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Document de Travail
Working Paper
2012-12

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FISCAL POLICY REACTION TO THE CYCLE IN THE OECD: PRO- OR COUNTER-CYCLICAL?

Balázs Égert[1]

ABSTRACT

This paper analyses the reaction of fiscal policy to the cycle in OECD countries. The results suggest that while overall government balances were counter-cyclical in the past and more so in economic downturns than in upswings, discretionary fiscal policy was neutral on average. However, discretionary fiscal policy appears to react to the cycle in a non-linear fashion: fiscal policy in countries with high public debt and high government deficits tends to be pro-cyclical, while countries that have low public debt and that have surpluses are more likely to conduct a counter-cyclical fiscal policy. The paper also finds that asset prices have a significant impact on government balances.

JEL Codes: E32, E62, 21, H30, H60, C33

Keywords: Fiscal policy; pro-cyclicality, counter-cyclicality, OECD countries

1. OECD Economics Department. This is one of the background papers for the OECD's project on counter-cyclical economic policy. The main paper was issued as the *OECD Economics Department Working Paper* No. 760. The author is grateful to Jorgen Elmeskov, Peter Hoeller, Jean-Luc Schneider, Oliver Röhn and Douglas Sutherland for useful comments and suggestions and Susan Gascard for excellent editorial support.

Introduction and main findings

1. This paper analyses the fiscal policy reaction to the cycle in OECD countries during the last 30 years or so. It studies the behaviour of observed and planned cyclically-unadjusted and adjusted government balances and the components of government spending and revenues over the cycle. The paper also investigates whether fiscal policy reactions are linear or whether they depend on the size of the public debt and of government balances or the position in the cycle, whether the results are sensitive to alternative measures of the cycle, the estimation methods used or the inclusion of different sets of control variables. The results can be summarised as follows.

2. First, cyclically-unadjusted balances[2] are positively correlated with the output gap or GDP growth, implying an improving balance during an expansion and a worsening balance during economic slowdowns. In other words, overall fiscal policy (including automatic stabilisers and discretionary actions) was counter-cyclical. If asymmetries are allowed over the cycle, unadjusted balances were more counter-cyclical during downturns than during expansions.

3. Second, discretionary fiscal policy, as measured by cyclically-adjusted balances, are less well correlated with the output gap or GDP growth: discretionary fiscal policy was neutral or at best weakly counter-cyclical. Nevertheless, at the individual country level, discretionary fiscal policy was strongly counter-cyclical in Australia, Canada, Denmark and the United States and strongly pro-cyclical in Austria, Belgium, Hungary, the Netherlands, Poland, Portugal and the United Kingdom over the period from 1970 to 2008.

4. Third, discretionary fiscal policy appears to react to the cycle in a non-linear fashion. The results suggest that discretionary fiscal policy in countries running deficits larger than about 3% of GDP tends to be pro-cyclical, while countries with surpluses were able to respond to contractions in output by loosening fiscal policy. Fiscal policy reactions are pro-cyclical if public debt is higher than 90% of GDP, neutral or mildly pro-cyclical at intermediate levels of public debt and become counter-cyclical below debt of 30% of GDP. This result can, however, be obtained only if the cycle is captured by the output gap as no non-linear effects can be established, if the cycle is measured by GDP growth. Finally, strong non-linear effects can be detected if government size is used as the threshold variable. Countries with a large size of government show stronger counter-cyclical fiscal policy reactions than those with a small size of government. These findings are robust to a variety of econometric estimators and endogeneity does not seem to be a major issue.

5. Fourth, fiscal plans for cyclically-unadjusted primary balances and cyclically-adjusted general government balances, measured by OECD projections in the autumn for the next year, are not related to projected GDP growth or the projected output gap. This suggests that counter-cyclical discretionary policies may be decided at shorter notice than the budget preparation. By contrast, projected cyclically-unadjusted general government deficits are positively correlated with projected GDP growth rates but not with projected output gaps.

6. Fifth, fiscal balances (both cyclically-adjusted and unadjusted) are positively correlated with asset price developments (house prices and the stock market index). Fiscal balances are also positively

2. While it would be better to use underlying balances that also correct for one-off items, the Secretariat's time series for the underlying balances are considerably shorter. They usually start in the 1980s, whereas cyclically-adjusted balances are typically available from the 1970s. The two measures are almost perfectly correlated for most OECD countries.

correlated with openness: greater openness is associated with a stronger fiscal position.[3] Other controls have been used in the literature and also been tested here. However, additional explanatory variables, such as GDP volatility, debt servicing costs and political economy variables were not found to have an effect.

7. Finally, as far as government revenues and spending are concerned, the results show that cyclically-unadjusted government revenues show pronounced pro-cyclicality, while government spending overall is a-cyclical. On the revenue side, corporate taxes are found to react most strongly to GDP growth, while taxes on individuals, goods and services and social security contributions react less strongly. On the expenditure side, investment spending and government wages are the most pro-cyclical components, while government subsidies tend to be counter-cyclical. Social security transfers do not react to the cycle probably because they include health and pension payments that are a-cyclical and that dominate the cyclical component, which includes unemployment benefits.

Literature overview

Cross-country studies

8. The way fiscal policy reacts to the cycle has been subject to substantial empirical investigation. The consensus finding is that fiscal policy tends to be a-cyclical or counter-cyclical in developed countries, but pro-cyclical in developing countries (Fatas and Mihov, 2009). Usually, government balances as a per cent of GDP are used, when assessing the cyclicality of fiscal policy (Alesina *et al*., 2008; Afonso and Hauptmeier, 2009; Fatas and Mihov, 2009). Ilzetzki and Vegh (2009) argue that the cyclical component of tax revenues induces an automatic co-movement between government balances and the cycle. The pro-cyclicality finding for developing countries reflects that tax revenues are less cyclical in comparison with developed countries. They point out that it is more appropriate to look at government consumption and revenues. But because tax revenues are endogenous to the cycle, they should be instrumented by tax rates.

9. Cyclically-adjusted government balances remove the cyclical component from tax revenue and spending items. A first and simple approach consists in regressing the fiscal policy variable on a measure of the cycle and to interpret the residuals as the discretionary policy component. For instance, Fatas and Mihov (2003) use this approach and find that the residuals of the fiscal policy reaction functions of euro area countries diminished over time, indicating less reliance on discretionary fiscal policy.

10. The identification of discretionary fiscal policy based on regression residuals was criticised by Gali and Perrotti (2003) as being only the non-systematic part of discretionary policy. Instead, using government balances that are based on cyclically-adjusted spending and revenue categories as estimated by the OECD (Giorno *et al*., 1995; Girouard and André, 2005) should provide a more reliable overall picture of the fiscal policy stance. Using cyclically-adjusted primary balances, they find that discretionary fiscal policy became more counter-cyclical in the 1990s in the OECD countries, and in particular in the EU-15 countries after the introduction of the euro.[4] For a more recent dataset, Fatas and Mihov (2009) find that discretionary policy was slightly pro-cyclical in the euro area countries, while the United States pursued a strongly counter-cyclical discretionary policy. Auerbach (2009) also confirms the strong counter-cyclicality of US fiscal policy: he shows both the expenditure and revenue side reacted strongly counter-cyclically between 1984 and 2009 and that spending responded stronger than revenues. By contrast, the automatic stabilisers are found to react more strongly to the cycle in the euro area than in the United States.

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3. However, the gap coefficient of the country-specific discretionary fiscal policy reactions is not related to the openness indicator, suggesting no effect of openness on the fiscal policy response to the cycle.

4. They estimate country-specific reaction functions and calculate simple arithmetic averages for various country groups for various sub-periods. Their country-specific estimates are often statistically insignificant.

11. Strawczynski and Zeira (2009) take a different perspective and analyse the reaction of fiscal policy to temporary and permanent output shocks (instead of the cycle). They show that the reaction of general government deficits and spending to a temporary output shock is counter-cyclical and a-cyclical to a permanent shock. By contrast, government investment reacts pro-cyclically to permanent output shocks.

12. Based on an event study approach, Leigh and Stehn (2009) argue that the G7 countries eased discretionary fiscal policy during downturns in a timely manner on a number of occasions. Nevertheless, they also show that fiscal policy in Canada, the United States and the United Kingdom responded quicker and more often to downturns than in Italy, Germany, France and Japan. But they also show that discretionary fiscal easing occurs more often during economic recoveries in English-speaking countries than in the other G7 countries.

Studies focusing on European countries

13. Concerning European countries, Golinelli and Momigliano (2009) survey 20 studies focusing on euro area countries and show that there is frequent disagreement on whether fiscal policy is pro- or counter-cyclical. They design a large-scale sensitivity analysis of specifications, time coverage and data vintages and conclude that fiscal policy has been a-cyclical in the euro area. They demonstrate that the choice of regressors and whether the lagged dependent variable is included can shape the results.

14. Afonso and Hauptmeier (2009) do not find any significant relation between the lagged cycle and unadjusted primary government balances for 27 EU countries. They argue that fiscal rules improve primary balances (but do not affect primary spending). In particular, they show that fiscal rules embedded in the Maastricht Treaty, the Stability and Growth Pact (SGP), balanced budget and other fiscal rules at the level of general or central government have a positive effect on primary balances. However, Strawczynski and Zeira (2009) do not find similar results.

15. According to Buti and van den Noord (2004), discretionary fiscal policy was influenced by political cycles after the introduction of the euro. Golinelli and Momigliano (2009) report similar results for the euro area countries already before the adoption of the euro. Elections seem to influence (unadjusted) general government balances in other OECD countries over longer periods as well while government spending is not found to be influenced by electoral cycles (Strawczynski and Zeira, 2009). The main specification in Afonso and Hauptmeier (2009) also shows that elections are associated with a deterioration in primary government balances. Nevertheless, their result is not robust to alternative model specifications in which the coefficients either switch sign or become insignificant.

Studies focusing on spending and revenue components

16. Lee and Sung (2007) report strong counter-cyclicality of total government revenues of OECD economies with respect to GDP growth and mild pro-cyclicality for total government expenditure.[5] At a higher level of disaggregation, current and capital expenditure and subsidies and transfers are found to be a-cyclical. On the revenue side, income and commodity taxes react counter-cyclically whereas social security contributions appear insensitive to the cycle.

17. Lane (2003) shows that the cyclical behaviour of overall government spending in OECD countries hides a large degree of heterogeneity across spending components. Government transfers and debt interest payments are counter-cyclical, current spending is pro-cyclical and government investment behaves in a strongly pro-cyclical manner. A higher degree of disaggregation of current spending reveals

5. Concerning different levels of government, Blöchliger *et al*. (2010) show with simple correlation analysis that central governments are more counter-cyclical than state-level or local governments.

that government wages are more pro-cyclical than non-wage government consumption whereas government employment is a-cyclical. The cross-country variation in cyclical reactions is mostly explained by output volatility and dispersed political power. Public sector wages are the main channel through which higher output volatility and more dispersed political power lead to more pro-cyclicality in government spending. Darvas (2009) uses VAR models and shows that government consumption is pro-cyclical in Hungary but is counter-cyclical in the Czech Republic and Estonia.

Studies focusing on policy intentions

18. Fiscal policy reaction functions that are based on ex post data reflect fiscal outcomes rather than the intention of fiscal policy. Using forecasts of cyclically-adjusted primary government balances, Cimadomo (2007) shows that discretionary fiscal policy intentions are counter-cyclical in OECD countries, especially during expansions. He also shows that the outcome of discretionary fiscal policy measured by ex post data becomes pro-cyclical. Beetsma and Giuliodori (2008) split the sample and find that planned fiscal policy is counter-cyclical in non-EU OECD countries while it is a-cyclical in EU countries. Their results suggest that ex-post discretionary fiscal policy is a-cyclical in non-EU OECD countries and pro-cyclical in EU countries. Bernoth *et al*. (2008) show for euro area countries that fiscal policy is usually planned in a counter-cyclical fashion but the realisation of the plan becomes pro-cyclical. Golinelli and Momigliano (2009) point out that while the results reported above are sensitive to various data vintages and alternative measures of the output gap, fiscal policy plans in the euro area are more counter-cyclical than fiscal outcomes.

Asymmetries

19. To assess whether fiscal policy meets the intertemporal budget constraint, the impact of lagged public debt on the primary balance is often estimated. A positive coefficient implies that primary balances increase in response to higher public debt (Celasun and Kang, 2006). A general finding is that a rise in government debt leads to an improvement in primary government balances (Lee and Sung, 2007; Afonso and Hauptmeier, 2009). Nevertheless, an asymmetric reaction of fiscal policy to the cycle is typically found: it is counter-cyclical in downturns, while it is either a-cyclical or mildly pro-cyclical in upswings. This means that debt accumulated during downturns is not paid back during good times and this leads to an upward trend in government indebtedness (Lee and Sung, 2007; Leigh and Stehn, 2009).

Endogeneity issues

20. A major concern, when estimating fiscal policy reaction functions is endogeneity between fiscal policy and the cycle as fiscal policy does not only react to the cycle but it can also influence it. Gali and Perrotti (2003) used a measure of the cycle of other countries as instrument for a country's cycle.[6] Similarly, Jaimovich and Panizza (2007) employ the weighted average of foreign partners' GDP growth as an instrument of the domestic cycle and show that the instrumental variable approach overthrows the finding of a pro-cyclical fiscal policy for developing countries: indeed, fiscal policy in developing countries is counter-cyclical. Ilzetzki and Vegh (2008) assess the robustness of the finding that developing countries pursue pro-cyclical fiscal policies while developed OECD countries are less pro-cyclical or a-cyclical by employing a battery of methods that control for endogeneity of the cycle variable (instrumental variables, GMM, simultaneous equations and VAR models). Similar results based on an instrumental variable approach are reported in Lee and Sung (2007): government spending is strongly counter-cyclical in most OECD economies, with a few exceptions: In Australia, Japan, Portugal, New Zealand, Turkey and Greece government expenditure are not found to respond to the cycle.

6. They use the output gap of the EU-15 for the United States equation and the US output gap for the EU-15 countries.

Specification issues

Baseline specifications

21. The literature offers several options to analyse the cyclical nature of fiscal policy and its determinants. The first approach consists in estimating the extent to which policy reacts to economic cycles and then regressing the measure of cyclicality on a number of potential explanatory variables. The first stage involves the country-by-country (time series) estimation of a bivariate relationship where the measure of fiscal policy (F_t) is regressed on a measure of the cycle ($CYCLE_t$):

$$F_t = \beta_0 + \beta_1 CYCLE_t + \varepsilon_t \tag{1a}$$

22. The fiscal and the cycle variable can be either the cyclical component of a level variable (Agenor *et al*., 1999) or its rate of growth (Lane, 2003). In the second stage, the vector of betas is regressed on a set of explanatory variables (Z) including for instance output volatility, the level of economic development, trade openness, the size of the public sector, political instability or the level of government debt:

$$\beta_{1,i} = \chi + \delta \overline{Z}_i + \upsilon_i \tag{1b}$$

23. The second approach melts the two stages into a single stage by estimating the cyclical stance of policy by interacting cycles and potential explanatory variables on the right hand side either country-by-country or for a panel of countries (see *e.g*. Calderón *et al*., 2004):

$$F_{it} = \alpha_i + \beta_i CYCLE_{it} + \lambda_i CYCLE_{it} Z_{it} + \varepsilon_{it} \tag{1c}$$

Calderón *et al*. (2004) show that $-\frac{\beta_i}{\lambda_i}$ is the threshold value of the explanatory variable (in their case institutional quality), above which policies are counter-cyclical and below which they are pro-cyclical.

24. A third approach is taken here that extends the baseline bivariate reaction function with persistence (lagged fiscal variable) and a number of control variables that explain the cyclical behaviour of fiscal policy. Hence, the starting point is a linear fiscal policy reaction function of the following form:

$$F_t = \beta_0 + \beta_1 CYCLE_t + \beta_2 F_{t-1} + \overline{C}\,\overline{X} + \varepsilon_t \tag{2}$$

where F is the fiscal policy variable, CYCLE is the measure of the business cycle and X represents the vector of other control variables (C is the corresponding vector of coefficient estimates). Equation 2 is the full specification, but also narrower versions are estimated to render the results more comparable with the existing empirical work. Therefore, the equations (2a) to (2d) are estimated:

$$F_t = \beta_0 + \beta_1 CYCLE_t + \varepsilon_t \tag{2a}$$

$$F_t = \beta_0 + \beta_1 CYCLE_t + \beta_2 F_{t-1} + \varepsilon_t \tag{2b}$$

$$F_t = \beta_0 + \beta_1 CYCLE_t + \beta_2 F_{t-1} + \beta_3 DEBT_{t-1} + \varepsilon_t \tag{2c}$$

$$F_t = \beta_0 + \beta_1 CYCLE_t + \beta_2 F_{t-1} + \beta_3 DEBT_{t-1} + \overline{C}\,\overline{T} + \varepsilon_t \tag{2d}$$

Where DEBT(t-1) is the public debt-to-GDP ratio of the previous period and T is a subset of X.

25. The estimations are carried out for the following fiscal policy variables:

- General government balances (primary and total, cyclically-unadjusted and adjusted).
- General government revenues are split into tax revenues on profits and capital gains, tax revenues from individuals, tax revenues from the corporate sector, social security contributions, taxes on payroll and workforce and taxes on goods and services and other taxes.
- General government spending disaggregated into wage and non-wage final government consumption expenditure, social security transfers, subsidies, other payments and property income paid (including interest payments) by the government. These items add up to current spending. In addition, government investment is also analysed.

26. The cycle is measured ex post either by real GDP growth rates or the output gap estimated by the OECD. The other control variables include standard controls used in the literature such as the lagged public debt-to-GDP ratio, debt servicing (interest payments as a per cent of GDP), openness (exports and imports as a ratio of GDP), population growth, the size of the public sector (government consumption as a per cent of GDP), a Maastricht and euro area dummy, a measure of inflation (CPI) and GDP volatility. The growth rate of real house and stock prices are also used as controls to see the extent to which fiscal policy is affected by asset price cycles.

27. Three types of political economy variables are added as controls: a) the strength of the government, b) the background of the head of government and c) the timing of general elections. Two variables capture the strength of the government. The first variable measures the strength of the left-wing government and the second variable measures the strength of the right-wing government. These measures are constructed by interacting a variable ("side") that measures the political orientation of the government from 1 (very conservative) to 5 (very left wing) and a variable that measures the stability of the government ("strength") on a scale from 1 (caretaker or non-political government) to 6 (single party majority government) using the following formula: strength of left wing: if side>3 then = (side-3)*strength and = 0 otherwise, strength of right wing = if side<4 then = ((side-3)*(-1))*strength and = 0 otherwise. For instance, a value of 10 for the strength of the left wing indicates a strongly left wing and stable government. The variable that measures the educational and professional background of the head of government takes the value of one if he/she has university education in business/economics or have work experience in the private business sector, takes the value of 2 if he/she has both and is zero otherwise. Two variables are used to measure the timing of elections. The first one, "early election", takes the value of 1 for a given year if general elections took place in the first half of the year, 0.5 the year before and zero otherwise. The second one, "late election", is 1 for the year when elections took place in the second half in a given year and takes zero otherwise.

Comparing plans with outcomes: ex ante versus ex post data

28. Fiscal plans may be counter-cyclical but can turn out to be pro-cyclical once implemented for several reasons. First, if forecasts of cyclical developments are systematically wrong, counter-cyclical fiscal plans can turn into pro-cyclical outcomes. Second, a long delay with which fiscal plans are adopted may cause a counter-cyclical plan to turn pro-cyclical. Third, changes can occur during the implementation phase. Finally, governments may purposefully diverge from plans in the implementation phase for political economy reasons. For instance, governments may make a lot of promises before elections that they break after being elected.

29. Against this background, estimations are carried out for two types of dataset. In addition to data on fiscal outcomes and ex post data, the cyclicality of fiscal policy is also assessed in the light of forecasts, using autumn *OECD Economic Outlook* projections for the next year.

Econometric issues

Estimating a linear relationship

30. Estimating fiscal policy reaction functions on a country basis proves difficult for several reasons. First, unit root and stationarity tests suggest that the same set of fiscal variables is stationary for some countries while it contains a unit root for other countries. If the fiscal variable is stationary, the level fiscal variable can be regressed on the level of the cycle variable. If it is an I(1) process, the impact of the level cycle variable can be analysed by regressing the first differenced fiscal variable on the level of the cycle variable. This model would be extended to an error correction model if the level fiscal variable were cointegrated with other control variables. Clearly, coefficient estimates of the relation between the level of fiscal policy and the cycle do not compare easily to coefficient estimates using the first differenced fiscal variable and the level cycle. Second, quarterly data for fiscal policy and the other controls are needed, but quarterly data contain a large amount of noise especially the fiscal variables for many smaller countries. Additionally, the results for the quarterly fiscal policy reaction functions show that whether or not fiscal policy is pro-cyclical depends crucially on how the business cycle is measured: different measures can result in contradictory results for a country using the same specification and estimation method. Third, some of the controls (*e.g.* the political economy variable) are available only at annual frequency, which decreases the degrees of freedom rapidly for a data set that typically spans over 20 years.

31. Annual data in a panel setting are thus used to analyse the extent to which fiscal policy reacts to the cycle because panel unit root tests reject the null hypothesis of a unit root for our sample and annual fiscal data contain less noise than the quarterly data, which are often interpolated. Models (2a) to (2d) are estimated using the Least Square Dummy Variable estimator (LSDV or country fixed effects OLS) with standard errors that are robust to the presence of heteroskedasticity in the residuals. OLS may give rise to biased estimates as the reaction function can include the lagged dependent variable on the right hand side. As the lagged dependent variable may be correlated with the error terms, the difference GMM estimator developed by Arellano and Bond (1991) and the more efficient system GMM estimator proposed by Arellano and Bover (1995) are used. Celasum and Kang (2006) show that the LSDV estimator yields unbiased estimates of the lagged public debt variable in fiscal reaction functions and that the endogeneity of the output gap variable is best tackled using either the difference or the system GMM estimator.

32. GMM estimators were developed for panels with large cross-sectional and small time series dimensions. In our case, N and T are small. For such a case, the correction developed by Kiviet (1995), Bun and Kiviet (2003) and Bun and Carree (2005) for balanced panels and by Bruno (2005a, b) for unbalanced panels seems more appropriate. However, the Kiviet estimator is based on the assumption that the right-hand side variables are strictly exogenous.

Asymmetric effects

33. The reaction of policies to the cycle may differ along the different phases of the cycle (in expansion vs. contractions) or even within the same phase. The asymmetry across phases can be estimated using the following specification

$$F_t = I(CYCLE_t < 0)\left[\alpha_1 + \beta_1 CYCLE_t + \overline{\overline{CT}}\right] + [1 - I(CYCLE_t < 0)]\left[\alpha_2 + \beta_2 CYCLE_t + \overline{\overline{CT}}\right] + \varepsilon_t \qquad (3)$$

where $I(\bullet)$ is an indicator function taking value 1 in the contraction phase and zero in the expansion phase. For the level equations, the indicator function takes the value of 1 (0) if the output gap or real GDP growth is positive (negative). For the first difference equations, the indicator function takes the value of 1 (0) if the change in the output gap or in real GDP growth is positive (negative).

34. Alternatively, the indicator function can also be determined by economic expansions and slowdowns detected by business cycle dating methods applied to GDP growth rates or the output gap. We use a variant of the procedure developed by Bry and Boschan (1971) to determine peaks and troughs in the series (see, for instance, Avouyi-Dovi and Matheron, 2005 and Everts, 2007). First, a search is carried out to pin down local minima and maxima in a window of t+/-1. Second, no multiple consecutive peaks or troughs are allowed. In the occurrence of multiple peaks or troughs, the highest peak or lowest trough is selected and the rest eliminated. Third, no constraint is imposed on the duration of the cycle given the annual frequency of the dataset. Hence, peak-to-trough and trough-to-peak phases last at least 2 years and full peak-to-peak and trough-to-trough cycles last at least three years.

35. Finally, the cycle dating method is used to distinguish between the run-up to the financial crisis (last trough to peak period) and previous periods of economic expansions (trough to peak periods) and economic downturns.

Non-linear effects

36. More complex non-linear structures can be uncovered by two or three-regime models where the threshold value of the cycle is determined endogenously (and is not imposed exogenously as in the case of asymmetry) along the lines of the two-regime and three-regime threshold models proposed by Hansen (1999):

$$F_t = \begin{cases} \alpha_1 + \beta_1 \cdot CYCLE_t + \overline{\overline{CT}} + \varepsilon_t & if \quad T \le \rho \\ \alpha_2 + \beta_2 \cdot CYCLE_t + \overline{\overline{CT}} + \varepsilon_t & if \quad T > \rho \end{cases} \tag{4a}$$

$$F_t = \begin{cases} \alpha_1 + \beta_1 CYCLE_t + \overline{\overline{CT}} + \varepsilon_t & if \quad T_1 \le \rho \\ \alpha_2 + \beta_2 CYCLE_t + \overline{\overline{CT}} + \varepsilon_t & if \quad T_2 \ge \rho > T_1 \\ \alpha_3 + \beta_3 CYCLE_t + \overline{\overline{CT}} + \varepsilon_t & if \quad \rho > T_2 \end{cases} \tag{4b}$$

where T, T1 and T2 are the thresholds values of the cycle and ρ denotes the threshold variable (cycle). Along the lines of Hansen (1999), linear and non-linear models are selected as follows. We first estimate the linear model and the two-regime model. A grid search with steps of 1% of the distribution is carried out to find the value of the threshold variable that minimizes the sum of squared residuals of the estimated two-regime model. Hansen (1999) shows that $\beta_1 = \beta_2$ and $\beta_1 = \beta_2 = \beta_3$ can be tested using a likelihood ratio test and he proposes to derive the distribution of the test statistic via bootstrapping with repeated random draws with replacements (Hansen, 1999), as it does not follow a standard asymptotic distribution.

Data sources

37. Data on general government balances are drawn from the OECD's Economic Outlook database. The source of data on disaggregated government expenditure and revenues is from the OECD's National Accounts database. Most control variables are also constructed using data obtained from the Economic Outlook database. Exceptions are the political economy variables that are sourced from the Comparative

Political Dataset I and II 1960-2006 compiled at the University of Bern and from www.electionguide.org. Data for the years 2007 and 2008 are collected from internet sources (mostly Wikipedia). The data concerning the background of politicians draw on Dreher *et al*. (2009). House prices are obtained from the OECD house price database (a compilation of national data sources) and from national sources (central banks and statistical offices).

38. Data on forecasts with regard to general government balances, GDP growth and the output gap are obtained starting in 1995 from different vintages of the Economic Outlook database. For G-7 countries, data for the period between 1977 and 1994 were taken from print copies of the *OECD Economic Outlook*.

Results

Fiscal outcomes

39. The estimation results show that total and primary general government balances are strongly counter-cyclical. Coefficient estimates for GDP growth and the output gap range between 0.3 and 0.5. This implies that a 1 percentage point change in the growth rate of GDP or of the output gap is associated with a 0.3 to 0.5 percentage point lower deficit or higher surplus (Table 1). The estimated coefficients are slightly but systematically smaller for primary balances than for total balances.

40. This relationship also holds in first differences with very similar coefficient estimates (Table 1). The positive coefficient estimates indicate that an acceleration in GDP growth or a widening output gap leads to an improvement in government balances. These results are robust to the inclusion of a variety of control variables including the lagged fiscal policy variable, lagged public debt, real house and share price growth, openness, population, government size, inflation, GDP volatility, a Maastricht and euro dummy and a score of variables capturing political cycles and political influences on fiscal policy.

41. As noted above, the reaction of government balances to the cycle that are not adjusted for the cycle capture the effect of automatic stabilisers and discretionary fiscal policy. Therefore, the fiscal policy reaction functions are also estimated for cyclically-adjusted government balances. While cyclically-adjusted government balances also appear to be counter-cyclical in a bivariate relationship, this effect first diminishes and then vanishes completely at the conventional 5% significance level as additional control variables are added. The only instance when it does not happen is the first difference specification of the general government balances with the change in the GDP growth rate being the measure of the cycle. The positive coefficient estimates indicate a counter-cyclical fiscal policy even though this effect is 3 to 4 times smaller than for the overall government balance (including automatic stabilizers).

42. Tables 2 to 5 show that these findings are robust to alternative econometric estimation methods (including the LSDV estimator, the Kiviet estimator and the difference and system GMM estimators). The results also withstand the test of systematic jack-knifing of the country coverage by eliminating one country at a time. Finally, the results remain unchanged with respect to the inclusion of the first differences of the non-stationary covariates (lagged public debt, dependency ratio and trade openness).

43. As for the control variables, several interesting features emerge.[7] First, the coefficient on lagged public debt is always positive and significant at the 5% level implying that a high level of debt leads to improving fiscal balances. Changes in public debt are also associated with improving fiscal balances (Tables 2 to 5). Second, rising real house and share prices improve fiscal balances, even though the

7. Panel unit root tests indicate that while most series are stationary in levels, some control variables such as public debt, openness and the size of the public sector have a unit root. These variables are therefore used in the estimations both in levels and in first differences.

equation already controls for the real cycle. The effect of real house price growth on fiscal balances is generally stronger than that of real share price growth. Third, higher trade openness, the dependency ratio and inflation (measured by the rate of growth of the GDP deflator) are associated with a better fiscal position whereas larger governments and higher output volatility are linked with worse fiscal outcomes. At the same time, an increase in trade openness leads to an improvement in the fiscal balance, and a rise in the dependency ratio and government size generates larger deficits. Fourth, the Maastricht and euro dummies are usually insignificant or if they are significant, they have a counterintuitive negative sign. Finally, the political economy variables do not appear to be particularly important in influencing fiscal outcomes. The most important of them are election dates that generate higher deficits, though this result is sensitive to the econometric estimation method (confirmed by the LSDV and GMM estimators but rejected by the Kiviet estimator).

Country-specific outcomes

44. Interacting country dummies with the cycle variable makes it possible to obtain country-specific estimates of fiscal policy responsiveness *vis-à-vis* the cycle while maintaining homogeneity on the coefficient estimates of other variables. Results reported in Tables 6 show that unadjusted government balances reacted either in a counter-cyclical manner to the cycle or were a-cyclical in most countries. Greece and Hungary are exceptions where the effect of automatic stabilisers was dominated by a pronounced pro-cyclical fiscal policy stance. Discretionary fiscal policy was expansionary in good times and contractionary in bad times in a number of OECD countries such as; Austria, Belgium, Hungary, the Netherlands, Poland, Portugal and the United Kingdom. By contrast, discretionary fiscal policy was strongly counter-cyclical in Australia, Canada, Denmark and the United States. For the remaining countries, discretionary fiscal policy was either a-cyclical or the coefficient estimates are of different sign depending on whether GDP growth or the output gap is used to measure the cycle.

Asymmetry in fiscal policy outcomes

45. It is conceivable that fiscal policy reacts to the cycle differently during cyclical upswings and downturns. One way of looking at this issue is to split the estimate of the reaction of fiscal policy into periods, when GDP growth or the output gap are negative or positive. The estimations show that the unadjusted government balances (total or primary) react counter-cyclically both in upswings and downturns, but that downturns trigger a more counter-cyclical response than upswings. At the same time, discretionary fiscal policy, captured by cyclically-adjusted balances, does not react to the cycle either in upswings or downturns (Table 7).

46. Another way to look at asymmetric fiscal policy reactions is to use upswings and downturns that are identified by a version of the Bry and Boschan business cycle dating method. The cycles identified in this way for GDP growth and the output gap yield very similar results.

47. Finally, it is interesting to see the extent to which the last upswing was different from previous upswings. Panel C and D of Table 7 show that fiscal policy did not react to the last upswing if the cycle is measured in terms of the output gap. The picture is different if GDP growth is used instead of the output gap. In this case, fiscal policy was more counter-cyclical than during earlier upswings but was less counter-cyclical than during downturns. If fiscal responsiveness is analysed in first differences, the picture changes completely as the fiscal response during the last upswing is stronger than during earlier expansions or downturns, while fiscal policy seems to be neutral in the last upswing if it is measured with changes in GDP growth.

48. However, cyclically-adjusted government balances do not seem to have responded in any of the three regimes (last upswing, previous upswings and all slowdowns), except for the case of the primary

balance, which is found to be pro-cyclical during the last upswing, if the cycle measure is the output gap. This holds true both for the level and first difference specifications.

Non-linearity in fiscal policy outcomes

49. Fiscal policy seems highly non-linear with respect to the size of government balances, the level of public debt and the size of the government (Table 8). Estimation results reported in Table 8, Panel A indicate the existence of three distinct regimes if the cycle is measured by GDP growth and if the threshold variable is the government balance itself. In this case, cyclically-unadjusted balances react in a strongly counter-cyclical way to the cycle if the balance is in surplus, the reaction is milder if the balances are either slightly in deficit or in surplus and is even milder or neutral below a certain deficit threshold. The cyclically adjusted balance even becomes pro-cyclical below the deficit threshold of 3.6% of GDP for total balances and 2.7% of GDP for primary balances. The results for the output gap are less robust.

50. A similar non-linear effect is detected for public debt (Table 8, Panel B). For public debt levels above 89% to GDP, fiscal policy is pro-cyclical. At intermediate levels of between 30% and 89%, the fiscal policy reaction is either neutral or mildly pro-cyclical and becomes counter-cyclical below 30%. This result can however be obtained only if the cycle is captured by the output gap as no non-linear effects can be established, if the cycle is measured by GDP growth.

51. One reason why fiscal policy is pro-cyclical if public debt is high and why countries with large deficits consolidate public finances during economic downturns is that long-term interest rates may rise significantly above a certain level of public debt. Countries that face increasing interest payments may decide to undertake fiscal consolidation to prevent snowball effects or limit future interest payments by cutting primary deficits and thus lowering debt.

52. Panel threshold models were used to analyse a possible non-linear relationship between public debt and the difference between short-term and long-term interest rates in OECD countries. While it is difficult to establish strong non-linear effects for all OECD countries for 1995 to 2010, long-term interest rates appear to be a non-linear function of public debt for the G-7 countries (excluding Japan) in recent years (2007:q1-2009:q4). The estimation results indicate a 4 basis point increase in long-term rates relative to short-term rates if public debt exceeds 76% of GDP. The effect of public debt on long-term interest rates is not statistically significant below this threshold.[8]

53. Finally, strong non-linear effects can be detected if government size is used as the threshold variable (Table 8, Panel C). A larger size of government induces more counter-cyclical fiscal policy reactions than a small size of government.

Fiscal plans and business cycle forecasts

54. Four measures that capture fiscal plans have been used: government consumption, cyclically-unadjusted total and primary balances and the cyclically-adjusted total government balance. We find that forecasted government consumption reacts positively to forecasted GDP growth and the changes in it but not to the forecasted output gap. Similarly, forecasted total (and primary) balances are related to GDP forecasts but no relationship could be established for output gap forecasts. Finally, the forecast of the cyclically-adjusted total balance does not bear any relation with GDP or output gap forecasts. Interestingly, both forecasted government consumption and government balances are influenced by past house price growth. An increase in real house prices at the time of the making the forecast is reflected in higher forecasted government consumption and lower deficits/higher surpluses (Table 9, Panel A and B).

8. The estimation results are not reported here but can be obtained from the author upon request.

55. As far as asymmetric reactions are concerned, the change in the planned fiscal policy stance is counter-cyclical in the face of worsening cyclical conditions and fiscal policy plans become pro-cyclical if economic conditions improve (Table 9, Panel C and D).

The reaction of fiscal revenues and expenditure to the cycle

56. The revenue side is more responsive to GDP growth than the output gap (Table 10). Corporate and property taxes respond strongly to GDP growth, while taxes on individuals, goods and services and social security contributions react less strongly. Taxes on payroll and other taxes do not react at all to the cycle.

57. The components of government spending behave differently over the cycle. Government wages and investment spending are found to be positively correlated with both measures of the cycle (GDP growth and output gap), while government subsidies increase in bad times and shrink during expansions. Non-wage consumption, social security transfers, other payments and property income paid by the government appear to be largely unaffected by the cycle. Nevertheless, country-specific estimates unveil some cross-country heterogeneity. For instance, government wages behave counter-cyclically in Australia and the United Kingdom and investment is also counter-cyclical in the Czech Republic and Sweden. Furthermore, subsidies move in tandem with the cycle in the Czech Republic and Poland. Finally, non-wage government consumption can be both counter- and pro-cyclical at the country level.

Conclusion

This paper studied the fiscal policy reaction to the cycle in OECD countries during the last 30 years. The paper provides with a number of interesting results. First, estimation results show that automatic stabilisers move government deficits in a counter-cyclical manner, but discretionary fiscal policy is neutral if measured against the output gap and is mildly counter-cyclical if measured against changes in GDP growth rates. These findings hide substantial country differences. While the automatic stabilisers dominate overall government balances in most OECD countries, the discretionary component of government balances is found to be strongly pro-cyclical in a number of OECD countries (Austria, Belgium, Hungary, the United Kingdom, the Netherlands, Poland and Portugal), counter-cyclical in others (Australia, Canada, Denmark, Ireland, Korea and the United States), and a-cyclical in the remaining countries (or the results were sensitive to the alternative use of GDP growth or the output gap for the measure of the cycle). A second finding of the paper is that real house and share prices have a strong impact on cyclically-unadjusted and adjusted balances. Furthermore, the overall response of balances to the cycle is asymmentric with a more counter-cylical response in downturns than in upswings, but no [asymmetry is found?] for cyclically-adjusted balances. Using GDP growth or output gaps yields conflicting results for the last upswing. In addition, the paper finds that there is a strong non-linear effect in the way fiscal policy reacts to the cycle: fiscal policy is counter-cyclical if balances are in surplus, if public debt is low and if the size of government is large but the reaction becomes pro-cyclical in the presence of large deficits, high public debt and countries with a small government. The estimation results also suggest that fiscal plans are asymmetric: they are pro-cyclical in the face of forecasted improvement cyclical conditions and are countercyclical if cyclical conditions are expected to worsen. Past real house price increases are reflected in total and discretionary fiscal policies. When looking at the components of the spending and revenue sides, our results suggest that wage government consumption (in healthcare) and investment spending (in healthcare and education) are generally the most pro-cyclical components of government spending, while government subsidies tend to be counter-cyclical. On the revenue side, corporate taxes are found to react most strongly to GDP growth, while taxes on individuals, goods and services and social security contributions react less strongly. Taxes on payroll and other taxes do not show a cyclical component.

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Table 1. **Fiscal policy reaction function – LSDV estimator using various control variables**

Panel A. General government balances

Dependent variable (fiscal policy)	Defg	Defg	Defg	Defg	Defg	Defg	Defg	Defg	Defg	Defg	Defg	Defg	Defg	Defg
Measure of cycle	Gap	Gap	Gap	Gap	Gap	Gap	Gap	Dgdpv	Dgdpv	Dgdpv	Dgdpv	Dgdpv	Dgdpv	Dgdpv
							Levels							
Cycle	**0.53****	**0.217****	**0.254****	**0.239****	**0.258****	**0.21****	**0.209****	**0.389****	**0.268****	**0.321****	**0.332****	**0.312****	**0.296****	**0.301****
Fiscal policy (-1)		0.692**	0.771**	0.795**	0.704**	0.694**	0.693**		0.736**	0.831**	0.852**	0.789**	0.76**	0.76**
Debt(-1)			0.018**	0.017**	0.019**	0.024**	0.023**			0.016**	0.018**	0.019**	0.026**	0.025**
Real house price growth				0.048**	0.035**	0.034**	0.034**				0.026**	0.022**	0.019*	0.019*
Real share price growth				0.009**	0.009**	0.008**	0.008**				0.004*	0.005*	0.004*	0.004*
Openness					0.031**	0.033**	0.032**					0.02**	0.022**	0.021**
Dependency ratio					0.059*	0.034	0.036					-0.013	-0.036	-0.036
Gov size(-1)					-0.175**	-0.146**	-0.145**					-0.145**	-0.108*	-0.108*
Debt servicing					-0.001*	-0.001**	-0.001**					0	-0.001*	-0.001*
GDP volatility						-0.147*	-0.146*						-0.158**	-0.158**
Inflation						0.086**	0.084**						0.117**	0.115**
Euro_dummy						-0.38	-0.318						-0.206	-0.147
Maastricht_dummy						0.215	0.204						0.191	0.179
Election date_early year							-0.398							-0.402
Election date_late year							-0.134							-0.193
Strength of left wing gov							-0.017							0.005
Strength of right wing gov							-0.019							-0.018
Background of prime minister							0.019							0.044
No of obs	944	938	852	651	648	648	648	1 114	1 096	887	651	648	648	648
Adj. R-squared	0.565	0.815	0.853	0.859	0.863	0.868	0.867	0.51	0.819	0.867	0.867	0.867	0.874	0.874
							First differences							
Cycle	**0.358****	**0.369****	**0.422****	**0.487****	**0.425****	**0.394****	**0.394****	**0.123****	**0.128****	**0.187****	**0.2****	**0.216****	**0.245****	**0.247****
Fiscal policy (-1)		-0.069	-0.005	0.028	-0.073	-0.065	-0.068		-0.089	0.074	0.13**	-0.049	-0.04	-0.041
Debt(-1)			0.025**	0.041**	0.048**	0.051**	0.051**			0.009	0.027**	0.033**	0.036**	0.036**
Real house price growth				0.003	0.005	0.009	0.009				0.014	0.011	0.01	0.01
Real share price growth				0	0.002	-0.001	-0.001				-0.004*	0.001	-0.002	-0.002
Openness					0.045**	0.031	0.029					0.054**	0.032*	0.03
Dependency ratio					-0.464**	-0.287	-0.281					-0.805**	-0.524**	-0.518**
Gov size(-1)					-0.52**	-0.523**	-0.536**					-0.83**	-0.841**	-0.848**
Debt servicing					-0.001	-0.002**	-0.002**					0	-0.001	-0.001
GDP volatility						-0.146	-0.152						-0.204**	-0.206**
Inflation						0.183**	0.18**						0.231**	0.231**
Euro_dummy						-0.283	-0.274						-0.344*	-0.33*
Maastricht_dummy						0.198	0.183						0.261*	0.243
Election date_early year							-0.525*							-0.589*
Election date_late year							-0.235*							-0.253*
Strength of left wing gov							0.036							0.032
Strength of right wing gov							0.012							0.002
Background of prime minister							-0.024							-0.132
No of obs	915	909	823	626	623	623	623	1085	1067	858	626	623	623	623
Adj. R-squared	0.11	0.117	0.159	0.178	0.213	0.26	0.262	0.005	0.03	0.04	0.057	0.156	0.235	0.238

Notes: *,** and *** denote statistical significance at the 10%, 5% and 1% levels. DEFG, DEFP, DEFGSA, DEFPSA denote total general government balances, the primary of general government, cyclically adjusted total general government balances and the cyclically adjusted primary balance. Gap and DGDPV refer to the output gap and real GDP growth.

Panel B. Cyclically-adjusted general government balances

Dependent variable (fiscal policy)	Defgsa	Defgsa	Defgsa	Defgsa	Defgsa	Defgsa	Defgsa	Defgsa	Defgsa	Defgsa	Defgsa	Defgsa	Defgsa	Defgsa
Measure of cycle	Gap	Gap	Gap	Gap	Gap	Gap	Gap	Dgdpv	Dgdpv	Dgdpv	Dgdpv	Dgdpv	Dgdpv	Dgdpv
							Levels							
Cycle	**0.138****	**0.021**	**0.05***	**0.022**	**0.011**	**-0.04**	**-0.04**	**0.219****	**0.094****	**0.103****	**0.068***	**0.051**	**0.039**	**0.041**
Fiscal policy (-1)		0.786**	0.805**	0.816**	0.727**	0.714**	0.714**		0.78**	0.8**	0.814**	0.725**	0.715**	0.714**
Debt(-1)			0.015**	0.014**	0.015**	0.019**	0.018**			0.015**	0.014**	0.015**	0.019**	0.018**
Real house price growth				0.035**	0.027**	0.026**	0.026**				0.028**	0.022**	0.019**	0.019**
Real share price growth				0.006**	0.007**	0.006**	0.006**				0.006**	0.007**	0.006**	0.006**
Openness					0.026**	0.027**	0.027**					0.025**	0.026**	0.026**
Dependency ratio					0.034	0.02	0.021					0.023	0.013	0.014
Gov size(-1)					-0.147**	-0.133**	-0.136**					-0.144**	-0.108*	-0.111*
Debt servicing					0	-0.001	-0.001					0	-0.001*	-0.001
GDP volatility						-0.155**	-0.155**						-0.113	-0.113
Inflation						0.067**	0.065**						0.064**	0.061**
Euro_dummy						-0.178	-0.136						-0.19	-0.146
Maastricht_dummy						0.175	0.167						0.159	0.152
Election date_early year							-0.372							-0.366
Election date_late year							-0.173							-0.183
Strength of left wing gov							-0.016							-0.014
Strength of right wing gov							-0.006							-0.005
Background of prime minister							0.041							0.053
No of obs	865	838	794	640	637	637	637	865	838	794	640	637	637	637
Adj. R-squared	0.428	0.803	0.814	0.829	0.829	0.834	0.834	0.437	0.806	0.817	0.83	0.83	0.834	0.834
							First differences							
Cycle	**0.077****	**0.098****	**0.116****	**0.138****	**0.088***	**0.055**	**0.056**	**0.05****	**0.066****	**0.059****	**0.05**	**0.067****	**0.077****	**0.081****
Fiscal policy (-1)		-0.058	-0.056	-0.036	-0.086	-0.074	-0.074		-0.053	-0.052	-0.024	-0.097	-0.086	-0.086
Debt(-1)			0.039**	0.045**	0.056**	0.057**	0.057**			0.033**	0.04**	0.052**	0.053**	0.053**
Real house price growth				0.009	0.011	0.013	0.014				0.013	0.01	0.01	0.01
Real share price growth				0	0.001	0	-0.001				-0.001	0.001	0	0
Openness					0.031*	0.024	0.022					0.032*	0.021	0.019
Dependency ratio					-0.454**	-0.343*	-0.338*					-0.516**	-0.362**	-0.356**
Gov size(-1)					-0.306**	-0.307**	-0.317**					-0.407**	-0.404**	-0.417**
Debt servicing					-0.001*	-0.002**	-0.001**					-0.001	-0.001**	-0.001**
GDP volatility						-0.157*	-0.163*						-0.133	-0.136
Inflation						0.105**	0.103**						0.119**	0.117**
Euro_dummy						-0.269	-0.263						-0.276	-0.269
Maastricht_dummy						0.146	0.131						0.156	0.141
Election date_early year							-0.548*							-0.562*
Election date_late year							-0.267**							-0.281**
Strength of left wing gov							0.016							0.012
Strength of right wing gov							0.019							0.019
Background of prime minister							-0.026							-0.035
No of obs	838	811	767	615	612	612	612	838	811	767	615	612	612	612
Adj. R-squared	-0.015	-0.01	0.011	0.016	0.04	0.063	0.068	-0.017	-0.014	0.001	0.001	0.04	0.07	0.075

Notes: *,** and *** denote statistical significance at the 10%, 5% and 1% levels. DEFG, DEFP, DEFGSA, DEFPSA denote total general government balances, the primary of general government, cyclically adjusted total general government balances and the cyclically adjusted primary balance. Gap and DGDPV refer to the output gap and real GDP growth.

Panel C. Primary balance of general government

Dependent variable (fiscal policy)	Defp	Defp	Defp	Defp	Defp	Defp	Defp	Defp	Defp	Defp	Defp	Defp	Defp	Defp
Measure of cycle	Gap	Gap	Gap	Gap	Gap	Gap	Gap	Dgdpv	Dgdpv	Dgdpv	Dgdpv	Dgdpv	Dgdpv	Dgdpv
							Levels							
Cycle	**0.399****	**0.181****	**0.236****	**0.219****	**0.213****	**0.182****	**0.181****	**0.308****	**0.249****	**0.302****	**0.311****	**0.297****	**0.282****	**0.287****
Fiscal policy (-1)		0.657**	0.709**	0.726**	0.683**	0.691**	0.69**		0.676**	0.752**	0.777**	0.742**	0.745**	0.745**
Debt(-1)			0.025**	0.021**	0.023**	0.023**	0.023**			0.022**	0.021**	0.021**	0.024**	0.023**
Real house price growth				0.042**	0.039**	0.037**	0.036**				0.023**	0.024**	0.021**	0.02**
Real share price growth				0.008**	0.009**	0.008**	0.008**				0.003	0.004*	0.004*	0.004*
Openness					0.031**	0.033**	0.033**					0.022**	0.023**	0.022**
Dependency ratio					0.055*	0.05	0.052*					-0.014	-0.019	-0.019
Gov size(-1)					-0.13**	-0.105*	-0.105*					-0.108*	-0.064	-0.063
Debt servicing					0.001**	0.001	0.001					0.001**	0.001	0.001
GDP volatility						-0.142*	-0.141*						-0.143**	-0.143**
Inflation						0.018	0.017						0.055*	0.054*
Euro_dummy						-0.42*	-0.375						-0.254	-0.212
Maastricht_dummy						0.154	0.145						0.145	0.135
Election date_early year							-0.327							-0.329
Election date_late year							-0.145							-0.198
Strength of left wing gov							-0.012							0.007
Strength of right wing gov							-0.014							-0.014
Background of prime minister							0.003							0.017
No of obs	894	888	825	651	648	648	648	1 023	1 005	849	651	648	648	648
Adj. R-squared	0.262	0.642	0.72	0.756	0.76	0.763	0.762	0.25	0.654	0.743	0.771	0.772	0.776	0.776
							First differences							
Cycle	**0.395****	**0.405****	**0.427****	**0.457****	**0.4****	**0.369****	**0.37****	**0.133****	**0.138****	**0.183****	**0.182****	**0.2****	**0.217****	**0.219****
Fiscal policy (-1)		-0.074	0.011	0.036	-0.054	-0.062	-0.064		-0.099	0.088*	0.133**	-0.03	-0.04	-0.04
Debt(-1)			0.048**	0.051**	0.054**	0.054**	0.054**			0.031**	0.037**	0.039**	0.04**	0.04**
Real house price growth				0.004	0.006	0.009	0.009				0.016	0.013	0.011	0.011
Real share price growth				0	0.001	0	-0.001				-0.004**	0	-0.001	-0.002
Openness					0.035**	0.026	0.024					0.044**	0.028	0.026
Dependency ratio					-0.358*	-0.22	-0.212					-0.68**	-0.445**	-0.439**
Gov size(-1)					-0.457**	-0.482**	-0.494**					-0.742**	-0.772**	-0.78**
Debt servicing					0	-0.001	-0.001					0.001	0	0
GDP volatility						-0.14	-0.146						-0.204**	-0.206**
Inflation						0.135**	0.132**						0.177**	0.177**
Euro_dummy						-0.414**	-0.407**						-0.471**	-0.458**
Maastricht_dummy						0.187	0.173						0.246*	0.228
Election date_early year							-0.506*							-0.566*
Election date_late year							-0.252*							-0.263*
Strength of left wing gov							0.031							0.028
Strength of right wing gov							0.013							0.004
Background of prime minister							-0.029							-0.132
No of obs	867	861	798	626	623	623	623	996	978	822	626	623	623	623
Adj. R-squared	0.124	0.131	0.169	0.175	0.2	0.232	0.234	0.004	0.034	0.045	0.056	0.144	0.202	0.205

Notes: *,** and *** denote statistical significance at the 10%, 5% and 1% levels. DEFG, DEFP, DEFGSA, DEFPSA denote total general government balances, the primary of general government, cyclically adjusted total general government balances and the cyclically adjusted primary balance. Gap and DGDPV refer to the output gap and real GDP growth.

Panel D. Cyclically-adjusted primary balance of general government

Dependent variable (fiscal policy)	Defpsa	Defpsa	Defpsa	Defpsa	Defpsa	Defpsa	Defpsa	Defpsa	Defpsa	Defpsa	Defpsa	Defpsa	Defpsa	Defpsa
Measure of cycle	Gap	Gap	Gap	Gap	Gap	Gap	Gap	Dgdpv	Dgdpv	Dgdpv	Dgdpv	Dgdpv	Dgdpv	Dgdpv
							Levels							
Cycle	**-0.035**	**-0.036**	**0.002**	**-0.024**	**-0.037**	**-0.064***	**-0.064***	**0.2****	**0.071****	**0.083****	**0.071****	**0.054**	**0.037**	**0.039**
Fiscal policy (-1)		0.797**	0.771**	0.773**	0.751**	0.748**	0.748**		0.788**	0.761**	0.766**	0.75**	0.75**	0.75**
Debt(-1)			0.02**	0.018**	0.017**	0.015**	0.015**			0.02**	0.018**	0.017**	0.015**	0.015**
Real house price growth				0.031**	0.032**	0.03**	0.029**				0.02**	0.022**	0.021**	0.021**
Real share price growth				0.005**	0.006**	0.005**	0.005**				0.006**	0.007**	0.006**	0.006**
Openness					0.026**	0.028**	0.027**					0.024**	0.027**	0.026**
Dependency ratio					0.037	0.043	0.044					0.03	0.037	0.038
Gov size(-1)					-0.056	-0.057	-0.059					-0.027	-0.019	-0.022
Debt servicing					0.001**	0.001**	0.001**					0.001**	0.001**	0.001**
GDP volatility						-0.135**	-0.135**						-0.077	-0.077
Inflation						-0.009	-0.011						-0.015	-0.017
Euro_dummy						-0.236	-0.214						-0.267	-0.243
Maastricht_dummy						0.151	0.144						0.132	0.126
Election date_early year							-0.312							-0.304
Election date_late year							-0.177							-0.188
Strength of left wing gov							-0.013							-0.011
Strength of right wing gov							-0.003							-0.002
Background of prime minister							-0.008							0.005
No of obs	865	838	794	640	637	637	637	865	838	794	640	637	637	637
Adj. R-squared	0.303	0.769	0.787	0.823	0.825	0.826	0.826	0.321	0.77	0.79	0.824	0.825	0.826	0.825
							First differences							
Cycle	**0.063***	**0.079****	**0.097****	**0.123****	**0.081***	**0.048**	**0.05**	**0.044***	**0.056****	**0.044***	**0.039**	**0.055**	**0.051**	**0.055***
Fiscal policy (-1)		-0.054	-0.052	-0.033	-0.069	-0.073	-0.073		-0.051	-0.049	-0.021	-0.076	-0.081	-0.081
Debt(-1)			0.054**	0.054**	0.059**	0.057**	0.057**			0.05**	0.05**	0.055**	0.054**	0.054**
Real house price growth				0.01	0.013	0.013	0.014				0.014	0.012	0.012	0.012
Real share price growth				0	0.001	0	0				-0.001	0.001	0	0
Openness					0.02	0.019	0.017					0.021	0.018	0.016
Dependency ratio					-0.316	-0.248	-0.242					-0.376*	-0.27	-0.264
Gov size(-1)					-0.24**	-0.256**	-0.265**					-0.324**	-0.323**	-0.338**
Debt servicing					0	0	0					0	0	0
GDP volatility						-0.145	-0.149						-0.137	-0.138
Inflation						0.041	0.04						0.05	0.05
Euro_dummy						-0.414**	-0.41**						-0.422**	-0.417**
Maastricht_dummy						0.15	0.136						0.159	0.144
Election date_early year							-0.54*							-0.551*
Election date_late year							-0.283**							-0.292**
Strength of left wing gov							0.004							0.002
Strength of right wing gov							0.02							0.02
Background of prime minister							-0.082							-0.09
No of obs	838	811	767	615	612	612	612	838	811	767	615	612	612	612
Adj. R-squared	-0.016	-0.015	0.021	0.026	0.033	0.044	0.049	-0.017	-0.016	0.013	0.013	0.033	0.046	0.052

Notes: *,** and *** denote statistical significance at the 10%, 5% and 1% levels. DEFG, DEFP, DEFGSA, DEFPSA denote total general government balances, the primary of general government, cyclically adjusted total general government balances and the cyclically adjusted primary balance. Gap and DGDPV refer to the output gap and real GDP growth.

Table 2. **Fiscal policy reaction function –LSDV estimator for the full specification**

Panel A. Estimation results, LSDV estimator, first differences

Dependent variable	Cgv growth	Cgv growth	D_defg	D_defg	D_defgsa	D_defgsa	D_defp	D_defp	D_defpsa	D_defpsa
D_gap	**0.160****		**0.343****		**0.013**		**0.334****		**0.020**	
D_dgdpv		**0.159****		**0.182****		**0.0508***		**0.174****		**0.043**
Fiscal policy(-1)	-0.359**	-0.326**	-0.0978	-0.0889	-0.0952*	-0.103*	-0.0633	-0.0505	-0.0662	-0.0723
Inflation	0.012	0.014	0.018	0.011	-0.003	0.001	0.020	0.012	-0.011	-0.008
Maastricht_dummy	0.035	0.050	0.153	0.196	0.107	0.109	0.169	0.211	0.146	0.149
Real house price growth	0.003	0.005	0.022	0.0361**	0.0225*	0.0207*	0.018	0.0318**	0.0174*	0.016
Real share price growth	-0.001	-0.002	0.00840**	0.00834**	0.00780**	0.00727**	0.00764**	0.00765**	0.00671**	0.00632**
D_Debt(-1)	-0.0467**	-0.0540**	0.0429**	0.0380**	0.0499**	0.0479**	0.0573**	0.0528**	0.0617**	0.0602**
Debt servicing	0.006	0.008	-0.002	-0.003	-0.004	-0.003	-0.009	-0.009	-0.010	-0.009
D_openness	-0.0545*	-0.0591**	0.0425**	0.0512**	0.0282*	0.0252*	0.0323**	0.0410**	0.017	0.015
D_dependency ratio	0.275	0.207	-0.281*	-0.488**	-0.333*	-0.320*	-0.213	-0.416**	-0.248	-0.244
D_gov size (-1)	-1.325**	-1.561**	-0.568**	-0.811**	-0.320**	-0.372**	-0.511**	-0.738**	-0.274**	-0.320**
D_interest rate	-0.128*	-0.114*	0.008	0.063	0.001	0.003	0.047	0.102*	0.048	0.051
Euro_dummy	-0.130	-0.158	-0.133	-0.242	-0.182	-0.167	-0.268	-0.370**	-0.368**	-0.360**
Gdp growth volatility	0.084	0.048	-0.112	-0.148*	-0.071	-0.076	-0.060	-0.094	-0.014	-0.019
Strength of left wing gov	-0.010	-0.004	-0.005	-0.001	-0.011	-0.012	0.002	0.006	-0.004	-0.005
Strength of right wing gov	-0.010	-0.014	-0.019	-0.022	-0.010	-0.012	-0.015	-0.018	-0.005	-0.007
Background of prime minister	0.009	-0.018	0.273*	0.259	0.248	0.246*	0.161	0.146	0.114	0.112
Election date_early year	0.309	0.302	-0.432	-0.426	-0.437	-0.441	-0.315	-0.307	-0.327	-0.331
Election date_late year	0.303	0.299	-0.243**	-0.235**	-0.259**	-0.279**	-0.256**	-0.246**	-0.267**	-0.282**
No. of obs.	659	668	635	637	622	622	635	635	622	622
Adj-R sq.	0.329	0.343	0.265	0.242	0.1	0.104	0.26	0.235	0.094	0.097
AIC	2 780.3	2 805.9	2 379.4	2 404.9	2 239.7	2 236.8	2 338.4	2 359.8	2 235.3	2 233.4
BIC	2 865.6	2 891.5	2 464	2 489.6	2 323.9	2 321	2 423	2 444.4	2 319.5	2 317.6

Notes: *,** and *** denote statistical significance at the 10%, 5% and 1% levels. DEFG, DEFP, DEFGSA, DEFPSA denote total general government balances, the primary of general government, cyclically adjusted total general government balances and the cyclically adjusted primary balance. CGV is real government consumption. Gap and DGDPV refer to the output gap and real GDP growth. D_ indicates first differences.

Panel B. Estimation results – LSDV estimator, levels

Dependent variable	Cgv	Cgv	Defg	Defg	Defgsa	Defgsa	Defp	Defp	Defpsa	Defpsa
Gap	**0.144****		**0.159****		**-0.056**		**0.120****		**-0.105****	
Dgdpv		**0.134****		**0.214****		**-0.006**		**0.201****		**0.002**
Fiscal policy(-1)	0.234**	0.255**	0.728**	0.767**	0.734**	0.734**	0.707**	0.744**	0.762**	0.763**
Inflation	0.0550**	0.0736**	0.002	0.022	0.005	-0.002	-0.023	-0.004	-0.024	-0.035
Maastricht_dummy	0.165*	0.153*	0.228	0.202	0.170	0.167	0.121	0.111	0.100	0.092
Real house price growth	0.0180*	0.011	0.0460**	0.0324**	0.0319**	0.0294**	0.0400**	0.0262*	0.0260**	0.020
Real share price growth	-0.005	-0.00683*	0.00786**	0.00525**	0.00520**	0.00599**	0.00781**	0.00557**	0.00507**	0.00648**
D_Debt(-1)	-0.0416**	-0.0486**	0.010	0.011	0.009	0.013	0.013	0.016	0.017	0.024
Debt servicing	0.007	0.009	0.003	0.003	0.005	0.004	0.001	0.000	0.001	0.000
D_openness	-0.0578**	-0.0735**	0.0646**	0.0462**	0.0295**	0.0312**	0.0514**	0.0351**	0.016	0.018
D_dependency ratio	-0.085	-0.015	-0.631**	-0.465**	-0.578**	-0.544**	-0.529**	-0.360*	-0.443**	-0.364**
D_gov size (-1)	-0.231	-0.287	-0.376**	-0.347**	-0.170*	-0.163	-0.516**	-0.465**	-0.276**	-0.259**
D_interest rate	-0.133*	-0.114*	0.027	0.045	0.014	-0.001	0.039	0.052	0.043	0.012
Euro_dummy	-0.339	-0.148	0.177	0.345	0.268	0.248	-0.199	-0.014	-0.181	-0.207
Gdp growth volatility	-0.065	-0.087	-0.122	-0.169	-0.133	-0.104	-0.121	-0.149	-0.114*	-0.059
Strength of left wing gov	-0.010	-0.001	0.002	0.009	-0.005	-0.007	0.015	0.020	0.009	0.005
Strength of right wing gov	-0.007	-0.013	-0.013	-0.019	-0.009	-0.009	-0.011	-0.016	-0.006	-0.006
Background of prime minister	-0.011	-0.025	0.198	0.227	0.170	0.185	0.175	0.199	0.112	0.144
Election date_early year	0.291	0.282	-0.378	-0.384	-0.425	-0.420	-0.343	-0.336	-0.388	-0.377
Election date_late year	0.302**	0.307**	-0.101	-0.155	-0.155	-0.157	-0.105	-0.157	-0.158*	-0.166*
No. of obs.	663	668	640	640	632	632	640	640	632	632
Adj-R sq.	0.187	0.189	0.756	0.762	0.682	0.681	0.685	0.695	0.65	0.646
AIC	2 677	2 697.3	2 344.2	2 329.2	2 197.7	2 200	2 306.4	2 287.1	2 207.8	2 215.6
BIC	2 762.4	2 782.9	2 429	2 413.9	2 282.3	2 284.5	2 391.2	2 371.8	2 292.4	2 300.1

Notes: *,** and *** denote statistical significance at the 10%, 5% and 1% levels. DEFG, DEFP, DEFGSA, DEFPSA denote total general government balances, the primary of general government, cyclically-adjusted total general government balances and the cyclically-adjusted primary balance. CGV is real government consumption. Gap and DGDPV refer to the output gap and real GDP growth. D_ indicates first differences.

Table 3. **Fiscal policy reaction function– bias corrected LSDV estimator**

Panel A. Estimation results – Kiviet estimator, first differences

Dependent variable	Cgv growth	Cgv growth	D_defg	D_defg	D_defgsa	D_defgsa	D_defp	D_defp	D_defpsa	D_defpsa
D_gap	**0.158****		**0.344****		**0.014**		**0.335****		**0.021**	
D_dgdpv		**0.160****		**0.184****		**0.050**		**0.176****		**0.043**
Fiscal policy(-1)	-0.340**	-0.307**	-0.063	-0.053	-0.063	-0.071	-0.029	-0.015	-0.034	-0.040
Inflation	0.014	0.016	0.008	0.001	-0.008	-0.004	0.012	0.004	-0.013	-0.010
Maastricht_dummy	0.034	0.048	0.134	0.178*	0.094	0.096	0.153	0.196*	0.135	0.137
Real house price growth	0.003	0.004	0.0218*	0.0358**	0.0222*	0.0205*	0.018	0.0313**	0.017	0.016
Real share price growth	-0.001	-0.002	0.00858**	0.00848**	0.00784**	0.00731**	0.00778**	0.00776**	0.00672**	0.00634**
D_Debt(-1)	-0.0462**	-0.0534**	0.0443**	0.0393**	0.0506**	0.0487**	0.0585**	0.0538**	0.0622**	0.0607**
Debt servicing	0.006	0.008	-0.003	-0.003	-0.004	-0.004	-0.009	-0.009	-0.010	-0.010
D_openness	-0.0540**	-0.0590**	0.0432**	0.0517**	0.029	0.026	0.0329*	0.0413**	0.017	0.015
D_dependency ratio	0.281	0.216	-0.279	-0.487*	-0.337	-0.324	-0.210	-0.413**	-0.251	-0.249
D_gov size (-1)	-1.318**	-1.554**	-0.550**	-0.800**	-0.316**	-0.368**	-0.493**	-0.726**	-0.269**	-0.316**
D_interest rate	-0.128**	-0.114**	0.007	0.063	0.001	0.003	0.046	0.101**	0.047	0.050
Euro_dummy	-0.101	-0.126	-0.146	-0.263	-0.186	-0.172	-0.272	-0.380	-0.367	-0.360
Gdp growth volatility	0.086	0.049	-0.110	-0.145	-0.066	-0.072	-0.058	-0.091	-0.009	-0.014
Strength of left wing gov	-0.010	-0.004	-0.006	0.000	-0.011	-0.013	0.002	0.007	-0.004	-0.005
Strength of right wing gov	-0.010	-0.014	-0.019	-0.021	-0.010	-0.012	-0.014	-0.016	-0.006	-0.007
Background of prime minister	-0.001	-0.024	0.286	0.277	0.253	0.251	0.174	0.164	0.121	0.118
Election date_early year	0.304	0.297	-0.427	-0.423	-0.435	-0.439	-0.312	-0.305	-0.327	-0.331
Election date_late year	0.302	0.295	-0.244	-0.237	-0.261	-0.280	-0.256	-0.247	-0.267	-0.282
No. of obs.	659	668	635	637	622	622	635	635	622	622

Notes: *,** and *** denote statistical significance at the 10%, 5% and 1% levels. DEFG, DEFP, DEFGSA, DEFPSA denote total general government balances, the primary of general government, cyclically-adjusted total general government balances and the cyclically-adjusted primary balance. CGV is real government consumption. Gap and DGDPV refer to the output gap and real GDP growth. D_ indicates first differences.

Panel B. Estimation results – Kiviet estimator, levels

Dependent variable	Cgv	Cgv	Defg	Defg	Defgsa	Defgsa	Defp	Defp	Defpsa	Defpsa
D_gap	**0.132****		**0.157****		**-0.058**		**0.120****		**-0.109****	
D_dgdpv		**0.132****		**0.231****		**0.008**		**0.202****		**0.003**
Fiscal policy(-1)	0.272**	0.291**	0.732**	0.775**	0.778**	0.787**	0.707**	0.744**	0.777**	0.764**
Inflation	0.0619**	0.0792**	0.011	0.041	-0.007	0.007	-0.023	-0.003	-0.015	-0.034
Maastricht_dummy	0.162	0.148	0.236**	0.217**	0.172	0.195*	0.121	0.111	0.117	0.093
Real house price growth	0.0177*	0.010	0.0468**	0.0323**	0.0346**	0.0326**	0.0400**	0.0262*	0.0271**	0.0201*
Real share price growth	-0.005	-0.00667**	0.00789**	0.005	0.005	0.00569*	0.00781**	0.00557*	0.005	0.00649**
D_Debt(-1)	-0.0405**	-0.0466**	0.010	0.012	0.008	0.012	0.013	0.016	0.018	0.0245*
Debt servicing	0.006	0.008	0.003	0.002	0.006	0.006	0.001	0.000	0.001	0.000
D_openness	-0.0571**	-0.0724**	0.0651**	0.0469*	0.0358**	0.0382**	0.0514**	0.035	0.017	0.018
D_dependency ratio	-0.090	-0.009	-0.646**	-0.471	-0.589**	-0.572**	-0.529*	-0.360	-0.471**	-0.365*
D_gov size (-1)	-0.241	-0.291*	-0.369**	-0.328**	-0.171	-0.143	-0.516**	-0.465**	-0.266**	-0.258*
D_interest rate	-0.132**	-0.116**	0.027	0.041	0.007	-0.011	0.039	0.052	0.043	0.012
Euro_dummy	-0.269	-0.080	0.133	0.286	0.411	0.359	-0.199	-0.017	-0.210	-0.215
Gdp growth volatility	-0.062	-0.081	-0.114	-0.148	-0.123	-0.084	-0.121	-0.148	-0.107	-0.058
Strength of left wing gov	-0.009	-0.001	0.001	0.008	-0.004	-0.006	0.015	0.019	0.009	0.005
Strength of right wing gov	-0.008	-0.013	-0.012	-0.017	-0.013	-0.012	-0.011	-0.016	-0.005	-0.006
Background of prime minister	-0.033	-0.042	0.173	0.190	0.225	0.209	0.175	0.197	0.071	0.139
Election date_early year	0.281	0.276	-0.384	-0.391	-0.441	-0.446	-0.343	-0.336	-0.403	-0.378
Election date_late year	0.304	0.307	-0.100	-0.154	-0.144	-0.147	-0.105	-0.158	-0.157	-0.166
No. of obs.	663	668	640	640	632	632	640	640	632	632

Notes: *,** and *** denote statistical significance at the 10%, 5% and 1% levels. DEFG, DEFP, DEFGSA, DEFPSA denote total general government balances, the primary of general government, cyclically adjusted total general government balances and the cyclically adjusted primary balance. CGV is real government consumption. Gap and DGDPV refer to the output gap and real GDP growth. D_ indicates first differences.

Table 4. **Fiscal policy reaction function – first difference GMM estimator**

Panel A. Estimation results – difference GMM, first differences

Dependent variable	Cgv growth	Cgv growth	D_defg	D_defg	D_defgsa	D_defgsa	D_defp	D_defp	D_defpsa	D_defpsa
D_gap	**0.156****		**0.363****		**0.024**		**0.351****		**0.025**	
D_dgdpv		**0.163****		**0.179****		**0.0491****		**0.168****		**0.036**
Fiscal policy(-1)	-0.372**	-0.328**	-0.124*	-0.125*	-0.111**	-0.133**	-0.086	-0.075	-0.074	-0.090
Inflation	-0.003	0.010	0.041	0.025	0.011	0.010	0.034	0.014	-0.008	-0.011
Maastricht_dummy	0.017	0.066	0.190	0.225	0.141	0.125	0.197	0.237	0.167	0.166
Real house price growth	0.003	0.004	0.019	0.0378**	0.022	0.021	0.016	0.0337**	0.016	0.017
Real share price growth	-0.001	-0.002	0.00827**	0.00790**	0.00731**	0.00669**	0.00742**	0.00718**	0.00631**	0.00572**
D_Debt(-1)	-0.0466**	-0.0562**	0.0418**	0.0360**	0.0525**	0.0494**	0.0539**	0.0501**	0.0632**	0.0618**
Debt servicing	0.004	0.008	-0.003	-0.002	-0.005	-0.004	-0.009	-0.008	-0.010	-0.010
D_openness	-0.0547*	-0.0590**	0.0374**	0.0556**	0.022	0.0269*	0.0286*	0.0462**	0.011	0.018
D_dependency ratio	0.254	0.217	-0.305**	-0.545**	-0.351**	-0.374**	-0.239	-0.494**	-0.323**	-0.328**
D_gov size (-1)	-1.307**	-1.594**	-0.581**	-0.845**	-0.298**	-0.369**	-0.514**	-0.745**	-0.246**	-0.300**
D_interest rate	-0.113	-0.116*	0.008	0.055	0.006	-0.001	0.037	0.085	0.044	0.040
Euro_dummy	-0.055	-0.145	-0.309	-0.409	-0.454	-0.343	-0.309	-0.527**	-0.519*	-0.535**
Gdp growth volatility	0.117	0.082	-0.156*	-0.206**	-0.120	-0.142	-0.106	-0.139*	-0.061	-0.073
Strength of left wing gov	0.040	0.021	-0.035	-0.004	-0.029	-0.007	-0.033	0.001	-0.029	-0.004
Strength of right wing gov	-0.006	-0.022	-0.013	-0.020	-0.013	-0.011	-0.018	-0.021	-0.015	-0.012
Background of prime minister	0.053	-0.023	0.242	0.262	0.200	0.221	0.247	0.159	0.080	0.084
Election date_early year	0.530	0.421	-0.424	-0.469	-0.432	-0.499	-0.291	-0.336	-0.318	-0.382
Election date_late year	0.318*	0.304	-0.277**	-0.246**	-0.313**	-0.313**	-0.295**	-0.260**	-0.332**	-0.329**
No. of obs.	634	643	610	612	597	597	610	610	597	597

Notes: *,** and *** denote statistical significance at the 10%, 5% and 1% levels. DEFG, DEFP, DEFGSA, DEFPSA denote total general government balances, the primary of general government, cyclically adjusted total general government balances and the cyclically adjusted primary balance. CGV is real government consumption. Gap and DGDPV refer to the output gap and real GDP growth. D_ indicates first differences.

Panel B. Estimation results – difference GMM, levels

Dependent variable	Cgv	Cgv	Defg	Defg	Defgsa	Defgsa	Defp	Defp	Defpsa	Defpsa
Gap	**0.159****		**0.161****		**-0.074**		**0.157****		**-0.078**	
Dgdpv		**0.116****		**0.248****		**0.024**		**0.234****		**0.012**
Fiscal policy(-1)	0.112	0.154	0.625**	0.688**	0.654**	0.668**	0.607**	0.686**	0.664**	0.690**
Inflation	0.044	0.0686**	0.024	0.042	0.026	0.009	-0.028	0.004	-0.028	-0.040
Maastricht_dummy	0.154	0.149	0.254	0.214	0.225	0.187	0.142	0.113	0.117	0.090
Real house price growth	0.0162**	0.011	0.0485**	0.0300**	0.0344**	0.0278*	0.0391**	0.023	0.0244**	0.018
Real share price growth	-0.005	-0.007	0.00575**	0.00348*	0.00417**	0.00529**	0.00588**	0.00428**	0.00452**	0.00591**
D_Debt(-1)	-0.0402**	-0.0478**	-0.003	0.000	0.008	0.013	0.006	0.009	0.019	0.024
Debt servicing	0.006	0.007	0.006	0.006	0.004	0.005	0.002	0.002	0.000	0.001
D_openness	-0.0541**	-0.0686**	0.0602**	0.0407**	0.0264**	0.0287**	0.0442**	0.0285**	0.013	0.016
D_dependency ratio	-0.134	-0.054	-0.801**	-0.631**	-0.710**	-0.669**	-0.598**	-0.423**	-0.582**	-0.490**
D_gov size (-1)	-0.143	-0.231	-0.311**	-0.264**	-0.172**	-0.152*	-0.468**	-0.426**	-0.271**	-0.261**
D_interest rate	-0.122*	-0.091	0.022	0.027	0.020	-0.018	0.024	0.044	0.023	-0.008
Euro_dummy	0.042	0.080	0.407	0.628	0.395	0.596	-0.312	0.017	-0.291	-0.227
Gdp growth volatility	0.010	-0.008	-0.173	-0.209*	-0.152	-0.106	-0.177	-0.207**	-0.152*	-0.108
Strength of left wing gov	-0.007	0.022	0.003	-0.006	-0.005	-0.022	0.036	0.026	0.006	-0.006
Strength of right wing gov	-0.009	-0.009	0.005	-0.020	0.003	-0.010	0.011	-0.001	-0.002	-0.013
Background of prime minister	0.126	0.038	0.115	0.040	0.091	0.048	0.163	0.129	0.083	0.049
Election date_early year	0.504	0.478	-0.482	-0.536	-0.542	-0.597	-0.386	-0.391	-0.447	-0.513
Election date_late year	0.339**	0.358**	-0.131	-0.206**	-0.195**	-0.200**	-0.126	-0.181*	-0.223**	-0.205**
No. of obs.	638	643	615	615	607	607	615	615	607	607

Notes: *,** and *** denote statistical significance at the 10%, 5% and 1% levels. DEFG, DEFP, DEFGSA, DEFPSA denote total general government balances, the primary of general government, cyclically adjusted total general government balances and the cyclically adjusted primary balance. CGV is real government consumption. Gap and DGDPV refer to the output gap and real GDP growth. D_ indicates first differences.

Table 5. **Fiscal policy reaction function– system GMM estimator**

Panel A. Estimation results – system GMM, first differences

Dependent variable	Cgv growth	Cgv growth	D_defg	D_defg	D_defgsa	D_defgsa	D_defp	D_defp	D_defpsa	D_defpsa
D_gap	**0.165****		**0.340****		**0.011**		**0.333****		**0.021**	
D_dgdpv		**0.156****		**0.181****		**0.0496****		**0.174****		**0.044**
Fiscal policy(-1)	-0.361**	-0.328**	-0.085	-0.073	-0.0862*	-0.0933**	-0.053	-0.037	-0.053	-0.059
Inflation	0.011	0.011	0.010	0.004	-0.002	0.001	0.016	0.009	-0.003	0.000
Maastricht_dummy	0.005	0.018	0.125	0.163	0.076	0.079	0.136	0.173	0.098	0.101
Real house price growth	0.001	0.004	0.021	0.0341**	0.0226**	0.0206**	0.016	0.0289**	0.0168*	0.0158*
Real share price growth	-0.001	-0.002	0.00844**	0.00843**	0.00775**	0.00721**	0.00752**	0.00759**	0.00649**	0.00609**
D_Debt(-1)	-0.0442**	-0.0502**	0.0423**	0.0399**	0.0473**	0.0454**	0.0585**	0.0560**	0.0611**	0.0597**
Debt servicing	0.006	0.008	-0.002	-0.003	-0.003	-0.003	-0.009	-0.010	-0.010	-0.009
D-openness	-0.0561**	-0.0613**	0.0390**	0.0458**	0.0277**	0.0246*	0.0283**	0.0353**	0.016	0.014
D_dependency ratio	0.231	0.176	-0.350**	-0.526**	-0.370**	-0.360**	-0.265*	-0.438**	-0.270**	-0.269**
D_gov size (-1)	-1.297**	-1.527**	-0.535**	-0.763**	-0.311**	-0.359**	-0.477**	-0.689**	-0.254**	-0.301**
D_interest rate	-0.124*	-0.105*	0.008	0.068	-0.003	-0.001	0.053	0.112**	0.048	0.051
Euro_dummy	-0.048	-0.072	-0.056	-0.137	-0.083	-0.072	-0.153	-0.231**	-0.189	-0.184
Gdp growth volatility	0.073	0.036	-0.093	-0.128*	-0.061	-0.063	-0.047	-0.082	-0.011	-0.014
Strength of left wing gov	0.007	0.013	-0.004	-0.003	0.002	0.001	-0.011	-0.010	-0.006	-0.007
Strength of right wing gov	-0.003	-0.006	-0.024	-0.0280*	-0.009	-0.010	-0.021	-0.0255*	-0.007	-0.008
Background of prime minister	0.000	-0.018	0.285**	0.276**	0.248**	0.244**	0.155	0.147	0.095	0.092
Election date_early year	0.280	0.272	-0.402	-0.392	-0.354	-0.361	-0.298	-0.287	-0.240	-0.246
Election date_late year	0.307*	0.302	-0.261**	-0.261**	-0.278**	-0.297**	-0.273**	-0.270**	-0.289**	-0.303**
No. of obs.	659	668	635	637	622	622	635	635	622	622

Notes: *,** and *** denote statistical significance at the 10%, 5% and 1% levels. DEFG, DEFP, DEFGSA, DEFPSA denote total general government balances, the primary of general government, cyclically adjusted total general government balances and the cyclically adjusted primary balance. CGV is real government consumption. Gap and DGDPV refer to the output gap and real GDP growth. D_ indicates first differences.

Panel B. Estimation results – system GMM, levels

Dependent variable	Cgv	Cgv	Defg	Defg	Defgsa	Defgsa	Defp	Defp	Defpsa	Defpsa
D_gap	**0.115****		**0.102****		**-0.033**		**0.0895****		**-0.0836****	
D_dgdpv		**0.196****		**0.205****		**0.008**		**0.168****		**-0.015**
Fiscal policy(-1)	0.410**	0.382**	0.890**	0.900**	0.870**	0.869**	0.795**	0.814**	0.910**	0.910**
Inflation	0.019	0.0355*	-0.025	-0.009	-0.022	-0.024	-0.027	-0.012	-0.011	-0.0179*
Maastricht_dummy	0.075	0.079	0.228	0.211	0.169	0.164	0.101	0.101	0.077	0.065
Real house price growth	0.0144*	-0.001	0.0413**	0.0247*	0.0253**	0.0230*	0.0392**	0.0257**	0.0238**	0.0216**
Real share price growth	-0.003	-0.005	0.0101**	0.00747**	0.00653**	0.00690**	0.00841**	0.00626**	0.00506**	0.00625**
D_Debt(-1)	-0.0333**	-0.0378**	0.0342**	0.0346**	0.0255**	0.0275**	0.023	0.0258*	0.0385**	0.0433**
Debt servicing	0.007	0.009	-0.006	-0.006	-0.001	-0.001	-0.005	-0.005	-0.004	-0.005
D-openness	-0.0514**	-0.0766**	0.0539**	0.0338**	0.0211*	0.0212**	0.0427**	0.0263**	0.013	0.0160*
D_dependency ratio	-0.325*	-0.114	-0.566**	-0.297**	-0.513**	-0.479**	-0.519**	-0.299**	-0.392**	-0.359**
D_gov size (-1)	-0.525**	-0.452**	-0.424**	-0.376**	-0.186**	-0.179**	-0.496**	-0.450**	-0.234**	-0.228**
D_interest rate	-0.137**	-0.123**	0.060	0.0713*	0.022	0.011	0.075	0.0889**	0.062	0.038
Euro_dummy	-0.118	0.024	-0.216*	-0.068	-0.059	-0.057	-0.121	-0.016	-0.066	-0.082
Gdp growth volatility	0.066	0.015	-0.042	-0.120	-0.010	0.003	-0.048	-0.111	-0.025	0.013
Strength of left wing gov	0.027	0.028	0.006	0.004	0.004	0.003	-0.007	-0.008	-0.002	-0.004
Strength of right wing gov	0.017	0.007	-0.0337*	-0.0409**	-0.019	-0.019	-0.0354**	-0.0408**	-0.011	-0.010
Background of prime minister	-0.126	-0.111	0.171	0.233	0.063	0.073	0.166	0.206*	0.053	0.070
Election date_early year	0.338	0.271	-0.326	-0.373	-0.320	-0.309	-0.221	-0.263	-0.237	-0.210
Election date_late year	0.259*	0.259**	-0.176	-0.216**	-0.224*	-0.228*	-0.167*	-0.201**	-0.211**	-0.213**
No. of obs.	663	668	640	640	632	632	640	640	632	632

Notes: *,** and *** denote statistical significance at the 10%, 5% and 1% levels. DEFG, DEFP, DEFGSA, DEFPSA denote total general government balances, the primary of general government, cyclically adjusted total general government balances and the cyclically adjusted primary balance. CGV is real government consumption. Gap and DGDPV refer to the output gap and real GDP growth. D_ indicates first differences.

Table 6. **Country-specific fiscal policy reaction function**

Panel A. Country specific fiscal policy reactions to the cycle – levels

Dependent variable (fiscal policy)	Defg	Defg	Defgsa	Defgsa	Defp	Defp	Defpsa	Defpsa
Cycle	Gap	Dgdpv	Gap	Dgdpv	Gap	Dgdpv	Gap	Dgdpv
AUS	0.435**	0.502**	0.195*	0.324**	0.401**	0.500**	0.147	0.344**
AUT	0.240**	-0.0911	-0.0106	-0.444**	0.303**	-0.0925	0.0613*	-0.379**
BEL	-0.239*	-0.100	-0.664**	-0.476**	-0.0633	-0.0746	-0.434**	-0.374**
CAN	0.249**	0.328**	0.0349	0.0950**	0.159**	0.252**	-0.0477	0.0538*
CHE	0.0621	0.196**	-0.0679	-0.0293	0.105	0.205**	-0.0443	-0.00532
CZE	-0.0804	0.276**	-0.269**	0.0925*	-0.124	0.300**	-0.346**	0.113**
DEU	-0.0367	0.198**	-0.327**	-0.231**	-0.0763*	0.138**	-0.354**	-0.280**
DNK	0.587**	0.523**	0.257**	0.211**	0.552**	0.569**	0.220**	0.331**
ESP	0.165**	0.248*	-0.0833	-0.0784	0.187*	0.167	-0.0492	-0.115
FIN	0.260**	0.318**	0.0702	0.0380	0.276**	0.395**	0.0639	0.147**
FRA	0.00341	0.244**	-0.231**	0.0206	-0.00927	0.151**	-0.242**	-0.0543
GBR	-0.0167	0.0119	-0.244**	-0.197**	-0.0619	-0.0332	-0.282**	-0.231**
GRC	-0.544**	-0.951**	-0.635**	-1.058**	-0.655**	-1.023**	-0.619*	-1.127**
HUN	-0.993**	-0.793**	-1.286**	-1.080**	-1.181**	-0.835**	-1.426**	-1.082**
IRL	0.210**	0.240**	-0.0354	0.0850	0.0761	0.198**	-0.145**	0.0652
ITA	-0.492**	-0.0677	-0.713**	-0.313**	-0.444**	-0.157	-0.590**	-0.337**
JPN	0.149**	0.215**	-0.00161	0.119**	0.138**	0.236**	-0.0249	0.133**
KOR	-0.0292	0.0848**	-0.164**	-0.0316	0.0405	0.123**	-0.0875	0.0171
NLD	0.0647	0.177**	-0.204**	-0.0456	0.0123	0.142**	-0.255**	-0.0536
NOR	0.574**	0.464**	0.181**	0.00550	0.315**	0.334**	-0.212**	-0.162**
NZL	0.171**	0.206**	-0.0298	-0.0179	0.116**	0.115**	-0.0915*	-0.127**
POL	0.0183	0.0526	-0.107	-0.152	0.0451	0.0560	-0.0730	-0.111
PRT	0.0407	0.127	-0.179**	-0.190**	0.150**	0.0585	-0.0495	-0.220**
SWE	0.610**	0.649**	0.288**	0.228**	0.551**	0.669**	0.195**	0.283**
USA	0.232**	0.391**	0.0460	0.161**	0.198**	0.369**	0.0222	0.166**
No. of obs.	640	640	632	632	640	640	632	632
Adj-R sq.	0.771	0.770	0.703	0.694	0.700	0.711	0.664	0.665
AIC	2 275.0	2 279.3	2 127.1	2 146.5	2 247.7	2 225.3	2 154.9	2 152.9
BIC	2 355.3	2 359.6	2 207.1	2 226.6	2 328.0	2 305.7	2 234.9	2 233.0

Notes: *,** and *** denote statistical significance at the 10%, 5% and 1% levels. DEFG, DEFP, DEFGSA, DEFPSA denote total general government balances, the primary of general government, cyclically adjusted total general government balances and the cyclically adjusted primary balance. Control variables shown in Tables 2 to 5 are included in the estimations but not reported. Gap and DGDPV refer to the output gap and real GDP growth.

Panel B. Country-specific fiscal policy reactions to the cycle – first differences

Dependent variable (fiscal policy) Cycle	D_ddefg D_gap	D_ddefg D_dgdpv	D_ddefgsa D_gap	D_ddefgsa D_dgdpv	D_ddefp D_gap	D_ddefp D_dgdpv	D_ddefpsa D_gap	D_ddefpsa D_dgdpv
AUS	0.679**	0.373**	0.365**	0.258**	0.729**	0.386**	0.434**	0.271**
AUT	0.0560	-0.208**	-0.381**	-0.323**	0.0645	-0.234**	-0.338**	-0.345**
BEL	-0.0656	0.266**	-0.574**	0.0700**	-0.0259	0.112**	-0.450**	-0.0565**
CAN	0.477**	0.309**	0.117**	0.147**	0.420**	0.275**	0.0871**	0.117**
CHE	0.195**	-0.0706	-0.134*	-0.165**	0.200**	-0.0741	-0.111*	-0.171**
CZE	0.150	0.498**	-0.193	0.325**	0.153	0.474**	-0.180	0.305**
DEU	0.180**	0.317**	-0.356**	-0.000740	0.150**	0.305**	-0.364**	-0.0111
DNK	0.842**	0.386**	0.412**	0.199**	0.861**	0.370**	0.486**	0.207**
ESP	0.321**	0.319**	-0.140	0.133**	0.131	0.181**	-0.294*	0.0128
FIN	0.481**	0.0929*	0.0913	-0.0841**	0.550**	0.206**	0.160**	0.0246
FRA	0.293**	0.272**	-0.0581	0.156**	0.209**	0.233**	-0.118	0.115**
GBR	-0.032	-0.0391	-0.200**	-0.0599*	-0.0522	-0.0486*	-0.188**	-0.0650**
GRC	-1.803**	0.200	-2.262**	-0.0909	-1.565**	-0.130	-1.994**	-0.380*
HUN	-1.262**	-0.731**	-1.720**	-0.767**	-1.381**	-0.805**	-1.781**	-0.806**
IRL	0.450**	0.279**	0.155*	0.197**	0.471**	0.299**	0.210**	0.224**
ITA	0.276**	0.282**	-0.113	0.123**	0.155*	0.234**	-0.198**	0.0796**
JPN	0.261**	0.0995**	0.0850**	0.0234	0.257**	0.121**	0.0853**	0.0420
KOR	0.232**	0.137**	0.0637**	0.0671**	0.251**	0.146**	0.0684**	0.0674**
NLD	0.260**	0.0800*	-0.136	0.139**	0.189**	0.0522	-0.173**	0.115**
NOR	0.331**	0.674**	0.144**	0.0653	0.353**	0.501**	0.104	-0.226**
NZL	0.481**	0.161**	0.0722**	-0.0198	0.457**	0.103**	0.0672*	-0.0718**
POL	-0.00338	-0.162*	-0.363**	-0.347**	-0.0189	-0.190**	-0.339**	-0.357**
PRT	0.121	0.0478	-0.301**	-0.0840**	0.136	0.00413	-0.229*	-0.117**
SWE	0.819**	0.263**	0.341**	-0.0355	0.856**	0.302**	0.383**	0.00631
USA	0.496**	0.193**	0.188**	0.0608**	0.465**	0.190**	0.175**	0.0622**
No. of obs.	635	637	622	622	635	635	622	622
Adj-R sq.	0.292	0.248	0.143	0.101	0.299	0.241	0.145	0.097
AIC	2 327.9	2 372.3	2 181.3	2 211.2	2 276.7	2 327.0	2 171.8	2 205.8
BIC	2 408.0	2 452.5	2 261.1	2 290.9	2 356.9	2 407.2	2 251.6	2 285.5

Notes: *,** and *** denote statistical significance at the 10%, 5% and 1% levels. DEFG, DEFP, DEFGSA, DEFPSA denote total general government balances, the primary of general government, cyclically adjusted total general government balances and the cyclically adjusted primary balance. Control variables shown in Tables 2 to 5 are included in the estimations but are not reported. Gap and DGDPV refer to the output gap and real GDP growth. D_ indicates changes in percentage points for government balances.

Table 7. **Asymmetric effects**

Panel A. Asymmetric effect of the business cycle on fiscal policy - levels

	ASYMMETRY = HIGH=+ values, LOW=-values								ASYMMETRY – DATING GAP				ASYMMETRY – DATING GDP GROWTH			
Dependent variable	Defg	Defg	Defgsa	Defgsa	Defp	Defp	Defpsa	Defpsa	Defg	Defgsa	Defp	Defpsa	Defg	Defgsa	Defp	Defpsa
Cycle	Gap	Dgdpv	Gap	Dgdpv	Gap	Dgdpv	Gap	Dgdpv	Gap	Gap	Gap	Gap	Dgdpv	Dgdpv	Dgdpv	Dgdpv
Cycle high	**0.152****	**0.262****	**-0.074**	**0.005**	**0.143****	**0.232****	**-0.073**	**-0.008**	**0.162****	**-0.029**	**0.137****	**-0.056**	**0.311****	**0.07***	**0.296****	**0.07***
Cycle low	**0.263****	**0.525****	**-0.008**	**0.243**	**0.217****	**0.601****	**-0.055**	**0.31***	**0.297****	**0.002**	**0.28****	**-0.018**	**0.302****	**0.027**	**0.291****	**0.027**
Debt(-1)	0.691**	0.761**	0.713**	0.714**	0.689**	0.745**	0.748**	0.748**	0.725**	0.742**	0.708**	0.767**	0.778**	0.73**	0.76**	0.756**
Real house price growth	0.023**	0.025**	0.018**	0.018**	0.023**	0.023**	0.015**	0.014**	0.024**	0.019**	0.023**	0.015**	0.026**	0.019**	0.024**	0.015**
Real share price growth	0.033**	0.019*	0.026**	0.019**	0.036**	0.021**	0.029**	0.021**	0.044**	0.031**	0.046**	0.033**	0.019*	0.019**	0.021**	0.021**
Openness	0.008**	0.004*	0.006**	0.007**	0.008**	0.004**	0.005**	0.007**	0.008**	0.005**	0.007**	0.004*	0.004	0.006**	0.004	0.005**
Dependency	0.032**	0.021**	0.027**	0.026**	0.033**	0.023**	0.027**	0.027**	0.034**	0.026**	0.034**	0.026**	0.02**	0.025**	0.021**	0.025**
Gov size (-1)	0.039	-0.033	0.023	0.016	0.054*	-0.015	0.044	0.041	0.051	0.03	0.067**	0.052*	-0.04	0.01	-0.024	0.033
Debt servicing	-0.146**	-0.109*	-0.136**	-0.115**	-0.105*	-0.068	-0.059	-0.029	-0.085	-0.12*	-0.058	-0.048	-0.102	-0.122**	-0.057	-0.037
Gdp volatility	-0.001**	-0.001*	-0.001	-0.001*	0.001	0.001	-0.001**	-0.001**	-0.001*	-0.001	0.001*	0.001**	-0.001*	-0.001	0.001	0.001**
Inflation	-0.144*	-0.117	0.153**	-0.075	-0.14*	-0.086	0.134**	-0.027	-0.143	-0.134*	-0.141*	-0.12*	0.165**	-0.134*	-0.149**	-0.1
Euro_dummy	0.083**	0.112**	0.064**	0.059**	0.016	0.051	-0.011	-0.02	0.08**	0.06**	0.014	-0.013	0.124**	0.07**	0.065**	-0.007
Maastricht_dummy	-0.321	-0.16	-0.137	-0.156	-0.377	-0.229	-0.214	-0.254	-0.182	-0.026	-0.208	-0.098	-0.011	0.037	-0.086	-0.079
Election date_early year	0.198	0.182	0.164	0.155	0.141	0.139	0.143	0.128	0.07	0.037	0.02	0.029	0.059	0.027	0.024	0.009
Election date_late year	-0.401	-0.382	-0.374	-0.352	-0.328	-0.301	-0.312	-0.286	-0.464	-0.443	-0.379	-0.366	-0.483*	-0.457	-0.41	-0.387
Strength of left wing gov	-0.142	-0.191	-0.178	-0.182	-0.15	-0.195	-0.178	-0.186	-0.141	-0.182	-0.158	-0.191	-0.204	-0.194	-0.208*	-0.198*
Strength of right wing gov	-0.018	0	-0.016	-0.018	-0.013	0.001	-0.013	-0.017	-0.026	-0.016	-0.023	-0.013	0.013	-0.005	0.016	-0.003
Background of prime minister	-0.017	-0.018	-0.005	-0.006	-0.013	-0.014	-0.003	-0.002	-0.028	-0.011	-0.022	-0.006	-0.019	-0.007	-0.014	-0.002
No. of obs.	648	648	637	637	648	648	637	637	588	587	588	587	611	600	611	600
Adj-R sq.	0.867	0.875	0.833	0.834	0.761	0.778	0.826	0.826	0.881	0.85	0.789	0.842	0.883	0.847	0.791	0.838

Notes: *,** and *** denote statistical significance at the 10%, 5% and 1% levels. DEFG, DEFP, DEFGSA, DEFPSA denote total general government balances, the primary of general government, cyclically adjusted total general government balances and the cyclically-adjusted primary balance. Gap and DGDPV refer to the output gap and real GDP growth. "Cycle high" and "Cycle low" in the left-hand side block of ASYMMETRY indicate negative and positive values of the cycle variables (real GDP growth and output gap). For "ASYMMETRY dating gap" and "ASYMMETRY dating GDP growth", "Cycle low" ("Cycle high") includes observations of the cycle variable in downturns (expansions) identified using the business cycle dating algorithm of Bry and Boschan.

Panel B. Asymmetric effect of the business cycle on fiscal policy – first differences

	ASYMMETRY = HIGH=+ values, LOW=- values								ASYMMETRY – DATING GAP				ASYMMETRY – DATING GDP GROWTH			
Dependent variable	D_defg	D_defg	D_defgsa	D_defgsa	D_defp	D_defp	D_defpsa	D_defpsa	D_defg	D_defgsa	D_defp	D_defpsa	D_defg	D_defgsa	D_defp	D_defpsa
cycle	D_gap	D_dgdpv	D_gap	D_dgdpv	D_gap	D_dgdpv	D_gap	D_dgdpv	D_gap	D_gap	D_gap	D_gap	D_dgdpv	D_dgdpv	D_dgdpv	D_dgdpv
Cycle high	**0.296****	**0.186****	**0.025**	**0.081***	**0.285****	**0.177****	**0.039**	**0.07**	**0.393****	**0.087**	**0.367****	**0.084**	**0.174****	**0.054**	**0.167****	**0.05**
Cycle low	**0.473****	**0.318****	**0.079**	**0.081**	**0.438****	**0.268****	**0.058**	**0.037**	**0.475****	**0.102**	**0.45****	**0.093**	**0.32****	**0.111***	**0.267****	**0.058**
Debt(-1)	-0.069	-0.045	-0.074	-0.086	-0.065	-0.043	-0.073	-0.08	-0.042	-0.053	-0.041	-0.056	-0.007	-0.072	-0.004	-0.067
Real house price growth	0.05**	0.036**	0.057**	0.053**	0.053**	0.04**	0.057**	0.054**	0.041**	0.051**	0.043**	0.05**	0.032**	0.046**	0.035**	0.047**
Real share price growth	0.009	0.009	0.014	0.01	0.009	0.011	0.014	0.012	0.011	0.012	0.011	0.012	0.01	0.01	0.012	0.012
Openness	-0.001	-0.002	-0.001	0	0	-0.002	0	0	-0.001	-0.001	-0.001	0	-0.002	0	-0.002	0
Dependency	0.03	0.03*	0.023	0.019	0.025	0.026	0.018	0.016	0.029	0.024	0.025	0.02	0.028	0.022	0.024	0.018
Gov size (-1)	-0.257	-0.496**	-0.331*	-0.356**	-0.192	-0.424**	-0.24	-0.269	-0.212	-0.306	-0.14	-0.209	-0.48**	-0.343*	-0.406**	-0.257
Debt servicing	-0.535**	-0.845**	-0.317**	-0.417**	-0.493**	-0.777**	-0.265**	-0.339**	-0.488**	-0.309**	-0.45**	-0.262**	-0.812**	-0.432**	-0.744**	-0.353**
Gdp volatility	-0.002**	-0.001	-0.001**	-0.001**	-0.001	0	0	0	-0.002**	-0.002**	-0.001	0	-0.001	-0.001*	0	0
Inflation	-0.09	-0.146	-0.144	-0.136	-0.092	-0.164	-0.142	-0.153	-0.149	-0.206**	-0.143	-0.192*	-0.167	-0.151	-0.189*	-0.178*
Euro_dummy	0.178**	0.228**	0.103**	0.117**	0.131**	0.175**	0.04	0.051	0.184**	0.107**	0.134**	0.04	0.24**	0.12**	0.186**	0.053
Maastricht_dummy	-0.314	-0.365*	-0.274	-0.269	-0.441**	-0.482**	-0.414**	-0.409**	-0.241	-0.19	-0.385*	-0.345*	-0.315	-0.209	-0.432**	-0.356*
Election date_early year	0.184	0.244	0.132	0.141	0.173	0.229	0.136	0.144	0.057	0.001	0.054	0.013	0.132	0.015	0.121	0.025
Election date_late year	-0.515*	-0.6*	-0.546*	-0.562*	-0.497*	-0.574*	-0.539*	-0.548*	-0.551*	-0.553*	-0.526*	-0.54*	-0.631**	-0.61*	-0.605**	-0.592*
Strength of left wing gov	-0.226*	-0.243*	-0.265**	-0.281**	-0.244*	-0.256*	-0.282**	-0.294**	-0.245*	-0.253**	-0.26*	-0.263**	-0.247*	-0.269**	-0.258*	-0.282**
Strength of right wing gov	0.034	0.031	0.015	0.012	0.028	0.028	0.004	0.002	0.046	0.034	0.042	0.024	0.038	0.026	0.036	0.018
Background of prime minister	0.012	0.002	0.019	0.019	0.013	0.004	0.02	0.02	0.016	0.026	0.017	0.027	0.003	0.022	0.004	0.023
No. of obs.	623	623	612	612	623	623	612	612	574	572	574	572	587	576	587	576
Adj-R sq.	0.262	0.239	0.067	0.074	0.234	0.205	0.047	0.05	0.3	0.083	0.275	0.06	0.252	0.081	0.214	0.051

Notes: *,** and *** denote statistical significance at the 10%, 5% and 1% levels. DEFG, DEFP, DEFGSA, DEFPSA denote total general government balances, the primary of general government, cyclically adjusted total general government balances and the cyclically-adjusted primary balance. Gap and DGDPV refer to the output gap and real GDP growth. D_ indicates first differences. "Cycle high" and "Cycle low" in the left-hand side block of ASYMMETRY indicate negative and positive values of the cycle variables (real GDP growth and output gap). For "ASYMMETRY dating gap" and "ASYMMETRY dating GDP growth", "Cycle low" ("Cycle high") includes observations of the cycle variable in downturns (expansions) identified using the business cycle dating algorithm of Bry and Boschan.

Panel C. Asymmetric effect of the business cycle on fiscal policy – last upswing, levels

Dependent variable	Defg	Defg	Defgsa	Defgsa	Defp	Defp	Defpsa	Defpsa
Cycle	Gap	Dgdpv	Gap	Dgdpv	Gap	Dgdpv	Gap	Dgdpv
Cycle last peak	**0.080**	**0.320****	**-0.139**	**0.062**	**-0.012**	**0.279****	**-0.23****	**0.028**
Cycle earlier peaks	**0.167****	**0.222****	**-0.06**	**-0.034**	**0.177****	**0.2****	**-0.038**	**-0.034**
Cycle troughs	**0.263****	**0.527****	**-0.008**	**0.248**	**0.218****	**0.603****	**-0.054**	**0.314***
Debt (-1)	0.693**	0.758**	0.713**	0.71**	0.688**	0.742**	0.742**	0.746**
Real house prices growth	0.023**	0.022**	0.018**	0.015**	0.023**	0.021**	0.015**	0.013**
Real share prices growth	0.033**	0.019*	0.025**	0.019**	0.035**	0.021**	0.028**	0.021**
Openness	0.008**	0.004	0.006**	0.006**	0.008**	0.004*	0.005**	0.006**
Dependency	0.034**	0.016**	0.028**	0.021**	0.036**	0.019**	0.031**	0.024**
Gov size (-1)	0.038	-0.028	0.022	0.021	0.052*	-0.011	0.043	0.044
Debt servicing	-0.144**	-0.108*	-0.134**	-0.114**	-0.105*	-0.067	-0.06	-0.029
GDP volatility	-0.001**	-0.001*	-0.001	-0.001	0.001	0.001	0.001**	0.001**
Inflation	-0.146*	-0.141**	-0.155**	-0.098	-0.146*	-0.105	-0.142**	-0.042
Euro_dummy	0.083**	0.121**	0.064**	0.067**	0.017	0.057*	-0.011	-0.015
Maastricht_dummy	-0.328	-0.126	-0.143	-0.123	-0.386*	-0.2	-0.22	-0.233
Election date_early year	0.195	0.193	0.161	0.166	0.133	0.147	0.134	0.135
Election date_late year	-0.395	-0.363	-0.369	-0.335	-0.315	-0.286	-0.3	-0.274
Strength of left wing gov	-0.137	-0.195	-0.173	-0.187	-0.139	-0.199	-0.166	-0.189
Strength of right wing gov	-0.019	0.005	-0.017	-0.013	-0.015	0.005	-0.015	-0.014
Background of prime minister	-0.018	-0.009	-0.006	0.003	-0.015	-0.007	-0.005	0.003
No. of obs.	648	648	637	637	648	648	637	637
Adj-R sq.	0.867	0.875	0.833	0.835	0.762	0.778	0.826	0.826

Notes: *,** and *** denote statistical significance at the 10%, 5% and 1% levels. DEFG, DEFP, DEFGSA, DEFPSA denote total general government balances, the primary of general government, cyclically-adjusted total general government balances and the cyclically adjusted primary balance. Gap and DGDPV refer to the output gap and real GDP growth. "Cycle last peak", "Cycle earlier peaks" and "Cycle troughs" include observations of the cycle variable during the last expansion, previous expansions and downturns identified using the business cycle dating algorithm of Bry and Boschan.

Panel D. Asymmetric effect of the business cycle on fiscal policy – last upswing, first differences

Dependent variable	D_defg	D_defg	D_defgsa	D_defgsa	D_defp	D_defp	D_defpsa	D_defpsa
Cycle	D_gap	D_dgdpv	D_gap	D_dgdpv	D_gap	D_dgdpv	D_gap	D_dgdpv
Cycle last peak	**0.589****	**0.37**	**0.344***	**0.311**	**0.584****	**0.368**	**0.333***	**0.315**
Cycle earlier peaks	**0.276****	**0.183****	**0.000**	**0.077***	**0.264****	**0.174****	**0.015**	**0.067**
Cycle troughs	**0.467****	**0.315****	**0.072**	**0.077**	**0.431****	**0.265****	**0.052**	**0.033**
Debt (-1)	-0.076	-0.047	-0.08	-0.088	-0.072	-0.045	-0.078	-0.083
Real house prices growth	0.049**	0.036**	0.057**	0.053**	0.052**	0.040**	0.057**	0.054**
Real share prices growth	0.009	0.009	0.014	0.010	0.009	0.010	0.013	0.011
Openness	-0.001	-0.002	-0.001	0.000	-0.001	-0.002	0.000	0.000
Dependency	0.028	0.029	0.02	0.018	0.022	0.025	0.015	0.014
Gov size (-1)	-0.255	-0.497**	-0.329*	-0.357**	-0.19	-0.425**	-0.238	-0.27
Debt servicing	-0.547**	-0.847**	-0.325**	-0.419**	-0.505**	-0.779**	-0.272**	-0.341**
GDP volatility	-0.002**	-0.001	-0.002**	-0.001**	-0.001	0.000	0.000	0.000
inflation	-0.094	-0.150	-0.149	-0.141	-0.096	-0.168	-0.146	-0.159
Euro_dummy	0.18**	0.230**	0.105**	0.119**	0.133**	0.177**	0.042	0.053
Maastricht_dummy	-0.389*	-0.393*	-0.357*	-0.304	-0.518**	-0.512**	-0.491**	-0.446**
Election date_early year	0.188	0.244	0.135	0.141	0.177	0.229	0.14	0.144
Election date_late year	-0.526*	-0.599*	-0.558*	-0.56*	-0.508*	-0.573*	-0.55*	-0.547*
Strength of left wing gov	-0.223*	-0.239*	-0.263**	-0.276**	-0.242*	-0.253*	-0.281**	-0.289**
Strength of right wing gov	0.037	0.030	0.018	0.011	0.032	0.027	0.007	0.001
Background of prime minister	0.013	0.003	0.020	0.020	0.014	0.004	0.021	0.021
No. of obs.	623	623	612	612	623	623	612	612
Adj. R-sq.	0.263	0.239	0.069	0.074	0.236	0.205	0.049	0.05

Notes: *,** and *** denote statistical significance at the 10%, 5% and 1% levels. DEFG, DEFP, DEFGSA, DEFPSA denote total general government balances, the primary of general government, cyclically adjusted total general government balances and the cyclically-adjusted primary balance. Gap and DGDPV refer to the output gap and real GDP growth. D_ indicates first differences. “Cycle last peak”, “Cycle earlier peaks” and “Cycle troughs” include observations of the cycle variable during the last expansion, previous expansions and downturns identified using the business cycle dating algorithm of Bry and Boschan.

Table 8. **Non-linear effects in fiscal reaction**

Panel A. Non-linearities in fiscal policy responses, threshold variable = deficit, non-linear variable = deficit

CYCLE VARIABLE	GDP growth				GAP			
FISCAL VARIABLE	Defg	Defgsa	Defp	Defpsa	Defg	Defgsa	Defp	Defpsa
P-values								
Linear vs. 2-regime model	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.014
2-regime vs. 3-regime model	0.000	0.000	0.000	0.000	0.001	0.107	0.000	0.198
Coefficient estimates of nonlinear variable								
LOW regime	0.135*	-0.220**	0.029	-0.269**	0.311**	-0.123**	0.474**	0.135*
MIDDLE regime	0.384**	0.155**	0.317**	0.024	0.003	0.282**	-0.020	-0.110**
HIGH regime	0.633**	0.367**	0.576**	0.307**	0.504**		0.387**	
Threshold No1	-4.155	-3.602	-1.901	-2.691	-5.059	0.993	-2.181	-4.042
Threshold No2	1.705	0.009	2.159	0.437	-0.083		2.568	

Notes: *,** and *** denote statistical significance at the 10%, 5% and 1% levels. Threshold No 1 is the numerical value of the threshold variable that separates the low and middle regime. Threshold No 2 is the numerical value of the threshold variable that separates the middle and high regimes. Control variables shown in Tables 2 to 5 are included in the estimations but are not reported.

Panel B. Non-linearities in fiscal policy responses, threshold variable = debt, non-linear variable = deficit

CYCLE VARIABLE	GDP	growth								GAP			
FISCAL VARIABLE	Defg		Defgsa		Defp		Defpsa			Defg	Defgsa	Defp	Defpsa
P-values													
Linear vs. 2-regime model	0.078		0.097		0.066		0.083			0.000	0.000	0.000	0.000
2-regime vs. 3-regime model	0.021		0.010		0.013		0.065			0.010	0.020	0.006	0.007
Coefficient estimates of nonlinear variable													
LOW regime	0.332**	0.336**	-0.011	0.048	0.380**	0.319**	0.104*	0.125**	0.046	0.423**	0.110**	0.420**	0.121**
MIDDLE regime	0.122*		0.157**		0.134**		-0.087	0.027		0.190**	-0.061	0.152**	-0.092**
HIGH regime	0.359**		0.028		0.322**		0.045			-0.152	-0.414**	-0.175*	-0.382**
Threshold No1	32.252		41.276		32.252		32.252	32.252		31.006	33.275	31.006	30.179
Threshold No2	41.276		55.209		41.276		41.276			89.375	89.375	89.375	89.375

Notes: *,** and *** denote statistical significance at the 10%, 5% and 1% levels. Threshold No1 is the numerical value of the threshold variable that separates the low and middle regime. Threshold No2 is the numerical value of the threshold variable that separates the middle and high regimes. Control variables shown in Tables 2 to 5 are included in the estimations but are not reported.

Panel C. Non-linearities in fiscal policy responses, threshold variable = government size, non-linear variable = deficit

CYCLE VARIABLE	GDP growth								GAP						
FISCAL VARIABLE	Defg		Defgsa			Defp	Defpsa		Defg		Defgsa		Defp	Defpsa	
P-values															
Linear vs. 2-regime model	0.006		0.098			0.000	0.047		0.000		0.005		0.001	0.006	
2-regime vs. 3-regime model	0.060		0.094			0.031	0.055		0.060		0.096		0.033	0.053	
Coefficient estimates of nonlinear variable															
LOW regime	0.259**	0.271**	0.123	0.030	0.048	0.228**	0.075	0.023	0.110**	0.110**	-0.131**	-0.115**	0.088**	-0.028	-0.123**
MIDDLE regime	0.388**	0.432**	0.014	0.193*		0.375**	-0.039	0.228**	0.284**	0.342**	-0.013	0.050	0.234**	-0.169**	0.059
HIGH regime	0.588**		0.188*			0.604**	0.097**		0.481**		0.149*		0.454**	0.062	
Threshold No1	19.165	19.512	24.069	24.069		19.238	19.512	24.069	20.622	20.622	20.19	20.934	24.901	22.781	22.781
Threshold No2	24.069		15.445			24.069	16.7		24.901		24.901		20.622	17.562	

Notes: *,** and *** denote statistical significance at the 10%, 5% and 1% levels. Threshold No1 is the numerical value of the threshold variable that separates the low and middle regime. Threshold No2 is the numerical value of the threshold variable that separates the middle and high regimes. Control variables shown in Tables 2 to 5 are included in the estimations but are not reported.

Table 9. **Fiscal plans**

Panel A. First differences

Fiscal plans	D_exp	D_exp	D_defp	D_defp	D_defg	D_defg	D_defgsa	D_defgsa
Real house price growth	0.012	0.021**	0.013	0.033**	0.011	0.0381**	0.008	-0.011
Real share price growth	0.002	0.000	0.015**	0.007	0.013**	0.006*	0.009**	0.007*
D_gap_forecast	0.012		0.161		0.133		-0.212*	
D_dgdp_forecast		**0.212****		**0.100**		**0.184****		**-0.087**
No. of obs.	260	534	251	338	253	460	242	260
Adj. R-sq.	0.166	0.131	0.223	0.19	0.264	0.23	0.1	0.131
AIC	703.7	2 044.7	888.8	1 282.9	822	1 684.8	743	831.7
BIC	771.4	2 126	955.8	1 355.5	889.2	1 763.3	809.3	899.3

Notes: *,** and *** denote statistical significance at the 10%, 5% and 1% levels. DEFG, DEFP, DEFGSA, DEFPSA denote total general government balances, the primary of general government, cyclically adjusted total general government balances and the cyclically adjusted primary balance. Exp is government consumption. Control variables shown in Tables 2 to 5 are included in the estimations but are not reported. Gap and DGDPV refer to the output gap and real GDP growth. D_ indicates first differences.

Panel B. Levels

Fiscal plans	Defp	Defp	Defg	Defg	Defgsa	Defgsa
Real house price growth	-0.007	0.019	0.006	0.0307**	-0.014	-0.016
Real share prices growth	0.006	0.002	0.007	0.004	0.002	0.006*
Gap_forecast	**0.097**		**0.181**		**-0.129**	
Dgdp_forecast		**0.371****		**0.336****		**-0.113**
No. of obs.	277	361	279	477	271	288
Adj. R-sq.	0.469	0.671	0.605	0.76	0.547	0.621
AIC	902.3	1 263.7	868.7	1 676	786.7	881.2
BIC	971.2	1 337.6	937.7	1 755.2	855.1	950.8

Notes: *,** and *** denote statistical significance at the 10%, 5% and 1% levels. DEFG, DEFP, DEFGSA, DEFPSA denote total general government balances, the primary of general government, cyclically adjusted total general government balances and the cyclically adjusted primary balance. Exp is government consumption. Control variables shown in Tables 2 to 5 are included in the estimations but are not reported.

Panel C. Asymmetries in fiscal plans, first differences

Fiscal plans	D_exp	D_exp	D_defp	D_defp	D_defg	D_defg	D_defgsa	D_defgsa
D_dgap_low	**0.034**		**0.667****		**0.614****		**0.104**	
D_dgap_high	**-0.028**		**-0.288**		**-0.264***		**-0.505****	
D_dgdpv_low		**0.189**		**0.517****		**0.465***		**0.312***
D_dgdpv_high		**0.215***		**-0.207**		**-0.006**		**-0.582****
No. of obs.	260	365	251	335	253	345	242	258
Adj. R-sq.	0.204	0.294	0.235	0.215	0.277	0.261	0.108	0.132
AIC	694.3	1 128.9	887.8	1264.6	820.2	1 277	741.5	823.4
BIC	772.6	1 214.7	965.3	1348.5	897.9	1 361.6	814.8	901.5

Notes: *,** and *** denote statistical significance at the 10%, 5% and 1% levels. DEFG, DEFP, DEFGSA, DEFPSA denote total general government balances, the primary of general government, cyclically adjusted total general government balances and the cyclically adjusted primary balance. Exp is government consumption growth. Control variables shown in Tables 2 to 5 are included in the estimations but are not reported. Gap and DGDPV refer to the output gap and real GDP growth. D_ indicates changes in percentage points for government balances.

Panel D. Asymmetries in fiscal plans, levels

	Defp	Defp	Defg	Defg	Defgsa	Defgsa
Gap_low	**0.150**		**0.168**		**-0.267****	
Gap_high	**0.029**		**0.285**		**0.113**	
Dgdpv_low		**2.095****		**2.709***		**0.276**
Dgdpv_high		**0.256****		**0.386****		**-0.087**
No. of obs.	275	346	276	355	271	288
Adj. R-sq.	0.471	0.68	0.628	0.789	0.576	0.635
AIC	891	1 201.9	840.3	1 203.3	771.7	870.9
BIC	970.6	1 286.5	920	1 288.5	851	947.8

Notes: *,** and *** denote statistical significance at the 10%, 5% and 1% levels. DEFG, DEFP, DEFGSA, DEFPSA denote total general government balances, the primary of general government, cyclically adjusted total general government balances and the cyclically adjusted primary balance. Control variables shown in Tables 2 to 5 are included in the estimations but are not reported. Gap and DGDPV refer to the output gap and real GDP growth.

Table 10. **Government spending and revenues**

Panel A. Government revenues and the cycle

REVENUE TYPE	**All Revenues**				**All Taxes**				**Taxes On individuals**			
Real house price growth	**0.111****	**0.0532***	**0.035**	**0.0970****	**0.129****	**0.073**	**0.048**	**0.124****	0.091	0.063	0.042	0.097
Real share price growth	0.003	-0.002	-0.001	-0.002	0.013	0.009	0.011	0.011	0.006	-0.001	0.001	0.001
Gap	**0.129**				**0.066**				**0.227**			
D_gap		**0.900****				**0.838****				**0.559**		
Dgdpv			**0.855****				**0.858****				**0.616****	
D_dgdpv				**0.337****				**0.145**				**0.095**
No. of obs.	575	572	580	580	575	572	580	580	575	572	580	580
Adj. R-sq.	0.129	0.214	0.243	0.159	0.126	0.151	0.169	0.132	0.092	0.1	0.11	0.092
AIC	3 170.5	3 096.1	3 118.4	3 179.3	3 797.6	3 763.1	3 801.2	3 826.2	3 846.2	3 822.8	3 864.7	3 876.5
BIC	3 253.2	3 178.7	3 201.3	3 262.2	3 880.3	3 845.7	3 884.1	3 909.1	3 929	3 905.5	3 947.6	3 959.4
	-13	-14	-15	-16	-17	-18	-19	-20	-21	-22	-23	-24
REVENUE TYPE	**Taxes On corporations**				**Soc. Sec. Contributions**				**Tax on payroll**			
Real house price growth	0.306**	0.017	-0.010	0.170	0.031	0.031	-0.018	0.057	-0.779	-1.015	-1.004	-0.975
Real share price growth	-0.020	-0.010	-0.002	-0.009	-0.011	-0.018	-0.019	-0.017	0.110	0.108	0.126	0.082
Gap	**-1.548**				**0.472**				**-2.040**			
D_gap		**3.044****				**0.327***				**2.985**		
Dgdpv			**2.532****				**0.742****				**1.810**	
D_dgdpv				**1.153***				**-0.073**				**3.150**
No. of obs.	575	572	580	580	529	527	529	529	262	260	262	262
Adj. R-sq.	0.066	0.088	0.088	0.068	0.01	0.006	0.019	0.004	0.081	0.083	0.081	0.095
AIC	5 167.2	5 126.8	5 198.8	5 211.5	3 866.8	3 855.7	3 861.7	3 869.7	2 803.4	2 783	2 803.3	2 799.3
BIC	5 250	5 209.4	5 281.7	5 294.4	3 947.9	3 936.8	3 942.9	3 950.9	2 849.8	2 829.3	2 849.7	2 845.7
	-25	-26	-27	-28	-29	-30	-31	-32	-33	-34	-35	-36
REVENUE TYPE	**Property income**				**Tax on Goods and services**				**Other Taxes**			
Real house price growth	**0.267****	**0.149***	**0.173****	**0.257****	**0.127****	**0.049**	**0.049**	**0.102****	0.237	0.650	0.648	0.832
Real share price growth	0.032	0.018	0.024	0.021	**-0.009**	**-0.0146****	**-0.0124****	**-0.0150****	0.385	0.177	0.180	0.201
Gap	**0.411**				**0.150**				**13.960**			
D_gap		**1.970****				**1.189****				**1.851**		
Dgdpv			**1.143****				**0.887****				**1.437**	
D_dgdpv				**0.482**				**0.529****				**-0.838**
No. of obs.	575	572	580	580	575	572	580	580	378	377	378	378
Adj. R-sq.	0.051	0.061	0.056	0.053	0.088	0.208	0.183	0.148	0.041	0.003	0.003	0.002
AIC	5 363.1	5 332.4	5 402	5 404	3 324.2	3 224.2	3 291.7	3 315.9	4 603.4	4 607	4 618.2	4 618.3
BIC	5 445.9	5 415	5 484.9	5 486.9	3 406.9	3 306.9	3 374.6	3 398.8	4 678.1	4 681.7	4 693	4 693

Notes: *,** and *** denote statistical significance at the 10%, 5% and 1% levels. Control variables shown in Tables 2 to 5 are included in the estimations but are not reported. Gap and DGDPV refer to the output gap and real GDP growth. D_ indicates first differences.

Panel B. Types of government spending over the cycle

	Dcgw	Dcgw	Dcgnw	Dcgnw	Dsspg	Dsspg	Dtsub	Dtsub
	Levels							
Gap	**0.182****		**0.196**		**0.0386**		**-0.525**	
Dgdpv		**0.300****		**0.0237**		**-0.149**		**-0.787**
No. of obs.	655	655	638	638	663	668	663	668
Adj. R-sq.	0.351	0.365	0.067	0.062	0.257	0.246	0.079	0.076
	Differences							
D_gap	**0.308****		**-0.00698**		**-0.513****		**-1.175***	
D_dgdpv		**0.343****		**0.207****		**-0.148**		**-1.174****
No. of obs.	650	653	633	635	658	667	658	667
Adj. R-sq.	0.326	0.346	0.371	0.375	0.237	0.219	0.251	0.254
	Dtocp	**Dtocp**	**Dypepg**	**Dypepg**	**Dypg**	**Dypg**	**Dig**	**Dig**
	Levels							
Gap	**0.472**		**-0.670****		**0.0725**		**0.940****	
Dgdpv		**0.460***		**-0.116**		**-0.0241**		**0.497****
No. of obs.	655	655	655	655	638	638	640	645
Adj. R-sq.	0.048	0.048	0.273	0.264	0.352	0.351	0.046	0.037
	Differences							
D_gap	**0.461**		**-0.580**		**-0.119**		**1.029****	
D_dgdp		**0.286**		**-0.179**		**0.029**		**0.200**
No. of obs.	650	653	650	653	633	635	636	645
Adj. R-sq.	0.174	0.174	0.213	0.209	0.312	0.309	0.305	0.295

Notes: *,** and *** denote statistical significance at the 10%, 5% and 1% levels. Control variables shown in Tables 2 to 5 are included in the estimations but are not reported. Cgw, cgnw, sspg, tsub, tocp, ypepg, ypg, ig are government wage payments, government non-wage consumption, social security payments, government subsidies, other payments, property income payments, current government disbursements and government investment. These variables are expressed as real growth rates. The GDP deflator was used to obtain real variables. gap and dgdpv refer to the output gap and real GDP growth. D_ indicates that the variable is expressed in first differences.

Panel C. Country-specific estimates of government spending types over the cycle

	Dcgw GAP	Dcgw DGDPV	Dcgnw GAP	Dcgnw DGDPV	Dsspg GAP	Dsspg DGDPV	Dtsub GAP	Dtsub DGDPV	Dtocp GAP	Dtocp DGDPV	Dypepg GAP	Dypepg DGDPV	Dypg GAP	Dypg DGDPV	Dig GAP	Dig DGDPV
	LEVELS															
_AUS	-0.584**	-0.201*	1.706**	0.327	-0.223	-1.258**	-1.988**	-1.884**	-0.226	0.588**	0.517	2.182**	0.257*	-0.0200	1.752**	0.206
_AUT	-0.118	1.334**	0.310**	-0.343**	0.272**	0.244	-0.627	-2.509**	0.0786	1.863**	0.203	1.282**	0.0260	0.293**	-0.364	0.0797
_BEL	0.362**	0.590**	-0.00852	-0.807**	0.377*	0.335	-2.186**	-2.433**	0.180	-0.642	1.230*	0.395	0.129	-0.0907	0.0925	-0.422
_CAN	-0.0234	-0.0594	0.543**	0.0228	-0.413**	-0.611**	0.567	-0.809	-0.0649	0.289*	-0.304	0.279	-0.0292	-0.220**	0.883**	-0.517
_CHE	0.311**	0.579**	0.479**	0.191	0.0193	-0.0595	-1.274**	-0.314	0.426**	0.542**	-0.411	-0.448	-0.197*	-0.557**	0.970*	0.133
_CZE	-0.0660	0.0580	-1.048**	-0.483**	1.222**	1.232**	3.464**	1.273**	-0.459	0.251	-1.435**	-3.094**	-0.0603	0.0721	-3.053**	-0.604**
_DEALL	0.489**	0.584**	0.695**	0.475**	0.00529	-0.401**	0.266	1.584**	3.745**	4.574**	0.219	0.172	0.496**	0.378**	1.281**	0.984**
_DNK	-0.0827*	-0.0639	-0.462**	-0.428**	-0.469**	-0.0151	-2.154**	-1.553**	-0.194*	0.351**	-1.710**	-0.0335	-0.519**	-0.200**	0.337	1.266**
_ESP	0.486**	0.597**	0.867**	0.280	0.727**	0.540**	-1.335**	-2.100*	-0.433*	0.509	-0.0371	-1.962**	0.283**	-0.0862	1.266**	2.366**
_FIN	0.128**	0.0857	0.349**	0.139	-0.0739	-0.729**	-0.170	-0.644	0.143	0.0367	-1.650**	-1.788**	0.0205	-0.337**	0.383	0.350
_FRA	0.336**	0.302**	0.455**	0.0466	0.583**	0.152	-1.071**	-1.482**	0.725**	0.0883	-1.077**	-4.433**	0.176**	-0.200**	0.826**	0.551*
_GBR	-0.103	-0.251**	0.354**	-0.150	-0.416**	-0.379*	0.0226	-1.461**	-0.0548	0.391	-1.253**	1.326**	-0.145**	-0.240*	2.621**	1.398**
_GRC	-0.492*	0.139	-3.303**	-2.461**	1.591**	1.425**	-0.957	-6.794**	2.728**	6.659**	4.400**	4.362**	0.527**	0.924**	-2.421*	1.279
_HUN	0.272	1.625**	2.777**	1.847**	3.015**	1.630**	1.411	-1.874*	2.321**	1.169**	0.369	-0.694	0.939**	0.744**	.	.
_IRL	0.681**	0.204**	1.144**	0.243*	0.335**	-0.181*	-1.966**	-1.475**	0.175	-0.109	-0.659	-0.681*	0.377**	-0.133*	3.101**	0.947**
_ITA	0.419**	0.520**	0.501**	0.360**	-0.192	-0.320**	-3.441**	-1.967**	-0.848**	-0.174	0.823	-0.266	0.174	-0.121	1.649**	0.654**
_JPN	0.0430	0.273**	0.0595	0.333**	-0.141*	0.454**	-0.183	-0.822**	-0.184*	0.656**	0.117	2.287**	-0.101*	0.184**	1.254**	1.359**
_KOR	0.423**	0.339**	0.0379	-0.00122	-0.552**	-0.0101	0.871	0.140	0.505**	-0.153	-2.859**	-0.0200	0.197*	0.124**	1.417**	0.437**
_NLD	0.333**	0.576**	0.444**	-0.00236	0.468**	0.494**	0.0533	2.015**	0.337*	0.336*	-0.926**	-0.828**	0.198**	0.193**	0.710**	0.0260
_NOR	-0.208**	0.414**	-0.0804	-0.395**	-0.285**	-0.451**	-1.294**	-0.959	-0.110	-0.0277	-0.384*	-1.628**	-0.132**	-0.119	0.160	-0.656
_NZL	0.362**	0.207**	0.0822	-0.0289	0.729**	-0.0198	-4.328**	-1.649**	0.986**	0.216	0.879**	0.937**	0.571**	0.276**	2.932**	0.328
_POL	0.325**	0.342**	1.093**	1.676**	0.0949	-0.198	2.152**	7.421**	-0.206	-0.656**	-1.037**	-1.552**	0.118	-0.00116	.	.
_PRT	0.593**	1.551**	-1.639**	-0.165	-0.206**	-0.378**	1.510**	-3.250**	0.666**	1.425**	0.907**	-0.205	0.126*	0.413**	0.768**	1.319**
_SWE	0.253**	0.202**	-0.128	-0.485**	0.637**	0.0715	0.691	-1.521**	0.563**	0.744**	-1.792**	-0.912**	0.0345	-0.243**	-0.551**	-0.550
_USA	0.00701	0.208**	0.00589	-0.489**	-0.0935	-0.875**	-2.998**	0.531	0.268**	0.605**	-0.330	0.146	-0.102	-0.228**	0.610**	-0.227
No. of obs.	655	655	638	638	663	668	663	668	655	655	655	655	638	638	640	645
Adj. R-sq.	0.356	0.390	0.120	0.060	0.269	0.260	0.087	0.079	0.104	0.106	0.282	0.298	0.358	0.357	0.042	0.013

Panel C. Country-specific estimates of government spending types over the cycle (continued)

	Dcgw GAP	Dcgw DGDPV	Dcgnw GAP	Dcgnw DGDPV	Dsspg GAP	Dsspg DGDPV	Dtsub GAP	Dtsub DGDPV	Dtocp GAP	Dtocp DGDPV	Dypepg GAP	Dypepg DGDPV	Dypg GAP	Dypg DGDPV	Dig GAP	Dig DGDPV
	FIRST DIFFERENCES															
_AUS	-0.607**	-0.0847*	0.719**	-0.174	-2.237**	-1.731**	-4.068**	-2.438**	1.192**	0.980**	3.085**	2.238**	-0.0799	-0.0525	0.785*	0.0855
_AUT	1.111**	1.572**	0.0454	-0.374**	-0.111	-0.441**	-3.282**	-3.232**	1.168**	2.117**	1.088**	0.0973	0.164*	0.132**	0.731	1.828**
_BEL	0.808**	0.530**	-0.108	0.526**	0.366	0.111	-5.576**	-2.195**	-0.448	-0.0662	-1.192	-1.646**	-0.209*	-0.0392	-0.733	1.853**
_CAN	-0.199**	0.171**	-0.192*	-0.168*	-1.794**	-1.035**	-1.458*	-3.506**	-0.183	0.0896	0.0446	-0.131	-0.472**	-0.283**	0.204	-0.145
_CHE	0.838**	0.842**	0.368*	0.00281	-0.853**	0.171	-0.972	0.706**	0.984**	0.626**	-0.973**	-0.938**	-0.202**	-0.300**	1.273**	0.845**
_CZE	-0.406**	-0.0207	-1.333**	1.667**	0.298	1.300**	1.938*	0.324	1.040**	5.405**	-7.061**	-13.93**	-0.514**	0.984**	-3.639**	3.564**
_DEALL	0.281**	0.189**	0.0527	-0.0546	-1.166**	-0.888**	0.762	1.365**	5.519**	3.202**	-0.311	0.00725	0.181**	0.0207	0.301	-0.635*
_DNK	-0.148*	0.238**	-0.981**	-0.0360	-0.0127	0.350**	-1.297**	-0.00683	0.469*	0.107	-3.118**	-1.184**	-0.581**	0.122	1.365**	0.731
_ESP	0.983**	0.681**	-0.0876	-0.751**	0.731**	0.121	-3.367**	-1.786**	-0.621	0.922**	-1.482**	-3.162**	0.0381	-0.294**	1.952**	2.697**
_FIN	0.0607	-0.00989	0.0683	-0.176	-0.890**	-0.996**	0.679	0.633*	-0.144	-0.256	-2.789**	-0.857**	-0.401**	-0.314**	0.197	-0.0680
_FRA	0.0728	0.265**	-0.310**	0.285**	-0.369**	-0.335**	-1.099	-1.086**	0.316**	0.0811	-5.225**	-5.755**	-0.477**	-0.225**	0.721*	0.927**
_GBR	-0.694**	-0.371**	0.363**	0.556**	-0.922**	-0.287**	-0.770	-3.915**	-0.527**	0.0252	-0.292	0.589**	-0.526**	-0.218**	4.329**	3.065**
_GRC	-0.149	1.990**	-5.660**	3.739**	0.725*	2.749**	-42.70**	-23.49**	13.03**	7.978**	7.760**	2.157**	0.625**	2.331**	11.36**	13.84**
_HUN	1.656**	1.634**	4.288**	3.524**	2.637**	1.835**	0.151	-1.853*	4.845**	2.976**	0.950	-1.478*	1.608**	1.389**	.	.
_IRL	0.410**	0.191**	0.783**	0.147	-0.740**	-0.591**	-3.446**	-1.540**	-1.308**	-0.981**	-1.131**	-0.447**	-0.240**	-0.172**	2.560**	0.385*
_ITA	0.832**	0.480**	0.298**	0.207**	-0.746**	-0.230**	-4.432**	-2.253**	-0.630**	0.0570	-0.996**	-0.787**	-0.274**	-0.131**	1.499**	0.137
_JPN	0.0153	0.309**	0.0572	0.456**	-0.607**	0.138*	-1.256**	-2.028**	-0.482**	0.669**	1.514**	2.225**	-0.230**	0.233**	0.705**	1.428**
_KOR	0.608**	0.369**	0.0428	0.0432	0.525**	0.753**	-0.138	-0.412*	-0.178	-0.130	-0.666*	0.438*	0.224**	0.160**	1.223**	0.303*
_NLD	0.428**	0.360**	0.0129	0.212**	0.0759	0.0147	1.709	2.270**	-0.237	-0.854**	-1.665**	-0.895**	0.0261	0.154**	-0.108	-0.602
_NOR	0.767**	0.188	0.146	-0.648**	-0.0116	-0.914**	0.217	-0.136	2.717**	0.988**	0.644	-1.858**	0.590**	-0.171**	0.979**	-0.419
_NZL	-0.103	0.156**	0.0408	0.442**	0.505**	-0.176**	-0.0356	-1.853**	0.334*	-0.619**	1.684**	1.530**	0.436**	0.423**	2.299**	-1.277**
_POL	0.614**	0.185	2.243**	2.204**	-0.264	0.0764	9.335**	6.517**	-1.843**	-1.093**	-4.360**	-3.062**	-0.112	0.0698	.	.
_PRT	1.929**	1.389**	-0.908**	2.100**	-0.564**	0.168	-3.467**	-9.031**	1.356**	0.389**	2.444**	1.993**	0.601**	0.627**	1.547**	-0.414
_SWE	0.220**	0.422**	-0.818**	0.0755	-0.506**	-0.340**	0.101	-0.981**	0.508**	0.845**	-0.996**	-0.541**	-0.374**	0.0455	-0.557**	1.322**
_USA	0.128*	0.380**	-0.398**	-0.113*	-1.163**	-0.608**	-2.778**	1.723**	0.670**	0.747**	0.377	0.212	-0.307**	0.0251	0.665*	-0.0473
No. of obs.	650	653	633	635	658	667	658	667	650	653	650	653	633	635	636	645
Adj. R-sq.	0.366	0.373	0.373	0.387	0.260	0.257	0.262	0.289	0.241	0.204	0.234	0.266	0.330	0.327	0.293	0.297

Notes: *,** and *** denote statistical significance at the 10%, 5% and 1% levels. Control variables shown in Tables 2 to 5 are included in the estimations but are not reported. Cgw, cgnw, sspg, tsub, tocp, ypepg, ypg, ig are government wages, government non-wage consumption, social security payments, government subsidies, other payments, property income payments, current government disbursements and government investment, all expressed in real growth rates. The GDP deflator was used to obtain real variables. Gap and DGDPV refer to the output gap and real GDP growth.