WHAT DETERMINES FISCAL BALANCES?

AN EMPIRICAL INVESTIGATION IN DETERMINANTS OF CHANGES IN OECD BUDGET BALANCES

by Mika Tujula
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In 2004 all publications will carry a motif taken from the €100 banknote.

CONTENTS

Abstract

Fiscal balances have deteriorated quickly in recent years, bringing back to the foreground the question what factors help explain such sharp changes. This paper takes a broad perspective at the issue regarding countries included, the range of explanatory variables tried, and the time-span. The empirical analysis shows that changes in budget balances are affected by debt growth, macroeconomic developments and political factors. In particular, we find that the run-up to EMU induced additional consolidation in Europe and that budget balances deteriorate markedly in election years. Asset prices also may affect budgets, but the impact remains limited in normal times.

Non-technical summary

Government accounts in many OECD countries have deteriorated rapidly in the early 2000s. In Europe, government deficits on average have risen sharply and have exceeded the 3% of GDP reference value of the Maastricht Treaty in many countries. In the US, a discussion on consequences of vanishing public debt due to large government surpluses at the end of the 1990s was put on hold as sizeable deficits on government balances rapidly emerged.

Such events bring to the foreground the issue what factors causes such changes in government balances. Relevant questions in this context are: How strongly do changes in the macroeconomic environment affect government balances? Do general elections affect governments' incentives to stimulate the economy? Do large swings in asset and housing markets have an effect on government balances? Do different types of government (left-wing or right-wing) have different fiscal attitudes?

More insight into the causes of changes in fiscal balances improves the understanding of the budgetary processes. This may help in selecting tools to avoid the occurrence of unsustainably large government deficits and debts. The outcomes of the study can also help in forming expectations about future budgetary developments. Such insight is of particular importance in Europe given the EU fiscal framework aimed at avoiding excessive government deficits.

This paper takes a broad perspective at the causes of changes in government deficits regarding the countries considered, the time-span covered, and the potential range of explanatory variables included in the empirical approach. We focus on OECD countries as far as data availability allows, leaving 22 countries. However, we separately pay attention to the sample of 15 European countries given the EU fiscal rules under the Maastricht Treaty. In addition, estimations for a sub-set of countries provide information on the robustness of the results. The time-period covered is 1970-2002, thus also including the 1970s when many countries faced rapid fiscal deteriorations. On the basis of an overview of the relevant literature, a wide range of potentially explanatory variables has been selected, relating to budgetary, macroeconomic and political developments.

The empirical analysis is based on pooled Least Squares. In addition, White-heteroscedasticity-consistent and Seemingly Unrelated regressions estimates were also included to tackle possible heteroscedasticity respectively cross-country and cross-time correlations.

The empirical outcomes suggest that changes in fiscal balances are shaped by the fiscal starting position (last year's change in the debt ratio), macroeconomic conditions, interest rates, the election cycle, EMU-entry and asset price developments. The positive relation between budget changes and last year's debt ratio points to a self-correcting mechanism: large fiscal debts are corrected in the period thereafter, and vice versa, though the size of the effect is rather limited. Macroeconomic developments affect budgets via automatic stabilisers and fine-tuning policies. Fiscal policies have not operated symmetrically over the business cycle: governments have been more prone to stimulate economies in downswings via expanding budgets than to restrict economic growth in upswings via tightening budget balances. An increase in the long-term interest rate increases budget deficits by about 0.15% of GDP in the year thereafter, but the effect is less important in more recent years. Election years are also clearly reflected in larger budget deficits, reflecting political business cycles. For the EU countries, approaching the year in which the decision was made on early EMU participation (1998) spurred fiscal consolidation, but the data do not reveal any lasting effect of EMU on budgetary behaviour. Asset market prices (stock markets and housing prices) also affect budgetary outcomes, even though their effect normally is limited and mostly relevant in the more recent years.

Specifically with regard to the European countries, these findings imply that when setting safety margins below the 3% of GDP ceiling of the Maastricht Treaty, taking into account more factors than simply the macroeconomic sensitivity of budgets is a necessity. If not, there is an increased risk of excessive deficits because of insufficient margins below the 3% of GDP ceiling of the Maastricht Treaty increases.

1. Introduction

Budgetary balances deteriorated substantially in the early 2000s, both in Europe and in the US. Deficits in many European countries, including the large countries Germany and France, have surpassed the 3% of GDP reference value that the Maastricht Treaty contains for government deficits. Across the Atlantic, budgetary discussions in the US in the second half of the 1990s focused on consequences of a very low or even a disappearing government debt. Now, the US again faces significant deficits, 3.7% of GDP in 2002. After several years of steady improvements in public finances, these adverse developments provide a reminder of how quickly fiscal balances can deteriorate.

Such events call for more insight in the factors that result in changes in fiscal balances. This study may contribute to signalling upcoming changes at an early stage, and to finding remedies especially to prevent or limit very sharp changes. We do not find other studies in this area fully satisfactory in terms of their time coverage, the span of countries involved, and/or the specification of dependent and explanatory variables.

The main aim of our paper is to identify the main factors causing changes in fiscal balances. We do this for the set of OECD countries as far as data availability allows. However, given the fiscal deficit limits that apply now in the EU, we also separately consider the EU sample. Section 2 first describes the background for this study in more detail, while section 3 provides a history of fiscal developments in the OECD sample. After describing the various factors that may result in changes in fiscal balances and our research strategy (section 4), we present the results (section 5). The final section of the paper (section 6) contains conclusions.

2 Motivation

The motivation for this study first of all stems from a positive analysis of public finances: what factors contribute to changes in budget balances? To what extent do the changes in the macroeconomic environment affect fiscal outcomes? Is there a political business cycle? Is there a built-in correction mechanism in public finances, with governments responsive to increasing debt levels? Are some political or fiscal institutions effective in avoiding or redressing high deficits?

While the study cannot give full answers to all questions of interest, it aims at throwing some light on the importance of various factors by adopting a broad approach.

The questions above receive special attention in the European Union, with avoidance of excessive deficit being an entry condition to EMU, and remaining a requirement after adoption of the euro. Compliance with budgetary discipline is examined on the basis of reference values for the general government deficit ratio (3% of GDP) and for the gross debt ratio (60% of GDP). In case of continued non-compliance, a number of consecutive steps can be taken, which ultimately could lead to the imposition of fines. In addition, the 1997 Stability and Growth Pact requires countries to respect a medium-term budgetary position objective of close to balance or in surplus. Such a position allows countries to deal with normal cyclical fluctuations, while avoiding that the government deficit goes above the 3% of GDP reference value for the deficit. Apart from cyclical variations, there are other sources of budget volatility that need to be taken into account to reduce the risk of excessive deficits. In 2001, the ECOFIN Council endorsed the Content and Format of Stability and Convergence Programmes[1], which states that a medium-term budgetary position

> "…has to take account of several elements, such as the possibility to deal with adverse cyclical developments and other unforeseen risks whilst respecting the government deficit reference value, the need to take account of other sources of variability and uncertainty in budgets, and the need to ensure a rapid decline in high debt ratios."

This study tries to contribute to identifying factors that cause additional volatility and may result in sharp changes in the government budget balance.

While focussing on causes of changes in budget balances, it has to be recognised that changes in deficits themselves may have economic consequences. There is a vast volume of theoretical and empirical economic literature focussing on the consequences of deficits and debts on macroeconomic variables including interest rates, exchange rates, inflation, savings, employment and economic growth.[2] On the latter, for instance, it can be argued that budgetary volatility makes it more difficult for economic agents to discover the underlying course of public finances. Agents may not fully and directly distinguish incidental and cyclical factors causing sharp changes in budget balances from permanent shifts in fiscal policies. Uncertainty may lead them to postpone decisions with longer-term consequences such as investment, thus potentially contributing to lower economic growth in the medium and long term.

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[1] Countries within the EU submit annual stability programmes (euro area countries) or convergence programmes (non-euro area EU countries), specifying their medium-term budgetary targets.
[2] Hemming et al. (2002) provide a good overview of macro-economic consequences of changes in budgets.

Tax-smoothing models (e.g. Barro (1979)) provide a theoretical rationale for varying budget deficits. The theory suggests that temporary expenditure shocks can be fully reflected in deficits, thereby avoiding distortionary costs associated with tax rate variations. However, the observed cross-country-variation in fiscal behaviour, and fast increasing debt ratios in the 1970s and 1980s, cannot be reconciled with this theory (Alesina, Roubini and Cohen (1997)). Thus, this theory does not seem to explain changes in government fiscal positions.

3   The stylised facts: three decades of fiscal ups and downs

The geographical focus in this study is the OECD area, as far as data availability allows, with special attention paid to the 15 countries formally constituting EU. The sample starts in 1970, thus including the economic recession of the early 1970s and its effects on government balances. The sample ends in 2002, capturing some recent fiscal deteriorations. In addition, for the EU countries it includes years in the run-up to EMU, as well as the first experiences with EMU. Data refer to general government fiscal balances.

Chart 1 shows the average general government deficit in the period covered for the three major currency areas. It shows euro area and US deficits moving broadly in parallel until 1994, after which US deficits lead euro area developments. In both monetary areas, 2001 saw a reversal of fiscal improvements that had started around the middle of the 1990s. In Japan, developments were broadly in line with those in the two other major currency areas until 1980. After that, movements were contrary, with Japan reaching a record deficit of more than 10% of GDP in 1998, and staying at high levels unprecedented in the euro area and US thereafter.

Chart 1. Deficits in major currency areas, 1970-2002 (as a percentage of GDP)
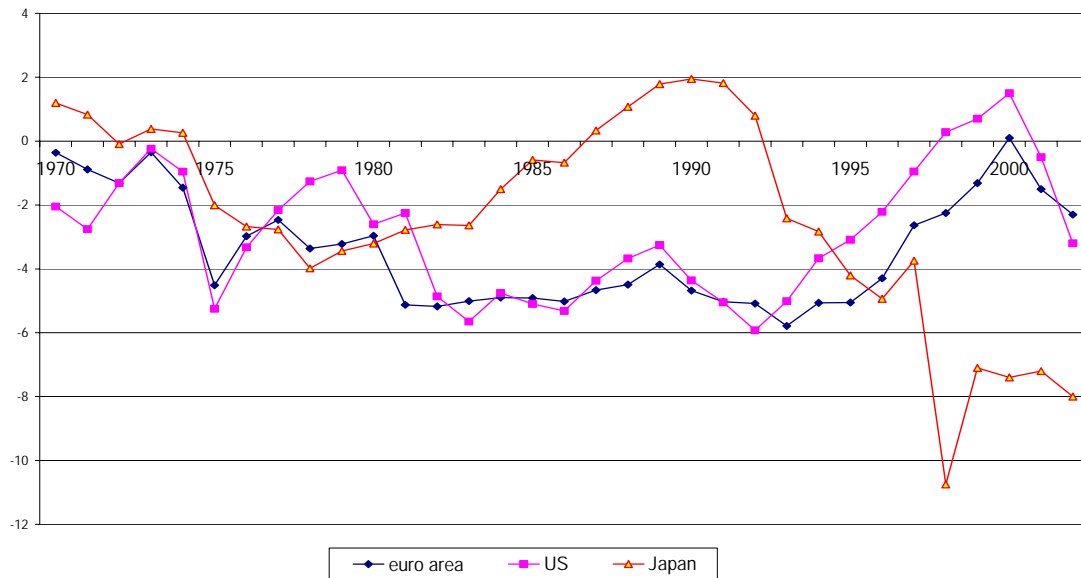
The degree of budgetary volatility has been very diverse across countries. As an illustration for that, chart 2 depicts the largest surplus and the largest deficit recorded over 1970-2002 per country, with countries ranked according to the difference between these two.

Chart 2. Maximum and minimum budget balances per country, 1970-2002 (as a percentage of GDP)
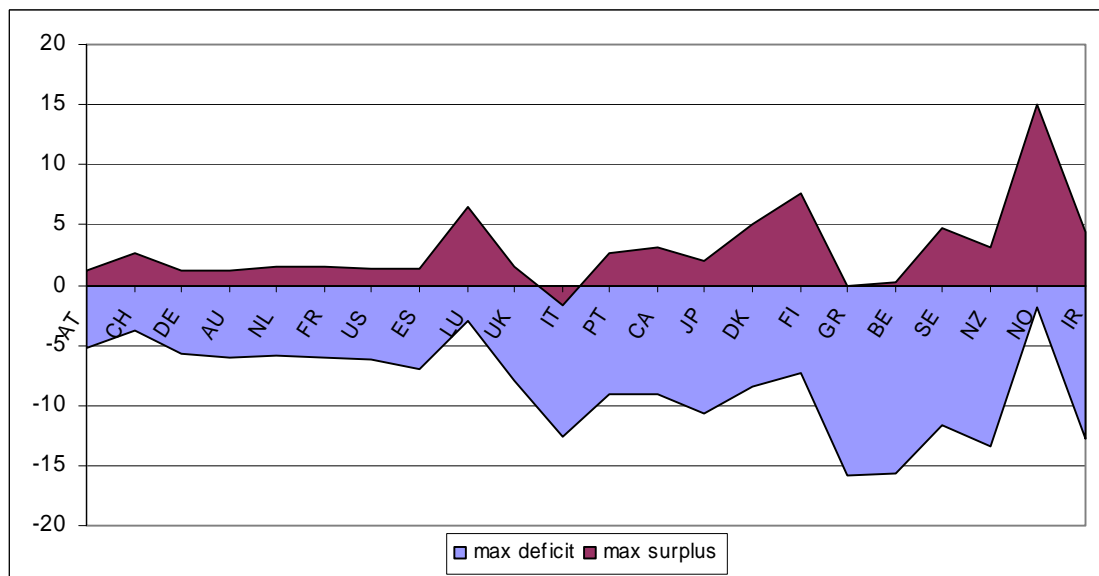
With differences being marked, three other observations are worth mentioning. First, on average, larger countries exhibit smaller dispersion in budget balances. This probably reflects the fact that these countries are less sensitive to economic shocks because of their size and their economies being less dependent on the exports sector, translating into smaller cyclical fluctuations in budgets. In addition, the budgetary sensitivity in the larger countries usually is somewhat smaller than in the smaller ones, since the share of government sector in the whole economy is inversely related to the country's size. Secondly, stability-oriented countries like Austria and Switzerland also have a low score on the fiscal dispersion index. Results did not change much when using standard deviations instead of the high-low differences. Finally, larger dispersion on average is related to larger deficits, and less to larger surpluses. While only few countries have observed surpluses over 5% of GDP, the large majority of countries experienced deficits above 5% of GDP in at least one year in the period observed.

Additional information on fiscal policies in the period 1970-2002 stems from considering changes in fiscal outcomes. Charts 3 and 4 below give some additional insight in the time- and cross sectional distribution of large fiscal changes. In particular, we focus on deteriorations, which often take place quicker than budgetary improvements. A large fiscal deterioration is defined as a worsening in the government budget balance that amounts to at least 2% of GDP during one year. In chart 3, the vertical axis measures the number of large fiscal deteriorations in the period 1970-2002, while in chart 4 the number of countries experiencing a large fiscal deterioration in a particular year is given on the vertical axis.

Chart 3. Number of large fiscal deteriorations in the OECD per country, 1970-2002
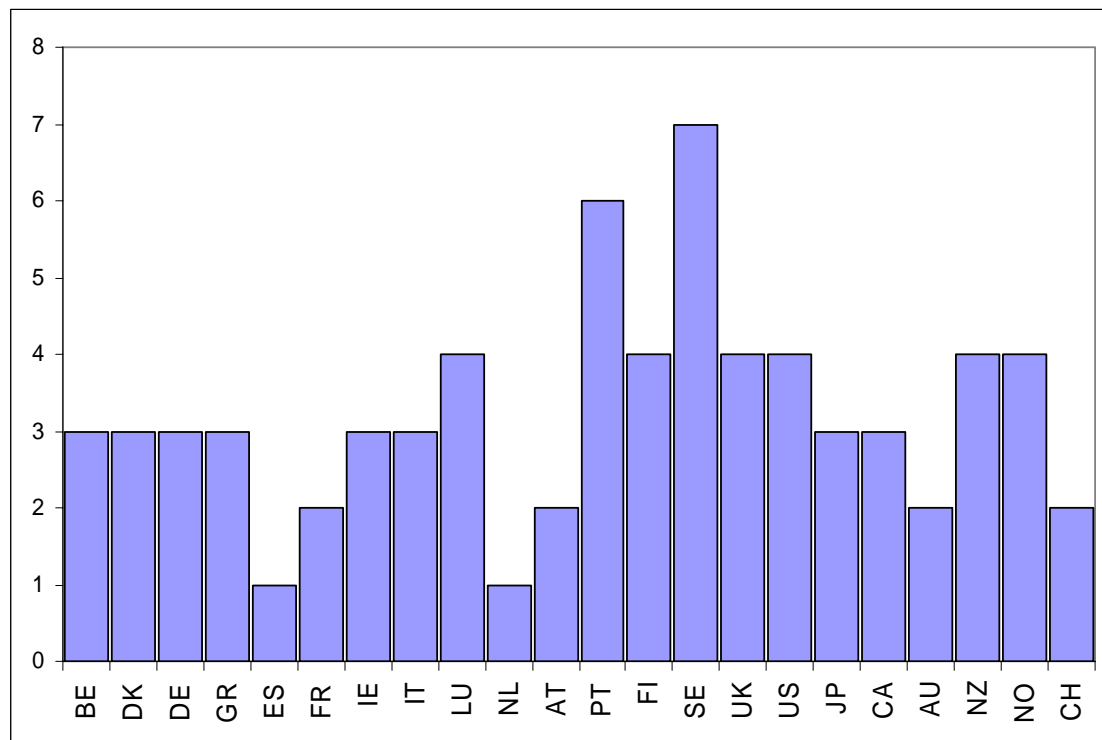
Portugal and Sweden stand out as countries with deficits deteriorating relatively often by 2% of GDP or more on an annual basis, whereas Spain and the Netherlands only experienced one such episode over the last three decades. The time profile in chart 4 shows a sharp fiscal deterioration in 14 of the 22 sample countries in 1975. Other years/periods in which many countries suffered from large budgetary setbacks were 1982, 1992-1994, and 2002. This underlines the usefulness of including the early 1970s in our sample, adding many interesting cases, while also showing the value-added of including recent data.

Chart 4. Number of large fiscal deteriorations in OECD countries per year, 1970-2002
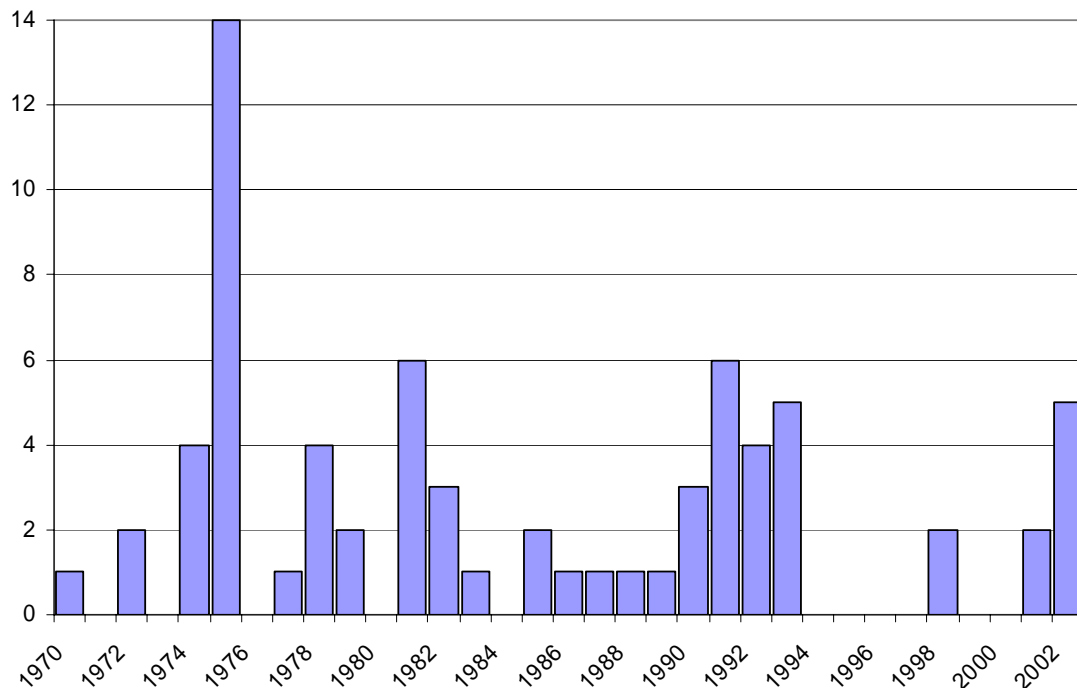
4   Factors causing changes in fiscal balances

The analysis of budget deficits is all but a new topic. Increasing budget deficits and debts after the first oil crisis boosted economic research into the causes of budgetary changes. Initially, emphasis in such studies was on economic and fiscal factors explaining observed budgetary trends. Later, attention shifted to explaining cross-country variations as common economic circumstances coincided with divergences in countries' fiscal behaviour. Behavioural effects were taken into account, with particular attention paid to political-economy aspects, more or less starting with Roubini and Sachs (1989a). Political aspects included fragmentation, measured e.g. by the number of spending ministers or the number of political parties in government. Also the political orientation of the cabinet has been taken into account (e.g. Carlsen (1997)). The political business cycle has been used as explanation of budget increases around election dates. The role of direct democracy (referendums) has been included as well (Feld (2002)). Also features of the budgetary process were examined in analysing differences in fiscal outcomes; Alesina and Perotti (1999) highlighted the role of budgetary procedures, while Hallerberg and Von Hagen (1999) emphasised the role of budgetary institutions in explaining budgetary outcomes. Extensions have

been made regarding the countries covered, including countries from central and eastern Europe (e.g. Gleich (2003)) and developing countries (e.g. Woo (2003)).

While providing useful information on the determinants of changing budgetary positions, previous studies on this topic do not fully meet our demands. Many of them are not recent, thus not including the creation of EMU in the countries of the European Union, and the period of deteriorating deficits around and after the turn of the century. Furthermore, the specification of both dependent and independent variables often leaves much to be improved upon, with many studies focussing on one or a limited number of the explanatory variables only. While often looking at political-economy aspects, other factors, such as asset price developments, tend to be ignored. Our approach to measuring factors resulting to changes in fiscal balances is as follows.

A. Choice of dependent variable

A first choice in the analysis concerns the budgetary variable to concentrate on. A wide variety of fiscal measures is available, including deficits and debts, and nominal or cyclically adjusted data.

- The debt ratio, either net or gross, has been used on the basis that it is a broader measure of government activities than the deficit (e.g. De Haan and Sturm (1997)).[3] However, governments usually define their annual budgetary targets in flow terms (deficits) rather than in stock terms (debt). This is partly because stock variables are harder to target as factors outside direct government control (for instance economic growth, exchange rate changes and asset price changes) affect stock variables more than flow variables. Thus, this study will focus on deficit data rather than debt data.

- Instead of nominal budget data, some studies concentrate on cyclically adjusted data (e.g. Perotti and Kontopoulos (2002)), sometimes excluding net interest payments. Correcting deficits for the effects of the business cycle in principle gives a better measure of the policy-related part of the budget, and reduces the simultaneity bias that may arise as budgets and economic growth interact. However, there are serious caveats in estimating cyclically adjusted balances, notably defining trend/potential output. Interest payments can be taken out so as to distinguish between the automatic effects of interest rate changes on budgets and the fiscal policy reaction to that.

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[3] Roubini and Sachs (1989b) in particular argue for using *net* debt on economic grounds. De Haan and Sturm (1997) prefer *gross* debt data as these are statistically more reliable.

- Another question concerns the use of central versus general government data. The former has been advocated on the ground that fiscal changes usually originate from this part of the government sector (Volkerink and De Haan (2001)). General government, however, has a wider coverage, and non-central government sectors in some countries play a major role in budgetary activities. Moreover, the general government is the relevant concept in the context of the EU fiscal policy framework.

Taking into account the above considerations, as well as data availability, we will use nominal general government budget balance as the dependent variable in our analysis.

B. Independent variables

As to the factors explaining changes in budgetary outcomes, one can distinguish budgetary, macroeconomic, political and dummy variables.

Budgetary variables

- *Change in debt ratio.* The debt-to-GDP ratio captures concerns on the sustainability of fiscal policy. On that account, increasing debt ratios should lead to an improvement in the budget balance. It could therefore be expected to enter the equation with a positive sign. The change in the debt ratio may however show up with a negative sign in the estimations. A higher debt ratio automatically causes a rise in interest payments, resulting in a worsening of the fiscal balance, which is our dependent variable.

  On the specification of the debt variable, a quadratic formulation has been suggested (Melitz (2000)) revealing that higher debt levels induce more stabilising fiscal reactions. Another suggestion has been to use interest rate-growth adjusted debt ratios (Roubini and Sachs (1989a)). This adjustment reflects the fact that government debt ratios may not give rise to sustainability concerns if output growth exceeds the real interest rate.

- *Lagged budget balance*. Lagged budget changes could be introduced in the estimation equations on account of corrections to past budgetary imbalances. Large changes in budget deficits in the past may induce governments to undo part of the past increase. Changes in fiscal balances may also result from budgetary inertia. This means that the past fiscal policy

decisions such as the implementation of tax reforms and major spending reforms can affect public finances in the following years as well. However, lagged dependent variables are known to produce inconsistent estimates. Considering that changes in the debt ratios already will be included, we decided to exclude the lagged changes in the budget balance as a right-hand side variable.

Macroeconomic variables

- *Unemployment rate/output growth/output gap.* These variables measure the fiscal responsiveness to macroeconomic conditions. They operate mainly through automatic stabilisers, via tax revenues and unemployment-related expenditures. An additional effect could arise from discretionary fine-tuning efforts. Anti-cyclical policies aim at stabilising economic growth around potential. In a recession, this calls for additional deficits, while in a boom a contractionary budget helps dampening cyclical upswings and avoiding overheating of economies.

  Literature points to possible asymmetries in fiscal responses to recessions and upturns (e.g. Mayes and Viren (2000)). In recessions, governments pursue expansionary policies to combat the downturn, but in economic upswings the cyclical budgetary proceeds are used for cutting taxes or increasing spending rather than for additional consolidation.

- *Long-term interest rate.* A high interest rate worsens the overall budget balance via increasing interest expenditure on newly issued debt and on rolling debt. On the other hand, higher interest rates signal higher opportunity costs of bond market financing, possibly urging governments to improve the fiscal balance. Overall, however, the first effect is expected to dominate, thus producing a negative correlation between interest rates and budget balances. An alternative measure could be interest expenditures as a percentage of GDP, on the ground that effects of high interest rates on fiscal policies depend on the prevailing debt level (e.g. Volkerink and De Haan (2001) and Eschenbach and Schuknecht (2002)). However, it would enter then in the estimation equation being part of an accounting identity.

- *Inflation.* Inflation often is included among the variables affecting the budget balance. It may have an automatic effect on government receipts and expenditures through nominal progression in tax rates and tax brackets, and via price-indexation of receipts and

expenditures. In addition to this automatic effect, including this variable may be justified by assuming governments to adjust policies in case of inflation, for instance because high inflation erodes competitiveness and risks causing pressures on fixed exchange rates for countries participating in an exchange rate agreement (Kontopoulos and Perotti (1999)). It may also result in an increase in long-term interest rates and thus have a negative effect on investment and economic growth. On the other hand, governments might also welcome inflation as it erodes the real value of nominal government debt. Thus, the overall effect of inflation on budget balances is not *a priori* clear.

- *Short-term interest rate*. In setting fiscal policy, the monetary policy stance may be an argument. The expected reaction, however, is ambiguous. High short-term interest rates to reduce inflationary pressures could be supported by fiscal policy or it could be countered, depending on policy preferences, views on the operation of the economy, and the allocation of tasks among policymakers. Modelling monetary policy by an interest rate, moreover, may capture other elements such as cost of government financing, as described above when discussing long-term interest rates. This may be of particular importance in case of predominantly short-term financing or in case there is a strong link between short-term and long-term interest rates.

- *Asset prices*. Experiences in a few Nordic countries in the early nineties demonstrated that equity and house prices may significantly affect government budgets. Asset price effects on the budget may occur via the following channels; [4]

  ➤ Directly via budgetary items. In particular, one can think of capital gains taxes and wealth-induced changes in consumption tax revenues.

  ➤ Indirectly, via second-round effects of asset prices on the economy, for instance lower consumer tax revenues due to lower consumer confidence and private consumption when asset prices decline.

  ➤ Via the fiscal costs of a budgetary bailout of financial institutions in trouble.

- *Welfare level*. Real GDP per capita is a potential explanatory variable, under the assumption that low welfare levels lead to higher deficits for financing catching-up expenditures (Woo

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[4] Schuknecht and Eschenbach (2002) provide a more detailed description of the channels of impact of asset prices on fiscal variables.

(2003)). Although our sample is restricted to developed countries, possibly the economically less developed countries face higher deficits because of higher investment needs.

Political variables

Many studies on causes of fiscal changes focus on cross-country differences in political institutions. The general idea is that certain political aspects increase the likelihood of major changes in the fiscal policy course and the occurrence or persistence of high deficits. Political factors increasing the deficit bias include the area of political instability (e.g. frequency of elections), political orientation (e.g. left-wing versus right-wing government), and the budgetary process (e.g. the competencies of the minister of finance). In specific, this study considers the following political variables.

- *Election year*, to detect electoral fiscal cycles as suggested by the literature on political business cycles. Upcoming elections may cause politicians to spend more and tax less to increase the likelihood of being re-elected.

- *Government composition index* (left-right wing parties in cabinet). It has been suggested that left-wing political parties are more expenditure- and deficit-prone than right wing parties (e.g. Kontopoulos and Perotti (1999)). In addition, left-wing governments may implement larger anti-cyclical programmes in recessions but also undertake more consolidation during upswings (Carlsen (1997)).

- *Type of government* (from single party government to temporary caretaker government). A single party government is believed to be more decisive than multiparty majority governments, let alone minority governments and caretakers, reducing the need for higher deficits as grease for the coalition.

- *Fiscal governance*. This variable measures whether major budgetary powers have been allocated to the Finance Minister ("delegation"), whether the role of the Minister of Finance is merely to enforce the pre-existing contract between spending ministers ("commitment"), or whether spending decisions are more or less made in isolation from other ministers ("fiefdom"). A final possibility is a mixture delegation and commitment ("mixed"). The typology is based on Hallerberg (2004).

- *Number of political parties*. The effective number of parties in parliament may affect the fiscal orientation as a high number of parties indicates a need for coalition governments, increasing the likelihood of higher budget deficits.

- The *overall political constraint index* constructed by Henisz (2002) measures the quality of political institutions in a country. The higher the quality, the lower are the expected deficits.

Dummy variables

- The *run-up to EMU* may have resulted in additional consolidation measures in European countries to qualify as early participants in the European monetary union. Compliance with the convergence criteria on debt and deficit was a necessary requirement to adopt the euro. It is not evident that the effect is a lasting one.[5]
- *Country- and year dummies* were also considered. Country-specific dummies for instance relate to the German unification (1990) and to financial rescue support for troubled banks in Finland and Sweden (1991-1993) and in Japan (1998). Year dummies have been included to capture cross-country related macroeconomic shocks that are not fully reflected in the macroeconomic variables included in the estimated equation, e.g. oil price shocks in the 1970s, the first Iraq war and the ERM crisis in the early 1990s, and the September 11th terrorist attacks and the second Iraq war in 2001/2002 As emphasised in Kontopoulos and Perotti (1999), not taking year-dummies into account may severely distort the results.

5 Estimation equation, estimation technique, and results

The data range included in the estimations is 1970-2002. Including the 1970s is considered fruitful, as it was a period with rapid fiscal deteriorations in nearly all countries included, providing a good opportunity to test which factors cause changes in fiscal balances. Including the most recent period in the sample not only includes another episode of quickly deteriorating fiscal balances, but also allows some preliminary testing on changed fiscal attitudes in European countries just before and after EMU.

In our approach, we will focus on the nominal general government budget balance, as pointed out earlier. Main arguments for this choice relate to data availability and the fact that governments often monitor it (or a similar concept) or even target it. This argument also favours using nominal

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[5] Beetsma and Bovenberg (1999) argue that EMU may well have strengthened the deficit bias. They point out that, contrary to the pre-EMU period, expansionary fiscal policies in one euro area country are no longer counteracted by exchange rate developments because of the adoption of the single currency. Interest rate reactions will also be smaller than before as short-term ECB interest rates set are based on euro area average conditions, and long-term interest rates are less responsive to national fiscal developments owing to increasingly integrated European capital markets.

instead of cyclically adjusted balances, which is reinforced by the caveats in distinguishing trend and cyclical developments. In addition, it is the relevant concept in the EU-context as European fiscal rules refer to the nominal general government net lending/net borrowing. Some drawbacks of the approach adopted here, however, also deserve attention. Taking the deficit in one year as dependent variable implies that transitory effects are included as well, for instance resulting from one-off transactions that were reversed in the following year(s). Furthermore, using nominal balances does not allow making a distinction between automatic effects of the economy on the budget and discretionary policy reactions causing changes in budgetary outcomes that arise if the government reacts systematically to changes in the macroeconomic environment.

Estimates are based on pooled Least Squares. The estimation period is 1970-2002, but shorter for some countries and for some explanatory variables reflecting data availability. Altogether 713 observations were used for 22 countries. Budget balances have been corrected for UMTS receipts, which were particularly large in a few European countries in 2000. In addition, all series have been corrected for data-breaks to arrive at consistent series. Our focus is on changes in budget balance rather than fiscal balance levels, to arrive at stationary series. All estimations include fixed-country effects, to account for country-specific characteristics not captured by other explanatory variables. Coefficient values, not shown in the table, were close to zero in all countries. Sources and descriptions of the data used are included in annex 1. Annex 2 includes the results of the unit root tests for the main variables to be used in the empirical analysis, revealing satisfactory outcomes.

5.1 Results for OECD countries

In first instance, regressions were run for all OECD countries for which data were available for the key variables identified in section 4, being: the former 15 EU countries, USA, Japan, Australia, Canada, New Zealand, Norway and Switzerland. The main empirical findings are (see table 1, 2nd column):

- *Changes in the government debt* in the previous year give rise to a correction in the budget balance. It produces a statistically significant but small positive coefficient (0.04): countries with fast increases in debt ratios undertake slightly more consolidation efforts to improve budget deficits. An alternative specification, the change in the growth-interest rate differential adjusted debt ratio, yielded no statistically significant results, possibly because it is a rather

volatile measure. Net debt neither produced satisfactory results. Given the public focus on gross debt, and lower statistical reliability of net debt data, we preferred to use the gross debt data. Statistically significant results were obtained using the difference between the country's debt ratio and the average debt ratio over the countries included in our sample but coefficients did not markedly differ from the ones reported above, reflecting that in many countries the debt ratio has consistently been above or below the average.

- *Real GDP growth* has a positive impact on budgets, as expected, the income elasticity of the budget being 0.15.[6] Using changes in the unemployment rate and output gap gave rather similar results as when using changes in GDP.[7] In view of the relatively high correlation between real GDP growth and the change in the unemployment rate (-0.5 across all countries), we did not include both in the estimated equation but only used GDP growth.[8] The changes in the output gap were not used in the final equation specifications because of the problems and uncertainties related to their computation.

The income elasticity reported is rather low compared to standard income elasticities of budget deficits: the OECD (Van den Noord (2000)) reports income elasticities around 0.5 for the average of European countries[9] and somewhat lower values for most non-European countries, like in the US (0.25), Japan (0.26) and Australia (0.28). Melitz (2000), in an overview of the literature on income elasticities, concludes that values around 0.25 are not uncommon in empirical estimates. Viren (2000) studies income elasticities using various approaches (single equations, VAR-models, and structural macro economic model simulations) and also concludes values in the order of 0.2-0.3 for EU countries.

A number of factors can help explain the relatively low value of our income elasticity compared to standard income elasticities. For one, the year dummies included mostly pertain to years with negative economic shocks, thus likely picking up some income effect. In addition, whereas standard coefficients only include automatic effects, the coefficients in our estimation may also reflect pro-cyclical fiscal policies: governments using cyclical proceeds

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[6] As explained later in the main text, the reported elasticity is the elasticity applying in economic upswings as we include a dummy variable in the equation measuring the elasticity in downswings.

[7] Trend GDP growth has been estimated using a HP-filter with lambda value of 100.

[8] The correlation between real GDP growth and the change in the unemployment rate may raise some doubts about studies including both of them as independent variables (Roubini and Sachs (1989a), (1989b), Hallerberg and Von Hagen (1999), Carlsen (1997)).

[9] This corresponds to the income elasticities used by the Commission. See Commission (2000).

in upturns for additional spending, while in a recession the deterioration in the deficit is counteracted by consolidation measures. The Commission (2001) and Hallerberg and Strauch (2002) indeed conclude pro-cyclical policies for the last three decades, at least for the EU.[10] Feedback effects, reflecting effects of budget changes on national income, can also not be excluded.

- *Asymmetrical fiscal responses* to a positive and a negative output gap (change) were also tested. Two additional dummy variables were included in the estimated equation, a first one taking value 1 in case of a negative output gap, a second one taking value 1 when the output gap declines. While the second dummy variable produced no good statistical results, the interaction of the dummy for the output gap *level* with GDP growth produced satisfactory results at the 10% significance level when lagging the dummy by one year. This is denominated "GAP" in the tables. The negative value (-0.06) indicates that in recessions the income elasticity of the budget balance is lower than in upswings. This lower responsiveness of budgets to a 1% increase in GDP may reflect more expansionary policies in or just after economic downswings, causing slower revenue growth or higher expenditure growth than would be expected if the fiscal stance were neutral. The asymmetric response is in line with Viren (2000) but contrasts Wyplosz (2002) who considers Italy, France and the US.

- Interest rates. The one-year lagged change in nominal long-term interest rates has a negative effect on budget balances. A 1% increase in the interest rate results in a deterioration in the government budget balance in the order of 0.14% of GDP. The obtained results seem fairly plausible in the light of the prevailing government debt levels and the debt structures. They are also broadly in line with the rule of thumb computations and, for the European countries, with the estimates provided in the stability and convergence programmes regarding the interest rates sensitivity of fiscal balances. As we use overall budget balances as dependent variable and not the primary balance, we are not able to distinguish between an automatic effect of interest rates on budgets and any discretionary government response to higher borrowing costs. Inclusion of the real long-term interest rate, with and without inclusion of a consumer price index, did not produce satisfactory results.

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[10] If this explanation holds, the coefficient on the interaction variable of the recession-dummy and real GDP growth measures whether a policy is more or less pro-cyclical in recessions.

- Lagged changes in *stock market prices* are positively related to budgetary balances, though the effect is small (0.004).[11] Results using current stock market prices were statistically not significant. The lagged effect may reflect delayed private sector responses to changes in wealth as well as tax collection lags. The size of the effect does not appear unrealistic, taking into account generally low effective tax rates on capital gains, their low share in total government tax revenue and also low propensies to consume out of wealth.

- Fiscal balances on average deteriorate by about 0.3% of GDP in *general elections* years.[12] If elections are related to the business cycle, e.g. because budgetary cuts in difficult economic times are politically harder to implement, the coefficient would also capture part of the effect of macro-economic conditions on the budget. Furthermore, as far as budgets are 'not managed' because of the changeover to a new government, the coefficient not only measures deliberate fiscal expansions to gain electoral support, but also the lack of parliamentary backing for government reactions in case of adverse macroeconomic or budgetary developments. In addition, it could reflect strategic attempts of an outgoing government to limit the room for manoeuvre for a new government with another ideology (Beetsma and Bovenberg (1999)).

- Effects of EMU-entry are evident for the EU countries in the sample. The results show a 0.8% of GDP additional annual improvement in budget balances over the period from 1994 to 1998. The significant effect is in line with the findings of Volkerink and De Haan (2001). Von Hagen et al. (2002) conclude that main effects were only present in the first half of the 1990s, mentioning that large consolidation in the later years of the 1990s reflects other determinants of budget balances. Busemeyer (2004) reported EMU-effects for 1992-1997. Extending our EMU-variable to include years after 1998 did not produce statistically significant results. This could confirm the general notion that consolidation efforts accelerated in many EU countries with the prospect of an early EMU-entry but not on a permanent basis. [13]

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[11] This compares to an elasticity value as high as 0.85-0.95 in Eschenbach and Schuknecht (2002).
[12] Buti and Van den Noord (2003) and Clark and Hallerberg (2001) provide evidence that the political business cycle has not disappeared in Europe after the start of EMU.
[13] It cannot be excluded that the EMU dummy variable partly captures cross-country effects that for the other years are included in specific year-dummies.

- Country-specific dummies reflecting bank bailout costs in Finland, Sweden (1991-1993) and Japan (1998) also proved significant (not shown in the tables). While bailout costs typically are related to fierce asset price developments, and thus could be reflected in the asset price coefficients, the emergence of financial problems of a corporation or financial institution usually follows a boom-bust pattern that is difficult to include in macroeconomic variables. We found no significant effect for a German unification dummy.[14]

- Significant year-dummies were included in the estimation equation for the years 1974, 1975, 1976, 1978, 1981, 1990, 1991, 1992, and 2002 (not shown in the tables). To improve the comparability of the results, these year-dummies were kept the same in all subsequent estimation equations.

While the above arguments contributed to explaining changes in budget balances in our sample of OECD countries, a few others did not.

As to *other political variables*, the variable measuring the type of government sometimes produced significant effects, but with a counter-intuitive sign. Theory suggests that caretaker governments are less decisive than single party governments because of lack of parliamentary support. Our empirical results, however, indicate otherwise, which is why it has been excluded.[15] Other political variables included did not deliver significant results. This relates to the Schmidt-index of the cabinet composition, assuming left-wing parties to be more deficit-prone than right-wing parties. Lack of empirical support for this suggestion is not uncommon, as e.g. in Alesina, Roubini and Cohen (1997).[16] They explain the result by pointing out that left-wing governments may be more prone to increase both expenditure and taxes, leaving deficit positions relatively unaffected. Equally, the number of parties in parliament was included, as well as Henisz' political stability measure and variables measuring the fiscal governance type[17], but none with statistically significant results.

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[14] The negative effect of German unification on public finances in Germany was most likely captured by the ERM crisis related common macroeconomic shock dummy in the beginning of 1990s.

[15] Kontopoulos and Perotti (1999) argue that the case for single-party governments to be stronger is not clear-cut. Furthermore, they point to classification difficulties, and also suggest that effects on expenditures may be more likely than effects on budget balances.

[16] In Volkerink and De Haan (2001), government ideology only matters in the 1970s.

[17] The non-significant result for the governance variables applies to the EU countries, as only data for these countries were available.

Short-term interest rates did not have a significant effect on budget balances. This interest rate is a limited indicator for monetary policy, as it also reflects financing costs for short-term debt. Furthermore, effects may be more indirect, running from monetary policy via macroeconomic developments to the budget, via automatic effects. One study finding a significant effect of short-term interest rates on fiscal balances is Melitz (2000). He reports macroeconomic policies moving in opposite directions; a tight monetary policy induces a loose fiscal policy, and *vice versa*.

Inflation did not prove to have a significant effect on budgets. One reason for this could be differences in indexation mechanisms in the sample of countries. In some countries, there is no full and immediate indexing of tax brackets for inflation, causing tax revenues to rise with inflation. In such countries, tax schemes are usually adjusted on an ad hoc basis, broadly following price developments but not immediate and one-to-one. On the other hand, a number of countries link government expenditures explicitly to inflation, e.g. when targeting real expenditure growth, causing expenditures to increase directly and proportionally with the inflation rate. Viren (1998) indeed reports both positive and negative significant coefficients for inflation on the fiscal balance in a sample of OECD countries.

Real GDP per capita did not enter the equation satisfactorily. Possibly, income differences within our country-sample were not large enough to detect such an effect. Alternatively, at least for the European countries, EU capital transfers to countries with large physical investment programmes may leave the overall national budgetary effect too small to detect.

Result robustness: testing for sub-periods and using alternative estimation techniques
Table 1 also shows the estimation outcomes when splitting the sample in two: 1970-1986 (column 3) and 1987-2002 (column 4). Apart from allowing detecting changes over time, such a split can be justified by a change in economic paradigm around the middle of the 1980s. The disadvantages of Keynesian-inspired fine-tuning policies became more evident, and concerns about sustainability received priority with mounting government debt. Thus, the mid-1980s represents the period in which deficits peaked in many countries, and started falling thereafter. The exact timing of this change however differs markedly across countries.

Comparing results across the two sub-samples, it is clear that results are more robust for the recent period than for the 1970s and the first half of the 1980s. The debt coefficient increases, from 0.03 to 0.08, reflecting increasing concerns on debt sustainability given high debt ratios and possibly rising awareness regarding the impact of ageing populations on public finances. Also,

the income elasticity of the budget increases. The increase could reflect the rise in the tax burden and the size of automatic stabilisers in most countries or the move to a more counter-cyclical (or less pro-cyclical) policy over time, as observed by Gali and Perotti (2003) though their observation is not undisputed. Interest rates are the main exception to the observation that the magnitudes and significance of variables increase over time, as they turn insignificant in the second sub-period. Stock market effects increase, both in size and significance over time, possibly related to the increased asset markets valuation, higher asset market volatility during the more recent period, and to increasing and more diversified asset ownership. Finally, the election cycle is more clearly evident in the more recent period.

Cross-section panel estimates can be subject to some caveats. One could be heteroscedasticity, for which reason the full sample equation was re-estimated using White-heteroscedasticity-consistent standard errors and covariance. Another risk in this type of estimations is cross-country correlations (e.g. an oil shock) and cross-time correlations (e.g. social-cultural features specific to one country). While OLS with country-specific intercepts and time-dummies, as employed so far in this study, may remove effects of these correlations in an ad hoc way, we also re-estimated equations using SUR to provide a more elaborated way of dealing with them.

Table 2 shows the full period results of these estimates.[18] Generally, differences between the results reported previously for OLS (repeated in column 2) and the results using White's estimations (column 3) are small, the main difference being the effect of EMU entry turning somewhat smaller, from 0.8 to 0.6. The reverse happens when considering the results of SUR estimates. The size and significance of nearly all coefficients increases substantially in the SUR estimates, confirming that the included variables indeed affect changes in budget balances. It must be noted however, that the comparability of the outcome with previous results shown is reduced due to a reduced number of observations being available and the exclusion of the year-dummies.[19]

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[18] The sub-periods used before in the OLS estimates were too short for SUR re-estimation.

[19] SUR estimates in Eviews require balanced samples, reducing the number of observations by 20% on account of missing observations, especially towards the beginning of the period.

In a next estimation, *house price changes* were included. A practical drawback of including house prices is limited data-availability, both regarding the period covered and the countries included. Furthermore, definitions are not harmonised, measuring diverging house price concepts in various countries. Conclusions on this variable thus can only be made with more than usual caution. Inclusion of house price changes (one-year lagged) in the above equations produced small effects (0.02), significant at the 10% level only, as shown in the third column of table 3. Significance levels of other coefficients, however, decrease somewhat, notably for stock price increases, turning insignificant at the 10% level. The results again improve somewhat when using White-heteroscedasticity-consistent standard errors and covariance, as shown in the table in the last column. Both stock prices and house prices are significant, at the 10% level.

5.2 Results for EU countries

As a next step, the sample of countries was restricted to the former 15 EU countries. One motivation for this is to see whether European fiscal attitudes differ from the others, as suggested by Viren (1998) for continental Europe. In addition, splitting the sample of countries provides insight in the sensitivity of the results described to the countries included. Table 4 shows the results for the entire time-span (1970-2002) and sub-periods using OLS, for the moment ignoring house prices.

The results for the EU countries very much resemble those for our OECD sample, both regarding the size of the coefficients and the degree of their significance. While similarities dominate, a few small differences can be pointed at. Income elasticities in the EU appear to be slightly smaller than in the OECD sample in spite of the higher tax burden, possibly reflecting stronger (and longer) fine-tuning efforts by European governments. The stock market effect in the EU is marginally smaller, and is non-significant in the EU. The smaller effect may be attributed to smaller stock markets in the EU than in Anglo-Saxon countries outside the EU or less private ownership, causing smaller macroeconomic effects. On the other hand, the electoral cycle effect appears to be somewhat stronger in the EU (coefficient 0.41 instead of 0.34).

As before for the OECD sample of countries, the entire period was split in two sub-periods, 1970-1986 and 1987-2002. Comparing results for the second sub-period with the first one shows that the size and significance of coefficients increases with time. This applies in particular to the income elasticity of the budget and the stock market effects, the latter turning significant in the

most recent sub-period. Finally, the electoral cycle effect intensifies over time in the EU, and is more pronounced than in the OECD sample. The only main exception to the improved results in the period 1987-2002 concerns interest rates, loosing their statistical significance.

Next, we re-estimated the results using White-heteroscedasticity-consistent standard errors and covariance and using SUR to cover cross-country and cross-time correlations. Results, as reported in table 5, reveal that using White's estimation technique has no major impact on the outcomes, indicating some robustness of the results. SUR estimation results generally show higher significance levels of coefficients, with the coefficient values slightly increasing. This applies in particular to the election effect, increasing to 0.55% whereas the EMU effect increases to as much as 0.95%. As before with the results for the OECD sample, the improved outcomes could (partly) reflect the smaller number of observations used for SUR estimates.

Finally, we also included lagged house price changes in the equation (table 6). Considering both the results from OLS (column 3) and from White's estimation technique (column 4), house price increases in the EU may have some significance at the significance 10% level. The effect of changes in stock prices remains insignificant.

6   Conclusions

Insight into the causes of changes in fiscal balances improves the understanding of the budgetary processes, and may help in selecting tools to avoid the occurrence of unsustainable large deficits and debts. In Europe, this is of particular importance given the EU fiscal framework aimed at avoiding excessive government deficits.

Our analysis shows that fiscal outcomes are shaped by sustainability considerations (last year's change in the debt ratio), macroeconomic conditions, interest rates, the election cycle, EMU-entry and asset price developments. The role of the initial budgetary conditions points to some self-correcting mechanism, although rather weak. Macroeconomic growth affects budgets via automatic stabilisers. Discretionary fiscal policies, however, have been used more to stimulate economies in downswings than to restrict economic growth in upswings. Higher interest rates affect budgets negatively, as expected. Election years are clearly reflected in larger budget deficits. For the EU countries, approaching the decision-day on early EMU participation spurred fiscal consolidation, but effects have subdued since. There is some evidence that asset market prices (house prices and

stock markets) also affect budgetary outcomes, though their effect normally is limited and not always statistically significant.

These results are fairly robust. Specific results to some extent depend on the estimation method used, the specification of variables, and on the time period covered. Generally, results improve in terms of significance the more recent the period that is considered. This applies in particular to budgetary effects of asset price variables. The main exception concerns interest rates, whose effects decline over time. Compared to the OECD sample, the estimation results for the EU countries generally show a lower income elasticity, lower stock price effects, and a stronger impact of the election cycle.

Specifically with regard to the European countries, these findings imply that when setting safety margins below the 3% of GDP ceiling of the Maastricht Treaty, taking into account more factors than simply the cyclical sensitivity of budgets is a necessity. A mechanistic approach that ignores the other factors runs the risk of being surprised more often by the occurrence of excessive deficits. Elections affect budgetary orientations, and changes in stock and house market prices, that can have substantial budgetary effect in turmoils, warrant caution in setting budgetary targets.

Table 1. Determinants of changes in fiscal balances: results for 22 OECD countries, 1970-2002 and sub-periods.

	1970-2002	1970-1986	1987-2002
Δ DEBT (-1)	0.04 (2.9)**	0.03 (1.2)	0.08 (3.7)**
REAL GDP GROWTH	0.15 (4.7)**	0.12 (2.9)**	0.24 (4.3)**
GAP*REAL GDP GROWTH	-0.06 (-1.9)*	-0.06 (-1.5)	-0.07 (-1.5)
Δ L-T INTEREST RATE (-1)	-0.14 (-2.6)**	-0.17 (-2.2)**	-0.02 (-0.3)
STOCK PRICE INCREASE (-1)	0.004 (2.0)**	-0.001 (0.3)	0.009 (2.9)**
ELEC	-0.34 (-2.7)**	-0.31 (-1.7)*	-0.39 (-2.3)**
EMU	0.79 (4.0)**		0.54 (2.4)**
Adjusted R-squared	0.31	0.23	0.38
D-W	1.99	2.12	2.07
Nr of observations	713	361	352

Fixed country-effects, time-dummies and country-specific dummies are not shown.
** = significant at the 5% significance level, * = significant at the 10% significance level.

Table 2. Determinants of changes in fiscal balances: results for 22 OECD countries, 1970-2002, alternative estimation technique.

	OLS	White-heterosc. Consistent	SUR
Δ DEBT (-1)	0.04 (2.9)**	0.04 (2.6)**	0.06 (7.7)**
REAL GDP GROWTH	0.15 (4.7)**	0.15 (5.3)**	0.23 (21.4)**
GAP*REAL GDP GROWTH	-0.06 (-1.9)*	-0.05 (-1.7)*	-0.07 (-6.5)**
Δ L-T INTEREST RATE (-1)	-0.14 (-2.6)**	-0.16 (-3.3)**	-0.18 (-9.3)**
STOCK PRICE INCREASE (-1)	0.004 (2.0)**	0.004 (2.0)**	0.006 (9.0)**
ELEC	-0.34 (-2.7)**	-0.31 (-3.0)**	-0.44 (-12.0)**
EMU	0.79 (4.0)**	0.61 (3.9)**	0.79 (9.9)**
Adjusted R-squared¶	0.31	0.36	0.81
D-W¶	1.99	1.96	2.03
Nr of observations	713	713	572

¶ For White-estimate and SUR weighted statistics.
Fixed country-effects, time-dummies and country-specific dummies are not shown.
** = significant at the 5% significance level, * = significant at the 10% significance level.

Table 3. Determinants of changes in fiscal balances: results for 22 OECD countries, 1970-2002, including house prices.

	OLS	OLS	White-heterosc. Consistent
Δ DEBT (-1)	0.04 (2.9)**	0.03 (1.9)*	0.04 (2.2)**
REAL GDP GROWTH	0.15 (4.7)**	0.16 (3.8)**	0.16 (4.7)**
GAP*REAL GDP GROWTH	-0.06 (-1.9)*	-0.06 (-1.7)*	-0.05 (-1.6)
Δ L-T INTEREST RATE (-1)	-0.14 (-2.6)**	-0.20 (-3.1)**	-0.19 (-3.4)**
STOCK PRICE INCREASE (-1)	0.004 (2.0)**	0.004 (1.4)	0.004 (1.8)*
ELEC	-0.34 (-2.7)**	-0.30 (-2.2)**	-0.29 (-2.5)**
EMU	0.79 (4.0)**	0.80 (3.8)**	0.65 (4.0)**
HOUSE PRICE INCREASE (-1)		0.02 (1.9)*	0.02 (1.9)*
Adjusted R-squared	0.31	0.35	0.42¶
D-W	1.99	1.84	1.86¶
Nr of observations	713	539	539

¶ For White-estimate weighted statistics.
Fixed country-effects, time-dummies and country-specific dummies are not shown.
** = significant at the 5% significance level, * = significant at the 10% significance level.

Table 4. Determinants of changes in fiscal balances: results for 15 EU countries, 1970-2002 and sub-periods.

	1970-2002	1970-1986	1987-2002
Δ DEBT (-1)	0.03 (2.1)**	0.03 (1.2)	0.06 (2.6)**
REAL GDP GROWTH	0.13 (3.4)**	0.08 (1.6)	0.21 (3.5)**
GAP*REAL GDP GROWTH	-0.07 (-2.0)**	-0.05 (-1.0)	-0.09 (-1.7)*
Δ L-T INTEREST RATE (-1)	-0.13 (-2.3)**	-0.22 (-2.4)**	-0.04 (-0.5)
STOCK PRICE INCREASE (-1)	0.003 (1.3)	-0.003 (-0.8)	0.008 (2.3)**
ELEC	-0.41 (-2.8)**	-0.33 (-1.5)	-0.49 (-2.4)**
EMU	0.85 (4.3)**		0.68 (3.0)**
Adjusted R-squared	0.32	0.21	0.41
D-W	2.06	2.06	2.18
Nr of observations	490	250	240

Fixed country-effects, time-dummies and country-specific dummies are not shown.
** = significant at the 5% significance level, * = significant at the 10% significance level.

Table 5. Determinants of changes in fiscal balances: results for 15 EU countries, 1970-2002, alternative estimation technique.

	OLS	White-heterosc. Consistent	SUR
Δ DEBT (-1)	0.03 (2.1)**	0.03 (1.7)*	0.05 (3.3)**
REAL GDP GROWTH	0.13 (3.4)**	0.14 (3.9)**	0.19 (6.4)**
GAP*REAL GDP GROWTH	-0.07 (-2.0)**	-0.07 (-2.1)**	-0.09 (-3.3)**
Δ L-T INTEREST RATE (-1)	-0.13 (-2.3)**	-0.15 (-2.7)**	-0.20 (-4.4)**
STOCK PRICE INCREASE (-1)	0.003 (1.3)	0.003 (1.5)	0.004 (2.3)**
ELEC	-0.41 (-2.8)**	-0.39 (-2.9)**	-0.55 (-5.9)**
EMU	0.85 (4.3)**	0.69 (4.2)**	0.95 (4.4)**
Adjusted R-squared¶	0.32	0.36	0.36
D-W¶	2.06	2.08	2.06
Nr of observations	490	490	420

¶ For White-estimate and SUR weighted statistics.
Fixed country-effects, time-dummies and country-specific dummies are not shown.
** = significant at the 5% significance level, * = significant at the 10% significance level.

Table 6. Determinants of changes in fiscal balances: results for 12 EU countries, 1970-2002, including house prices.

	OLS	OLS	White-heterosc. Consistent
Δ DEBT (-1)	0.03 (2.1)**	0.04 (1.8)*	0.03 (1.7)*
REAL GDP GROWTH	0.13 (3.4)**	0.17 (3.2)**	0.18 (3.8)**
GAP*REAL GDP GROWTH	-0.07 (-2.0)**	-0.13 (-2.6)**	-0.12 (-2.9)**
Δ L-T INTEREST RATE (-1)	-0.13 (-2.3)**	-0.19 (-2.5)**	-0.17 (-2.5)**
STOCK PRICE INCREASE (-1)	0.003 (1.3)	0.003 (1.1)	0.004 (1.5)
ELEC	-0.41 (-2.8) **	-0.41 (-2.5) **	-0.38 (-2.6) **
EMU	0.85 (4.3) **	0.92 (4.3) **	0.75 (4.4) **
HOUSE PRICE INCREASE (-1)		0.02 (1.7)*	0.02 (1.9)*
Adjusted R-squared	0.32	0.40	0.44¶
D-W	2.06	2.05	2.04¶
Nr of observations	490	349	349

¶ For White-estimate weighted statistics.
Fixed country-effects, time-dummies and country-specific dummies are not shown.
** = significant at the 5% significance level, * = significant at the 10% significance level.

Annex 1. Definitions and sources of the data

Government deficit (BUDGET)
General government net borrowing / net lending as % of GDP. Data have been corrected for one-off UMTS receipts, which played a role particularly around the turn of the century.
Source: the European Commission Ameco, the OECD Economic Outlook and the IMF World Economic Outlook databases.

Government debt (DEBT)
General government gross debt as % of GDP
Source: the European Commission Ameco, the OECD Economic Outlook and the IMF World Economic Outlook databases.

Long-term nominal interest rates
Source: the OECD Economic Outlook, the IMF World Economic Outlook and the Global Financial databases.

Short-term nominal interest rates
Source: the OECD Economic Outlook, the IMF World Economic Outlook and the Global Financial databases.

Unemployment rate
Source: the OECD Economic Outlook database.

Real GDP growth
Source: the OECD Economic Outlook database.

GDP gap
Difference between actual and trend real GDP, as a percentage of the latter. Trend GDP is estimated using a HP-filter on real GDP, with lambda value of 100.

Inflation rate
Consumer price index
Source: the OECD Economic Outlook database.

House prices
Changes in nominal prices of existing and new dwellings. With few exceptions, data series are not available for longer time periods. To arrive at sufficiently long data-series, we linked series that were somewhat comparable if available. Data are non-harmonised, making cross-country comparisons rather difficult. Some national series reflect overall indices of house price conditions, while others however only pertain to specific dwellings or to specific geographical areas. No series are available for Austria, Portugal, and for New Zealand, and data are also missing for the (early) 1970s in most other countries.
Source: BIS.

Stock prices
Source: the Global Financial database.

Real GDP per capita
Source: the OECD Economic Outlook database.

Election years (ELEC)
Dummy with value 1 in years in which parliamentary elections have taken place (France and the US: presidential elections). Years in which no democratic general elections were possible (Spain, Portugal and Greece in the 1970s) have been given value 0.
Source: International Institute for Democracy and Electoral assistance (www.idea.int).

Government type
Type of government, ranging from 1 (single party government) to 6 (temporary caretaker government). A single party government is believed to be more decisive than multiparty majority governments, let alone minority governments and caretakers, reducing the need for higher deficits as "grease" for the coalition.
Source: Armingeon et.al (2002*).*

Government party
Political orientation of government cabinet, ranging from 1 (no social-democratic and other left parties in cabinet posts) to 5 (hegemony of social-democratic and other left parties in the government cabinet).
Source: Armingeon et.al (2002).

Number of political parties
This variable measures the effective number of parties in parliament, provided it received more than 2% of the votes in the election. A high number of parties indicates the need for coalition governments, increasing the likelihood of high budget deficits.
Source: Armingeon et.al (2002).

Fiscal Governance
Three separate dummies, reflecting Commitment, Delegation or Mixed fiscal governance were based on the categorisation included in Hallerberg (2004), covering the EU Member States for the period 1973-2002.
Source: Hallerberg (2004).

Political Stability
The political stability index measures how likely policies are to change on the basis of the number of veto points in a country's political system. A high value indicates that the political system in the country faces many constraints, reducing the likelihood of major changes.
Source: Henisz (2002).

EMU-dummy (EMU)
Dummy taking value 1 in 1994-1998 in the EU Member States, 0 otherwise.

GDP gap dummy (GAP)
Dummy taking value 1 in case of a negative GDP gap (real GDP below trend GDP), 0 otherwise.

Annex 2. Unit root tests on main series

This annex shows the main results of unit root tests on the dependent and the main independent variables for the period 1970-2002 for our 22 OECD countries, as far as data are available. Testing focussed on the Augmented Dickey-Fuller test for panels as included in Eviews. For the variables that were included in our favoured regressions, the test statistics are included in the table below. The outcomes reveal that the assumption of unit roots can be safely rejected at high significance levels.

Table A2.1 ADF-test results for 22 OECD countries, 1970-2002

Variable

Δ Government deficit (% GDP)	365.2***
Δ Government debt (% GDP)	160.7***
Real GDP growth	272.2***
Growth of stock prices	403.7***
Growth of house prices	128.3***
Δ Long-term interest rate	304.1***

*** denotes that the assumption of an individual unit root has a probability of less than 1%.

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