure of each main sub-item[6] – in some cases accounting for collection lags – and the elasticity of the tax bases to output. The spending elasticity is of relatively minor importance, as only the spending on unemployment benefits is adjusted for the cycle. Other budget components are assumed to be cyclically insensitive. Table 1 gathers the elasticities from OECD for the major budget categories in the countries we study.[7] 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).

Quite some uncertainty surrounds the computation of structural balances in this two-step procedure. Depending on the skewness of the distribution of the moving-average weights in the filter that is being applied and the phase of the economic cycle, trend output is biased towards actual values especially towards the end of the sample. Another problem is posed by structural breaks. Windfall revenues or unexpected spending are entirely included in the structural balance if they have no economic effects. Filters distribute the effects of a break forward and backward on the trend. But this problem is not limited to statistical methods. Even if we use the production function or consider a deterministic trend a reasonable approximation to potential output, incorporating shifts remains a problematic issue. The production function approach moreover suffers from plenty of assumptions that make cumulative uncertainty rather large.[8] 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

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

[6] The OECD adjusts only social security contributions, corporate, personal and indirect taxes.

[7] Girouard and André (2005) update the elasticities in a previous OECD study by Van den Noord (2002).

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

to changes in the economy. We return to these difficulties 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.[9]

Macroeconomic models that allow for cyclical fluctuations around some steady-state trending growth path can be found in the growing class of Dynamic Stochastic General Equilibrium (DSGE) models with nominal rigidities. These models have by now been extended to include fiscal policy. In the initial Real Business Cycle models, there are only supply-side effects of fiscal policy that transmit through wealth effects and the labour/leisure choice (Baxter and King, 1993). Micro-founded models based on sticky prices provide a rationale for stabilisation policies, but even in the New Keynesian type of models of fiscal policy, the supply side effects still tend to dominate demand side effects of fiscal policy management (Linnemann and Schabert, 2003). A larger role for demand side effects of fiscal policy is only found in models that introduce some further imperfections via 'Rule of Thumb' consumers or a fraction of liquidity constrained consumers (Galí et al., 2005; Bilbiie et al., 2006). The latter models come also closer to replicating the results of the growing empirical literature on the effects of fiscal policy.

The main result of studies that use the VAR-counterparts to DSGE-models is that they can indeed recover significant effects of fiscal expansions on output. These are more in line with a positive 'Keynesian' effect on consumption, albeit the eventual multiplier is strongly reduced. The identification of fiscal policy is fraught with difficulties, however.[10] First, the implementation of announced changes in government policies is subject to lengthy and visible political negotiations that are anticipated in private agents' behaviour. As a consequence, fiscal shocks need not affect fiscal variables first. This is a problem of the shock being non-fundamental (Lippi and Reichlin, 1994). Second, decisions on fiscal policy affect different groups in the public via a range of different spending and tax instruments. There exists no 'standard' fiscal shock: every political discussion considers the trade-off

[9] Potential output is nevertheless assumed exogeneous in the production function approach.
[10] A full discussion of the problems in identifying the effects of fiscal policy is provided in Perotti (2005).

between a range of possible taxation and spending adjustments. The means of financing and the adjustment in expenditures and revenues wrap empirically relevant effects of different budget components in an aggregate fiscal shock without considering the path of public debt. Most studies focus on total spending or revenues, and find small and positive effects of government spending on consumption, but prolonged negative effects of higher taxation. Only a couple of studies consider the dynamic behaviour of some particular budget components.[11] Third, these identification problems are only exacerbated by the automatic reaction of fiscal aggregates to economic variables.

The seminal contribution of Blanchard and Perotti (2002) lies in using a semi-structural VAR that employs external institutional information on the elasticity of fiscal variables to output. Cleaning out the automatic cyclical reaction of the total fiscal balance leaves shifts to the cyclically adjusted balance as discretionary fiscal shocks. Blanchard and Perotti (2002) additionally impose some timing restrictions on the economic effects of discretionary policy. These timing assumptions avoid to some extent anticipation effects but would not capture these completely if implementation lags are important. Subsequent studies have mainly attempted to verify the original approach of Blanchard and Perotti (2002) with a variety of techniques and usually tend to confirm their findings.[12]

However, the empirical literature has hitherto ignored the supply and demand channels of fiscal policy that are at front-stage of the theoretical DSGE models. Such effects are only implicitly acknowledged in these VAR studies. Changes in tax revenues, for example, are usually found to have lasting effects on output. There are nevertheless two other strands of the empirical fiscal policy literature that attribute a role to supply side variables. First, the literature on non-Keynesian effects of fiscal policy would argue that fiscal consolidation might have positive consequences on output. The composition of the fiscal adjustment thereby plays an important role (Alesina and Perotti, 1995). The effects of consolidation on agents' expectations on the future economic outlook – measured by asset markets' reaction (Giavazzi and Pagano, 1990) – suggests a role for permanent wealth and supply-side effects of fiscal policy. Second, most VAR studies have so far ignored the literature on the long-term growth effects of fiscal policies. The main message of the endogenous growth models that have been developed is that higher taxation unambiguously reduces output, but

[11] Ramey and Shapiro (1998) look into the sectoral reallocation effects following shocks. A particular role in the transmission of fiscal policy shocks is also played by the labour market. A couple of papers compare the effects of consumptive government purchases to increases in public employment (Finn, 1998; Pappa, 2005; Cavallo, 2005). Perotti (2004) and Kamps (2004) examine the output and labour market effects of government investment.
[12] 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.

that these losses may be offset by using the proceeds for productive spending items (Barro, 1990; King and Rebelo, 1990). These seminal models have been made more realistic by allowing endogenous responses of labour (Turnovsky, 2000). Typical tests of these growth models give empirical support to the role of spending and taxes to long-term growth (Kneller et al., 1999). It can be argued that additional government spending in catching-up countries such as Portugal and Spain had rather different effects than further expansions of the budget in France and Germany, for example. This provides an additional argument for including the former countries in our analysis.

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

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.[13] 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).

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

We specify an empirical model of fiscal policy as a small-scale VAR in real output y_t and the expenditure g_t and revenue side t_t of the government budget. We can summarise the data properties in a VAR-model (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 $\begin{bmatrix} y_t & g_t & t_t \end{bmatrix}$, 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. That is, the *i,j*-th element of the infinite horizon sum of coefficients, call it $C(1)_{ij}$, is assumed to be zero. This requires an indirect restriction in (3) on the product of the transformation matrix A and the inverted long-run coefficient matrix $B(1)^{-1}$. In other words,

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

For the system consisting of government expenditures, revenues and output, we assume three structural shocks to drive output and fiscal variables. 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 that to fiscal policy, we employ the elasticity approach advocated by Blanchard and Perotti (2002). We derive a shock to spending and/or revenues from which the cyclical effects have been removed. In other words, the shock with transitory effects on output – but unaffected by short-term variation in output – is the fiscal policy shock and reflects discretionary changes in the fiscal policy stance.[14] 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).[15] The fiscal shock thus includes discretionary decisions unrelated to the cycle. Moreover, any government policy that interferes with the workings of automatic stabilisers on a systematic basis is considered as a fiscal intervention. Unlike other VAR studies, we split an overall change in fiscal policy into a part that has a short-term economic effect (the fiscal 'demand' shock), and into shocks that may have potentially long-term growth effects (the 'supply' shock).[16]

One important limitation of the current version of the model is that we cannot tell apart the growth effects coming from 'pure' technology shocks from those deriving from tax and spending decisions. Our supply shock is thus a combination of all shocks with long-term output effects. The negative effects of distortionary taxation or incentive-distorting spending show up in this shock, as well as the possibly positive effects of government investment. Instead, we isolate in the fiscal 'demand' shock only those changes in the discretionary budget stance that have temporary effects on output. A full-fledged analysis of the economic growth effects of fiscal policy would require additional restrictions.[17] The current identification

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

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

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

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

is sufficient though for the purpose of deriving a fiscal indicator. We summarise our assumptions in (5) (see also Table 2):

$$C(1)=\begin{bmatrix} \bullet & 0 & 0 \\ \bullet & \bullet & \bullet \\ \bullet & \bullet & \bullet \end{bmatrix} \text{ and } A=\begin{bmatrix} \bullet & \bullet & \bullet \\ \bullet & \gamma & \alpha \\ \bullet & \bullet & \bullet \end{bmatrix}. \qquad (5)$$

We can not simply set to zero the elasticity γ of government expenditures. Unemployment benefits move over the cycle in EU-countries, even if their contribution to variation in total spending is not large. The parameter γ comes directly from the elasticities calculated by the OECD that we reported in Table 1. Instead of multiplying each revenue category by its cyclical elasticity and GDP share, we have subtracted 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) so as to obtain the total elasticity of revenues α. The coefficients do not sum to zero as the budget is assumed to be countercyclical. Table 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^*.[18] Under this assumption, one can compute the structural deficit as in (6):

$$d_t^* = \frac{g_t^* - t_t^*}{y_t^*}. \qquad (6)$$

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

This measure cannot directly be compared to the cyclically adjusted balances provided by the European Commission, the OECD or to those derived from some statistical filtering method. First, the output gap we derive need not correspond to the fluctuations around a smooth trend on some assumption on the frequency of the business cycle. The economic shocks that drive potential output reflect changes in productivity – that may derive from a variety of sources – and might vary over time. Our approach is best seen in the line of papers that investigate the role of nominal versus technology shocks in economic fluctuations (Nelson and Plosser, 1982; King et al., 1991; Galí, 1992).

Second, the variation in the structural balance is different from that in traditional two-step methods. This discrepancy owes to the definition of structural balance. This is perhaps best illustrated with an example. Consider a tax cut, for a given level of government spending and exogenous output. This would lead to a deficit, *ceteris paribus*. If fiscal policy indeed has real economic effects as the empirical literature suggests, then the tax cut temporarily boosts output. As a consequence, tax revenues will increase and spending on unemployment benefits decrease, and the budget surplus will rise. The traditional measure for cyclical

[18] 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).

adjustment takes out all cyclical variation, also the one induced by fiscal policy, which leads to an overstatement of the structural balance. In our approach, we control for this economic effect of the tax cut. The SVAR-model excludes that part of the variation in GDP due to discretionary fiscal measures whereas the conventional models take total output variation into account. But our approach goes even one step further. Imagine that the tax cut also raises potential output in the long term. This widens the gap between actual and potential output at the moment the fiscal shock occurs. Structural balance would be improved as the increased tax base (now, and in the future) makes the fiscal position more sustainable. Similar arguments can be made for the effects of spending. As a consequence, our indicator of structural balance does not necessarily display a smaller variation than traditional indicators. This will particularly be true if (a) the indicator is mainly driven by fiscal or supply shocks; or (b) if the underlying economic shocks we retrieve are more volatile than what conventional output gap measures suggest.

Our model-based indicator has some favourable properties in comparison to more conventional measures. First, the long-term constraints hold the promise of imposing fewer contentious restrictions on the short-term effects of the fiscal shocks. Any anticipation effect and the contemporaneous reactions of fiscal balances to economic conditions are not constrained. Second, the simultaneous determination of a measure of cyclical output and fiscal balance is internally more coherent. While the method is definitely more complex, total uncertainty is quantified. We impose a minimal set of economic restrictions and the validity of these assumptions can be discussed. As the empirical model is also consistent with recent DSGE models of fiscal policy, these assumptions can be tested. Sensitivity analysis can make clear the weakness of the model in some specific direction. Moreover, progress in theoretical models of fiscal policy can lead to further refinements of the approach. Third, by adopting an economic – and not a statistical – method, the end-point problem of filters is eliminated. The indicator gives timely information on changes in the fiscal stance.[19] Finally, our indicator is also more relevant for the assessment of fiscal policy. Our measure indicates better the change in the stance of fiscal authorities, also with a view to growth effects and long-term sustainability.

At the same time, the econometric approach suffers from some weaknesses. First, extensions are difficult as the method is rather data demanding – at least in the time series dimension. The annual frequency of the data may lead to some difficulties in the identification of business cycle shocks, for example. Second, the gains of loosening the

[19] 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.

constraints of 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. One may also check the consistency of some short-term restrictions with the long-term behaviour of the model, as in King and Watson (1997). Third, there is a possibly large set of underlying shocks from which we extract only a few. As discussed above, we extract a generic supply and cyclical shock, as well as a fiscal shock. This necessarily involves a debatable linear aggregation over shocks. If each shock affects the economy in qualitatively the same way the shocks may be commingled. This is particularly acute for the analysis of fiscal policy, as different expenditure and revenue categories may indeed have different longer run effects on output that are not distinguishable from technology shocks but moreover have similar short-term responses. Fourth, a problem may also occur of high frequency feedbacks. We observe fiscal policy only at an annual frequency. We assume the structural shocks to be orthogonal but if there are mid-year revisions of the budget, this may muddle both economic and fiscal shocks. This only stresses the problem of correctly identifying the timing of shifts in fiscal policies. Finally, a major assumption underlying the VAR-model is parameter constancy. The conclusions of VARs are highly sensitive to the presence of structural breaks. Especially for fiscal policy, there is evidence of non-linear effects (see Giavazzi et al., 2000, for instance). We therefore run some stability tests on the VAR-model.

4. Empirical analysis

4.1. Data

All data are annual and come from AMECO.[20] This database covers the longest available period since 1970 up till 2004 for which fiscal data are available for France, Germany, Portugal and Spain. Fiscal data and output are deflated by the GDP-deflator and are defined in first differences of log-levels. In many studies, the fiscal data are scaled to GDP, but this clouds inference. As economic shocks affect both fiscal variables and GDP, this leads to a spurious negative correlation between the deficit and these shocks. Moreover, we are

[20] Details are in Appendix 1. A program containing the RATS-code for the SVAR model is available from the authors upon request.

primarily interested in distilling a fiscal indicator on the basis of the historical decomposition of output. For the same reason, we do not concentrate on the effects of fiscal policy on private output but use total output instead. We also ignore possible cointegration between overall expenditures and revenues, which derives from the intertemporal budget constraint.[21] This implies that parameter estimates may no longer be efficient albeit still consistent. However, inference on the short-term results of the VAR would hardly be affected by non-stationarity of the data (Sims et al., 1990).

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

Table 4 reports the results. For Germany, we could detect a further break in the data in 1976, related to the large increase in social spending under the Brandt government. For France, Portugal and Spain in contrast, we find a significant break date that is seemingly related to the Maastricht consolidations, albeit the confidence bounds are rather large and span nearly the entire nineties. It is nevertheless suggestive of the change in the conduct of fiscal policy under the effect of the Maastricht rules. Due to this imprecision, we refrained from explicitly modelling these shifts with additional dummy variables.

Table 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).

[21] For such an analysis, see Claeys (2004).

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. [22] We have summarised all results in Figures 3a and 3b. 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 3a). The speed of accumulation is rather fast: after five years, the major part of the shock has worked out. In Germany, this happens even faster. The sampling uncertainty around the effect is large, but given the large bounds we have used, the significance of most impulse responses after some years is actually surprising. To what extent are these supply shocks driven by fiscal developments? In France and Portugal, these shocks go hand in hand with positive long-term effects on total expenditures and revenues as well. This effect is also strongly significant.[23] The difference between revenues and spending responses is not significant, hence it is not obvious that this leads to a build up of public debt. In Germany and Spain on the contrary, revenues do not change significantly, but government expenditures shrink considerably, leading to large accumulated surpluses at a horizon of 10 years.

But whether the causality runs from fiscal policy to productivity growth, or vice versa, is not obvious. Recall that the supply shock contains productivity shocks that may emanate from the private as well as the public sector. The significant co-movement of spending and revenues suggests that fiscal 'supply' shocks are an important source of the overall productivity shock.[24] If these relations are positive (the case of France and Portugal), this implies higher spending or tax revenues have contributed to economic growth. In the opposite case (Germany or Spain), a reduction of spending – and less so a lower tax burden – would trigger higher potential output growth. But there are a few alternative explanations. Positive economic shocks that enlarge the tax base would – for a given tax rate – automatically lead to a larger revenue intake owing to automatic stabilisers. For reasons of political economy, this could lead the government to directly spend the proceeds of the treasury. This expansion of the budget could consequently get locked in and lead to a

[22] 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.
[23] 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.
[24] 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, endorsing the hypothesis that supply side effects of fiscal policy decisions are part of the 'supply' shock.

permanent rise in government expenditure. This mechanism would work for both permanent and cyclical shocks, if we assume that the government does not systematically react in different ways to permanent or transitory economic shocks. This allows us to get some insight in the importance of the private versus public productivity shocks. The fiscal responses to cyclical shocks, which include business cycle shocks with transitory output effects that are not related to fiscal policy can give some indication. Surprisingly, the effects of cyclical shocks on output are hardly significant and indicate the small size of temporary economic fluctuations.[25] As a consequence, there is not always an obvious simultaneous rise in tax revenues. In Germany and Portugal, government revenues do rise in response to a positive output gap, and this effect remains permanent. Moreover, in both countries government expenditures tend to rise as well. This gives some support for the 'ratcheting up' effect on spending. In France or Spain instead, government spending does not react in a significant way and tax revenues even tend to decline.

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

In France and Germany instead, the reaction of fiscal variables to permanent shocks is opposite to the reaction to business cycle shocks and supports the view that fiscal variables driving long-term growth in both countries. That spending and revenues go up after a positive supply shock, whereas there is a non-significant response or a decline following cyclical shocks, would suggest a larger role for productive public spending in France instead. Evidence for Germany rather seems to indicate a too large size of government. We find that revenues and spending go up permanently after cyclical shocks, but positive supply shocks tend to be associated with reductions in spending.

[INSERT FIGURE 3a HERE]

[25] This is a likely consequence of the annual frequency of the fiscal data.

The fiscal shock then regards all discretionary policy interventions on spending and/or revenues that are not systematically related to the cycle and have only temporary effects on the economy. These discretionary fiscal shocks have somewhat prolonged effects on output. There is a lot of uncertainty around this effect and none of the responses is really significant. We scale the impulse responses in Figure 3a such that they always display positive output effects. We do not find the typical result of small positive Keynesian effects on output in all countries. In Germany and Spain, a typical Keynesian response would follow upon demand boosting deficits. In France and Portugal on the other hand, fiscal contractions would lead to positive short-term effects on output instead. Such different responses likely depend on the composition of the fiscal adjustment or other structural parameters in the respective economies, but cannot be further examined in the current model.

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

What does this imply for the contribution of fiscal policies to output variation (Figure 3b)? Supply shocks account for at least 50% of total variance in output at all horizons, and this goes up to 90% in Portugal and Spain. For the latter countries, this was perhaps to be expected given their strong economic growth over the last two decades. Most of the variation in output is thus caused by productivity shocks even at short horizons. As we do not separately identify private and public supply shocks, we cannot really quantify the relative magnitude of both channels. But as pointed out above, we think that productive spending or revenues has contributed to some extent to the variance of output. The demand effects of fiscal policy in France and Germany are at least as large as those of supply effects. In Portugal or Spain instead, only a minor role is played by discretionary fiscal policy. The contribution of cyclical fluctuations to variations in output is negligible, as was to be expected from the results on the impulse responses.

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

We think that the reason for the large contribution of fiscal policy is to be found elsewhere. To the extent that automatic stabilisers reduce the volatility of economic fluctuations, the tendency of governments to reduce taxation and/or rise spending in a procyclical way only adds to short-term output fluctuations and brings about aggregate macroeconomic instability. This policy volatility can moreover have negative effects on the long-term growth prospects of the economy.[26] The unwinding of previous taxation decisions goes against the principle of 'tax smoothing'. The procyclicality of budgets implies negative supply-side effects. This explains the surprisingly low contribution of cyclical fluctuations.

[INSERT FIGURE 3b HERE]

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),[27] we have repeated for comparison the output gaps of the European Commission, OECD and the one obtained by applying a Hodrick-Prescott filter. There is a rather close correspondence between these measures and our supply shock based gap for France and Germany. Given that we have used the OECD elasticities only for distinguishing shocks with transitory effects on output, this is all the more remarkable. The smooth gap for Portugal and Spain underlines the importance of supply relative to demand shocks in both countries. This might indeed be expected given the strong economic catch-up that both countries have experienced. We believe that potential output tracked much closer actual output developments in these

[26] We are certainly not the first study to document that European countries have not left automatic stabilisers to work, but instead have overturned these in a procyclical way. We do show however the macroeconomic instability that results as a consequence. With other models, Alesina and Bayoumi (1996) showed how fiscal policy at the US state level rather contributes to macroeconomic instability, and how fiscal rules have been useful in constraining discretion. Similar cross-country evidence is provided by Fatás and Mihov (2003b).
[27] We plot all series over the period 1980-2004 only.

countries. The usual statistical filtering methods are not adequate to capture this trend behaviour over small samples. Cyclical fluctuations are therefore rather minor. We provide some further robustness checks in the Appendix 2.[28]

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

[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 the cyclically adjusted deficit. This reflects the definition of the structural balance, by which we take out the automatic stabilisers and the induced stabilisation effects caused by fiscal policies. In addition, fiscal policy also affects permanent output and therefore the structural fiscal position fluctuates around balance.

The indicator is also much more volatile. This follows from the major contribution of supply and fiscal shocks to the variation in output, spending and revenues (Figure 3b). As we discuss below, one of the causes of this strong volatility – apart from the dominant supply side shocks – is the procyclical bias that characterises fiscal policymaking that induces extra variation, especially so in government revenues.

We may then expect our fiscal measure to coincide with some episodes of fiscal laxness or retrenchment. We consider the budget to undergo a strong expansion (contraction) when the cyclically adjusted primary balance falls (increases) by at least 2 percentage points of GDP in one year, or at least 1.5 percentage points on average in the last two years. This is the

[28] 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). These calculations are based on monthly industrial production series. Our measure matches the changes in the output gap in all countries.

measure proposed by Alesina and Ardagna (1998). In Table 5, we gather those fiscal years in which a strong expansion or adjustment has occurred in our dataset (see Afonso, 2006).

At first sight, the correspondence is rather close. Comparing the changes in Figure 4 (bottom left panel) to the years in Table 5, we detect all events that the Alesina-Ardagna measure also suggests. For example, we find budgetary cost of Reunification on German public finances to have been large. The Maastricht rules have also led to considerable fiscal retrenchment in France and Spain. There are a few events in Portuguese fiscal policy over the eighties that we do not date exactly. But we do find a switch between contraction and expansion starting in 1982-83. The Alesina-Ardagna measure does not pick up all expansions and contractions that we find, however. Some of these episodes correspond to well known changes in the fiscal stance (e.g. the 'Mitterand' budgets in France 1981). Another major expansion in France in 1992 follows upon a string of expansionary budgets. Spain equally undergoes major expansions in the early eighties and nineties (1981 and 1993 respectively). Fiscal policy is also lax in Portugal (1990). Prolonged contractions occur over the eighties in France, Germany and Spain too.

Table 5. Large fiscal expansions and contractions

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

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

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

How has this consolidation been achieved? The right hand side panels of Figure 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 equivalent spending decisions.[29] For Spain, the moderate decline in tax

[29] 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.

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.

4.4. Some sensitivity analysis

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

First, elasticities are assumed to be time-invariant. These are not representative of the tax and spending structures that have prevailed in historical samples, however. In some countries, the expansion of the welfare state has led to gradually larger tax bases and dramatic changes in tax systems (Portugal and Spain). But even in France and Germany, time-variation cannot be neglected. Budget elasticities tend to move over the business cycle as well (Bouthevillain et al., 2001). Changes in elasticities also throw up a more subtle difficulty in the interpretation of the fiscal shocks that we have already discussed in section 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.[30] 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

[30] Similar arguments can be put forward for various expenditure items.

payments for cyclical variation and assumes the net effect of inflation to be zero.[31] 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. We conduct a grid search on different values for γ and α that Girouard and André (2005) provide. 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.[32] For all possible combinations of this revenue elasticity α and for a given spending elasticity γ, 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.[33] The uncertainty about the elasticity does not seem to play a major role then, and this confirms the findings of Blanchard and Perotti (2002) or Marcellino (2002).

Table 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 total revenues, α	-0.11 [0.51, 0.66]	-0.18 [0.46, 0.68]	-0.05 [0.44, 0.52]	-0.15 [0.43, 0.53]

One of the other interesting scenarios is the one in which we switch off the elasticities. By setting γ and α equal to zero, we assume that neither spending nor revenues react to the cycle. This consequently attributes a larger role to discretionary fiscal policies. The effect on the structural indicator depends however on the relative contribution of changes in taxes or spending to fiscal shocks. Figure 5 contrasts the structural indicator obtained with the OECD elasticities against the one with zero elasticities. The effect is only marginal. In most periods, the results are rather similar. This reflects again the prevalence of the supply relative to the temporary economic shocks. Oftentimes, there are more prolonged periods of moderate deviations.

[31] Eschenbach and Schuknecht (2004) argue that government revenues and expenditures are also affected by asset prices changes in ways not accounted for by standard cyclical-adjustment methods.
[32] 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.
[33] 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.

[INSERT FIGURE 5 HERE]

Fiscal policy might be more seriously biased against automatic stabilisers than our 'zero-elasticity' scenario suggests. There is quite some evidence that in European countries, governments have been systematically overturning the working of automatic stabilisers (Galí and Perotti, 2003; Lane, 2003). The true expenditure and revenue elasticities may therefore be biased upward in comparison to observed elasticities. As a consequence, we would attribute too much of the variation in fiscal policies to the economic cycle and too little to the offsetting systematic discretionary adjustments.

To illustrate this phenomenon for Germany, France, Portugal and Spain, we follow Lane (2003) in estimating the output elasticity of the main budgetary items. I.e., we regress in (7) the main budget items on economic growth for the sample period 1970-2004,

$$d \log X_{i,t} = \omega_i + \gamma_i d \log Y_t + \mu_{i,t} \qquad (7)$$

where $X_{i,t}$ is total spending, government investment, current spending (consumption and wage spending), or interest payments, and Y_t is real output. Likewise, we estimate model (7) in which where $X_{i,t}$ contains either total revenues, current revenues or (in)direct tax revenues. The estimates are also repeated for the decades 1970-1980, 1981-1990, and 1991 to 2004, as we have reasons to expect quite some time-variation. Table 7 reports the results of an OLS estimation of (7), with a correction for first-order autocorrelation.

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

We have argued before that the procyclical bias in fiscal policy is mainly due to reversals in taxes. We indeed confirm the procyclicality of revenues as in all countries, elasticities are

significantly larger than the corresponding elasticities from OECD (see also Table 1).[34] 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.[35]

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

	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.

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

[34] 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.

[35] The time variation in elasticities is also apparent from a recursive regression of (7). Coefficient plots are summarised in Appendix 3 and further documents some of the problems with constant elasticities. We have not reported the elasticities of interest payments and investment, as these coefficients are much more volatile than those of other budget items. There are relevant breaks associated with major shifts in fiscal policy (e.g. German Reunification, democracy in Portugal and Spain). For most spending categories, we remark a modest decline over time in Germany and a more outspoken one in France, while changes are minor for most revenue categories. Portugal and Spain have seen a large rise in elasticities of all items, owing to the expansion of their welfare states. This rise has pushed elasticities even above those in Germany and France.

to impose the 'actual' elasticity in the VAR model (5), the interpretation of the fiscal shock is one that includes all discretionary interventions. The drawback of the approach is that our 'cyclical' shock is a mongrel reaction to economic conditions, in which we cannot tell apart the importance of systematic policy and the economic cycle. The difference in the structural indicator – obtained with the OECD elasticities – can then be attributed to the procyclical bias in fiscal policy.

Table 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 (5)

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

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 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 limits and leaves more room for a country-specific interpretation of the medium-term budgetary objective. First, it allows for a gradual adjustment effort under

unfavourable economic conditions, as long as consolidation continues in good economic times. Second, the revised Pact also attributes more importance to the quality of the budget adjustment. The revised Pact provides for the implementation of structural reforms that carry temporary budgetary costs, but which through positive supply-side effects enhance the structural balance and thus the long-term sustainability of public finances.

This 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 wage spending or public employment – or indirectly. Finally, instead of specifying a model in output and fiscal policies only, the inclusion of prices and/or interest rates can lead to a more accurate description of the economic shocks.

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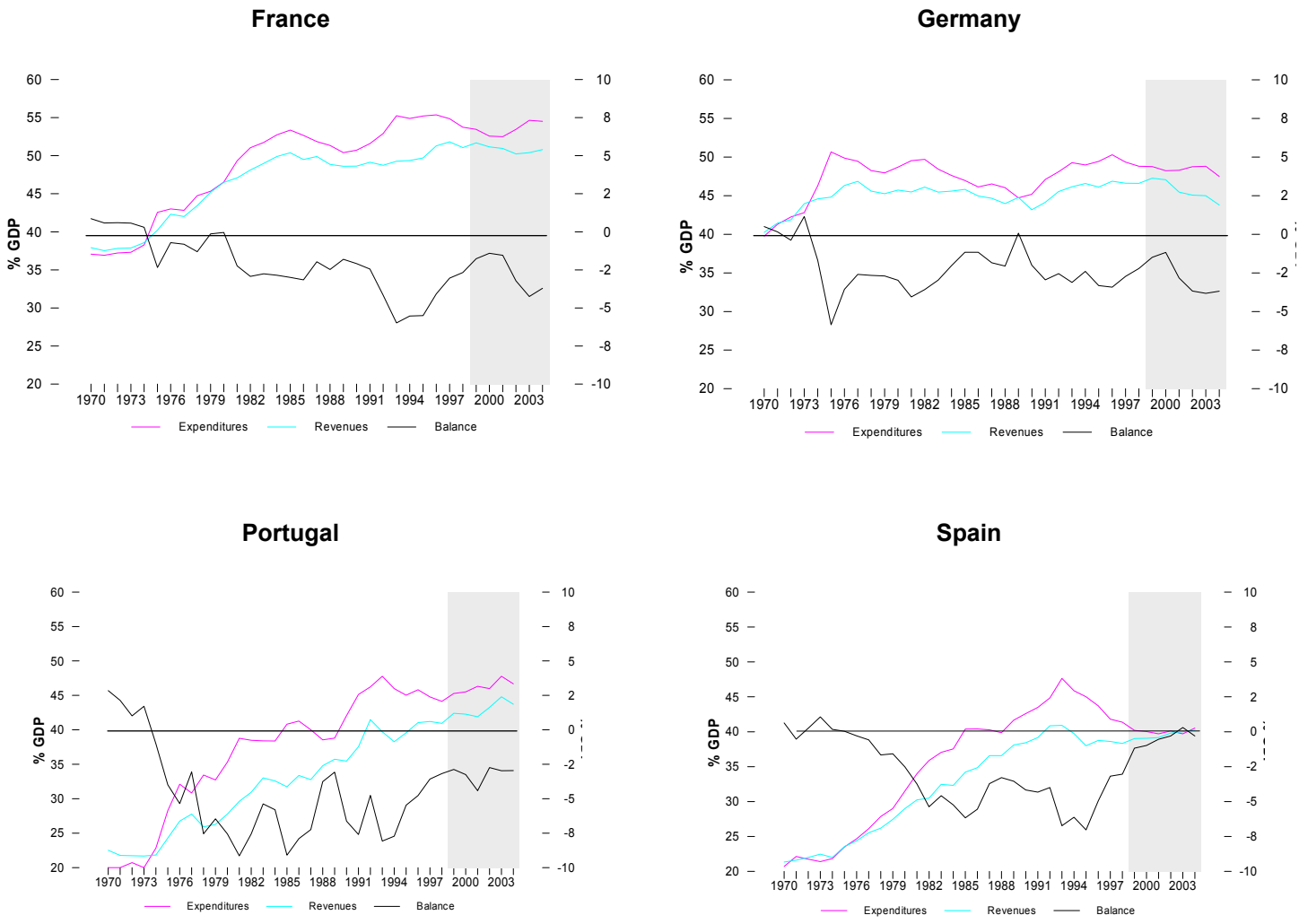
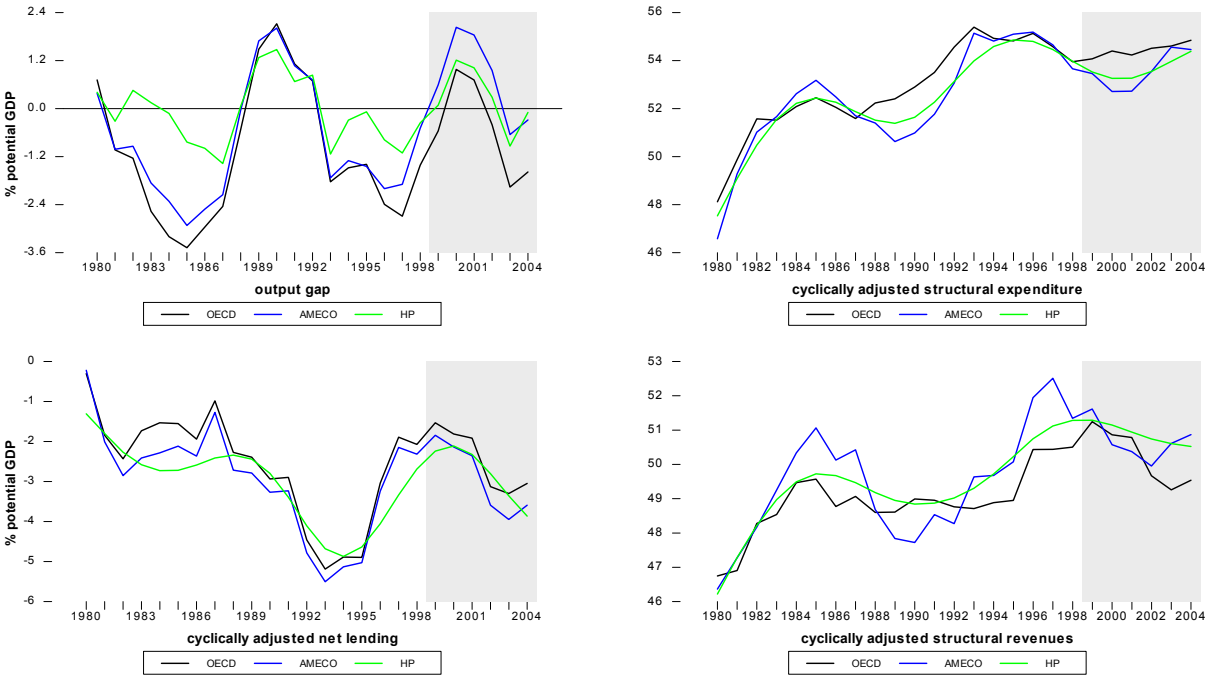
Figure 1 – General government spending, revenue and deficit (% of GDP)
left-hand scale – revenue or spending / right-hand scale – deficit



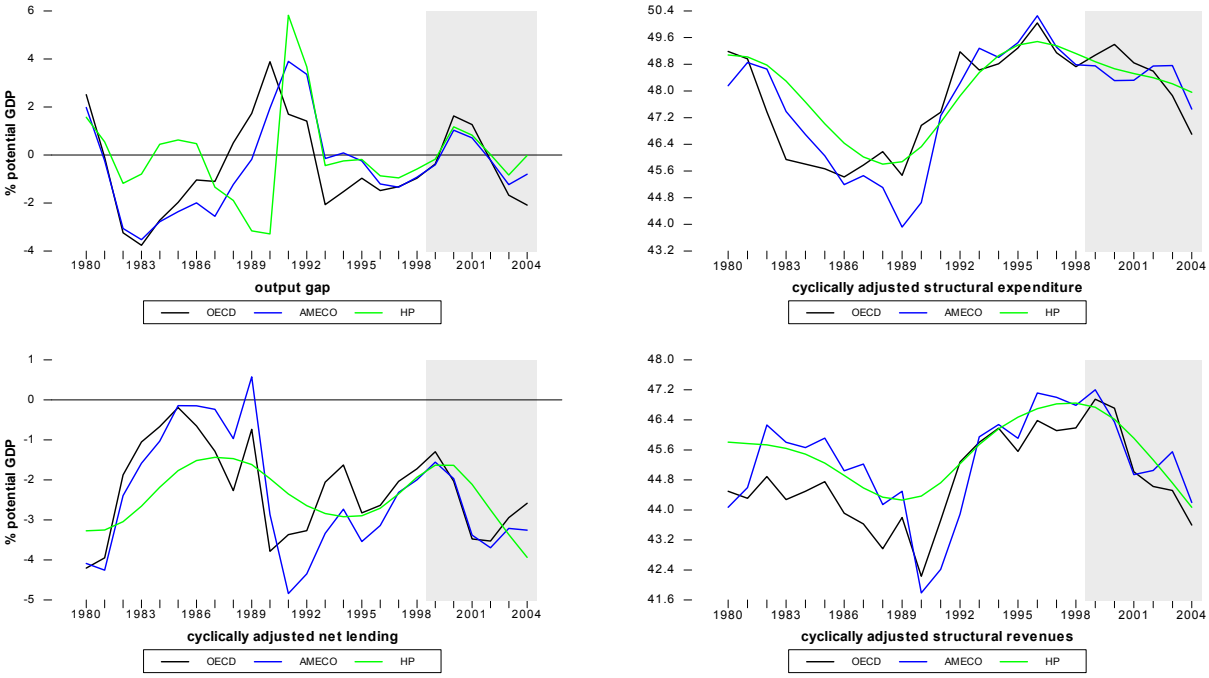
Source: AMECO database, updated on 4 April 2005. The shaded area indicates the start of EMU.

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

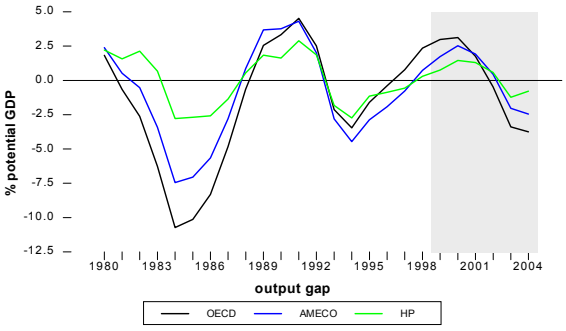
France

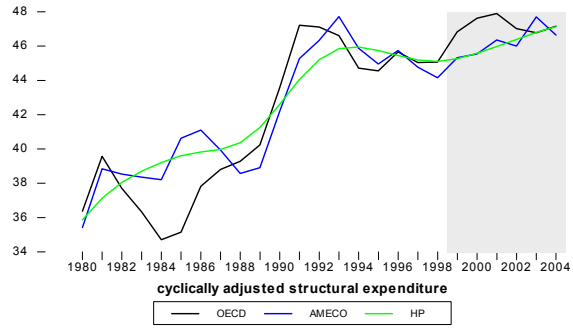


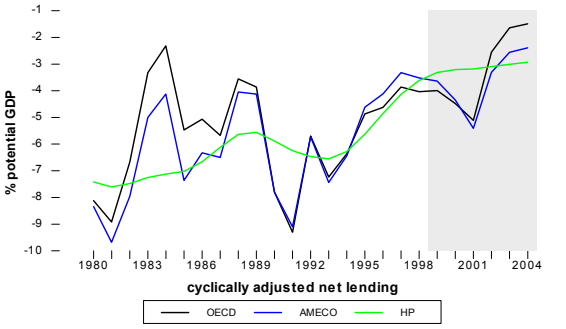
Germany

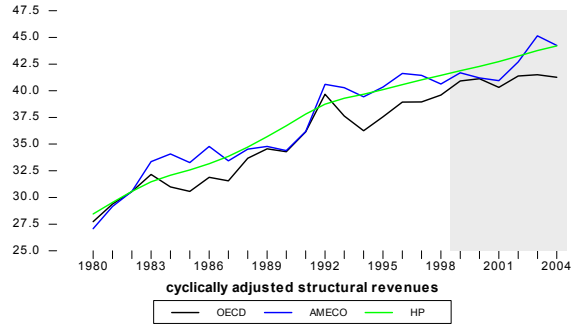


Portugal

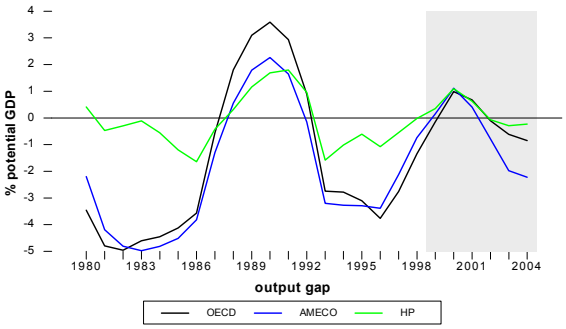


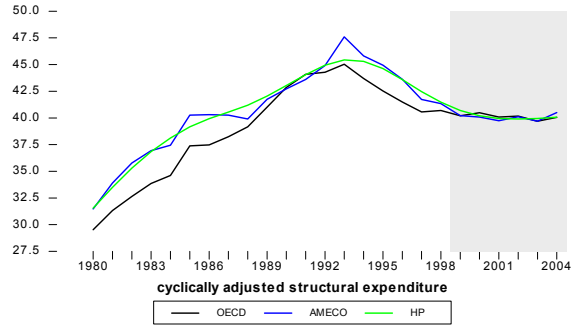


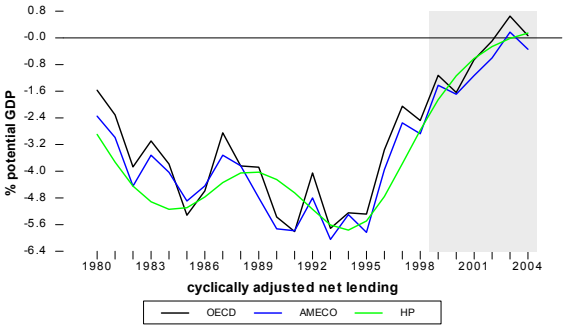




Spain







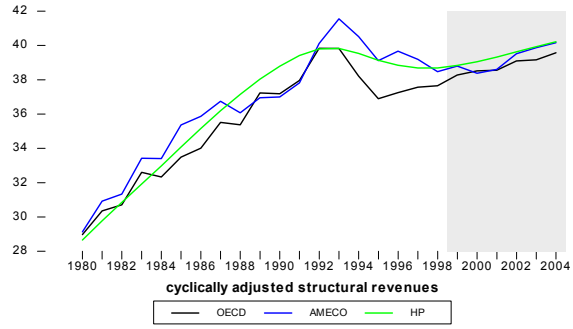
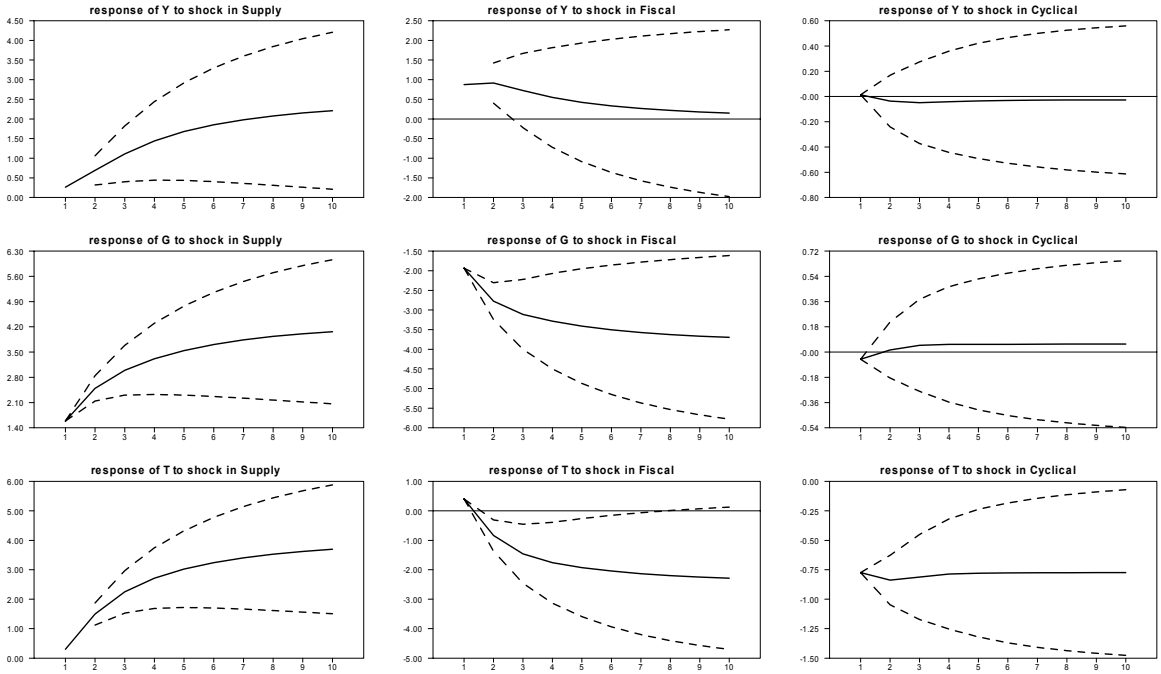
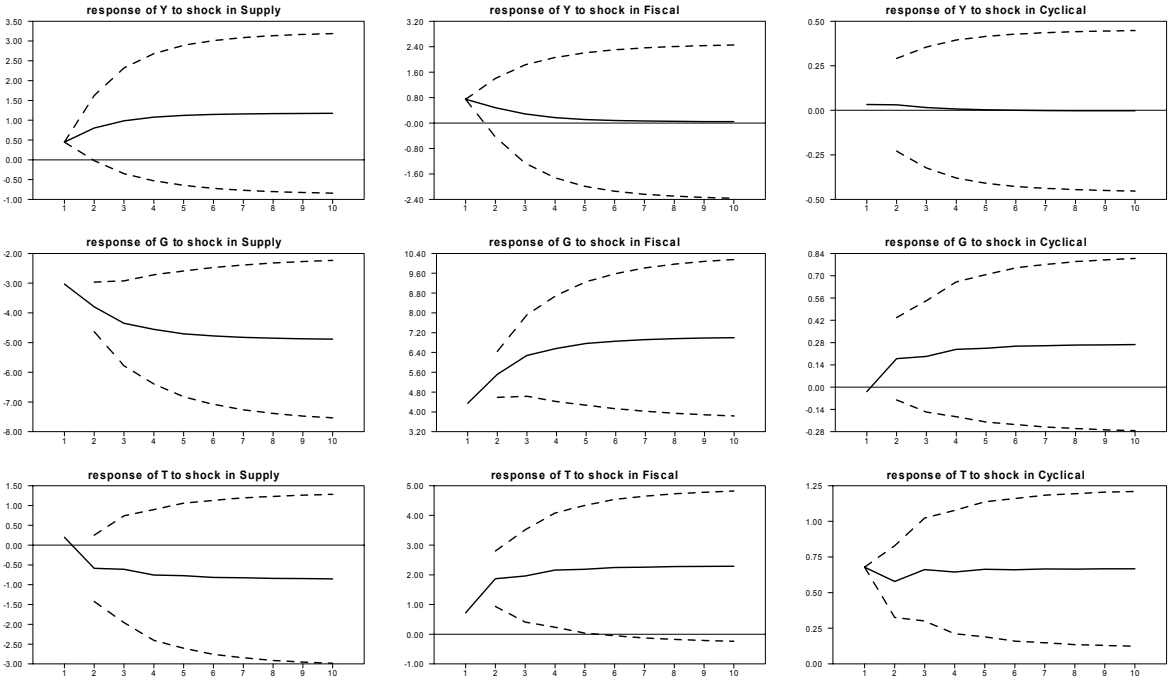


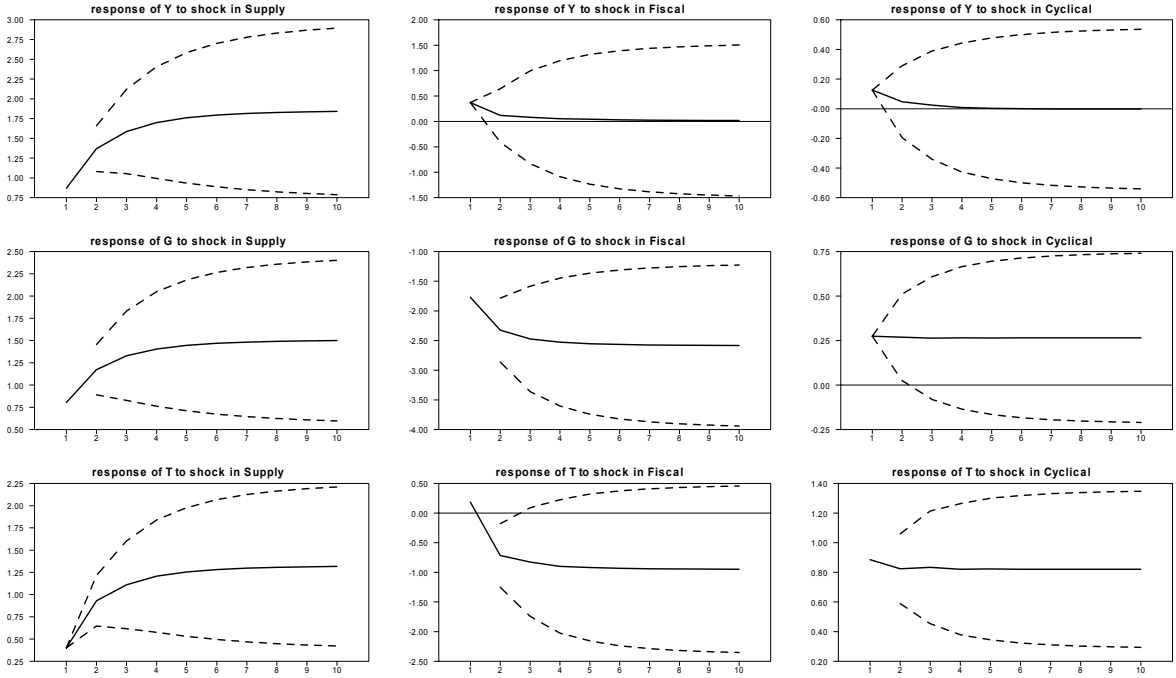
Figure 3a – Impulse responses
(response to a 1 standard deviation shock, bootstrapped responses with 5000 draws)
France



Germany



Portugal



Spain

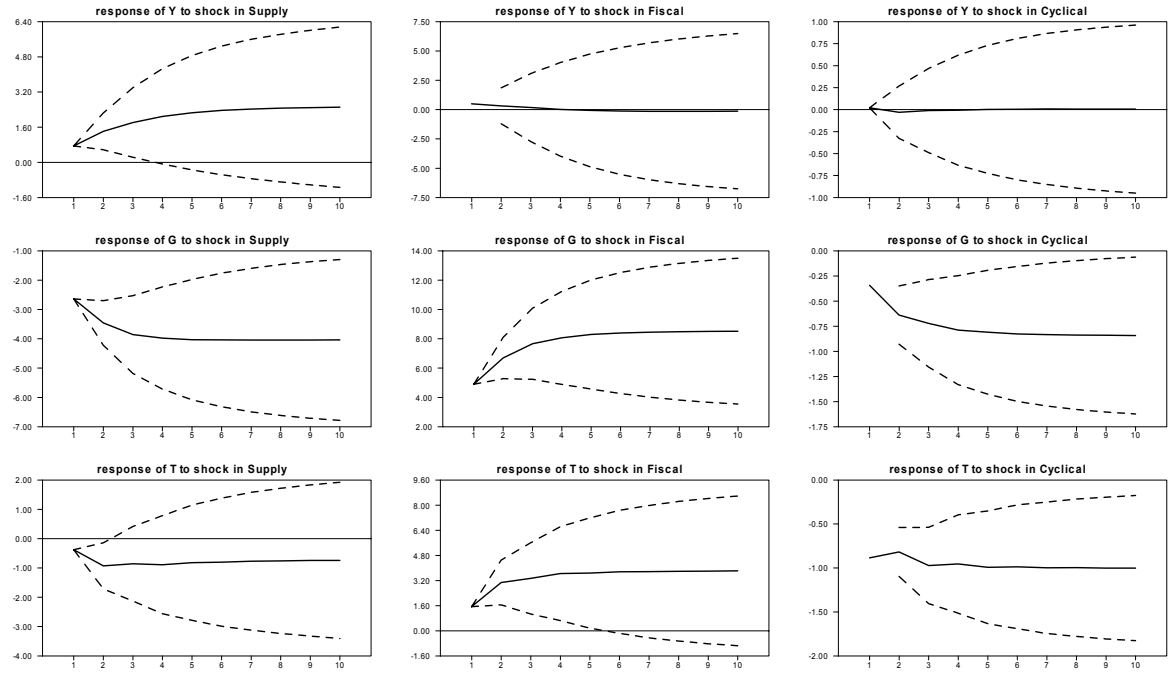
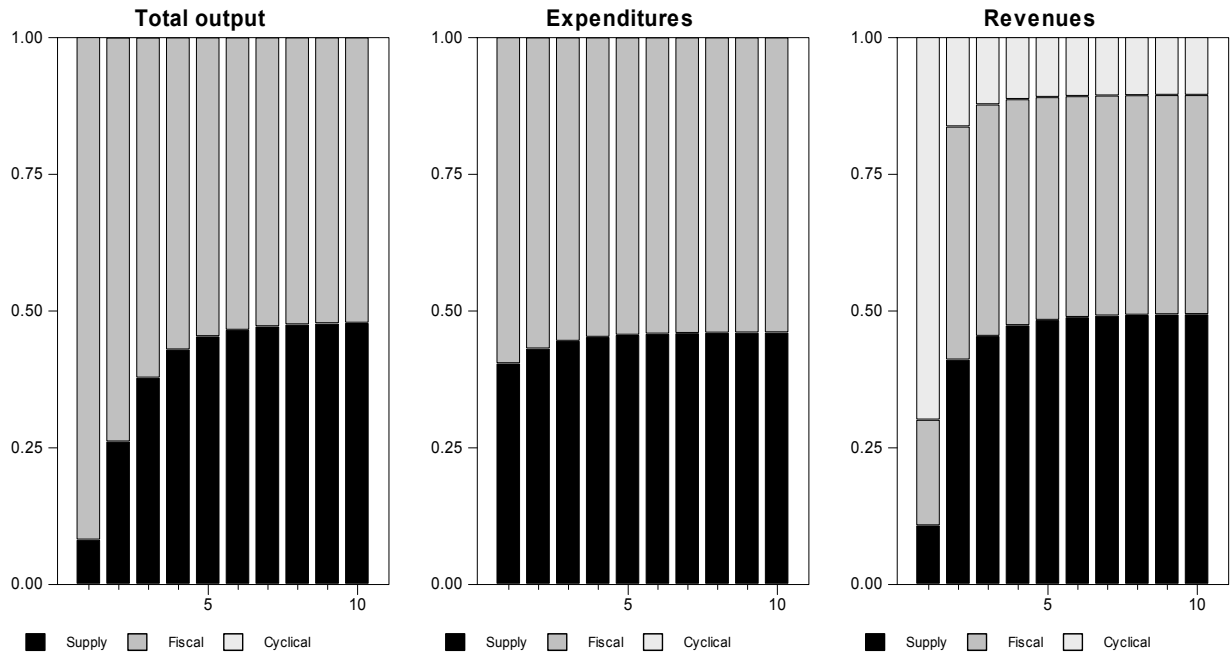
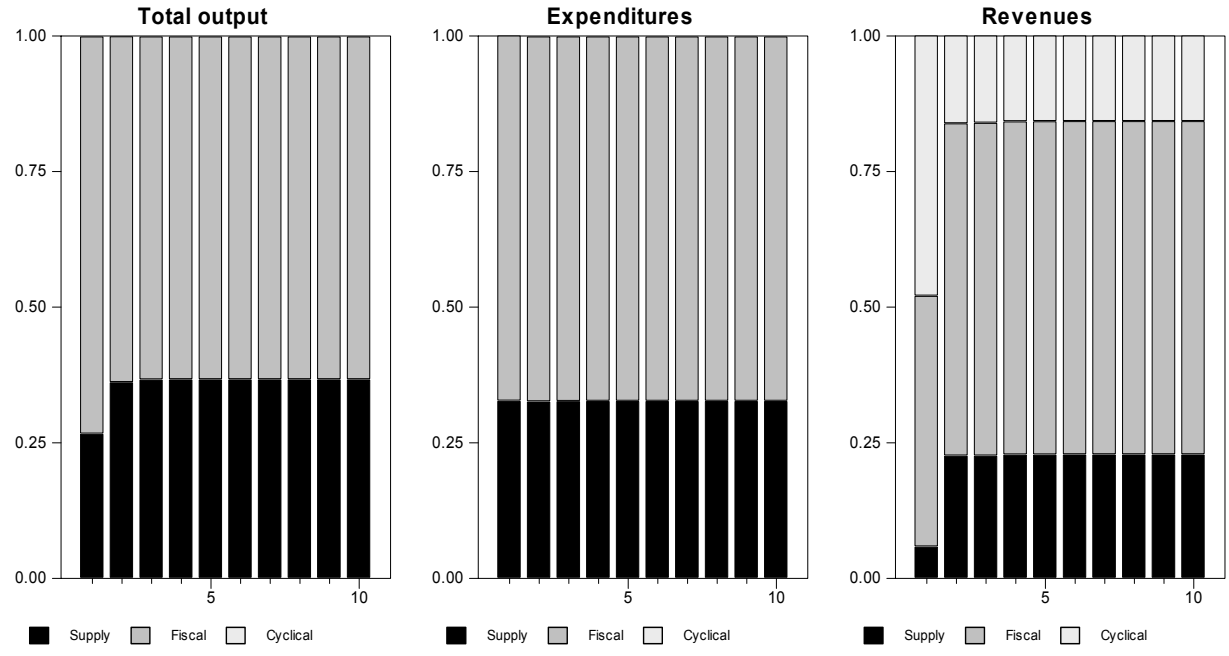


Figure 3b – Forecast Error Variance decomposition

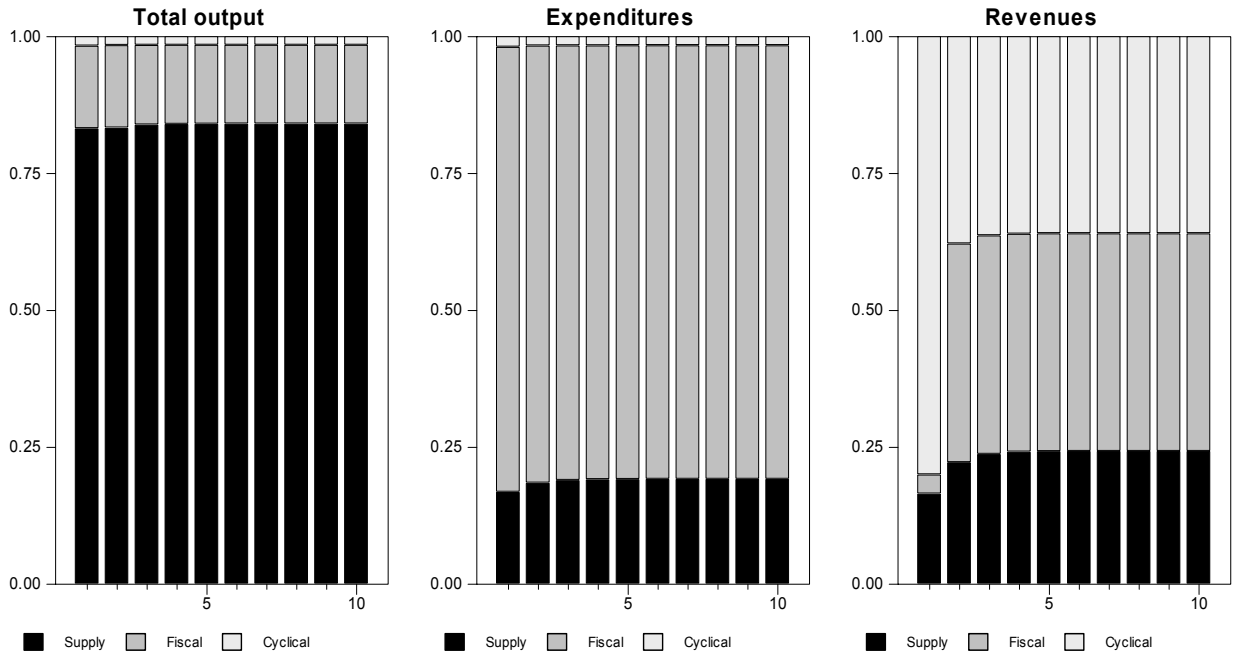
France



Germany



Portugal



Spain

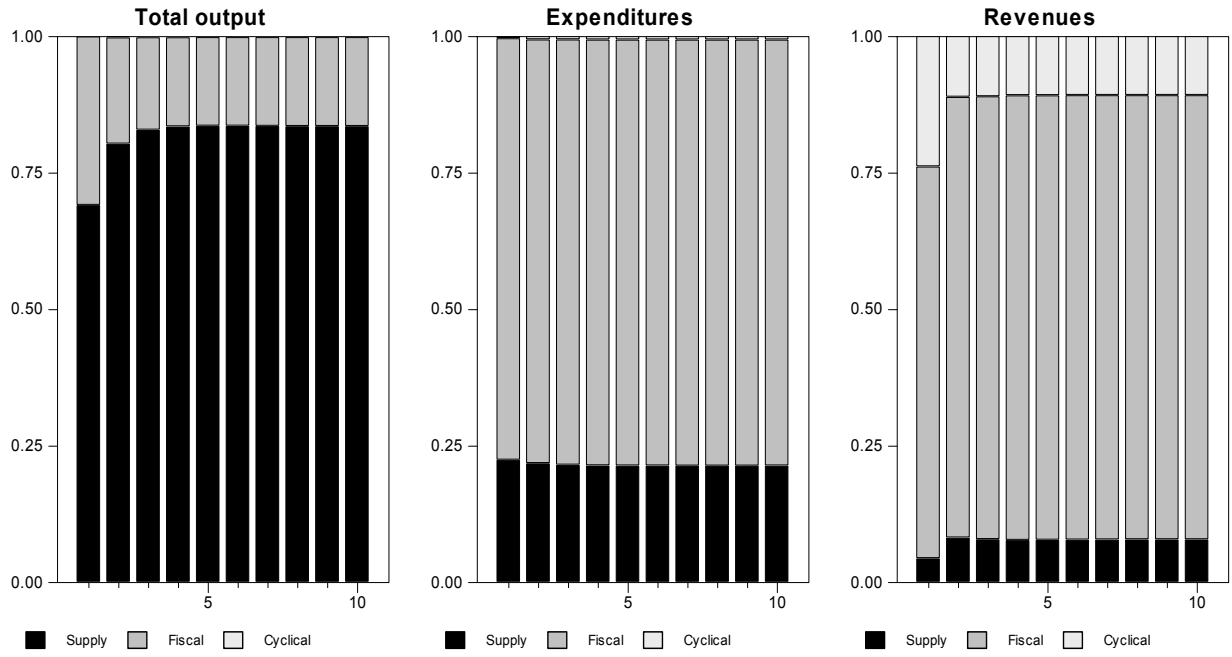
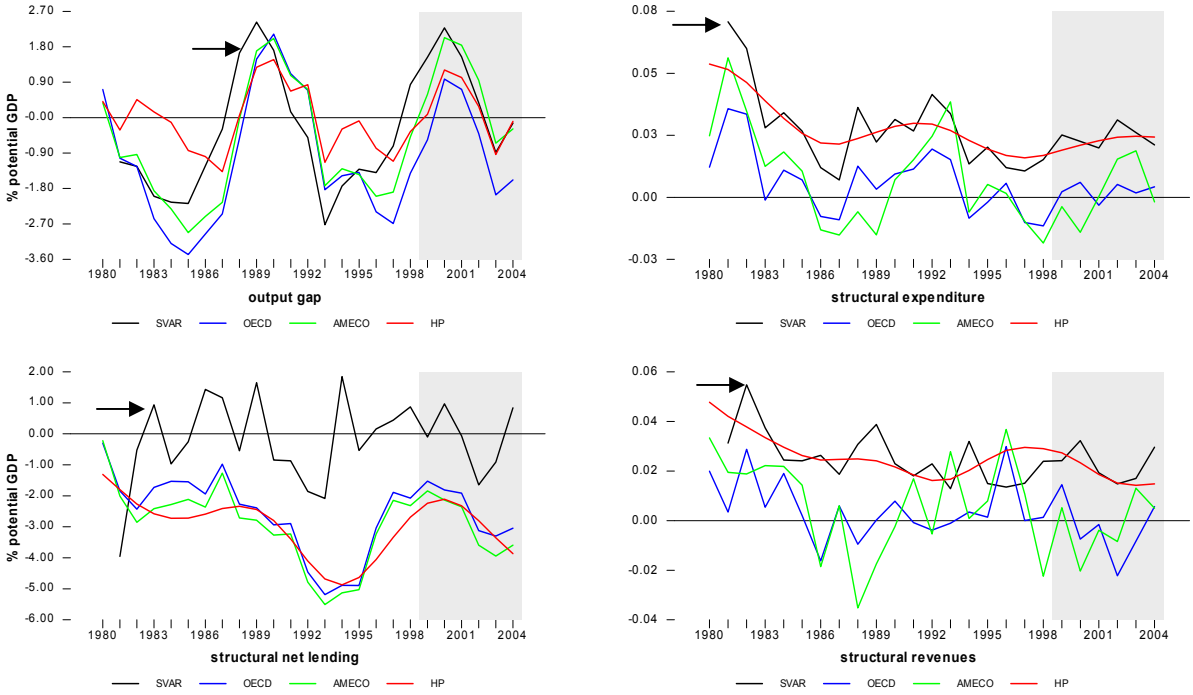
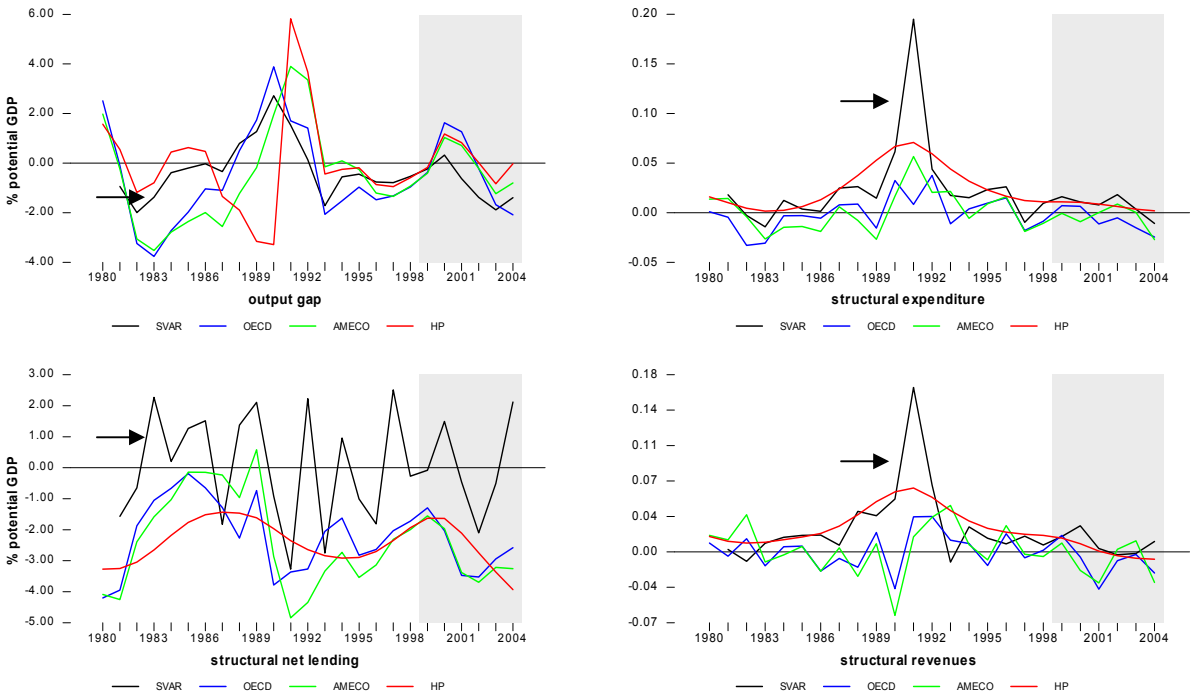


Figure 4 – SVAR-indicator of output gap, structural net lending, expenditure and revenues (% potential GDP) (indicated by arrows)

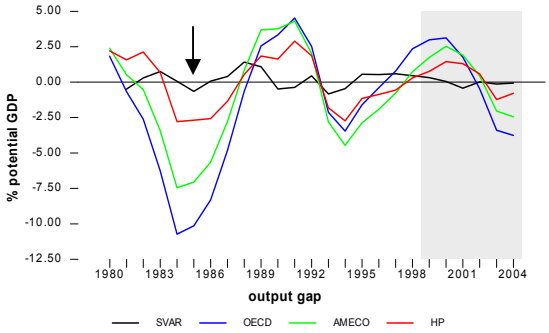
France

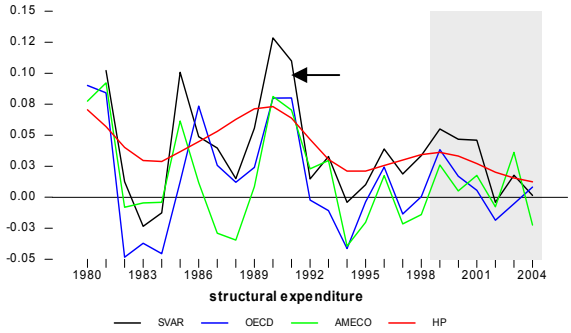


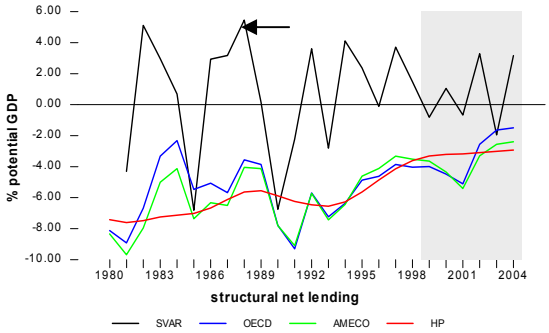
Germany

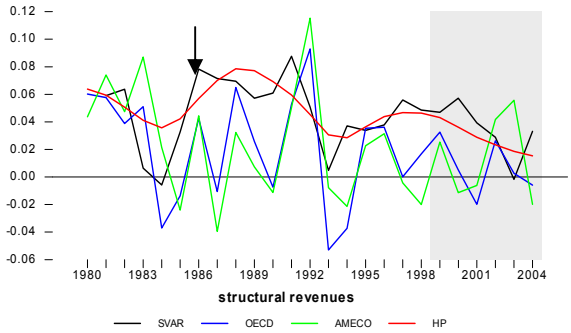


Portugal

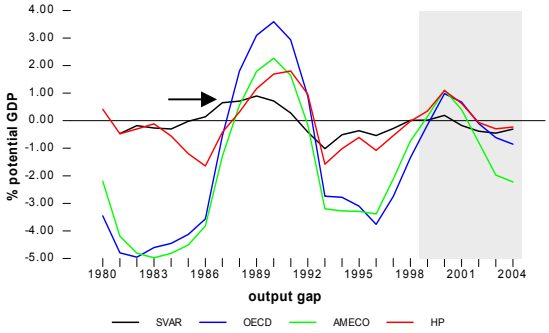


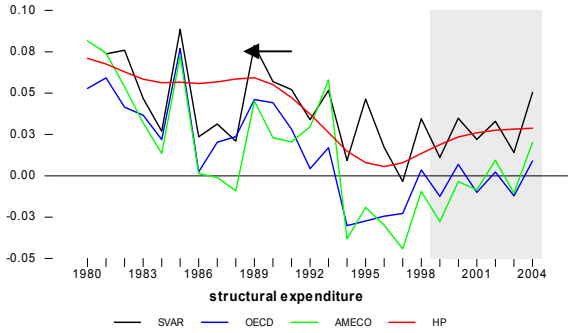


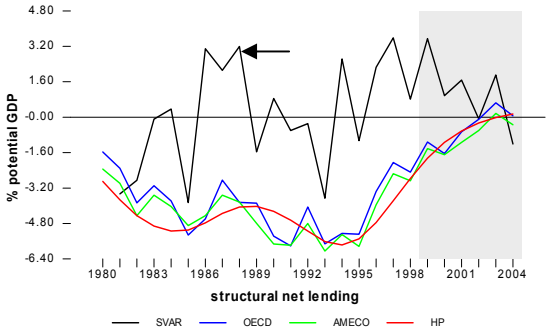




Spain







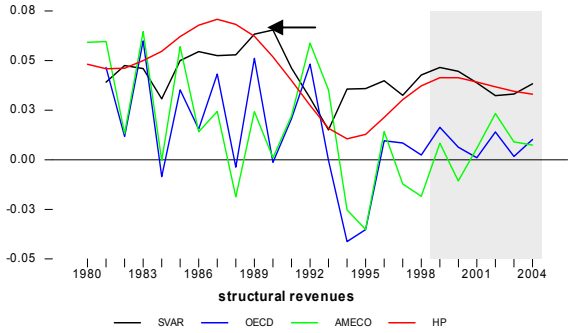
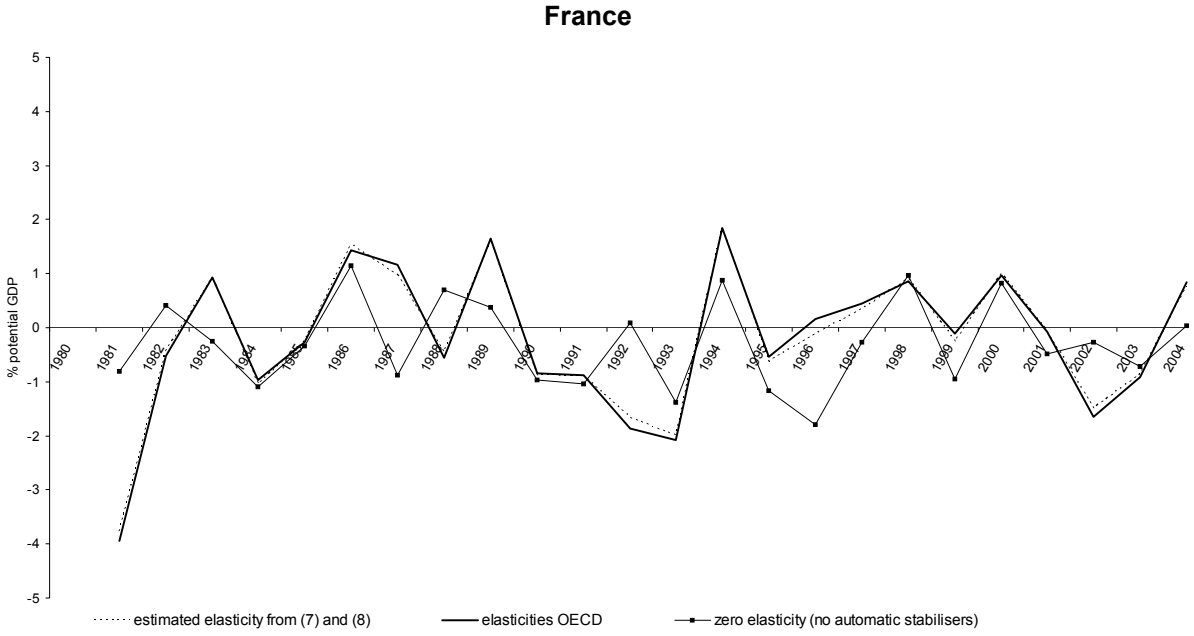
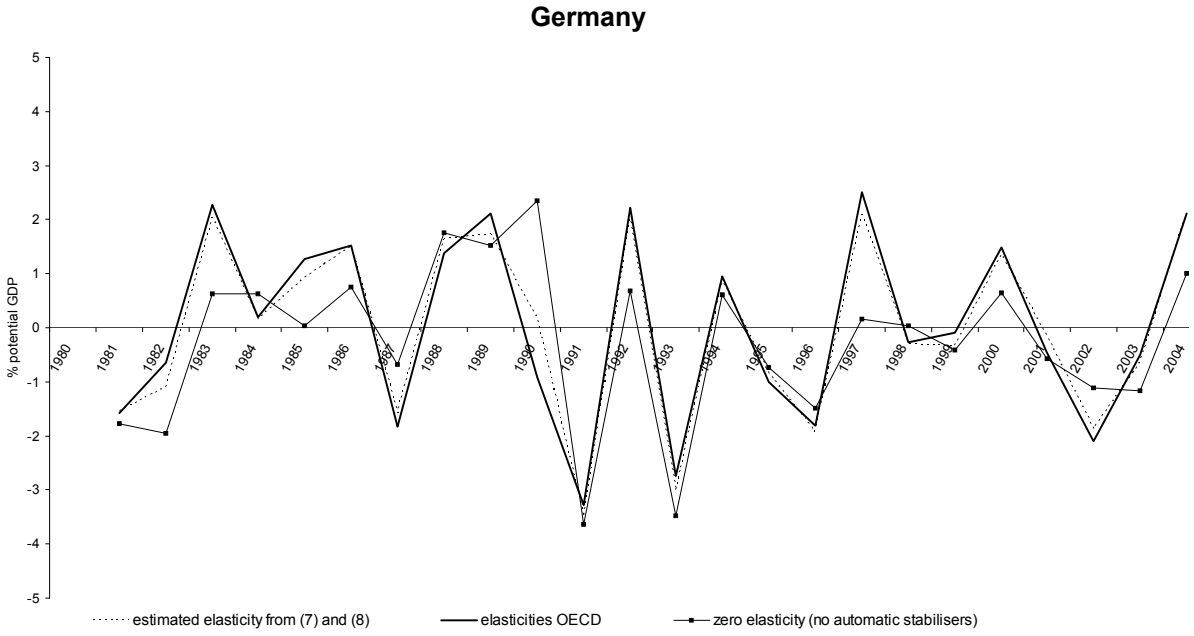
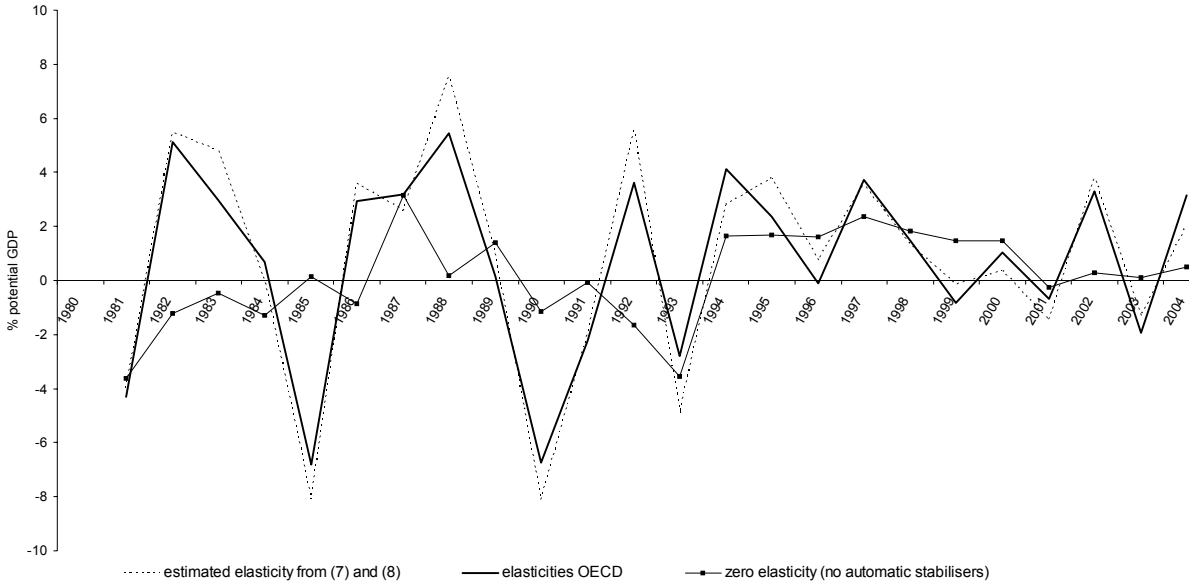


Figure 5 – Sensitivity analysis: SVAR-indicators of structural net lending (% potential GDP)

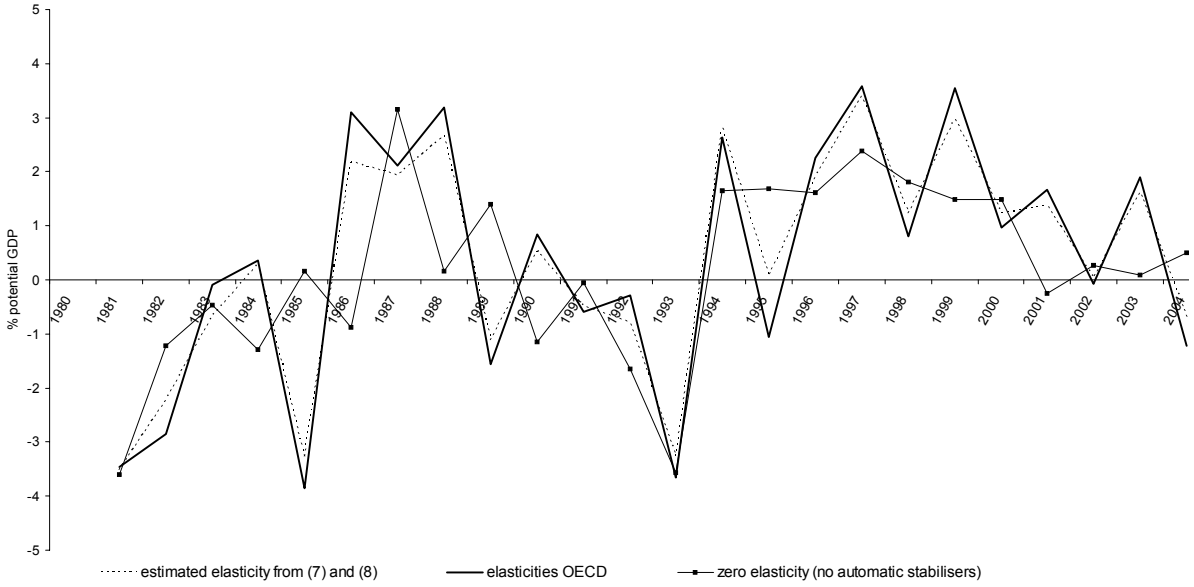




Portugal



Spain



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.	Economic Cycle Research Institute (ECRI), at www.businesscycle.com, algorithm updated in September 2005

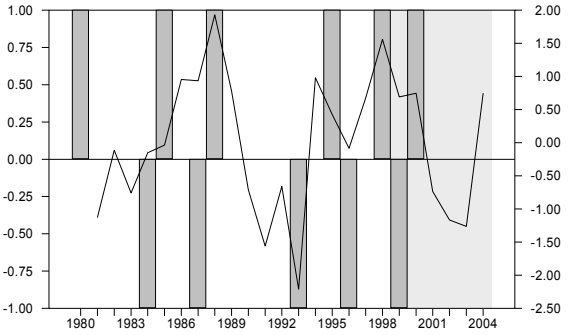
Note: AMECO data are for general government, according to ESA-95, in billions of euro (national currency definition). The UMTS licensing receipts for the year 2000, or following years, are added to total expenditure. Data are from the AMECO database, updated on 4 April 2005. Comparable data definitions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

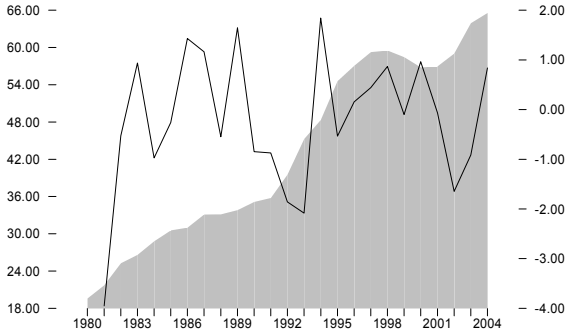
Appendix 2. The fiscal indicator: some additional results

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

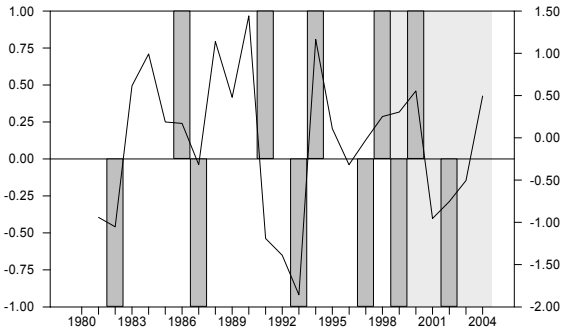
b) SVAR-indicator of fiscal balance (% potential GDP)(line, right-hand scale) versus debt ratio (% of GDP)(shaded area, left-hand scale).

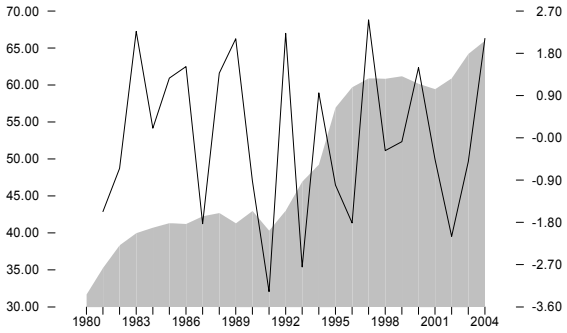
France





Germany





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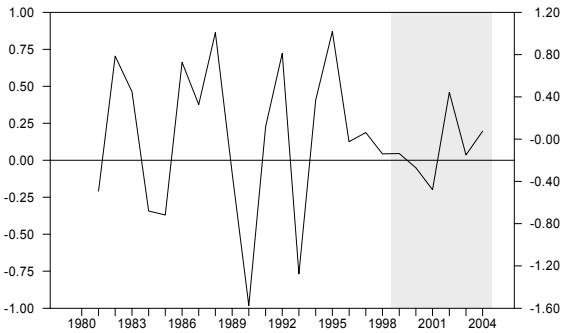

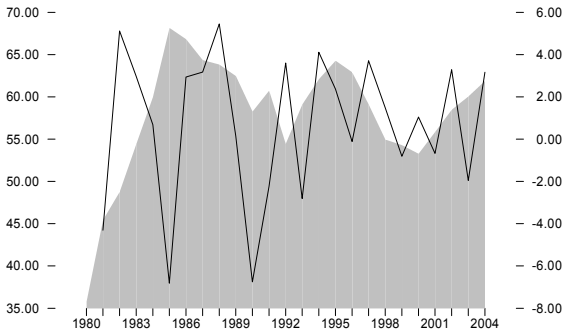

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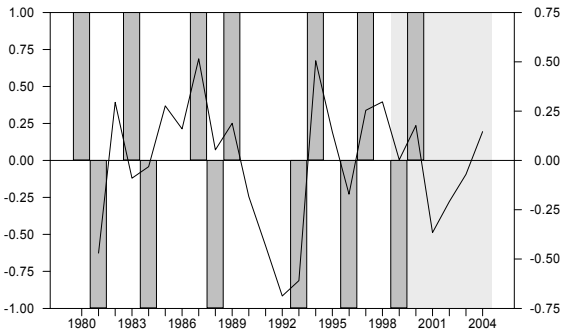
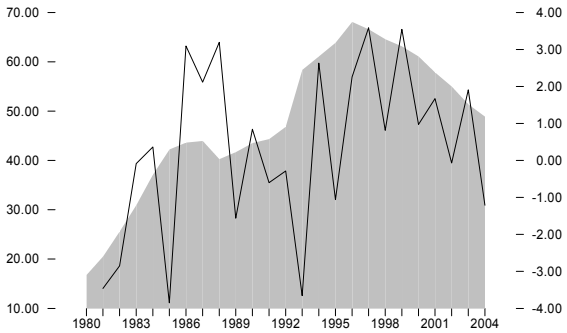
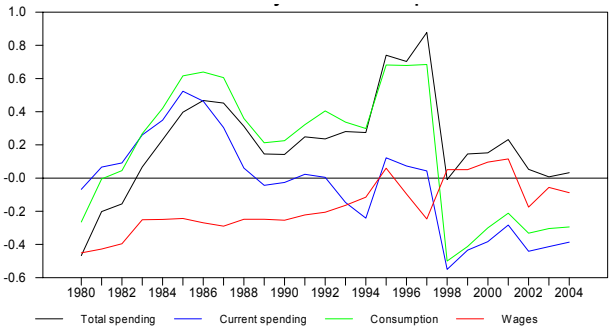
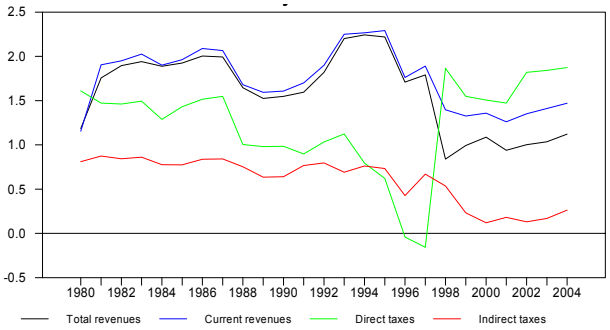




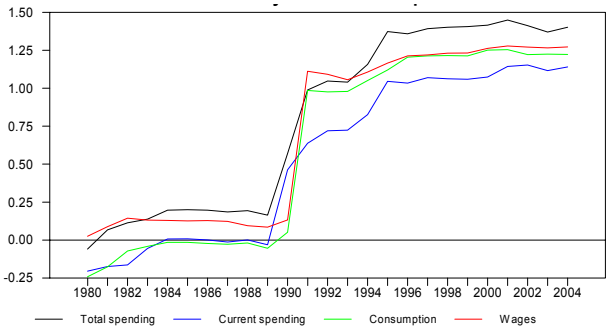
Appendix 3. Recursive estimates of budget elasticities

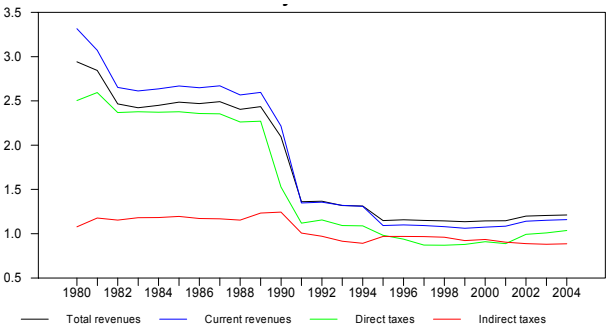
France



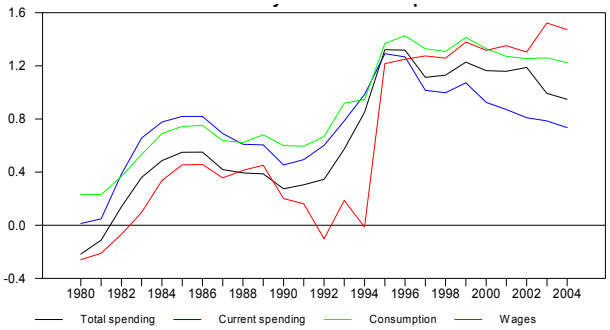


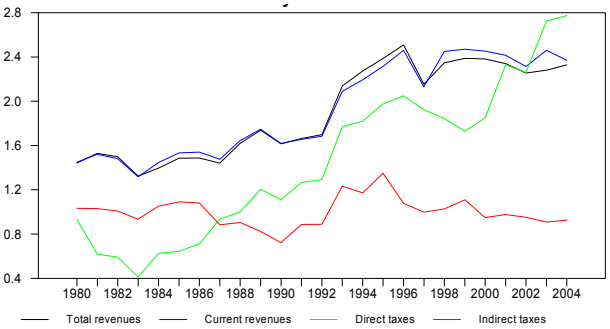
Germany





Portugal





Spain