CYCLICAL ASYMMETRY IN FISCAL VARIABLES

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In this paper we present a stylised framework of fiscal policy determination that considers both structural targets and cyclical factors. We find significant cyclical asymmetry in the behaviour of fiscal variables in a sample of fourteen EU countries over 1970-2004, with budgetary balances (both overall and primary) deteriorating in contractions without correspondingly improving in expansions. Analysis of budget components reveals that cyclical asymmetry comes from expenditure, in particular from transfers in cash. We find no evidence that fiscal rules introduced in 1992 affected the cyclical behaviour of fiscal variables. Numerical simulations show that cyclical asymmetry inflated average deficit levels, contributing significantly to debt accumulation.

1 Introduction

There is growing evidence that fiscal variables react asymmetrically to positive and negative cyclical conditions. It has often been remarked that during 1970-2000 in European Union (EU) countries, deficits increased in downturns, but did not fall in periods of high growth, with countries offsetting the effects of automatic stabilizers via tax cuts and/or expenditure increases. The procyclicality of fiscal policy in good times is also a stylized fact in emerging markets.

Buti and Sapir (1998) note that for the average of EU countries, "when there is a moderately negative output gap […] the actual deficit gradually increases", while "when there is a moderately positive output gap […] the actual deficit remains stable", and it is only "when there is a strongly positive output gap [that] the actual deficit improves" (p. 87-88). Some evidence of asymmetric behaviour is provided by Buti *et al.* (1998) for high-debt EU countries where, between 1970 and 1990, deficit-to-GDP ratios are around 6 per cent of GDP when output is close to or above its trend value, while the imbalance increases up to 8 per cent when output falls below its trend level. In a previous version of this paper (Balassone and Francese, 2004) we found evidence of a significant difference in the elasticity of the overall

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balance to positive and negative output gaps in a sample of sixteen OECD countries over 1969-2002.[1]

Concerning developing countries, Gavin and Perotti (1997) provide evidence of fiscal expansions in good times and contractions in bad times in Latin America. Talvi and Végh (2000) point out that fiscal procyclicality seems to be the norm in the developing world, not just in Latin America. IMF (2007) extends the analysis in Balassone and Francese (2004) to developing countries and finds that the overall balance deteriorates in contractions without improving in expansions.

Available evidence suggests that expenditure play a predominant role in determining the observed cyclical asymmetry of the overall fiscal balance. For instance, Kaminsky *et al.* (2004) show that in a sample of eighty-three developing countries real government spending tends to increase much more in good times than in bad times. Hercowitz and Strawczynski (2004) use a panel of twenty-two OECD countries and find that "the prolonged rise in the spending/GDP ratio [over 1975-98] is partially explained by cyclical upward ratcheting due to asymmetric fiscal behaviour: the ratio increases during recessions and is only partially reduced in expansions" (p. 353).

However, while the cyclical behaviour of fiscal balances is usually analyzed with reference to positive and negative output gaps, the cyclicality of spending is generally measured with respect to GDP growth rates. For instance, both Kaminsky *et al.* (2004) and Hercowitz and Strawczynski (2004) define good and bad times as periods in which real GDP growth is, respectively, higher and lower than "normal" (with the norm defined as the sample average or median). Since periods in which real output growth is above/below an "average" value do not always correspond to periods in which the output gap is positive or negative, the available evidence on the cyclicality of spending and fiscal balances is not necessarily fully consistent.[2]

In order to provide comparable evidence on the cyclical behaviour of fiscal balances and public expenditure, we expand the stylised framework used in Balassone and Francese (2004) to allow for the analysis of the primary balance and individual budget components. We use data from a sample of fourteen EU member states over the period 1970-2004.

The stylised framework underlying the analysis is described in Section 2. Section 3 reports regression results on cyclical asymmetry in fiscal variables; besides the extent and source of asymmetry, the analysis also covers the impact of European fiscal rules on the cyclicality of fiscal policy and the long-term values of fiscal variables. The extent to which cyclical asymmetry affects deficit and debt levels is assessed in Section 4, using numerical simulations. Section 5 summarizes and concludes.

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[1] The estimated elasticity (strictly speaking, semi-elasticity) is 0.4 for negative output gap and zero for positive ones.

[2] IMF (2007) reports regression results indicating an asymmetric reaction of the expenditure-to-GDP ratio to positive and negative output gaps.

2 The stylised framework

The stylized description of the dynamics of the overall fiscal balance in this Section is based on Balassone and Francese (2004), which in turn owes significantly to Hercowitz and Strawczynski (2004).

We split the ratio of the budget balance to GDP (b_t, with $b_t>0$ indicating a deficit in period t) into a long-run component (b^l_t) and a cyclical component (b^c_t):

$$b_t = b^l_t + b^c_t \tag{1}$$

We assume that the long-run component is determined by a linear adjustment process towards the government's preferred balance and debt ratios to GDP, b^* and d^*,[3]

$$b^l_t = b_{t-1} + \alpha(b^* - b_{t-1}) + \beta(d^* - d_{t-1}) \qquad \alpha, \beta > 0 \tag{2}$$

Note that in the long run $d^*=b^*/g$, where g is the long-run nominal GDP growth.

The cyclical component, instead, is proportional to the difference between actual and trend GDP (*i.e.* the output gap, ω_t). To allow for cyclical asymmetry, the coefficient of proportionality is different ($\eta=\eta^P, \eta^N; \eta^P \neq \eta^N$) depending on whether the output gap is positive ($\omega_t=\omega^P_t$) or negative ($\omega_t=\omega^N_t$):

$$b^c_t = \eta^P \omega^P_t + \eta^N \omega^N_t \tag{3}$$

The η coefficients in (3) include both the automatic reaction of the budget to cyclical conditions (*i.e.* what is usually called the budget elasticity to the cycle) and the discretionary action undertaken by fiscal authorities in response to such conditions.

Combining (2) and (3) gives:

$$b_t = (\alpha b^* + \beta d^*) + (1-\alpha) b_{t-1} - \beta d_{t-1} + \eta^P \omega^P_t + \eta^N \omega^N_t \tag{4a}$$

From which the following estimating equation for the overall balance results:[4]

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[3] These can be thought of as the result of the optimisation of an objective function linking electoral support – or consistency with one's "ideology", or both – to a number of macroeconomic variables, subject to constraints defined by one's preferred model of the economy (along the lines of the literature on the political business cycle; see, e.g., Nordhaus, 1975; and Alesina, 1987). Alternatively, b^* and d^* may be seen as the government's preferred solution to the present value budget constraint (Blanchard *et al.*, 1990). Artis and Marcellino (1998) provide a review of studies testing the hypothesis that governments actually behave so as to satisfy the present value budget constraint. Finally, a debt stabilisation motive in modelling budgetary decisions has been adopted in empirical analyses by several authors defining "simple" fiscal rules in analogy to the Taylor rule for monetary policy (see, e.g., Bohn, 1998; Ballabriga and Martinez-Mongay, 2002; Galí and Perotti, 2003).

$$b_t = \alpha_0 + \alpha_1 b_{t-1} + \alpha_2 d_{t-1} + \eta^P \omega_t^P + \eta^N \omega_t^N + u_t \qquad u_t \sim NID(0, \sigma_u) \tag{4b}$$

Countercyclical movements of the overall balance would require η^P, η^N<0, *i.e.* a slowdown in economic activity (ω_t<0) determines a worsening of the budget while an expansion (ω_t>0) determines an improvement. From (4) we define an asymmetry index as follows:

$$\phi = \eta^P - \eta^N \tag{5}$$

If ϕ=0 (η^P=η^N), then fiscal policy is symmetric with respect to the cycle, while if ϕ>0 the worsening of the budget balance due to a negative output gap is higher than the improvement in the balance experienced when GDP is above potential.

Since equation (4b) can only be estimated using ex-post evaluations of the output gap (as opposed to expected values), in empirical applications it must be interpreted as an instrument for assessing whether *de facto* budgetary movements have been pro/counter-cyclical and symmetric/asymmetric with respect to the cycle, regardless of the government's intention in that respect. It cannot be used to infer the policy intentions of fiscal authorities.[5]

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[4] A different specification is often used where the cyclically adjusted balance is regressed against its lagged value, the lagged value of debt and the output gap (plus, possibly, other control variables; see, e.g., Momigliano and Golinelli, 2007):

$$cab_t = \phi_0 + \phi_1 cab_{t-1} + \phi_2 d_{t-1} + \phi_3 \omega_t + u_t \qquad u_t \sim NID(0, \sigma_u) \tag{a}$$

Neither (4b) in the main text, nor (a) above have micro-foundations. Thus, when choosing between the two models one can only rely on how they fit the data. From (4b), using the identity b_t=cab_t + $\gamma\omega_t$ (where the budget balance is split into its cyclically adjusted component – cab_t – and the automatic reaction to the output gap – $\gamma\omega_t$) and dropping the distinction between positive and negative output gaps to economize in notation, we get

$$cab_t = \alpha_0 + \alpha_1 cab_{t-1} + \alpha_1' \omega_{t-1} + \alpha_2 d_{t-1} + (\eta - \gamma)\ \omega_t + u_t \qquad u_t \sim NID(0, \sigma_u) \tag{b}$$

where α'_1=$\alpha_1\gamma$. Comparison of (a) and (b) shows that the two specifications are equivalent if: (a) α'_1=*0* (that is, if current policy, as measured by cab_t, is not affected by past cyclical conditions); or (b) if the output gap is so persistent that it can be safely assumed that ω_t=ω_{t-1}. With our sample, in regressions not reported here, we consistently find $\alpha'_1 \neq 0$. Moreover, the correlation coefficient between of ω_t and ω_{t-1} is about 0.5. Hence we retain (4b) as our preferred specification.

[5] Otherwise we would be assuming perfect forecast on the part of the government, which is clearly too restrictive an assumption. When the purpose of the analysis is the assessment of policy intentions, two options can be considered: (a) the use of published government forecasts; and (b) the use of forecasts produced by international organisations. In both cases data availability is limited. Moreover, official government forecasts may suffer from systematic biases (see Larch and Salto, 2003, for evidence of a systematic tendency to overestimate growth, especially during slowdowns), while forecasts by international organizations do not necessarily reflect government's expectations (even assuming that they share the same information set). The informational problems associated with the analysis of policy rules have been thoroughly analysed in the context of monetary policy (see, e.g., Orphanides, 2001), but have received much less attention with reference to fiscal policy. See Momigliano and Golinelli (2006) for an analysis of fiscal policy reaction functions using real-time indicators.

2.1 The primary balance

While the framework described above focuses on the overall balance, the policy variable of fiscal authorities is the primary balance. From (2), by decomposing b_t into its interest (i_t) and primary balance (p_t) components, since $b^l_t = p^l_t + i_t$ and $b_t = p_t + i_t$, we have:

$$p^l_t = p_{t-1} - (i_t - i_{t-1}) + \alpha(b^* - p_{t-1} - i_{t-1}) + \beta(d^* - d_{t-1}) \tag{6}$$

Equation (6) shows that by ignoring the composition of the overall balance, equation (2) implicitly assumes that: (i) changes in interest expenditure ($i_t - i_{t-1}$) are compensated one-for-one by the primary balance; and (ii) differences between b^* and b_{t-1} have the same impact on p^l_t (as measured by α) regardless of whether they originate from p_{t-1} or i_{t-1}.

Since there is no reason to maintain a priori either assumption, we modify (6) to allow for partial compensation of changes in interest outlays by the primary balance and for a differential impact of the lagged primary balance and interest payments on the policy variable (p^l_t):

$$p^l_t = p_{t-1} - \xi(i_t - i_{t-1}) + \alpha'(b^* - p_{t-1} - \theta i_{t-1}) + \beta'(d^* - d_{t-1}) \qquad \xi \neq 1; \theta \neq 1 \tag{7}$$

Note that once we allow coefficients ξ and θ to be different from 1 and move from equation (6) to equation (7), we cannot assume that the other coefficients in equation (7) are the same as those in equations (2), hence the dash sign on α and β.

Concerning the cyclical component of the primary balance, we assume that it is determined in the same way as the cyclical component of the overall balance. Hence, by analogy with (3), we have:

$$p^c_t = \eta'^P \omega^P_t + \eta'^N \omega^N_t \tag{8}$$

Note again the dash sign accompanying the η coefficients, marking that they are different from their counterparts in (3) since they do not pick up the cyclical behaviour of interest expenditure.[6]

Summing (7) and (8) we obtain the equation governing the primary balance:

$$p_t = (\alpha' b^* + \beta' d^*) + (1 - \alpha') p_{t-1} - \beta' d_{t-1} - \xi(i_t - i_{t-1}) - \alpha' \theta i_{t-1} + \eta'^P \omega^P_t + \eta'^N \omega^N_t \tag{9a}$$

resulting in the estimating equation:

$$p_t = \alpha'_0 + \alpha'_1 p_{t-1} + \alpha'_2 d_{t-1} + \alpha_3 \Delta i_t + \alpha_4 i_{t-1} + \eta'^P \omega^P_t + \eta'^N \omega^N_t + u^p_t \tag{9b}$$

$$u^p_t \sim NID(0, \sigma^p_u)$$

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[6] Interest spending is not directly related to the output gap, but its ratio to GDP is affected by cyclical fluctuations in output.

Comparison of (4b) and (9b) indicates that an estimating equation for the primary balance should not be obtained by simple analogy with the one used for the overall balance without checking whether interest spending is a significant explanatory variable. Moreover, the inclusion of interest spending among regressors allows to control – albeit approximately – for possible interactions between fiscal and monetary policy.[7]

From the estimated parameters in (9b) we can recover the underlying value of b^*. In the long-run equilibrium we have $\omega=0$, $b=b^*$ and $d=d^*=(b^*/g)$. Therefore, $i_t = r\ (b^*/g)$, $\Delta i_t=0$, and $p_t=b^*- r(b^*/g)$ (where r is the long-run nominal interest rate). Substituting in (9b) it follows:

$$b^* = \frac{\alpha'_0}{(1-\alpha'_1) - \frac{\alpha'_2}{g} - (1-\alpha'_1+\alpha_4)\frac{r}{g}} \tag{10}$$

2.2 Expenditure and revenue

In order to analyze the cyclical behaviour of different budget components, we use the following definition of the primary balance:

$$p_t = \sum_{s=1}^{n} e_t^s - \sum_{s=n+1}^{m} r_t^s \tag{11}$$

where e^s_t ($s=1,\ldots,n$) are primary expenditure items and r^s_t ($s=n+1,\ldots,m$) are revenue items.

For each budget item we write an equation similar to (9b). We assume that similarly to the primary balance, each budget item x_t^s depends on its lagged value, the change in interest spending and its lagged level, lagged debt, and output gap. However, we also allow for cross interactions and include among regressors for each item, the lagged level of all other items:

$$x_t^s = \alpha_0^s + \alpha_1^s x_{t-1}^s + \alpha_2^s d_{t-1} + \alpha_3^s \Delta i_t + \alpha_4^s i_{t-1} + \sum_{k\neq s} \alpha_{5,k}^s x_{t-1}^k + \eta_s^P \omega_t^P + \eta_s^N \omega_t^N + u_t^s \tag{12}$$

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[7] To this end Galí and Perotti (2003) use a different approach. In their estimating equation the dependent variable is the cyclically adjusted primary balance, which is regressed against its lagged value, the lagged value of debt and a set of control variables, including the deviation of the interest rate from a predetermined Taylor rule. Specifically, they compute the average absolute deviation between each country's short-term interest rate and the rate generated by the following Taylor rule:

$$r_t = 4.0 + 1.5\ (\pi - 2.0) + 0.5\ x_t$$

where r is the short-term nominal interest rate and x is a vector of control variables. They argue that this rule is generally viewed as a good first approximation of the behaviour of central banks that have been successful in stabilising inflation and the output gap and such a rule has been shown to have desirable properties when embedded in a dynamic optimizing model with realistic frictions.

$$x_t^s = \begin{cases} e_t^s & \text{for } s = 1, \ldots, n \\ -r_t^s & \text{for } s = n+1, \ldots, m \end{cases}$$

with $u_t^s \sim NID(0, \sigma_u^s)$ and where the coefficients of proportionality to the output gap are specific to each budgetary item x_t^s.

To ensure that the sum of the m equations defined in (12) is equivalent to equation (9b) and that estimating the latter is equivalent to estimating the m equations in (12), we assume that in each of the m equations the coefficient of the lagged dependent variable is the same as the coefficient applying to the other lagged budget items (*i.e.* each x_t^s depends on the lagged value of the primary balance, not on its composition):

$$\alpha_1^s = \alpha_{5k}^s \quad \forall k \neq s \qquad \text{and} \quad \forall s = 1,\ldots,m \tag{13}$$

Therefore, we have:

$$x_t^s = \alpha_0^s + \alpha_1^s p_{t-1}^s + \alpha_2^s d_{t-1} + \alpha_3^s \Delta i_t + \alpha_4^s i_{t-1} + \eta_s^P \omega_t^P + \eta_s^N \omega_t^N + u_t^s \tag{14}$$

$$x_t^s = \begin{cases} e_t^s & \text{for s} = 1,\ldots,\text{n} \\ -r_t^s & \text{for s} = \text{n}+1,\ldots,\text{m} \end{cases}$$

The sum over s of the estimates of η_s^P and $\eta^N{}_s$ in the m equations defined in (14) is equal to the estimate of η'^P and η'^N in (9b).

For each budgetary item we can therefore define an asymmetry index as follows:

$$\phi_s = \eta_s^P - \eta_s^N \tag{15}$$

and the index of asymmetry for the primary balance can also be written as:

$$\phi' = \sum_{s=1}^{m} \phi_s = \sum_{s=1}^{n} \phi_{e_s} - \sum_{s=n+1}^{m} \phi_{r_s} \tag{16}$$

3 The empirical analysis

We apply the stylized framework described above to a sample of fourteen EU countries (those belonging to the EU before May 2004, excluding Luxembourg) over the period 1970-2004. The source for the data is the AMECO database published by the European Commission.[8] Data are annual; fiscal variables are expressed in percent of GDP and display significant variation both over time and

[8] In particular, the data used in this study are retrieved from the Spring 2005 release of the AMECO dataset.

across countries; the sample is unbalanced (Tables 1a, 1b and 1c). Due to the dynamic structure of the estimating equations, whenever feasible we also use the Arellano-Bond method for dynamic panel regressions. Output gaps are computed using the Hodrick-Prescott filter.[9]

3.1 The overall balance

We start off by estimating equation (4b) including time dummies to check for breaks in the behaviour of fiscal policy. Each time dummy covers a decade in the sample (1980s, 1990s and 2000s). The equation is estimated both using fixed effects (FE) and Arellano-Bond (AB) techniques (Table 2, Columns A and B).

The results indicate the presence of cyclical asymmetry. The coefficient for the negative output gap is relatively large (–0.46 using FE; –0.39 with AB) and statistically significant at the 1 percent confidence level. The coefficient for the positive output gap is much smaller (–0.03 with FE; –0.13 with AB) and not significant at the 5 percent confidence level. The asymmetry index ϕ is significantly different from zero both with FE and AB (respectively, at the 5 and 1 percent significance level).

The coefficient of the lagged dependent variable is lower than one and the coefficient of lagged debt is negative, so that convergence of the equation is ensured.

Importantly, the exclusion of time dummies does not affect the results concerning cyclical asymmetry (Table 2, columns C and D).[10]

The coefficients of time dummies estimated using FE suggest that there might be a break at the beginning of the nineties. The time dummies are not jointly significant, but the dummies for the 1990s and the 2000s are individually significant and they are not statistically different.[11] Given that the Maastricht Treaty was signed in 1992, introducing constraints on deficit and debts for EU countries, we choose to account for the early nineties break with a 1992 dummy.[12] We use a general-to-specific estimation strategy. First we interact a dummy variable for 1992

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[9] To avoid end-point bias the Hodrick-Prescott filter is applied to GDP series longer then the regression sample (1960-2006 as opposed to 1970-2004; we used Commission forecasts for the last two years). By definition, there are about as many positive as negative gaps in the sample. We tried different values for the smoothing parameter λ and found that econometric results are robust to different choices. For regressions reported in the paper we used output gap estimates obtained by setting λ=30. See Bouthevillain *et al.* (2001) for a discussion of the issues involved in the use of the Hodrick-Prescott filter.

[10] The same result is obtained when using time dummies defined over five-years periods. Annual dummies unsurprisingly interfere with our cyclical variables.

[11] This is supported also by estimation using time dummies covering five-years periods.

[12] In 1997 the Stability and Growth Pact supplemented the fiscal rules introduced by the 1992 Treaty establishing a medium-term objective of a budgetary position "close to balance or in surplus". We cannot test for a structural break related to the Stability and Growth Pact given the smaller number of observations after 1997.

Table 1a

Descriptive Statistics: Main Fiscal Variables

(as a percentage of GDP; average values over the indicated period)

Country		Debt				Overall Balance[1]				Primary Balance[1]				Primary Expenditure				Revenue			
		1970-1979	1980-1989	1990-1999	2000-2004	1970-1979	1980-1990	1990-1999	2000-2004	1970-1979	1980-1990	1990-1999	2000-2004	1970-1979	1980-1990	1990-1999	2000-2004	1970-1979	1980-1990	1990-1999	2000-2004
Belgium	1970-2004	63.0	114.7	128.9	103.6	4.8	10.7	4.6	–0.3	0.6	0.8	–5.0	–6.1	43.9	49.0	43.4	44.0	43.2	48.2	48.4	50.1
Germany	1970-2004	22.6	38.9	52.2	63.9	1.7	2.0	2.6	2.7	0.4	–0.7	–0.7	–0.5	42.2	43.6	45.1	44.3	41.8	44.2	45.8	44.8
Greece	1988-2004	21.3	48.5	102.6	111.4		12.6	9.4	4.6		5.2	–1.7	–1.7		37.3	38.1	43.2		32.1	40.4	45.1
Spain	1970-2004	13.5	34.3	58.1	52.1	0.2	4.4	4.4	0.2	–0.1	2.3	–0.0	–2.4	23.9	35.9	39.2	37.5	24.0	33.8	39.2	39.9
France	1979-2004	20.8	28.6	49.3	62.2	0.1	2.3	3.7	2.9	–1.2	–0.1	0.3	–0.1	44.0	48.7	50.4	50.8	44.3	48.8	50.1	50.9
Ireland	1985-2004	55.1	96.2	79.0	32.6		7.5	0.9	–0.8		–1.5	–4.6	–2.1		41.2	35.6	32.6		42.7	40.1	34.7
Italy	1980-2004	52.5	77.7	115.0	107.7		11.0	7.6	2.9		3.2	–3.1	–2.7		41.5	42.8	42.8		38.2	45.9	45.4
Netherlands	1975-2004	41.2	64.9	73.9	55.3	1.4	4.8	2.6	1.3	–1.6	–0.8	–3.1	–1.8	45.6	52.1	46.2	44.6	47.2	52.8	49.3	46.4
Austria	1976-2004	23.5	48.1	62.2	64.8	2.7	3.2	3.2	1.1	0.8	–0.2	–0.6	–2.1	48.2	50.5	50.3	47.0	47.4	50.6	51.0	49.0
Portugal	1977-2004	25.1	51.5	59.0	60.6	5.7	6.6	5.5	3.6	3.6	0.8	–0.8	0.6	30.3	33.0	38.9	43.7	26.7	32.2	39.8	43.1
Finland	1975-2004	8.9	15.2	45.5	44.2	–5.4	–3.8	1.8	–3.5	–6.1	–5.3	–1.5	–5.6	39.9	43.7	54.3	47.8	46.0	49.0	55.9	53.4
Denmark	1971-2004	14.7	65.0	68.3	44.8	–2.0	2.1	0.9	–2.2	–3.6	–5.2	–5.1	–4.9	43.6	49.4	52.6	51.8	47.2	54.6	57.6	56.7
Sweden	1970-2004	28.0	53.9	64.9	51.8	–2.5	1.6	3.1	–1.5	–4.6	–4.6	–2.5	–4.1	46.8	54.4	58.6	54.7	51.1	59.0	61.2	58.8
United Kingdom	1970-2004	64.5	49.8	44.9	40.7	2.5	2.3	3.7	1.4	–1.6	2.3	3.7	1.4	40.6	40.9	39.9	39.9	42.2	43.3	39.5	40.8
Euro-area countries[2]		31.6	56.2	75.1	69.0	1.4	5.6	4.2	1.3	–0.5	0.3	–1.9	–2.2	39.7	43.3	44.0	43.5	40.1	43.0	46.0	45.7
EU countries[2]		32.5	56.2	71.7	64.0	0.9	4.8	3.9	0.9	–1.2	–0.3	–1.8	–2.3	40.8	44.4	45.4	44.6	41.9	45.0	47.4	47.1

[1] Positive values indicate deficits; negative values indicate supluses. – [2] Unweighted average.

Table 1b

Descriptive Statistics: Primary Expenditure Composition

(percentage on primary expenditure; average values over the indicated period)

Country		Transfers in Cash				Wages				Other Primary Expenditure			
		1970-1979	1980-1989	1990-1999	2000-2004	1970-1979	1980-1990	1990-1999	2000-2004	1970-1979	1980-1990	1990-1999	2000-2004
Belgium	1970-2004	32.6	36.7	38.0	35.8	26.0	26.0	26.9	26.8	41.4	37.3	35.1	37.4
Germany	1970-2004	36.1	37.0	39.1	43.2	23.9	21.8	19.6	17.6	40.0	41.2	41.3	39.1
Greece	1988-2004		39.1	39.5	42.1		31.1	29.7	28.0		29.8	30.8	29.9
Spain	1970-2004	34.4	36.9	36.3	32.6	31.3	27.8	28.5	27.6	34.3	35.3	35.2	39.8
France	1979-2004	34.1	34.9	36.0	35.8	28.7	27.4	26.6	26.8	37.0	37.7	37.4	37.4
Ireland	1985-2004		34.0	32.2	27.3		26.5	28.3	26.1		39.5	39.4	46.6
Italy	1980-2004		35.4	39.0	40.0		28.4	27.4	25.4		36.3	33.6	34.6
Netherlands	1975-2004	34.0	36.3	34.1	26.6	29.9	24.7	23.1	23.5	36.0	39.0	42.8	49.8
Austria	1976-2004	33.7	35.3	36.8	39.3	23.9	24.0	23.6	20.4	42.5	40.7	39.6	40.3
Portugal	1977-2004	21.4	26.6	28.8	32.2	31.3	31.2	34.8	34.0	47.4	42.2	36.3	33.7
Finland	1975-2004	27.4	30.1	37.4	34.9	32.2	32.1	28.6	28.5	40.3	37.8	33.9	36.6
Denmark	1971-2004	29.0	33.5	36.4	34.0	37.0	36.7	33.4	33.9	33.9	29.8	30.2	32.1
Sweden	1970-2004	30.1	33.5	34.5	32.4	35.4	34.1	29.6	29.6	34.6	32.4	36.0	38.0
United Kingdom	1970-2004	24.7	32.9	36.4	33.7	30.6	30.7	27.5	26.1	44.7	36.4	36.1	40.2
Euro-area countries [(1)]		31.7	34.8	36.1	35.4	28.4	27.4	27.0	25.9	39.9	37.9	36.9	38.7
EU countries [(1)]		30.7	34.4	36.0	35.0	30.0	28.8	27.7	26.7	39.3	36.8	36.3	38.3

[(1)] Unweighted average.

Table 1c

Descriptive Statistics: Revenue Composition

(percentage on revenue; average values over the indicated period)

		Direct taxes				Indirect taxes				Other revenue			
		1970-1979	1980-1990	1990-1999	2000-2004	1970-1979	1980-1990	1990-1999	2000-2004	1970-1979	1980-1990	1990-1999	2000-2004
Belgium	1970-2004	32.8	36.1	33.8	34.6	29.0	24.4	25.6	25.9	38.1	39.6	40.7	39.6
Germany	1970-2004	29.4	27.5	24.9	24.1	28.5	25.2	25.0	26.6	42.3	47.3	50.1	49.3
Greece	1988-2004		15.9	17.4	20.6		37.1	34.7	32.6		46.9	47.9	46.8
Spain	1970-2004	17.7	24.7	27.8	26.7	28.8	26.1	27.0	30.1	53.4	49.2	45.3	43.2
France	1979-2004	15.7	16.5	18.5	22.9	33.3	31.4	30.6	30.1	51.1	52.0	51.0	47.1
Ireland	1985-2004		32.4	35.0	35.4		35.7	34.0	36.8		31.9	31.0	27.9
Italy	1980-2004		31.6	32.7	30.9		23.9	26.9	32.1		44.6	40.3	37.0
Netherlands	1975-2004	30.6	25.9	28.1	24.8	21.5	19.6	22.3	27.7	47.9	54.5	49.5	47.5
Austria	1976-2004	23.8	23.6	24.2	26.7	33.6	31.3	29.1	29.6	42.6	45.1	46.7	43.6
Portugal	1977-2004	20.8	20.9	22.6	21.9	39.6	39.6	34.4	34.9	39.8	39.5	43.0	43.3
Finland	1975-2004	35.9	33.1	31.8	34.9	28.2	29.5	25.9	25.8	35.9	37.4	42.3	39.4
Denmark	1971-2004	51.2	49.9	51.8	52.4	34.8	32.2	29.7	30.6	14.1	17.9	18.5	17.1
Sweden	1970-2004	39.6	36.4	33.8	33.1	26.3	25.4	27.0	28.5	34.1	38.2	39.2	38.4
United Kingdom	1970-2004	38.6	38.3	38.6	39.6	28.3	30.5	33.0	32.7	33.2	31.2	28.4	27.8
Euro-area countries [(1)]		25.8	26.2	27.0	27.6	30.3	29.4	28.7	30.2	43.9	44.4	44.3	42.2
EU countries [(1)]		30.5	29.5	30.1	30.6	30.2	29.4	28.9	30.3	39.3	41.1	41.0	39.1

[(1)] Unweighted average.

Table 2

Fiscal Reaction Functions for the Overall Balance[1]

	A - 4b with ten-year dummy variables	B - 4b with ten-year dummy variables	C - 4b	D - 4b	E - 4b with dummy92 all variables	F - 4b with dummy92 constant and debt	G - 4b with dummy92 constant and debt	H - BF (2004) [2]
	Fixed effect	Arellano bond	Fixed effect	Arellano bond	Fixed effect	Fixed effect	Arellano bond	Arellano bond
a Constant	1.597 ***	–0.158 ***	1.623 ***	0.005	1.113 ***	1.077 ***	–0.006	0.026
	(0.318)	*(0.027)*	*(0.305)*	*(0.017)*	*(0.318)*	*(0.311)*	*(0.021)*	*(0.016)*
a1 Dummy for 1992					1.900 ***	1.757 ***	1.889 ***	
					(0.477)	*(0.457)*	*(0.639)*	
b Lagged Dependent Variable	0.822 ***	0.810 ***	0.820 ***	0.825 ***	0.725 ***	0.744 ***	0.746 ***	0.841 ***
	(0.033)	*(0.028)*	*(0.029)*	*(0.033)*	*(0.045)*	*(0.032)*	*(0.036)*	*(0.028)*
b1 Lagged Dependent Variable after 1992					0.018			
					(0.054)			
c Lagged Debt	–0.032 ***	–0.027 ***	–0.024 ***	–0.029 ***	–0.005	–0.006	–0.009	–0.013 **
	(0.007)	*(0.009)*	*(0.005)*	*(0.008)*	*(0.006)*	*(0.006)*	*(0.009)*	*(–0.006)*
c1 Lagged Debt after 1992					–0.037 ***	–0.034 ***	–0.034 ***	–0.029 ***
					(0.007)	*(0.007)*	*(0.009)*	*(0.006)*
d Positive Output Gap	–0.034	–0.131 *	–0.033	–0.040	–0.064	–0.081	–0.085	–0.129
	(0.097)	*(0.071)*	*(0.094)*	*(0.088)*	*(0.108)*	*(0.095)*	*(0.091)*	*(0.791)*
d1 Positive Output Gap after 1992					–0.195			
					(0.210)			
e Negative Output Gap	–0.458 ***	–0.391 ***	–0.458 ***	–0.457 ***	–0.439 ***	–0.522 ***	–0.511 ***	–0.416 ***
	(0.099)	*(0.082)*	*(0.099)*	*(0.086)*	*(0.130)*	*(0.099)*	*(0.076)*	*(0.081)*
e1 Negative Output Gap after 1992					–0.143			
					(0.181)			
f1 Dummy 1980-89	0.426	1.690 ***						
	(0.285)	*(0.320)*						
f2 Dummy 1990-99	0.735 **	3.463 ***						
	(0.353)	*(0.459)*						
f3 Dummy 2000-04	0.653 *	4.520 ***						
	(0.355)	*(0.492)*						
test joint significance of dummy variables	1.560	94.640 ***						
	(0.199)	*(0.000)*						
test dummy 1990-99=dummy 2000-04	0.082							
	(0.262)							
g asymmetry index ϕ=d-e	0.424 **	0.260 ***	0.425 **	0.417 ***	0.375 *	0.440 ***	0.426 ***	0.287 ***
	(0.168)	*(0.086)*	*(0.165)*	*(0.095)*	*(0.207)*	*(0.165)*	*(0.088)*	*(0.032)*
Sargan test		426.83 (0.971)		462.03 (0.757)			463.71 (0.739)	445.52 (0.653)
2nd order autocorrelation		–0.26 (0.795)		–0.23 (0.819)			–0.31 (0.757)	–1.11 (0.269)
nr. of observations	400	386	400	386	400	400	386	391
test if cyclical asymmetry is different before and after 1992					0.322			
					(0.270)			

(1) *, **, *** = signficance at 10, 5 and 1 per cent respectively. Robust standard errors in brackets. Sample countries: Austria, Belgium, Denmark, Finland, France, Greece, Germany, Ireland, Italy, Portugal, Spain, the Netherlands, the United Kingdom, Sweden. Period: 1970-2004.

(2) Sample countries: same as in footnote (1). Period: 1970-2000.

with all covariates (Table 2, Column E); then we drop terms with non-significant coefficients (Table 2, Column F and G, for FE and AB estimates respectively).

We find no evidence that the asymmetry index is different before 1992 and after 1992, but we do find a break in 1992 concerning the reaction of the balance to debt. The negative coefficient of lagged debt becomes much larger and statistically significant at the 1 percent level after 1992 (it goes from less than –0.01 to more than –0.04), consistent with the notion that Maastricht fiscal rules increased the relevance of the debt level in determining fiscal adjustment.

Overall these results confirm those in Balassone and Francese (2004; Table 2, Column H).

3.2 The primary balance

The specification used for the primary balance equation is the one indicated in (9b). Therefore, lagged interest spending and the variation in interest expenditure are included among regressors. As with the overall balance, also with the primary balance we follow a general to specific approach when testing for the 1992 break. Similarly to the overall balance equation, the 1992 dummy turns out to be significant only when interacted with the debt and the intercept term (Table 3, Columns A and B).

We find that interest spending is a significant explanatory variable in levels, though not in changes, regardless of the estimation method (Table 3). This confirms the discussion in Section 2.1 that an estimating equation for the primary balance should not be derived by simple analogy with the equation for the overall balance.

We find evidence of cyclical asymmetry also for the primary balance. The elasticity to negative output gap is again large (higher than –0.4) and statistically different from zero at the 1 percent confidence level. The elasticity to positive gaps, instead, is smaller (less than –0.2) and statistically significant only at lower confidence levels (5 and 10 percent for AB and FE, respectively). The asymmetry index is about 0.25, lower than the one for the overall balance, reflecting the non-zero estimate for the coefficient of positive output gaps. The asymmetry index is statistically different from zero at the 1 percent significance level when the equation is estimated using AB.

Using equation (10) we compute the long-run level of the overall balance (b^*) and debt (d^*) consistent with estimates in Table 3 (Column B). Given the break in 1992, we compute two sets of long-run values: one based on the dynamics characterising the period before 1992 and the other for the period beginning in 1992. For the euro-area average, the long-run deficit and debt levels drop from 2.8 and 56.8 percent of GDP to, respectively, 2.6 and 52.3 percent respectively (Table 4). This result reflects the reduction in long-run deficit levels in countries that were characterised by long-run deficits higher than 3 per cent of GDP before 1992 (Belgium, Greece, Italy and Portugal).

Table 3

Fiscal Reaction Functions for the Primary Balance[(1)]

	A - 11b with dummy92 all variables	B - 11b with dummy92 constant and debt	C - 11b with dummy92 constant and debt
	Fixed effect	**Fixed effect**	**Arellano bond**
a Constant	0.688 **	0.722 **	–0.001
	(0.289)	*(0.283)*	*(0.020)*
a1 Dummy for 1992	1.939 ***	1.696 ***	1.718 ***
	(0.453)	*(0.428)*	*(0.439)*
b Lagged Dependent Variable	0.622 ***	0.632 ***	0.636 ***
	(0.445)	*(0.036)*	*(0.021)*
b1 Lagged Dependent Variable after 1992	–0.043		
	(0.059)		
c Lagged Debt	0.004	–0.008	–0.011
	(0.012)	*(0.008)*	*(0.012)*
c1 Lagged Debt after 1992	–0.045 ***	–0.027 ***	–0.027 ***
	(0.013)	*(0.006)*	*(0.007)*
d Change in Interest Exp.	0.295	0.243	0.229
	(0.261)	*(0.196)*	*(0.218)*
d1 Change in Interest Exp. after 1992	–0.131		
	(0.395)		
e Lagged Interest Exp.	–0.334 ***	–0.216 ***	–0.203 **
	(0.114)	*(0.074)*	*(0.092)*
e1 Lagged Interest Exp. after 1992	0.152		
	(0.130)		
f Positive Output Gap	–0.115	–0.158 *	–0.168 **
	(0.095)	*(0.089)*	*(0.070)*
f1 Positive Output Gap after 1992	–0.347 *		
	(0.197)		
g Negative Output Gap	–0.298 **	–0.416 ***	–0.406 ***
	(0.143)	*(0.103)*	*(0.075)*
g1 Negative Output Gap after 1992	–0.203		
	(0.189)		
h asymmetry index $\phi=d-e$	0.183	0.258	0.238 ***
	(0.212)	*(0.167)*	*(0.088)*
Sargan test			460.13 (0.776)
2nd order autocorrelation			0.22 (0.825)
No. of observations	400	400	386
test if cyclical asymmetry is different	0.040 (0.269)		

(1) *, **, *** = significance at 10, 5 and 1 per cent respectively. Robust standard errors in brackets. Sample countries: Austria, Belgium, Denmark, Finland, France, Greece, Germany, Ireland, Italy, Portugal, Spain, the Netherlands, the United Kingdom, Sweden. Period: 1970-2004.

Table 4

Deficit and Debt Long-run Levels[1]
(percent of GDP)

	Overall balance		diff.	Debt		diff.
	before 1992	after 1992		before 1992	after 1992	
Belgium	5.9	3.7	–2.2	117.2	73.6	–43.6
Germany	1.5	2.1	0.7	29.1	42.6	13.5
Greece	8.5	4.6	–3.9	169.4	92.0	–77.4
Spain	1.8	2.3	0.4	36.7	45.3	8.6
France	1.9	2.3	0.4	38.5	45.9	7.4
Ireland	0.5	1.8	1.3	10.3	35.9	25.7
Italy	7.7	4.3	–3.4	154.7	86.8	–67.9
Netherlands	2.1	2.3	0.3	41.1	46.8	5.7
Austria	1.8	2.2	0.5	35.9	45.0	9.1
Portugal	3.5	2.8	–0.6	69.1	56.7	–12.4
Finland	–3.8	0.3	4.1	–76.5	5.4	81.9
Denmark	–1.2	1.2	2.4	–23.2	24.2	47.4
Sweden	–0.6	1.4	2.0	–11.5	28.3	39.8
United Kingdom	1.7	2.2	0.5	33.3	44.0	10.8
Euro-area countries (2)	2.8	2.6	–0.2	56.8	52.3	–4.5
EU countries (2)	2.2	2.4	0.2	44.6	48.0	3.5

(1) Computed using the estimated coefficients in Table 3 (Column B) and setting the long-run growth rate at 4 per cent and the interest rate on government debt at 5 per cent.
(2) Unweighted average.

3.3 Expenditure and revenue

As a first step to analyze the source of cyclical asymmetry "within the budget" based on (14), we estimate two equations separating the primary balance into its expenditure and revenue components.

In order to preserve comparability of results with those obtained for the primary balance as a whole, the equations are specified in the same way as the primary balance equation in Table 3, Columns B and C.

Results highlight that most of the cyclical asymmetry detected in the primary balance comes from the expenditure side of the budget (Table 5, columns A and B). The elasticity of revenue to both positive and negative output gaps is not

Table 5

Fiscal Reaction Functions for Primary Expenditure, Revenue and the Primary Balance(1)

	A - 16, Primary expenditure	B - 16, Revenue	C - Implied Primary Balance Fiscal Reaction from (A) and (B)
	Fixed effect	**Fixed effect**	
a Constant	38.487 ***	37.801 ***	0.685
	(0.699)	*(0.621)*	
a1 Dummy for 1992	4.459 ***	2.706 ***	1.753
	(0.828)	*(0.776)*	
b Lagged Primary Balance	0.542 ***	–0.087	0.629
	(0.076)	*(0.067)*	
c Lagged Debt	0.115	0.123 ***	–0.008
	(0.017)	*(0.016)*	
c1 Lagged Debt after 1992	–0.054 ***	–0.027 **	–0.028
	(0.013)	*(0.013)*	
d Change in Interest Exp.	0.210	–0.103	0.314
	(0.363)	*(0.283)*	
e Lagged Interest Exp.	–0.089	0.124	–0.213
	(0.142)	*(0.132)*	
f Positive Output Gap	–0.162	–0.013	–0.149
	(0.196)	*(0.174)*	
g Negative Output Gap	–0.589 ***	–0.183	–0.406
	(0.222)	*(0.185)*	
h asymmetry index $\phi=d-e$	0.427	0.170	0.257
	(0.355)	*(0.299)*	
No. of observations	400	400	

(1) *, **, *** = significance at 10, 5 and 1 per cent respectively. Robust standard errors in brackets. Sample countries: Austria, Belgium, Denmark, Finland, France, Greece, Germany, Ireland, Italy, Portugal, Spain, the Netherlands, the United Kingdom, Sweden. Period: 1970-2004.

significantly different from zero. On the contrary, primary expenditure have a cyclical behaviour similar to the primary balance (even though the asymmetry index is not statistically different from zero). In fact, the estimated coefficient for positive output gaps is not statistically different from zero (though the point estimate, –0.16, is not negligible), while we find a large (almost –0.6) elasticity to negative output gaps, which is also significantly different from zero at the 1 percent confidence level. Taking the difference of the two equations we get results very close to those obtained from direct estimation of the primary balance equation (Table 5, Column C).

To further investigate the role played by expenditure in determining fiscal asymmetry over the cycle, we break primary expenditure into three components: transfers in cash, wages, and other primary expenditures. Results, reported in Table 6, suggest that most of the cyclical asymmetry comes from transfers in cash. Wages and other primary expenditure behave like revenues: they do not significantly react to either positive or negative gaps. On the contrary, the elasticity of transfers in cash to negative output gaps is large (–0.28) and different from zero at the 5 percent confidence level, while their elasticity to positive output gaps is small (–0.06) and not significantly different form zero (however, the asymmetry index is again not significant). Summing up the three expenditure equations and subtracting the revenue equation we once again get results close to those from direct estimation of the equation for the primary balance (Table 6, Column E).

4 The effects of cyclical asymmetry

To assess the magnitude of the impact of cyclical asymmetry on debt accumulation we compare two simulations of debt dynamics for each country: one based on the asymmetric values of the ηs estimated from the primary balance equation in Table 3 (Column B); the other assuming symmetry.

Symmetric fiscal reactions over the cycle require $\eta^P = \eta^N = c$, with c a given constant. In our simulations we assume that $\eta^P = \eta^N = 0$, *i.e.* that fiscal variables do not react to cyclical developments. Setting c=0 allows to shield the results from the influence of the particular cyclical position of each country in the final year considered in the simulation.[13] The simulation exercise also assumes that all other coefficients are invariant to the value of ηs.

Both simulations are computed recursively based on the following equation:

$$d_t = (1 + r_t)d_{t-1} + p_t + s_t \tag{17}$$

where p_t is the primary balance simulated on the basis of coefficients in Table 3 (column B) and r_t and s_t are actual values of average debt cost and stock-flow adjustment recorded in each year.[14] In this way, we end up with a predicted value of debt in the final year (*i.e.* in 2004) in each of the two scenarios.

Table 7 reports the debt variation actually observed in the sample (first column) and the accumulation due to cyclical asymmetry in fiscal variables (second column),

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[13] We run simulations assuming other plausible values for c (ranging between –1 and +1): asymmetry always determines excess debt accumulation and is positively correlated with the size of the budget elasticity to the output gap.

[14] The stock-flow adjustment includes the impact of nominal GDP growth on the debt-to-GDP ratio as well as differences between the change in debt and the deficit arising within the Maastricht statistical framework (these are due to different accounting criteria, valuation effects and transactions coverage).

Table 6

Fiscal Reaction Functions for the Primary Expenditure Components, Revenue and the Primary Balance[(1)]

	A - 16, Transfers in cash	B - 16, Wages	C - 16, Other primary expenditure	D - 16, Revenue	E - Implied Primary balance fiscal reaction from (A), (B), (C) and (D)
	Fixed effect	**Fixed effect**	**Fixed effect**	**Fixed effect**	
a Constant	11.540	11.780 ***	15.166 ***	37.801 ***	0.685
	(0.355)	*(0.235)*	*(0.326)*	*(0.621)*	
a1 Dummy for 1992	2.337 ***	–0.170	2.293 ***	2.706 ***	1.753
	(0.446)	*(0.314)*	*(0.393)*	*(0.776)*	
b Lagged Primary Balance	0.257 ***	0.093 ***	0.193 ***	–0.087	0.629
	(0.043)	*(0.029)*	*(0.041)*	*(0.067)*	
c Lagged Debt	0.056 ***	0.011 *	0.048 ***	0.123 ***	–0.008
	(0.011)	*(0.006)*	*(0.009)*	*(0.016)*	
c1 Lagged Debt after 1992	–0.022 ***	–0.002	–0.030 ***	–0.027 **	–0.028
	(0.006)	*(0.004)*	*(0.006)*	*(0.013)*	
d Change in Interest Exp.	–0.074	0.141	0.144	–0.103	0.314
	(0.171)	*(0.127)*	*(0.166)*	*(0.283)*	
e Lagged Interest Exp.	0.106	0.077	–0.272 ***	0.124	–0.213
	(0.089)	*(0.057)*	*(0.065)*	*(0.132)*	
f Positive Output Gap	–0.058	–0.036	–0.068	–0.013	–0.149
	(0.102)	*(0.063)*	*(0.088)*	*(0.174)*	
g Negative Output Gap	–0.284 **	–0.146	–0.158 *	–0.183	–0.406
	(0.115)	*(0.090)*	*(0.095)*	*(0.185)*	
h asymmetry index $\phi=d-e$	0.227	0.110	0.090	0.170	0.257
	(0.188)	*(0.126)*	*(0.161)*	*(0.299)*	
Sargan test					
2nd order autocorrelation					
No. of observations	400	400	400	400	

(1) *, **, *** = significance at 10, 5 and 1 per cent respectively. Robust standard errors in brackets. Sample countries: Austria, Belgium, Denmark, Finland, France, Greece, Germany, Ireland, Italy, Portugal, Spain, the Netherlands, the United Kingdom, Sweden. Period: 1970-2004.

measured as the difference between debt accumulation in the two simulations based on asymmetric and symmetric ηs as described above. For EU countries, on average, debt accumulation due to asymmetric fiscal policy amounts to about one third of debt variation observed over the simulation period (one fourth for the euro area). The impact is relevant in all countries.

The impact of cyclical asymmetry in fiscal variables can also be gauged by estimating by how much the average deficit is inflated by asymmetry compared to a baseline where the cyclicality of fiscal variables is symmetric. The third column in Table 7 summarizes the results of such an exercise: over the period considered the average balance, both in the euro area and in the EU, is estimated to have been almost 0.3 percentage points of GDP worse every year because of cyclical asymmetry.

5 Conclusions

This paper set out to verify the presence of asymmetry in the reaction of fiscal balances to positive and negative cyclical conditions and identify which budgetary items account for it. To this end, we derived estimating equations for the primary balance and for selected budget components from a modified version of the stylised framework developed in Balassone and Francese (2004). The framework was put to test on a sample of fourteen EU member states over 1970-2004.

We found significant cyclical asymmetry in fiscal variables. The primary balance deteriorates in bad times without a corresponding offsetting improvement in good times: the elasticity to negative and positive output gaps is estimated at –0.41 and –0.17, respectively. Unless, contrary to what is usually assumed, automatic stabilizers are not symmetric, this asymmetry must come from discretionary policy. In this case, and provided our regressions control satisfactorily for other factors affecting fiscal balances, discretionary policy would appear to be offsetting a significant share of the working of automatic stabilizers.[15]

Numerical simulations show that, over the period considered, cyclical asymmetry inflated average deficit levels and contributed significantly to debt accumulation. The average primary balance of EU countries over 1970-2004 is estimated to have been 0.3 percent of GDP worse in each year than it would have been under symmetry. This accounts for about one third of debt accumulation observed over the same period.

We find no evidence that European deficit and debt rules affected the cyclical behaviour of fiscal variables. However, the introduction of such rules is found to be correlated with a sizeable reduction in long-term deficit and debt levels for countries with significant imbalances before 1992.

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[15] Estimates by international organisations of automatic budgetary elasticity to the cycle average about 0.5 for EU countries. See Bouthevillain *et al.* (2001).

Table 7

Asymmetry Impact on Debt Accumulation and Overall Deficit
(percent of GDP)

		Actual debt variation	Debt variation due to asymmetry (1)	Asymmetry impact on average overall deficit (1)
Belgium	1970-2004	31.8	5.8	0.16
Germany	1970-2004	47.8	6.0	0.17
Greece	1988-2004	42.1	3.9	0.23
Spain	1970-2004	33.9	8.5	0.24
France	1979-2004	44.4	6.0	0.23
Ireland	1985-2004	–71.8	9.9	0.49
Italy	1980-2004	47.6	5.1	0.20
Netherlands	1975-2004	14.9	6.0	0.20
Austria	1976-2004	37.5	4.7	0.16
Portugal	1977-2004	33.1	11.0	0.39
Finland	1975-2004	38.5	15.8	0.53
Denmark	1971-2004	29.5	7.1	0.21
Sweden	1970-2004	23.9	9.2	0.26
United Kingdom	1970-2004	–37.1	8.4	0.24
Euro-area countries (2)		27.3	7.5	0.27
EU countries (2)		22.6	7.7	0.27

(1) Computed using the estimated coefficients in Table 3 (Column B).
(2) Unweighted average.

Our estimates suggest that cyclical asymmetry comes from the expenditure side of the budget, mostly reflecting the behaviour of transfers in cash. This is a composite spending category. It includes rigid components, not expected to react to cyclical conditions, such as pensions. But it also includes spending programs specifically designed to react to the economic cycle, such as unemployment benefits. Finally, it includes items which can be manoeuvred discretionally, though to different extents. It may be the case that these discretionary spending increase in bad times to provide shelter against recessions, but the new outlays become entrenched thereafter and therefore are not reduced with the following expansion. Alternatively, it may be the case that discretionary spending substitutes for automatic stabilizers as cyclical conditions switch from negative to positive. Finally, the possibility that automatic stabilizers themselves are not symmetric could be explored. Whether

asymmetry arises out of political economy reasons, genuine mistakes in assessing cyclical conditions or because of, say, unemployment persistence is open to debate.[16]

Whatever the sources of cyclical asymmetry, our results lend some support to the introduction of expenditure rules. Committing to a predetermined rate of growth of expenditure can curb the tendency to increase public spending in good times while leaving the automatic stabilizers on the revenue side free to operate. An expenditure rule of this type can be relatively easily disseminated to the public and monitored, provided that the control aggregates are clearly specified.[17] Expenditure targeting – whether formally incorporated in a rule or not – has been playing a role in the fiscal framework of an increasing number of countries.[18]

It is important to ensure that the procyclical bias is not transferred to the revenue side of the budget – as of course procyclicality can arise from the revenue side – and that there is a long-term anchor to fiscal policy. During boom periods for instance, governments might be tempted to cut taxes or increase tax expenditures, even while sticking to expenditure rules (this occurred for instance in a number of EU members over 1999-2001). This suggests that expenditure ceilings cannot be set in isolation from provisions regarding revenue policy. More generally, expenditure targeting per se does not correct a structural tendency towards excessive deficits. A constant rate of growth of expenditure can be consistent with a gradual deterioration of the fiscal balance if revenues do not keep the same pace as expenditure. An anchor in terms of budget balance is therefore essential.

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[16] A variety of economic, financial and political economy factors can lead to fiscal policy being procyclical and asymmetric. According to one view, the roots of procyclicality lie in policy discretion and in the importance of competing electoral constituencies. A key argument is that constituencies and lobbies compete for their share of public resources, and a "common pool" problem arises. Since budgetary competition increases in good times, spending grows more than proportionally relative to the increase in revenue (Lane and Tornell, 1999). Another explanation of procyclicality stems from the premise that, while the government has the means to engage in countercyclical policy, it ends up not doing so due to an inaccurate assessment of the economic cycle. Indeed, analyses of the cyclicality of fiscal policy based on real-time macroeconomic data usually do not find strong evidence of cyclical asymmetry (see, e.g., Momigliano and Golinelli, 2006). However, difficulties in assessing macroeconomic conditions cannot explain why procyclicality tends to be asymmetric. Moreover, the evidence of systematic bias towards optimism in official forecasts of output growth is at odds with the notion that overspending in good times arises from inadequate information about the state of the cycle (Danninger *et al.*, 2004).

[17] A variety of issues arise in the implementation of expenditure rules. These include the choice of the expenditure aggregate to be targeted (items included, institutional coverage, level of disaggregation), the time horizon, the underlying macroeconomic assumptions and the valuation criteria. See, for instance, the discussion in IMF (2007) and the references therein.

[18] Expenditure rules are used, among others, in Finland, the Netherlands, Sweden, Switzerland, the United Kingdom, and the United States.

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