

## CYCLICAL ASYMMETRY IN FISCAL VARIABLES

*Fabrizio Balassone, Maura Francese and Stefania Zotteri, Banca d'Italia\**

### INTRODUCTION

**A**LTHOUGH THERE CONTINUES TO BE SOME debate on the feasibility and effectiveness of fiscal policy in stabilizing output fluctuations, there is little disagreement that policy should not be procyclical (i.e., that government balance should not deteriorate during good times and/or improve in bad times). Procyclical policies can sometimes be warranted by the need to preserve the sustainability of public finances, yet there is no room for chronic procyclicality. If stabilization policy is to be consistent with fiscal sustainability, then cyclical behavior of fiscal variables should be symmetric, so that the extra deficit accumulated in bad times is compensated for in good times.

However, there is growing evidence that fiscal variables react asymmetrically to positive and negative cyclical conditions. In European Union (EU) countries, during 1970-2000, it has often been remarked that 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.

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” (pp. 87-88).<sup>1</sup> Some evidence of asymmetric behavior is provided by Buti, Franco, and Ongena (1998) for high-debt EU countries where, between 1970 and 1990, deficit-to-GDP ratios were around 6 percent of GDP when output was close to or above its trend value, while the imbalance increased up to 8 percent when output fell below its trend level. In a previous paper, Balassone and Francese (2004) found evidence of a significant difference in the sensitivity of the overall balance to positive and negative output gaps in a sample of 16 OECD countries between 1969 and 2002.<sup>2</sup>

The procyclicality of fiscal policy in good times is also a stylized fact in emerging markets. 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 procyclicality seems to be the norm in the developing world, not just in Latin America. Kumar and Ter-Minassian (2007) extend the analysis in Balassone and Francese (2004) to developing countries and find that the overall balance deteriorates in contractions without improving in expansions.

Available evidence suggests that expenditures play a predominant role in determining the observed cyclical asymmetry of the overall fiscal balance. For instance, Kaminsky, Reinhart, and Végh (2004) show that in a sample of 83 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 22 OECD countries and find that “the prolonged rise in the spending/GDP ratio [over 1975-1998] is partially explained by cyclical upward ratcheting due to asymmetric fiscal behavior: the ratio increases during recessions and is only partially reduced in expansions” (p. 353).

While the cyclical behavior of fiscal balances is usually analyzed with reference to positive and negative output gaps (see the review in European Commission, 2006), the cyclicity 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 cyclicity of spending and fiscal balances is not necessarily fully consistent.<sup>3</sup>

In order to provide comparable evidence on the cyclical behavior of fiscal balances and public expenditures, we expand the stylized framework defined in Balassone and Francese (2004) – which uses the output gap to define cyclical conditions – to allow for the analysis of the primary balance

\*The views expressed in this paper are those of the authors and do not necessarily reflect those of the Banca d'Italia.

(i.e., the overall balance net of interest payments on public debt) and individual budget components. We use data from a sample of 14 EU member states during the period 1970 through 2004. We find significant cyclical asymmetry in fiscal variables, with the primary (and overall) budget balance deteriorating in contractions without correspondingly improving in expansions. Analysis of budget components reveals that the asymmetry comes from expenditure, in particular from transfers in cash. We find no evidence that fiscal rules introduced in 1992 with the Treaty of Maastricht affected the cyclical behavior of fiscal variables. Numerical simulations show that cyclical asymmetry inflated average deficit levels, contributing significantly to debt accumulation.

The stylized framework underlying the analysis is described in the next section. The third section reports regression results on cyclical asymmetry in fiscal variables. The extent to which cyclical asymmetry affects deficit and debt levels is discussed in the fourth section. The final section summarizes and concludes.

### THE STYLISED FRAMEWORK

The stylized description of the dynamics of the 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 ( $b_t^l$ ) and a cyclical component ( $b_t^c$ ):

$$(1) \quad b_t = b_t^l + b_t^c.$$

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  $d^*$ ,<sup>4</sup>

$$(2) \quad b_t^l = b_{t-1} + \alpha(b^* - b_{t-1}) + \beta(d^* - d_{t-1})$$

$$\alpha, \beta > 0.$$

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

The cyclical component is proportional to the difference between actual and trend GDP (i.e., the output gap,  $\omega$ ). 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 ( $\omega_t = \omega_t^p$ ) or negative ( $\omega_t = \omega_t^N$ ):

$$(3) \quad b_t^c = \eta^p \omega_t^p + \eta^N \omega_t^N.$$

The  $\eta$  coefficients in (3) include both the automatic reaction of the budget to cyclical conditions and the discretionary action undertaken by fiscal authorities in response to such conditions. Combining equations (2) and (3) gives:

$$(4) \quad b_t = (\alpha b^* + \beta d^*) + (1 - \alpha)b_{t-1} - \beta d_{t-1}$$

$$+ \eta^p \omega_t^p + \eta^N \omega_t^N,$$

which provides the basis for our empirical analysis.<sup>5</sup>

Countercyclical movements of the overall balance would require  $\eta^p, \eta^N < 0$ , (i.e., a GDP below its potential level ( $\omega_t < 0$ ) determines a worsening of the budget while economic activity above trend ( $\omega_t > 0$ ) determines an improvement). From equation (4) we define an asymmetry index  $\phi = \eta^p - \eta^N$ . If  $\phi = 0$  ( $\eta^p = \eta^N$ ), then fiscal policy is symmetric with respect to the cycle, while if  $\phi > 0$ , 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 (4) 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/countercyclical 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.<sup>6</sup>

While the framework described above focuses on the overall balance, the policy variable of fiscal authorities is the primary balance. From equation (4), by decomposing  $b_t$  into its interest ( $i_t$ ) and primary balance ( $p_t$ ) components, we can obtain the following estimating equation (see Balassone, Francese, and Zotteri, 2008 for technical details):

$$(5) \quad p_t = \alpha'_0 + \alpha'_1 p_{t-1} + \alpha'_2 d_{t-1} + \alpha'_3 \Delta i_t + \alpha'_4 i_{t-1}$$

$$+ \eta^{pP} \omega_t^p + \eta^{pN} \omega_t^N.$$

Comparison of equations (4) and (5) indicates that an equation for the primary balance should not be obtained by analogy with the one for the overall balance without checking whether inter-

est spending plays a role. Moreover, the inclusion of interest spending among regressors allows to control – albeit approximately – for possible interactions between fiscal and monetary policy.<sup>7</sup> From estimates of parameters in equation (5) we can recover the underlying value of  $b^*$  and  $d^*$  (see Balassone et al., 2008).

In order to analyze the cyclical behavior of different budget components, we write an equation similar to equation (5) for each budget component  $x^s$ :

$$(6) \quad x_t^s = \alpha_0^s + \alpha_1^s p_{t-1}^s + \alpha_2^s d_{t-1}^s + \alpha_3^s \Delta i_t + \alpha_4^s i_{t-1}^s + \eta_s^p \omega_t^p + \eta_s^N \omega_t^N.$$

The sum over  $s$  of the estimates of  $\eta_s^p$  and  $\eta_s^N$  in all the equations defined in equation (6) is equal to the estimate of  $\eta^p$  and  $\eta^N$  in equation (5).

### THE EMPIRICAL ANALYSIS

We apply this stylized framework to a sample of 14 EU countries (those belonging to the EU before May 2004, excluding Luxembourg) during the period 1970 through 2004. The data source is the AMECO database published by the European Commission (2005 release). Data are annual. The sample is unbalanced. Fiscal variables are expressed in percent of GDP and display significant variation both over time and across countries. Output gaps are computed using the Hodrick-Prescott (HP) filter.<sup>8</sup> By definition, there are about as many positive as negative gaps.

We start off by estimating equation (4) including time dummies to check for breaks in fiscal policy. Each time dummy covers a decade in the sample (Table 1, column A). The results indicate the presence of cyclical asymmetry. The coefficient for the negative output gap is relatively large (-0.46) and statistically significant at the 1 percent confidence level. The coefficient for the positive output gap is much smaller (-0.03) and not significant at the 5 percent level. The asymmetry index  $\phi$  is significantly different from zero at the 5 percent level.<sup>9</sup>

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 1, Column B).

The coefficients of time dummies suggest that there might be a break at the beginning of the 1990s when the Maastricht Treaty was signed, introducing ceilings for the ratios of deficit- and debt-to-GDP of EU member states (respectively, 3 and 60 percent). Therefore, we introduce a 1992 dummy in the equation.<sup>10</sup> First, we interact the 1992 dummy with all covariates (Table 1, column C); then, we drop terms with nonsignificant coefficients (Table 1, column D).

We find no evidence that the asymmetry index is different before 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 -0.03), consistent with the notion that Maastricht fiscal rules increased the relevance of the debt level in determining fiscal adjustment. Though reported results are based on fixed-effects estimation (FE), they are robust to estimation by the Arellano Bond method (AB) that takes into account the dynamic structure of the equation (see e.g., Table 1, column E).

The specification for the primary balance equation is the one indicated in equation (5). Similarly to the overall balance equation, the 1992 dummy is significant only when interacted with the debt and the intercept. We find that interest spending is a significant explanatory variable in levels, though not in changes, regardless of the estimation method (Table 2, Columns A and B).

We find evidence of cyclical asymmetry also for the primary balance. The coefficient of the negative output gap is again large (about -0.41) and statistically different from zero at the 1 percent confidence level. The coefficient of positive gaps, instead, is smaller (less than -0.17) and statistically significant only at lower confidence levels (5 and 10 percent for AB and FE, respectively). The asymmetry index is about 0.25 and it is statistically different from zero at the 1 percent significance level when the equation is estimated using AB.

We compute two sets of long-run values for  $b^*$  and  $d^*$  consistent with estimates in Table 2 (column A), based on the dynamics characterizing the periods 1970-1991 and 1992-2004. For the euro area, the long-run deficit and debt levels decrease from 2.8 and 56.8 percent of GDP to, respectively, 2.6 and 52.3 percent (Table 3). This reflects large reductions in countries with long-run deficits and debts higher than, respectively, 3 and 60 percent of GDP before 1992.

**Table 1**  
**Fiscal Reaction Functions for the Overall Balance (1)**

	<i>A - 4 with 10-year dummy variables</i>	<i>B - 4</i>	<i>C - 4 with dummy92 all variables</i>	<i>D - 4 with dummy92 constant and debt</i>	<i>E - 4 with dummy92 constant and debt</i>
	Fixed effect	Fixed effect	Fixed effect	Fixed effect	Arellano Bond
a Constant	1.597*** (0.318)	1.623*** (0.305)	1.113*** (0.318)	1.077*** (0.311)	-0.006 (0.021)
a1 Dummy for 1992			1.900*** (0.477)	1.757 *** (0.457)	1.889 *** (0.639)
b Lagged Dependent Variable	0.822*** (0.033)	0.820*** (0.029)	0.725*** (0.045)	0.744*** 0.032)	0.746*** (0.036)
b1 Lagged Dependent Variable after 1992			0.018 (0.054)		
c Lagged Debt	-0.032*** (0.007)	-0.024*** 0.005)	-0.005 (0.006)	-0.006 (0.006)	-0.009 (0.009)
c1 Lagged Debt after 1992			-0.037*** (0.007)	-0.034*** (0.007)	-0.034*** (0.009)
d Positive Output Gap	-0.034 (0.097)	-0.033 (0.094)	-0.064 (0.108)	-0.081 (0.095)	-0.085 (0.091)
d1 Positive Output Gap after 1992			-0.195 (0.210)		
e Negative Output Gap	-0.458*** (0.099)	-0.458*** (0.099)	-0.439*** (0.130)	-0.522*** (0.099)	-0.511*** 0.076)
e1 Negative Output Gap after 1992			-0.143 (0.181)		
f1 Dummy 1980-89	0.426 (0.285)				
f2 Dummy 1990-99	0.735** (0.353)				
f3 Dummy 2000-04	0.653* (0.355)				
g asymmetry index $\phi=d-e$	0.424** (0.168)	0.425** (0.165)	0.375* (0.207)	0.440*** (0.165)	0.426*** (0.088)
test joint significance of dummy variables	1.560 (0.199)				
test dummy 1990-99=dummy 2000-04	0.082 (0.262)				
Sargan test					463.71 (0.739)
2nd order autocorrelation					-0.31 (0.757)
number of observations	400	400	400	400	386
test if cyclical asymmetry is different before and after 1992			0.322 (0.270)		

(1) \*Significant at 10 percent; \*\*significant at 5 percent; \*\*\*significant at 1 percent. 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 2**  
**Fiscal Reaction Functions for the Primary Balance, Primary Expenditure and Revenue (1)**

	<i>A - 5, primary balance with dummy92 on constant and debt</i>	<i>B - 5, primary balance with dummy92 on constant and debt</i>	<i>C - 6, primary expenditure</i>	<i>D - 6, revenue</i>
	Fixed effect	Arellano Bond	Fixed effect	Fixed effect
a Constant	0.722** (0.283)	-0.001 (0.020)	38.487*** (0.699)	37.801*** (0.621)
al Dummy for 1992	1.696*** (0.428)	1.718*** (0.439)	4.459*** (0.828)	2.706*** (0.776)
b Lagged Primary Balance	0.632*** (0.036)	0.636*** (0.021)	0.542*** (0.076)	-0.087 (0.067)
c Lagged Debt	-0.008 (0.008)	-0.011 (0.012)	0.115 (0.017)	0.123*** (0.016)
cl Lagged Debt after 1992	-0.027*** (0.006)	-0.027*** (0.007)	-0.054*** (0.013)	-0.027** (0.013)
d Change in Interest Exp.	0.243 (0.196)	0.229 (0.218)	0.210 (0.363)	-0.103 (0.283)
e Lagged Interest Exp.	-0.216*** (0.074)	-0.203** (0.092)	-0.089 (0.142)	0.124 (0.132)
f Positive Output Gap	-0.158* (0.089)	-0.168** (0.070)	-0.162 (0.196)	-0.013 (0.174)
g Negative Output Gap	-0.416*** (0.103)	-0.406*** (0.075)	-0.589*** (0.222)	-0.183 (0.185)
h Asymmetry index $\phi = f-g$	0.258 (0.167)	0.238*** (0.088)	0.427 (0.355)	0.170 (0.299)
Sargan test		460.13 (0.776)		
2nd order autocorrelation		0.22 (0.825)		
number of observations	400	386	400	400

(1) \*Significant at 10 percent; \*\*significant at 5 percent; \*\*\*significant at 1 percent. 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.

As a first step to analyze the source of cyclical asymmetry “within the budget” based on equation (6), we estimate two equations separating the primary balance into its expenditure and revenue components. Results highlight that most of the cyclical asymmetry comes from the expenditure side of the budget (Table 2, columns C and D). The sensitivity of revenue to both positive and negative output gaps is not significantly different from zero. On the contrary, primary expenditures have a cyclical behavior 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, while we find a large (almost -0.6) coefficient for negative output gaps, which is also significantly different from zero at the 1 percent confidence level.

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

*Table 3*  
**Deficit and Debt Long-Run Levels (1) and Asymmetry Impact**  
**on Debt Accumulation and Overall Deficit**  
*(as a percentage of GDP)*

	<i>Long-run overall balance</i>			<i>Long-run debt</i>			<i>Actual debt variation over the sample period</i>	<i>Debt variation due to asymmetry</i>	<i>Asymmetry impact on average overall deficit</i>
	<i>before 1992</i>	<i>after 1992</i>	<i>diff.</i>	<i>before 1992</i>	<i>after 1992</i>	<i>diff.</i>			
Belgium	5.9	3.7	-2.2	117.2	73.6	-43.6	31.8	5.8	0.16
Germany	1.5	2.1	0.7	29.1	42.6	13.5	47.8	6.0	0.17
Greece	8.5	4.6	-3.9	169.4	92.0	-77.4	42.1	3.9	0.23
Spain	1.8	2.3	0.4	36.7	45.3	8.6	33.9	8.5	0.24
France	1.9	2.3	0.4	38.5	45.9	7.4	44.4	6.0	0.23
Ireland	0.5	1.8	1.3	10.3	35.9	25.7	-71.8	9.9	0.49
Italy	7.7	4.3	-3.4	154.7	86.8	-67.9	47.6	5.1	0.20
Netherlands	2.1	2.3	0.3	41.1	46.8	5.7	14.9	6.0	0.20
Austria	1.8	2.2	0.5	35.9	45.0	9.1	37.5	4.7	0.16
Portugal	3.5	2.8	-0.6	69.1	56.7	-12.4	33.1	11.0	0.39
Finland	-3.8	0.3	4.1	-76.5	5.4	81.9	38.5	15.8	0.53
Denmark	-1.2	1.2	2.4	-23.2	24.2	47.4	29.5	7.1	0.21
Sweden	-0.6	1.4	2.0	-11.5	28.3	39.8	23.9	9.2	0.26
United Kingdom	1.7	2.2	0.5	33.3	44.0	10.8	-37.1	8.4	0.24
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 2 (Column A). Computation of deficit and debt long-run values assumes a growth rate of 4 percent and an interest rate on government debt of 5 percent. - (2) Unweighted average.

primary expenditures. Results, reported in Table 4, suggest that most of the cyclical asymmetry comes from transfers in cash. Wages and other primary expenditures behave like revenues: they do not significantly react to either positive or negative gaps. On the contrary, the sensitivity of transfers in cash to negative output gaps is large (-0.28) and different from zero at the 5 percent confidence level, while their sensitivity to positive output gaps is small (-0.06) and not significantly different from zero (however, the asymmetry index is again not significant).

#### 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  $\eta$ s estimated from the primary balance equation in Table 2 (column A); the other assuming symmetry.

Symmetric fiscal reactions over the cycle require  $\eta^p = \eta^v = c$  with  $c$  a given constant. In our

simulations we assume that  $\eta^p = \eta^v = 0$  (i.e., fiscal variables do not react to cyclical developments). Setting  $c = 0$  allows shielding the results from the influence of the particular cyclical position of each country in the final year considered in the simulation.<sup>11</sup> The simulation exercise also assumes that all other coefficients are invariant to the value of the  $\eta$ s.

Both simulations are computed recursively based on the following equation:

$$(7) \quad d_t = (1 + \rho_t)d_{t-1} + p_t + s_t,$$

where  $p_t$  is the primary balance simulated on the basis of coefficients in Table 2 (column A) and  $\rho_t$  and  $s_t$  are actual values of average debt cost and stock-flow adjustment recorded in each year.<sup>12</sup> In this way, for each of the two scenarios, we end up with a predicted value of debt in 2004.

Table 3 reports the debt variation actually observed in the sample (column 7) and the accumulation due to cyclical asymmetry in fiscal variables (column 8), measured as the difference between debt accumulation in the two simulations based on

*Table 4*  
**Fiscal Reaction Functions for the Primary Expenditure Components, Revenue and the Primary Balance (1)**

	<i>A - 6, transfers in cash</i>		<i>C - 6, other primary expenditure</i>	
	<i>B - 6, wages</i>			<i>D - 6, revenue</i>
	Fixed effect	Fixed effect	Fixed effect	Fixed effect
a Constant	11.540 (0.355)	11.780*** (0.235)	15.166*** (0.326)	37.801*** (0.621)
al Dummy for 1992	2.337*** (0.446)	-0.170 (0.314)	2.293*** (0.393)	2.706*** (0.776)
b Lagged Primary Balance	0.257*** (0.043)	0.093*** (0.029)	0.193*** (0.041)	-0.087 (0.067)
c Lagged Debt	0.056*** (0.011)	0.011* (0.006)	0.048*** (0.009)	0.123*** (0.016)
cl Lagged Debt after 1992	-0.022*** (0.006)	-0.002 (0.004)	-0.030*** (0.006)	-0.027** (0.013)
d Change in Interest Exp.	-0.074 (0.171)	0.141 (0.127)	0.144 (0.166)	-0.103 (0.283)
e Lagged Interest Exp.	0.106 (0.089)	0.077 (0.057)	-0.272*** (0.065)	0.124 (0.132)
f Positive Output Gap	-0.058 (0.102)	-0.036 (0.063)	-0.068 (0.088)	-0.013 (0.174)
g Negative Output Gap	-0.284** (0.115)	-0.146 (0.090)	-0.158* (0.095)	-0.183 (0.185)
h Asymmetry index $\phi = f-g$	0.227 (0.188)	0.110 (0.126)	0.090 (0.161)	0.170 (0.299)
number of observations	400	400	400	400

(1) \*Significant at 10 percent; \*\*significant at 5 percent; \*\*\*significant at 1 percent. 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.

asymmetric and symmetric  $\eta$ s as described above. For countries where the debt ratio increased over the simulation period, debt accumulation due to asymmetric fiscal policy amounts to about one-fifth of debt variation observed over the simulation period. The impact is relevant in all countries.

The impact of cyclical asymmetry in fiscal variables can also be gauged by estimating how much the average deficit is inflated by asymmetry compared to a baseline where the cyclicalities of fiscal variables is symmetric. Column 9 in Table 3 summarizes the results of such an exercise: over the period considered, both in the euro area and in the EU, cyclical asymmetry is estimated to have worsened the average balance by almost 0.3 percentage points of GDP every year.

## 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 stylized framework developed in Balassone and Francese (2004). The framework was put to test on a sample of 14 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 sensitivity to negative and positive output gaps is estimated at -0.41

and -0.17, respectively. Provided our regressions control satisfactorily for other factors affecting fiscal balances, this suggests that discretionary policy is offsetting a significant share of the automatic reaction of the budget to the cycle in good times.<sup>13</sup> Simulations show that cyclical asymmetry inflated average deficit thus contributing significantly to debt accumulation.

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

Our estimates suggest that cyclical asymmetry comes from the expenditure side of the budget, mostly reflecting the behavior 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.

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 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 cyclicity of fiscal policy based on real-time macroeconomic data usually do not find strong evidence of cyclical asymmetry (see, e.g., Golinelli and Momigliano, 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, Cangiano, and Kyobe, 2004).

Our results lend some support to the introduction of expenditure rules. Committing to a

predetermined rate of growth of expenditure can reduce the risk of procyclical spending in good times while leaving the automatic stabilizers on the revenue side free to operate.<sup>14</sup> 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.<sup>15</sup> It is important to ensure that the procyclical bias is not transferred to the revenue side of the budget 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 countries during 1999 to 2001). This suggests that expenditure ceilings cannot be set in isolation from provisions regarding the overall budget balance.<sup>16</sup>

## Notes

- <sup>1</sup> The output gap is the percentage difference between actual output and its trend (or potential) value.
- <sup>2</sup> The estimated sensitivity is 0.4 for negative output gaps and zero for positive ones.
- <sup>3</sup> Kumar and Ter-Minassian (2007) report regression results indicating an asymmetric reaction of the expenditure-to-GDP ratio to positive and negative output gaps.
- <sup>4</sup> These can be thought of as the result of the optimization of an objective function linking electoral support to macroeconomic variables, along the lines of the political business cycle literature. Alternatively,  $b^*$  and  $d^*$  may be seen as the government’s solution to the present value budget constraint. Finally, a debt stabilization motive has been adopted in empirical analyses of budgetary decisions by several authors defining 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).
- <sup>5</sup> 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 (e.g., Golinelli and Momigliano, 2008). Neither this specification nor the one in the main text have micro-foundations. Thus, when choosing between the two models one can only rely on how they fit the data and, on this basis, we retain (4) as our preferred specification (Balassone et al., 2008).
- <sup>6</sup> Otherwise we would be assuming perfect forecast on the part of the government.
- <sup>7</sup> To this end Galí and Perotti (2003) use a different approach. They include among regressors the deviation of the interest rate from a predetermined Taylor rule.
- <sup>8</sup> To avoid end-point bias, the HP filter is applied to GDP series longer than the regression sample (1960-2006 vs. 1970-2004). See Bouthevillain et al. (2001) for a discussion of the issues involved in the use of the HP filter.



- <sup>9</sup> We used different partitions of our data set to check that results do not depend on strong responses of a handful of countries. We also checked that results are not affected by the introduction of an election dummy.
- <sup>10</sup> In 1997 the Stability and Growth Pact (SGP) established a medium-term objective of a budgetary position “close to balance or in surplus.” We cannot test for a structural break related to the SGP due to the small number of observations after 1997.
- <sup>11</sup> 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 sensitivity to the output gap.
- <sup>12</sup> 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). See Balassone, Franco, and Zotteri (2006).
- <sup>13</sup> Estimates by international organizations of automatic budgetary elasticity to the cycle average about 0.5 for EU countries. See Bouthevillain et al. (2001).
- <sup>14</sup> A variety of issues arise in the implementation of expenditure rules (Kumar and Ter-Minassian, 2007).
- <sup>15</sup> Expenditure rules are used, among others, in Finland, the Netherlands, Sweden, Switzerland, the United Kingdom and the United States.
- <sup>16</sup> 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.

## References

- Balassone Fabrizio, and Maura Francese. Cyclical Asymmetry in Fiscal Policy, Debt Accumulation and the Treaty of Maastricht. Rome, Italy: Banca d'Italia, 2004. Working Paper 531.
- Balassone, Fabrizio, Maura Francese, and Stefania Zotteri. Cyclical Asymmetry in Fiscal Variables. Rome, Italy: Banca d'Italia, 2008. Working Paper 671.
- Balassone, Fabrizio, Daniele Franco, and Stefania Zotteri. EMU Fiscal Indicators: A Misleading Compass? *Empirica* 33 (2006): 63-87.
- Ballabriga, Fernando and Carlos Martinez-Mongay. Has EMU Shifted Policy? Brussels, Belgium: European Commission, 2002. Directorate General for Economic and Financial Affairs, Economic Paper 166.
- Bohn, Henning The Behavior of U.S. Public Debt and Deficits. *Quarterly Journal of Economics* 113 (August 1998): 949-963.
- Bouthevillain, Carine, Philippine Cour-Thimann, Gerrit Van den Dool, Pablo Hernandez de Cos, Gert Lange-nus, Matthias Mohr, Sandro Momigliano, and Mika Tujula Cyclically Adjusted Budget Balances: An Alternative Approach. Frankfurt, Germany: European Central Bank, 2001. ECB Working Paper 77.
- Buti, Marco, and André Sapir. *Economic Policy in EMU: A Study by the European Commission Services*. Oxford, United Kingdom: Clarendon Press; 1998.
- Buti, Marco, Daniele Franco, and Hedwig Ongena. Fiscal Discipline and Flexibility in EMU: The Implementation of the Stability and Growth Pact. *Oxford Review of Economic Policy* 14 (Autumn 1998): 81-97.
- Danninger, Stephan, Marco Cangiano, and Annette Kyobe. The Political Economy of Revenue-Forecasting Experience from Low Income Countries. Washington, D.C.: International Monetary Fund, 2004. IMF Working Paper 05/02.
- European Commission. Annual Macro-economic Database (AMECO). Brussels, Belgium: Directorate General for Economic and Financial Affairs, 2005.
- European Commission. Public Finance in EMU – 2006. Brussels, Belgium: European Commission. *European Economy* 3 (2006).
- Gali, Jordi and Roberto Perotti. Fiscal Policy and Monetary Integration in Europe. *Economic Policy* 37 (October 2003): 535-572.
- Gavin, Michael and Roberto Perotti. Fiscal Policy in Latin America. In Ben Bernanke and Julio Rotemberg, eds. *NBER Macroeconomics Annual*. MIT Press: Cambridge, MA: MIT Press, 1997, pp. 11-61.
- Golinelli, Roberto and Sandro Momigliano. Real-time Determinants of Fiscal Policies in the Euro Area. *Journal of Policy Modeling* 28 (December 2006): 943-964.
- Golinelli, Roberto and Sandro Momigliano. The Cyclical Response of Fiscal Policies in the Euro Area: Why Results of Empirical Research Differ so Strongly? Rome, Italy: Bank of Italy, 2008. Working Paper 654.
- Hercowitz, Zwi, and Michel Strawczynski. Cyclical Ratcheting in Government Spending: Evidence from the OECD. *Review of Economics and Statistics* 86 (February 2004): 353-361.
- Kaminsky, Graciela L., Carmen Reinhart, and Carlos Végh. When It Rains, It Pours: Procyclical Capital Flows and Macroeconomic Policies. Cambridge, MA: National Bureau of Economic Research, 2004. NBER Working Paper 10780.
- Kumar, Manmohan and Teresa Ter-Minassian, eds. *Promoting Fiscal Discipline*. Washington, D.C.: International Monetary Fund, 2007.
- Lane, Philippe and Aaron Tornell. The Voracity Effect. *American Economic Review* 89 (March 1999): 22-46.
- Talvi, Ernesto and Carlos Végh. Tax Base Variability and Procyclicality of Fiscal Policy. Cambridge, MA: National Bureau of Economic Research, 2000. NBER Working Paper 7499.