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Fiscal policy and the cycle in the Euro Area: The role of government revenue and expenditure

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Abstract

This paper analyses the cyclical behaviour of fiscal policy in euro-area countries over the 1980-2005 period, focusing on the distinct role of government revenue and expenditure. The estimation of separate fiscal policy reaction functions in good and bad times reveals that, controlling for other factors, the *average* stance of fiscal policy is expansionary when output is above potential, thus denoting a *pro-cyclical bias in good times*, while no strong evidence of a cyclical bias is found in bad times. The separate estimation of reaction functions for revenue and expenditure policy indicates that this pro-cyclical bias is an entirely expenditure-driven phenomenon. Probit regressions also reveal that the *risk of pro-cyclicality* in good times stems from expenditure behaviour, since expenditure-based budgetary adjustment is a highly significant determinant of the probability of pro-cyclical fiscal policy in good times. The separate estimation of fiscal reaction functions in EU countries with strong and weak expenditure rules provide some support to the view that expenditure rules can be helpful to curb the expansionary bias of expenditure policy in good times.

Keywords: Fiscal stabilisation, government revenue, government expenditure, fiscal rules.

JEL Classification: E62, E63, H50

1. Introduction

Whether the actual behaviour of fiscal authorities is consistent with cyclical stabilisation objectives has been subject to extensive analysis in the recent decades. The interest in such an issue is particularly high for euro-area countries, since in monetary unions fiscal policy is one of the few tools available for active macroeconomic stabilisation. Even once it is established that fiscal policy suffers from pro-cyclicality, explanations and remedies are often not obvious. Understanding the different cyclical behaviour of government revenue and expenditure helps to that purpose. The aim of this paper is to shed light in this direction.

Fiscal activism moved in and out of fashion over the past decades. After a broadly positive attitude by economists and policy-makers towards discretionary fiscal policy for stabilisation purposes in the '50s, '60s and early '70s, a more pessimistic view became common. This change in attitude was partly associated with the stricter constraints on the use of fiscal policy as a demand management tool ensuing from large and rising budgetary imbalances, and partly was the result of accumulated experience showing the practical limits and pitfalls of discretionary fiscal policy. In recent years, a more balanced consensus view is emerging.[1] There is increasing recognition that fiscal policy could be effective on output if appropriately designed and that it could be the only tool left to counter large and protracted demand shocks when monetary policy is constrained, notably as a result of exchange rate arrangements.[2]

A different issue is whether fiscal authorities in practice run fiscal policy in a counter-cyclical fashion. It has become customary to assess the behaviour of fiscal policy over the cycle by means of the estimation of so-called fiscal reaction functions where measures of the fiscal stance are regressed against a series of possible factors explaining the behaviour of fiscal authorities, notably the past level of the deficit and the debt and a measure of cyclical conditions (e.g., Bohn (1988), Gali and Perotti (2003)). In spite of the consensus that fiscal policy should be geared in such a way to counter cyclical fluctuations, evidence of pro-cyclical behaviour is quite common, especially in developing countries but also in developed countries.[3]

Results from existing work based on fiscal reaction functions aimed at explaining fiscal behaviour in the euro area differ to a certain degree depending on the sample considered, data source and vintage, and on the specification adopted (see Golinelli and Momigliano (2008) for a comparison of existing estimates). However, a series of common findings on the response of the fiscal stance to the cycle emerge. First, in most studies, the reaction of the cyclically-adjusted budget balance (CAPB) to the output gap appears to be weak, often not statistically significant (Ballabriga and Martinez-Mongay (2002), Gali and Perotti (2003),

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[1] See, e.g., Auerbach (2005). Blinder (2004).

[2] "Quasi-experimental" micro evidence reveals that even temporary changes in taxes or government transfers are not fully saved, thus providing indirect support to the view that agents are often credit-constrained and contradicting the main tenet of the so-called Ricardian equivalence (Shapiro and Slemrod (2003), Parker (1999)). SVAR based evidence reports in general short-run fiscal multipliers positive but smaller than one (e.g., Blanchard and Perotti (2002)). New-generation DSGE models incorporating "rule-of-thumb" credit-constrained consumers yield positive fiscal multipliers in the short-to-medium run (Gali, Lopez-Salido, and Valles (2007)). Recent versions of large-scale DSGE models used in most central banks and international organisations share these features (e.g., Botman et al. (2006), Ratto, Roeger and in't Veld (2006), Coenen, Mohr, and Strub (2008)).

[3] For evidence of pro-cyclical fiscal behaviour in developing countries see e.g., Gavin and Perotti (1997) and Alesina and Tabellini (2005). Talvi and Vegh (2005), Manasse (2006). Evidence on OECD countries is found for instance in Gali and Perotti (2003) and OECD (2003).

Forni and Momigliano (2004), European Commission (2006)). Second, it matters whether the measure of cyclical conditions is an ex-post or a real-time one. The stronger evidence of counter-cyclicality when real-time data are used signals that there could be a difference between fiscal authorities' intentions and results (Forni and Momigliano (2004), Cimadomo (2007), Golinelli and Momigliano (2008), Bernoth et al. (2008)). Third, most existing studies do not support the view that after the introduction of the EU fiscal framework (the signing of the Maastricht Treaty), fiscal policy became more pro-cyclical (Gali and Perotti (2003), European Commission (2004), Annett (2006), Von Hagen and Wyplosz (2008)).[4] However, a tendency for fiscal policies becoming less pro-cyclical at mid 1990s is observed also across a larger set of OECD countries. Moreover, fiscal policy in OECD countries over the same period appears more counter-cyclical compared with euro-area countries (Gali and Perotti (2003)). Results are less clear-cut instead for what concerning the issue whether the response of fiscal authorities to cyclical developments is symmetric over the cycle or different depending on whether good or bad times are prevailing (see surveys in European Commission (2006) and Golinelli and Momigliano (2006)).

Most of the available analyses on the cyclicality of fiscal policy focus on the reaction of the cyclically-adjusted primary balance (which captures the stance of fiscal policy) with respect to the output gap (which captures cyclical conditions). Much less work has focused on the separate behaviour of government revenue and expenditure policy over the cycle. Some work has analysed the cyclical reaction of government expenditure but from a different perspective compared with the usual approach followed in the estimation of fiscal reaction functions. Fatas and Mihov (2003) estimate the reaction of government spending growth to GDP growth controlling for the lagged growth in government spending separately for 91 developed and developing countries. The residuals from such regressions are interpreted as a measure of the degree of spending activism. Fatas and Mihov (2003) find a strong positive correlation between spending activism and output fluctuations, concluding that expenditure policy is more likely to be a source of shocks rather than a shock absorber. Lane (2003) estimates the reaction of the growth of different categories of government spending to GDP growth in OECD countries, finding that while the growth in government transfers reacts negatively to that of GDP, a positive correlation is found for government consumption, notably government wage consumption, and government investment. Gali and Perotti (2003) instead estimate fiscal reaction functions separately for government revenue and expenditure for euro area countries and find that, while government revenue is a-cyclical, the reaction of government expenditure to the output gap is significantly pro-cyclical in the period preceding the Maastricht Treaty. Moreover, the estimation of fiscal reaction functions for government investment as a separate budgetary item provides evidence of a significant and strong pro-cyclical response to the output gap (Hallerberg and Strauch (2001), Gali and Perotti (2003), Turrini (2004)).

The aim of this paper is to make a step forward in the analysis of the cyclical behaviour of government revenue and expenditure. To this end, I consider different ways to make operational the concept of pro-cyclical fiscal policy. First, I consider the reaction of the fiscal stance to the output gap (*pro cyclicality at the margin*). This is what is measured by the estimation of fiscal reaction functions. In this respect, there will be an attempt to assess whether the response of the fiscal stance is different at different stages of the cycle (i.e., for different levels of the output gap). Second, I analyse the average fiscal impulse during periods

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[4] A greater stabilisation role for fiscal policy at national level in monetary unions is one of the explanations put forward to explain a reduced rather increased pro-cyclicality after the introduction of the EU fiscal framework (Gali and Perotti (2003)).

of positive or negative output gaps (*pro-cyclicality on average*). Third, by estimating separately fiscal reaction functions in good and bad times (as measured by the sign of the output gap), I control for the factors that could affect pro-cyclicality on average, thus obtaining a measure of *pro-cyclical bias*. Finally, I try to shed some light on the *risk of pro-cyclicality* by running probit estimations aimed to analyse the determinants of the probability of fiscal policy being pro-cyclical.

Overall, the results indicate that pro-cyclicality in the euro area is mostly an expenditure-driven phenomenon. The estimation of fiscal reaction functions reveals that the response of the change in cyclically-adjusted primary balance (CAPB) to the output gap is not statistically significant, suggesting that the overall fiscal stance is a-cyclical at the margin. However, this result appears to be the outcome, on the one hand, of a significantly counter-cyclical response of cyclically-adjusted revenue and, on the other hand, a significantly pro-cyclical response of primary cyclically-adjusted expenditure. The estimation of separate fiscal reaction functions in good and bad times reveals that, controlling for other factors, the average stance of fiscal policy is expansionary when output is above potential, which suggests pro-cyclical bias in good times, while there is no evidence of cyclical bias in bad times. The separate estimation of fiscal reaction functions for revenue and expenditure reveals that this pro-cyclical bias is an entirely expenditure-driven phenomenon. Probit regressions also reveal that the risk of pro-cyclicality in good times is related to expenditure behaviour, since expenditure-based budgetary adjustment is a highly-significant determinant of the probability of pro-cyclical fiscal policy in good times.

The last part of the paper addresses possible causes and remedies for the observed pro-cyclicality of expenditure. The separate estimation of fiscal reaction functions in EU countries with strong and weak expenditure rules provide some support to the view that expenditure rules can be helpful to curb the expansionary bias of expenditure policy in good times.

The remainder of the paper is organised as follows. The next section describes the sample and give some definitions that will prove useful throughout the analysis. Section 3 provides prima-facie descriptive evidence on the link between budgetary aggregates and the cycle. In section 4, fiscal reaction functions are estimated separately for government revenue and expenditure. Section 5 presents the analysis of the determinants of the risk of fiscal policy being pro-cyclical using Probit regressions. Section 6 discusses causes and solutions for the observed pro-cyclical behaviour of expenditure.

2. Data and definitions

The analysis considers euro-area countries (except Luxemburg) over the 1980-2005 period. This set of countries will be referred to, interchangeably as EU-11 or euro area in the remainder of the analysis. This data set permits to observe relatively homogenous countries over a representative time period. The source of public finance and output gap data is the AMECO dataset of the European Commission DG ECFIN. Only public finance data complied according the ESA95 accounting standard are considered.[5] Since the focus of the analysis is on results rather than fiscal authorities' intentions, only ex-post output gap data, based on the European Commission production function methodology (see Denis, McMorrow, and Roeger (2002)) are analysed. The estimated fiscal reaction functions can therefore either be interpreted as a simple statistical relation between budget balances and ex-post measures of

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[5] This reduces to some extent the length of the time series for some countries (Greece, Spain, Ireland) for which data for the early 1980s are available only in ESA79 accounting standards.

the cycle, without a clear behavioural connotation, or, alternatively, as the outcome of fiscal authorities' reaction to information available in real-time but strongly linked to ex-post output gaps. In support to the latter interpretation, it should be noticed that while real-time and ex-post output gaps can differ quite substantially, there are other indicators of the cycle available in real time to fiscal authorities that appear to be closely correlated to ex-post output gap realisations.[6]

As customary, in the following analysis a tightening (loosening) of the overall fiscal stance corresponds to an increase (reduction) of the CAPB as a share of potential output. It is worthwhile to recall some limitations underlying of this approach.

▪ First, there is inevitable uncertainty surrounding the cycle. This implies an inherent difficulty in forecasting and tracking the cycle in real time. This has consequences both for a correct use of fiscal policy but also, to some extent, for the reliability of output gap series used for analytical purposes. Moreover, the uncertainty associated with the measurement of the cycle makes non-trivial the choice of an operational definition of "good and bad times", i.e., the time periods during which fiscal policy needs to be, respectively tightened or loosened to ensure a counter-cyclical impact.

▪ Second, there are well-known limitations concerning the use of the change in the CAPB as a measure of the impulse provided by discretionary fiscal policy, notably related to fluctuations in the elasticity of revenue with respect to output.[7] This caveat needs to be taken into account especially when evaluating the stance of government revenue policy: part of the change in the ratio of cyclically-adjusted government revenue on potential output would be related to actual discretionary measures, part would be the result of fluctuations in revenue elasticities.

▪ Third, there is no trivial measure for the stance of expenditure policy. A benchmark of neutral expenditure stance is needed. However, there is no obvious definition and several concepts of neutral expenditure stance have been adopted in existing studies.[8] The definition of neutral expenditure policy chosen in this paper requires that primary cyclically-adjusted expenditure stays constant as a ratio of potential output, a definition which is consistent with the methodology for adjusting government expenditure for the cycle adopted in EU budgetary surveillance (Girouard and André (2005)) and is in line

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[6] For instance, in the past decade, and across EU countries, ex-post output gaps computed with the European Commission methodology were much more closely correlated with capacity utilisation rates than with real-time output gaps (European Commission (2008)).

[7] Changes in revenue elasticities could take place for several reasons. First, a non-negligible share of temporary revenue fluctuations is related to property taxes likely to be affected by swings in real and financial asset prices which may not necessarily follow the same pattern as economic cycles (Jaeger and Schuknecht (2003) and Eschenbach and Schuknecht (2004)). Second, lags in the collection of revenue may uncouple the budget balances from current output. Third, the link between revenue and budget balances changes since the incomes of households and corporations move into higher tax brackets. Fourth, changing composition of output could lead to variations in revenue elasticities over time if the relative size of revenue-rich output components expand or contract considerably.

[8] Buti and Van den Noord (2003) adopt a definition of neutral expenditure policy according to which primary government expenditures grow in line with potential output plus expected inflation. Fatàs et al. (2003) and Hughes-Hallet et al. (2004) resort to three different definitions of 'neutral fiscal policy': government spending is held constant in volume terms; government expenditures grow in line with revenue; government expenditures grow in proportion with trend GDP.

with recent evidence analysing the long-term relation between government expenditure and potential output across EU countries.[9]

I will try to make a step forward by considering throughout the whole analysis that follows alternative and complementary operational definitions of fiscal policy pro-cyclicality (counter-cyclicality is defined in a symmetric fashion).

Definition 1: Fiscal policy pro-cyclicality at the margin. (i) Fiscal policy is pro-cyclical at the margin if the CAPB rises as a share of potential output when the output gap falls. (ii) Government revenue policy is pro-cyclical at the margin if government cyclically-adjusted revenue rises as a share of potential output when the output gap falls. (iii) Government expenditure policy is pro-cyclical at the margin if government primary cyclically-adjusted expenditure falls as a share of potential output when the output gap falls.

The concept of fiscal policy cyclicality at the margin captures the reaction of the fiscal stance to cyclical movements. This is what is captured, controlling for other explanatory factors, by the regression coefficient of the output gap in the estimation of fiscal reaction functions.[10] Note that the fact the fiscal policy is counter-cyclical at the margin does not imply necessarily that it contributes to reduce cyclical imbalances. It could be the case that, for instance, the output gap is largely negative but closing. A fiscal contraction in such a circumstance would be consistent with fiscal policy being counter-cyclical at the margin, even though possibly contributing to keep output below potential.

Definition 2: Fiscal policy pro-cyclicality on average. (i) Fiscal policy is pro-cyclical if the CAPB rises on average as a share of potential output when the output gap is negative. (ii) Government revenue policy is pro-cyclical if government cyclically-adjusted revenue rises on average as a share of potential output when the output gap is negative. (iii) Government expenditure policy is pro-cyclical if government primary cyclically-adjusted expenditure falls on average as a share of potential output when the output gap is negative.

This concept of fiscal policy cyclicality captures whether fiscal policy on average contributes to reduce or to expand and existing cyclical imbalance, irrespective of whether the output gap is large or small, closing or widening.

Definition 3: Pro-cyclical bias of fiscal policy. (i) There is a pro-cyclical bias in fiscal policy if the CAPB rises on average as a share of potential output when the output gap is negative and after controlling for other determinants of the fiscal stance. (ii) There is a pro-cyclical bias in government revenue policy if governmnent cyclically-adjusted revenue rises on average as a share of potential output when the output gap is negative and after controlling for other determinants of the revenue policy. (iii) There is a pro-cyclical bias in government expenditure policy if government primary cyclically-adjusted government expenditure falls on average as a share of potential output when the output gap is negative and after controlling for other determinants of the revenue policy.

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[9] It is also consistent with evidence that over the past decades government cyclically-adjusted primary expenditure was cointegrated with potential output across EU-15 countries and that the cointegrating relationship implies a ratio of government expenditures over potential output that stays broadly constant over time (Arpaia and Turrini, 2008).

[10] Whether the coefficient of the output gap in fiscal reaction functions closely captures the marginal fiscal policy stance in the sense given in proposition 1 depends on the specification of the fiscal reaction function itself and on the definition of the variable capturing the fiscal stance.

A measure for the cyclical bias of fiscal policy is provided by the constant term in fiscal reaction functions using the change in the CAPB as a dependent variable and estimated separately for positive and negative values of the output gap.

The definitions of fiscal policy cyclicality provided above, when adopted in performing mean comparisons or regression analysis, do not permit to distinguish whether an overall assessment of (say) fiscal policy pro-cyclicality is the outcome of few isolated episodes of large fiscal expansions or contractions or the consequence of a systematic use of fiscal policy in a pro-cyclical fashion. In order to capture this aspect, the analysis will also look into the frequency of pro and counter-cyclical episodes and their determinants.

Definition 4: Risk of pro-cyclicality. (i) The risk of pro-cyclical fiscal policy is the frequency of episodes where the CAPB rises when the output gap is negative or where the CABP falls when the output gap is positive. (ii) The risk of pro-cyclical revenue policy is the frequency of episodes where the cyclically-adjusted revenue rises when the output gap is negative or where revenue falls when the output gap is positive. (iii) The risk of pro-cyclical expenditure policy is the frequency of episodes where the CAPB rises when the output gap is negative or where the CABP falls when the output gap is positive.

Binary-independent-variable multivariate regression permits to analyse the determinants of the risk of pro-cylicality.

3. Prima-facie evidence

A first gauge on fiscal policy cyclicality is obtained from a scatterplot of the change in the CAPB over the output gap, as shown in Figure 1. Each point in Figure 1 represents the situation of a particular country in a particular year in the CAPB change/output gap space. The regression line fitting the cloud of points in Figure 1, does not exhibit a high fit. The linear coefficient linking the change in the CAPB with the output gap represents the response of the fiscal stance to the cyclical developments, i.e., is a measure of fiscal policy cyclicality at the margin without controlling for other factors that affect budget balances. The estimated response appears on average pro-cyclical but weakly so.

Figures 2 and 3 report, respectively, the link between cyclically-adjusted government revenue and primary cyclically-adjusted government expenditure and the output gap. [11] While the share of cyclically-adjusted revenue on potential output appears to be largely independent of the output gap, the link between government expenditure and potential output is upward-sloping. Hence, it appears that the prima-facie evidence of a weak fiscal policy pro-cyclicality at the margin is an expenditure-driven phenomenon.

[Figures 1-3]

The comparison between the average change in the CAPB across the sample when the output gap is negative and when it is positive provides information on fiscal policy cyclicality on average. Figure 4 displays separately the average change in the CAPB, in cyclically adjusted revenue and in primary cyclically-adjusted expenditure when output was alternatively positive or negative. The Figure shows that the change in the CAPB is on average positive during periods of output above potential and negative when economic activity was instead below

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[11] Although a higher number of observations are available for revenue than for CAPBs and expenditures (due to missing observations on interest expenditures), the following analysis keeps the same sample for the CAPB, government revenue, and government expenditure to improve comparability.

potential. Moreover, the change in the CAPB appears to be significantly lower in the latter case. Overall, there is an indication of fiscal policy pro-cyclicality on average. Such pro-cyclicality appears to be entirely associated with the behaviour of expenditure: while revenue appears to grow on average over the whole period of the analysis, expenditure is strongly raised in good times and slightly reduced in bad times

[Figures 4 and 5]

The analysis does not permit to distinguish whether the fact that fiscal policy was on average pro or counter-cyclical was due to isolated episodes of very big expansions or contractions or whether instead it was the result of recurrent but small changes in the fiscal stance. In order to disentangle these two aspects, Figure 5 reports evidence on the risk of pro-cyclical fiscal policy, i.e., on the frequency of cases of pro and counter-cyclical fiscal policy when output is above and below potential. It is shown that both in period of positive and negative output gaps there was a slight prevalence of pro-cyclical behaviour among euro-area countries. Moreover, the fraction of pro-cyclical episodes over the total was very similar in good and bad times, while Figure 4 shows that the pro-cyclical tightening in bad times was much more pronounced on average than the pro-cyclical easing in good times. It appears therefore that pro-cyclicality in bad times is characterised by equally frequent but more pronounced episodes compared with the case of good times.

Figure 5 also shows that revenue was slightly more often counter-cyclical in good times and pro-cyclical in bad times, a message which is fully consistent with Figure 4. Regarding expenditure policy, it appears that it was also pro-cyclical, but much more frequently in good times (more than 60% of the cases). Hence, prima-facie evidence suggests that average pro-cyclicality in good times was the result of government expenditure growing faster that potential GDP growth.

A different question is whether the behaviour of fiscal authorities in euro area countries was broadly the same over the years or whether there were evident changes. With a view to address this question and repeat the same type of analysis as in Figure 4 and 5 but distinguishing this time the euro area sample in different sub-periods. The sub-periods have been chosen in such a way to reflect the main developments in the EU fiscal framework. The first sub-period (1980-1991) includes the years preceding the Maastricht Treaty. The second sub-period (1992-1998) corresponds with the run-up to EMU. Finally, the third sub-period are the years following the introduction of the euro and the SGP (1999-2005).

[Figures 6 and 7]

Figure 6 reports the average change in the CAPB, adjusted revenue and primary cyclically-adjusted expenditure. The data reveal that over time there has been a substantial change in the stance taken by fiscal authorities. The 1980s were years in which most countries inverted the tendency for budget deficits to grow that started in the 1970s and where several countries undertook ambitious consolidation programmes to stabilise debt. This translated into a weakly pro-cyclical stance in good times and into a more clear case of pro-cyclical fiscal policy in bad times. The run-up to EMU coincided with a tight fiscal stance irrespective of the cyclical position, so that pro-cyclicality concerned mostly bad times. A different picture emerges after the introduction of the euro. These years are characterised by a generalised loosening of the

fiscal stance with the result that pro-cyclical behaviour seems to pertain mostly to good times, as evidenced in previous analyses.[12] The analysis of the frequency of pro and counter-cyclical episodes (Figure 7) confirm that pro-cyclicality was mostly in bad times before the completion of EMU and in good times after.

Finally, the question arises whether the fiscal stance is roughly uniform across output gap levels or rather very different depending on whether the output gap is close to zero or far away from it. Figure 8 reports the average change in the CAPB, adjusted revenue and primary cyclically-adjusted expenditure in correspondence of different value intervals for the output gap. It appears that, contrary to expectations, large pro-cyclical responses are typical of cases where the output gap is far away from zero. Indeed, budgets are strongly tightened when the output gap is below -2% of potential output, and when output gaps are above 2% the average fiscal stance is loosened substantially. It is also observed an asymmetric behaviour of revenue and expenditure. While revenue is on average raised for extreme value of the output gap, the behaviour of expenditure is always pro-cyclical: sizably reduced for large negative output gaps, sizably raised for large positive output gaps.

4. Evidence from the estimation of fiscal reaction functions.

A better understanding of the previous results requires controlling for the main factors that could have affected the fiscal stance. Without controlling for other factors, the change in the CAPB provides a description of the fiscal stance, but is not sufficient to infer conclusions on which reasons underlie the observed behaviour of fiscal policy. In such an attempt, the econometric estimation of fiscal reaction functions is helpful in isolating the impact of factors that have normally an influence on the stance of fiscal policy.

4.1. Baseline estimation

Table 1 presents the results from the fixed-effect panel estimation of fiscal reaction functions separately using the year-on-year change in the CAPB, adjusted revenue, and primary cyclically-adjusted expenditure as dependent variables.

The explanatory variables used in the basic specification are the lagged dependent variable in level, the lagged debt, the lagged output gap, and two dummy variables, taking value 1, respectively, after 1992 and after 1999. The dependent variable in level captures a convergence element in the fiscal variables. A negative coefficient would indeed indicate that these variables tend to grow faster the lower their starting value. The lagged debt level captures the fiscal stabilisation motive of fiscal authorities; the expected sign is positive for the CAPB and in government revenue, negative for expenditure. The output gap captures the output stabilisation motive. More precisely, it is a measure of fiscal policy cyclicality at the margin, controlling for other factors. The variable is lagged to address the well-known endogeneity issue of the output gap in the estimation of fiscal reaction functions.[13] Finally,

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[12] E.g., IMF (2004).

[13] To address the issue of the endogeneity of the output gap an alternative is to use an instrumental variable estimator (and to adopt generally the lagged output gap and measures of the international cycle as instruments). A different route is that of using GMM methods, like the Arellano-Bond or Blundell-Blond estimators. Results in Table 1 hold qualitative unchanged using instead instrumental variable estimates where the output gap variable is instrumented with its own lag and the lag of a measure of foreign output gap constructed, for each country, on the basis of export shares towards the biggest three export markets.

the two dummy variables are aimed at capturing possible behavioural changes occurred in correspondence with, respectively, the signing of the Maastricht Treaty (1992) and the completion of the EMU project (1999). The constant term captures the portion of the change in the dependent fiscal policy variables not explained by the chosen explanatory variables.[14]

The basic specification is augmented in the even columns of Table 1 to include variables that have proven highly significant in recent estimation of fiscal reaction functions for the EU and the euro area and that were generally ignored in early work. First, as shown in Golinelli and Momigliano (2008), there appears to be common time-varying factors that affect significantly the fiscal behaviour of all euro-area countries. These factors are captured by time dummies in Golinelli and Momigliano (2008). Adding time dummies to the basic specification in Table 1 yields an F test that rejects the null hypothesis that all time dummies are equal to zero for revenue and expenditure, while for the CAPB time dummies are jointly nil.[15] In light of this result, and in order to gain degrees of freedom in the estimation, rather than including time dummies I include the US output gap lagged one period as a variable that captures shocks common to all euro-area countries. Hence, in the extended specification, common factors are captured not only by the "institutional" 1992 and 1999 dummies but also by this proxy for common shocks. Second, the extended empirical model in Table 1 includes a variable taking value 1 in all years and countries in which legislative election take place. Recent work show that elections have a strong performance in explaining the fiscal stance in euro-area countries in the past decades (Golinelli and Momigliano (2008); Debrun et al. (2008)).

[Table 1]

Results show that, as usually found in similar analyses, the coefficients of the lagged dependent variable and debt levels have the expected sign and are significant in the equation for the CAPB. Distinguishing the analysis of the determinants of revenue and expenditure reveals that the reaction to the debt mostly concerns the budget as a whole, since revenue and expenditure separately react in the expected way but in a non-significant way. The constant term denotes an average deterioration in the CAPB over the period analysed, while both government revenue and expenditure have grown as a share of potential output. It also appears that, starting from the completion of EMU up to the end of the sample, the CAPB has worsened on average, controlling for other factors, due to a reduction in cyclically-adjusted government revenue, as revealed by the coefficient of the "1999 dummy".

The election variable has the expected negative sign on the CAPB in line with the existence of an electoral budget cycle. The negative impact on budgets is significant and elections appear to be associated both with significantly larger reduction in government revenue and with expenditure increases. The US output gap appears to be significantly associated with a looser fiscal stance, again related to the behaviour of both government revenue and expenditure. It has been shown that global shocks to economic activity propagate first in the US and subsequently in the euro-area cycle (Giannone and Reichlin (2006)). To the extent that such global shocks are offset by the behaviour of monetary policy, the result can be interpreted as pointing to a substitution relationship between fiscal and monetary policy. This finding is

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[14] Note that, since fixed effects are normalised in such a way to have zero average, there is a simple interpretation of the constant term.

[15] The value of the F test is 1.34, 2.00, and 1.57, respectively for the CAPB, government revenue, and government expenditures.

common to previous work where estimated fiscal reaction functions include a variable capturing the monetary policy stance measured as the difference between actual policy rates and those predicted by an estimated Taylor rule (e.g., Gali and Perotti (2003), IMF (2004)).

In analogy with most existing analyses and the prima-facie evidence presented in the previous section, the coefficient for the output gap is non-significant for the equation of the CAPB. This confirms that, taking into other explanatory factors, fiscal policy appears broadly a-cyclical at the margin across euro-area countries since the early 1980s. However, disentangling the behaviour of revenue and expenditure reveals that the counterpart of the substantial a-cyclicity of the CAPB was not an analogous lack of responsiveness of the revenue and expenditure sides of the budget, but rather a significant counter-cyclical response of revenue compensated by a pro-cyclical response of expenditure.

4.2. The response of the fiscal stance in good and bad times

In order to check whether the reaction of the fiscal stance to the cycle contributes to reduce the difference between actual and potential output, the same equations as those presented in Table 1 are repeated allowing for a different coefficient for the output gap variable for different intervals of the output gap level. A first breakdown distinguishes, as customary, between positive and negative output gaps. A second breakdown allows for a finer decomposition, in line with the intervals considered in Figure 8 (output gap higher than 2 per cent of potential output, less than -2 per cent, and within brackets of 1 percentage point between 2 and -2 per cent).

It appears that there is no significant difference between the response of the overall fiscal stance in good and bad times as defined by the sign of the output gap. In all cases, there is evidence of a-cyclical behaviour at the margin. Referring to the basic specification, expenditure appears instead to be significantly pro-cyclical when the output gap is positive and a-cyclical when the output gap is negative. Such different behaviour in good and bad times however, seems to be absent when extending the model in such a way to include the effect of common shocks (as captured by the US lagged output gap) and elections. As will be clear in the next section, the impact of common shocks on the fiscal stance is quite different in good and bad times, which could explain the result.

Interestingly, the breakdown of the output gap in finer intervals reveals that expenditure is significantly pro-cyclical exactly for those levels of the output gap that are positive and of a big size. Hence, also controlling for other factors it is confirmed the result in Figure 8 that expenditure is loosened in a pro-cyclical fashion when output is already largely above potential and growing above trend.

[Table 2]

4.3. Estimating fiscal reaction functions in good and bad times

Estimating fiscal reaction functions separately in good and bad times permits to assess fiscal policy cyclicality on average controlling for other factors that affect the fiscal stance, i.e., whether fiscal policy is characterised by a cyclical bias. Looking at the constant term in the basic regression for the CAPB (column (1) and (2) in Table 3), there is evidence of a pro-

cyclical bias in good times.[16] The estimated constant term indicates, ceteris paribus, a looser fiscal stance when output is above potential. The fiscal stance appears more expansionary in good times than in bad times, significantly so without the inclusion of the common shocks and the elections variables among the regressors. The result could e related to the fact that the common shocks variable is significant only in bad times.[17]

Note also the negative and significant value for the coefficient of the 1999 dummy in case of bad times: the fiscal stance in periods with output below potential becomes less tight compared with previous periods.[18] This results suggests that the completion of the EMU project could have corresponded with weakened incentives to comply with the EU fiscal framework (due to the vanishing "carrot" associated with qualifying for EMU) or to a "consolidation fatigue".

Table 4 repeats the same exercise for government revenue. It appears that revenue stance is not significantly different in good and bad times. Controlling for other explanatory factors it appears that revenue has grown on average as share of potential output, which denote a pro-cyclical bias in bad times.

A different message emerges from Tale 5, that presents results for government expenditure. Expenditure behaviour appears to characterised by a pro-cyclical bias in good times. The behaviour of expenditure therefore is at the roots of the pro-cyclical bias in good times observed for the overall fiscal policy. The stance of expenditure policy appears to differ in good and bad times. On the one hand, in good times there is a stronger response of expenditure policy to past expenditure levels. In this respect, expenditure cuts motivated by the need to slim down government size appear as mostly a "good time phenomenon". On the other hand, controlling for other factors, expenditure as a share of potential output appears to grow faster in good times. This pattern appears to be broadly confirmed also taking into account elections and common shocks.[19]

[Tables 3-5]

5. Explaining the risk of pro-cyclical fiscal policy. Evidence from Probit regressions

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[16] Golinelli and Momigliano (2008), estimate separately fiscal reaction functions in good and bad times using data from the AMECO database for the same countries but running from 1988 to 2006 and a slightly different specification including time dummies. They do not find evidence of pro-cyclical bias in good times. Repeating the regressions in Table 3, columns (1) and (2), with a sample starting from 1988 the result of pro-cyclical bias is maintained. Repeating the regressions with time dummies the result of pro-cyclical bias is maintained and time dummies are rejected in good times (F test=0.81, P value=0.68) and borderline in bad times (F test=1.43, P value=1.01). The result of pro-cyclical bias in good times disappears when excluding the 1992 and 1999 dummies while including a full set of time dummies. The hypothesis that all time dummies are jointly zero is however accepted also in that case (F test=0.97, P value=0.49).

[17] A possible interpretation is that in bad times there is either a stronger reaction of monetary policy to global shocks or a stronger substitutions relation between fiscal and monetary policy or both.

[18]The comparison with periods before the run-up to EMU is obtained by summing the coefficient of the 1999 and the 1992 dummies.

[19] Running a fixed effect OLS regression under the constrained that all fixed effect sum to zero and interacting all explanatory variables for a dummy taking value 1 for positive output gaps reveals that the constant term is statistically significantly different in good and bad times at the 12 per cent level.

The analysis so far has focused as customary, on the year on year change in budgetary variables to measure the cyclical behaviour of fiscal policy. This approach does not allow to distinguish whether (say) pro-cyclical behaviour is associated to a small number of large episodes of fiscal loosening or tightening or whether instead it is the result of very frequent episodes of pro-cyclical fiscal policy in which, however, fiscal variables may undergo rather limited fluctuations.

In order to allow such a distinction, a new approach for the analysis of the determinants of fiscal policy is taken in the subsequent analysis. The approach consists of analysing which factors explain the probability of fiscal policy being pro-cyclical, irrespective of whether the variation in the CAPB is large or small. An episode is classified to be pro (counter) cyclical the CAPB rises as a share of potential output when the output gap is negative (positive). Fixed effect probit regressions are run using a binary dummy taking value 1 when fiscal policy is pro-cyclical as the dependent variable. Explanatory variables are the lagged CAPB, debt, and output gap, a variable capturing the composition of the budgetary adjustment (i.e., the share of expenditure adjustment over the sum of revenue and expenditure adjustment), and dummy variables capturing the run up to EMU and the introduction of the SGP.

Results are reported in Table 5. For the whole sample, no explanatory variable appears to have a statistically significant effect. However, the separate estimation of the probit model for periods of good and bad times reveals that the determinants of the probability of pro-cyclical episodes are radically different depending on whether output is above or below potential, and permits to identify a series of significant variables. In bad times, the size of the budget balance has a negative impact on pro-cyclicality, while debt has a positive effect. It emerges moreover that the probability of pro-cyclical fiscal tightening in bad times has significantly dropped after the introduction of the SGP. In good times instead both the lagged CAPB and expenditure-based adjustment appear to have a positive impact on pro-cyclicality, while debt has a negative impact. The most pertinent interpretation of the evidence is as follows. Budgets are more likely to be tightened the worse are initial budgetary positions and the higher are debt levels. Hence, in bad times, we expect pro-cyclical tightening more likely when the lagged CAPB is low and the lagged debt is high, consistently with the findings in column (2) of Table 5. At the opposite, in good times we expect that large deficits and debt reduce the likelihood of pro-cyclicality, since tightening in this case would act counter-cyclically. Moreover, pro-cyclicality would be more likely the more expenditure-based in budgetary adjustment. This result is in line with the evidence presented above indicating that in good times expenditure policy is on average more expansionary. Extending the model in such a way to include elections and common shocks preserves results. It is worth noting the positive and significant impact of elections on the risk of pro-cyclicality which holds only in good times (column (6) of Table 5).

6. The recurrence of pro-cyclical fiscal policy in the euro area: in search of explanations and solutions

In the following, the main reasons underlying the possible pro-cyclical behaviour of fiscal authorities are first discussed light of the results of the previous analysis. A discussion of possible reforms in fiscal governance that can help to contain the issue of pro-cyclicality follows.

6.1. What could explain pro-cyclicality in the euro area?

6.1.2. Rules-based frameworks for fiscal discipline

Explanations for pro-cyclicality in bad times are not hard to find, in light of the well-known trade-off faced by fiscal authorities between exerting an impulse on aggregated demand consistent with cyclical conditions and keeping deficits and debt under control. The findings presented in the previous section of the paper confirms this point. The fact fiscal policy is on average pro-cyclical in bad times is fully explained by the standard explanatory variables used in the estimation of fiscal reaction functions, notably the lagged CAPB and debt.

The trade-off between fiscal discipline and stabilisation is somehow solved ex-ante when numerical rules are present. In this case, the discretion of fiscal authorities to use of fiscal policy with stabilising purposes is constrained when deficits are high. While the argument that numerical rules could lead to pro-cylicality is quite straightforward, the available evidence is not clear cut. Gali and Perotti (2003) show that the response of the fiscal stance to the output gap (i,e, fiscal policy cyclicality at the margin) turned from slightly pro-cyclical to broadly a-cyclical after the EU fiscal framework.[20]

The evidence presented in this paper does not seem to suggest that the introduction of the EU fiscal framework was associated with a more pro-cyclical response of fiscal policy to cyclical conditions. Before the run-up to EMU the fiscal stance was on average weakly pro-cyclical in good times and more clearly pro-cyclical in bad times. The separate estimation of fiscal reaction functions in good and bad times suggests that, controlling for other factors, the completion of EMU and the introduction of the SGP was associated on average with a less pro-cyclical stance in bad times, while no significant impact of the EU fiscal framework is found on the average fiscal stance in good times.

6.1.3. Real-time measurement of the cycle

A further explanation for the observed pro-cyclicality is that governments may be genuinely willing to engage into counter-cyclical fiscal policies, but they only have a highly imperfect reading of the current cyclical conditions. The estimation of output gaps in real time is subject to substantial uncertainty, mainly related to revisions in the estimates of potential output. In case of a mistaken reading of the cycle, pro-cyclical policies may result ex-post while ex-ante the intention was to keep a counter-cyclical stance.

Recent evidence suggests that "genuine uncertainty" on real-time output gap figures can explain to a certain extent why fiscal policy is generally not counter-cyclical at the margin. Golinelli and Momigliano (2006, 2008) show that when real-time estimates of the output gap are used in the estimation of fiscal reaction functions fiscal policy at the margin appears to be counter-cyclical, as revealed by a negative and significant coefficient for the output gap variable.

Although problems with measuring the cycle in real time could explain a good deal of the pro-cyclicality observed ex-post, the present analysis reveals that there are episodes of pro-cyclical behaviour that hardly square with an interpretation fully based on "bad measurement but good intentions". The descriptive analysis in Figure 8 shows that the episodes where the fiscal stance was most evidently behaving pro-cyclically where those characterised by (ex-post) output gaps largely different from zero. But these are exactly the cases in which a wrong assessment of the cyclical position of the economy due to real-time errors is less likely.

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[20] Evidence over a large sample of EU and non EU countries go in the same direction. Manasse (2006) finds that countries where fiscal rules were in force exhibit on average a less pro-cyclical behaviour of fiscal policy at the margin.

Additionally, even after controlling for other factors, it appears that expenditure policy was clearly more pro-cyclical at the margin in periods with positive and large output gaps.

6.1.4. Inside lags

The presence of long "inside" lags with the use of fiscal policy as a stabilisation tool is a most often quoted source of observed pro-cyclical behaviour. The evidence presented above reveals an overall pro-cyclical bias in good times and suggests that expenditure rather than revenue is the budgetary item that exhibit pro-cyclical behaviour.

Identification and implementation lags could well explain excessive growth of expenditure in good times. Expenditure at time t is the outcome of budgetary decisions taken in previous periods, on the basis of growth forecasts made at time t-1 or earlier periods. Growth forecasts are generally influenced by current or recent growth developments. It follows that it is when output gap is positive, i.e., after protracted periods of growth above trend, that growth projections are more optimistic.[21] But this also means that, if more expenditure is planned the more optimistic the growth forecast, expenditure is likely to grow faster exactly in periods of positive output gap, thus resulting ex-post pro-cyclical.

6.1.5 Incentives

A different set of reasons for the observed pro-cyclical behaviour of fiscal policy is often referred to as "political economy" explanations. Short-sighted governments may underestimate the longer term negative consequences of deficits; pressure groups, when competing for government resources neglect the repercussions of their decisions on overall public finances (common pool problem). The result is a tendency for deficits to build up. As long as a deficit bias is present irrespective of cyclical conditions, pro-cyclical policies could emerge.

More interestingly, recent theoretical work has shown that the deficit bias associated with the common pool problem can get worse during good times, thus leading to a growth of deficits above normal. A reason could be the so-called "voracity effect": since competing pressure groups will devote a greater effort to obtain a share of government expenditure the higher is the total amount of resources available, spending is likely to grow more than proportionally with the increase in revenue.[22] Alternative arguments refer to the revenue side rather than the expenditure side of the budget. In order to curb pressures to increase spending in good times, forward-looking governments may decide not to allow the accumulation of any budgetary surpluses in the first place, preferring to cut taxes instead.[23] Analogously, governments may cut taxes in good times as a consequence of the pressures by the electorate to benefit from budgetary windfalls.[24]

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[21] The evidence reported in Strauch, Hallerberg, and Von Hagen (2004) on the recent EU experience seems consistent with this presumption. GDP forecasts reported in stability and convergence programmes tended to be more optimistic the higher the output gap at the time of forecast.

[22] This argument is formalised in Tornell and Lane (1999).

[23] Argument provided in Talvi and Vegh (2000).

[24] An argument along this lines is developed theoretically in Alesina and Tabellini (2005).

Finally, electorally-motivated governments may have a tendency to inflate the growth projections underlying their budgetary programmes, in such a way to justify fast expenditure growth.[25] If the cost of an upward bias in growth projection is lower the stronger the recent growth record, distorted incentives may add to the explanation for why growth forecasts are higher in good times and provide this way a rationale for the tendency of expenditure to behave pro-cyclically in good times.

Some pieces of evidence reported in this paper, in particular, the result that expenditure is more pronouncedly expanded when the output gap is positive and large, appear to be consistent with the view that, underlying pro-cyclical behaviour, there could be a role of incentives not fully in line with fiscal stabilisation objectives.

6.2 Pro-cyclical bias in expenditure policy in good times: implications for fiscal governance

The above evidence on possible explanations for pro-cyclical fiscal policies sheds light on possible reforms in fiscal governance that may help to contain the observed pro-cyclical bias in good times. These solutions mainly consist of improved institutional settings underpinning national fiscal policy-making. They include expenditure rules with an appropriate design, independent agencies in charge of forecasting and budgetary analysis, procedures for the approval of the budget designed in such a way to limit the influence of pressure groups on budgetary outcomes, rainy-day funds and revenue rules that define ex-ante the use of the extra revenue accruing to the government during good times.

6.2.1. Budgetary processes

It has been shown in theory that the common pool phenomenon could worsen in good times, thus providing a rationale for a pro-cyclical bias fiscal policy in good times (Tornell and Lane (1999)). Lane (2003) find support to this hypothesis showing that, in a cross-section of OECD countries, the extent of pro-cyclicality of government expenditure increases with an index of dispersion of political power.

From this perspective, any reform in fiscal governance aimed at limiting the extent of the common pool could contribute to contain the pro-cyclical bias. Hallerberg and von Hagen (1999) identify two broad approaches through which the budgetary process can be "centralised" in such a way to contain the common pool problem. In the "delegation" approach, this is achieved by delegating an explicit disciplining role to the finance ministry or to the prime minister. In the "contract" approach, arrangements and procedures ensure an ex-ante agreement (the contract) among spending ministries and other spending authorities (e.g., local authorities) on the size of the budget and the borrowing requirement.

6.2.2 Numerical fiscal rules

The impact of fiscal rules on cyclicality depends upon whether the rules apply to deficits or debt or rather to one side only of the budget (expenditure or revenue) and on the specific design of the rule. Moreover, the contemporaneous presence of several types of rules requires

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[25] An optimistic bias in the growth forecast of some some EU countries over the past decade is reported for instance in Strauch, Hallerberg and Von Hagen (2004), Larch and Salto (2005), Moulin and Wierts (2006), Jonung and Larch (2006).

an assessment of the impact that the whole system of fiscal rules has on the cyclical behaviour of fiscal policy. European Commission (2006) analyses the replies to questionnaires submitted to fiscal experts in the Quality of Public Finances Working Group of the Economic Policy Committee of the EU ECOFIN Council and find that the rules that are generally perceived as possibly pro-cyclical are budget balance and especially debt rules, while expenditure and revenue rules are in most cases not perceived as such. Debrun et al. (2008) build an index measuring to what extent the whole system of fiscal rules is "cycle-friendly" and find some evidence that EU countries with more cycle-friendly systems of national-level fiscal rules exhibited a less pro-cyclical fiscal policy at the margin.

Expenditure rules, while compatible with the working of automatic stabilisers in bad times, may indeed be effective in curbing the growth of expenditure in good times, thus possibly reducing the observed pro-cyclical bias of expenditure when output is above potential. In spite of wide agreement that expenditure rules could be helpful in containing the pro-cyclical bias of fiscal policy (e.g., Daban et al. (2003), Brunila (2002), European Commission (2003, 2005)), econometric analysis on their effectiveness to that purpose is relatively scarce. Wierts (2008) analyse EU countries and find that expenditure rules help to reduce the extent to which revenue windfalls translate into an upward revision in expenditure plans. Debrun et al. (2008) find that cycle-friendliness indexes of fiscal rules are more effective in explaining the actual cyclical stance of fiscal policy when constructed giving high weight on expenditure rules.

In the following, additional analysis is carried out with a view to assess the impact of expenditure rules on the extent of pro-cyclical bias of expenditure policy in good times. Figure 9 reports the frequency of pro and counter-cyclical expenditure episodes in EU countries with "strong" and "weak" expenditure rules.[26] "Strong and weak-rule countries" are defined as countries with the average overall expenditure rule index, respectively, below or above the median.[27] The figure shows that countries with strong expenditure rules were less likely to run pro-cyclical expenditure policies. In line with expectations, the difference is considerable especially in good times: countries with strong rules are considerably less prone to raise expenditure when output is above potential. Since, as shows previously, the ratio of primary cyclically-adjusted expenditure on GDP tends to raise especially in periods of positive output gap due to the fact that expenditure is planned on the basis of growth expectations, largely determined by current and recent growth developments. Expenditure frameworks putting a limit on the yearly growth expenditure is likely to be effective especially when expenditure grows faster, namely, when the output gap is positive.

In order to control for the main factors affecting the expenditure stance, I estimated fiscal reaction functions separately in good and bad times and distinguishing this time also between countries with strong and weak rules. The results in Table ?? shows that the behaviour of

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[26] The sample used in the analyses covers all the countries for which information on fiscal rules were obtained from the questionnaires submitted to Member States within the framework of the Quality of Public Finances Working Group attached to the Economic Policy Committee. These countries are all EU countries with the exception of Greece, Cyprus and Malta. The period considered is 1990-2005. The period chosen reflects the time frame considered in the questionnaire on fiscal rules, which includes all rules into force starting from 1990. The sample includes episodes of very large and rarely observed changes in budgetary data, observed mostly in New Member States. In order to avoid results being driven by these "outliers", the sample was trimmed in such a way to exclude the observations exhibiting changes in the CAPB and in the primary cyclically-adjusted expenditure outside the 2.5 per cent and the 97.5 per cent percentiles of the overall distribution.

[27] See European Commission (2006) for the definition and construction of the expenditure rule index used in the analysis.

expenditure in bad times was not significantly different for countries with weak and strong expenditure rules. As far as good times are concerned, some differences stand out instead. First, the analysis suggests that countries with stronger expenditure rules were less driven to cut expenditure by debt considerations in good times: the coefficient of the lagged debt/GDP ratio is not significantly different from zero, while that of weak-rule-countries is significantly negative, indicating that an increase in debt is associated with a reduction in the expenditure/GDP ratio. The regression results also show that, controlling for other factors, the growth of the primary cyclically-adjusted expenditure/GDP ratio, as captured by the constant term in the regression, was less pronounced in countries with strong expenditure rules. This result confirms the expectation that the presence of expenditure rules could contribute to curb the pro-cyclical bias of expenditure in good times.

It should be stressed that the effectiveness of expenditure rules in reducing the risk of pro-cyclicality depends on their specific design. A number of elements need to be considered in this respect.

- First, how expenditure ceilings are defined. Ceilings define as maximum expenditure ratios on GDP may be less effective than ceilings defined in terms of maximum expenditure growth rates. In the former case, during good times expenditure could grow in nominal terms without violating the ceiling, while this eventuality is less likely in the latter case. As for the choice of nominal or real growth rates, counter-cyclical stabilisation is enhanced when it is nominal growth to be capped. In such a case indeed, if periods of GDP growth above potential are characterised by demand-pull inflation, expenditure adjustment in good times is stronger.

- Second, which expenditure aggregate should be subject to ceilings. Obviously, expenditure ceilings have a higher chance of affecting the overall fiscal stance the broader is the expenditure aggregate subject to the ceiling. However, the exclusion of some categories could be advisable. Interest expenditure, being outside the direct control of fiscal authorities is one of such categories. The exclusion of cyclical components like unemployment subsidies permits the expenditure ceiling to be compatible with the full operation of automatic stabilisers. Conversely the definition of separate ceilings for particular type of expenditures characterised by a growing trend and that are hardly compressible downward in the short term (age-related expenditures in particular) could be advisable to avoid that expenditure rules translate into excessive compression of other expenditure categories.

- Third, a medium term orientation of the expenditure rules is likely to increase the correction of the pro-cyclical bias. Expenditure caps need to be determined and implemented over the medium-term to avoid a systematic revision of the ceilings which follow ongoing cyclical developments. However, it needs to be recalled once more that realistic macroeconomic assumptions underlying expenditure ceilings are key for the effectiveness of such instruments.

Concerning *revenue rules*, those that can be most helpful to contain the risk of pro-cyclical behaviour are those defining the use of windfall revenue ensuing from better than expected cyclical conditions or from "elasticity surprises" related for instance to asset price cycles or tax-rich growth. This rules are potentially effective in dealing with the issue of pro-cyclicality of expenditure policy in good times. Rules of this type address in the most direct way the issue to which fiscal authorities are faced when better than expected budgetary outcomes materialise. Pressures to increase expenditure become strong once there is awareness of unexpected extra-budgetary room. Defining ex-ante which share of the windfall revenue will be saved could be an effective commitment device for fiscal authorities and could re-address

the bias for fiscal policy to become pro-cyclical in good times. It is relevant to highlight that the concept of good times that makes operational this type of rules only partly overlaps with that defined in terms of the prevailing cyclical conditions. The realisation of windfall revenue is normally related with strong cyclical conditions but does not need always to be so, given that elasticity surprises may have a considerable quantitative impact without being strictly related to GDP fluctuations.

Related to revenue arrangements to deal with windfall gains, there is the setting up of so-called *rainy-day funds*. The basic idea is that the accumulation of resources in a fund during good times permits to draw resources during bad times without the need to run into pro-cyclical budgetary adjustment. Since in the EU, budget balances are complied in accrual terms, the effectiveness of rainy-day funds is limited: the accumulation and decumulation of resources in the fund are recorded as financial operations and do not affect the size of budget balances. However, rainy day funds could have a function of a commitment device for fiscal authorities to permit that when better than expected budgetary outcomes materialise a fraction of these resources is saved rather than spent (Franco et al. (2007)).

6.2.3. Independent budgetary institutions

An alternative avenue to address the pro-cyclical bias of fiscal policy consists of the establishment of institutions independent of the government with a role in fiscal policy-making (often dubbed "Fiscal councils"). In recent years, a certain number of proposals have been put forward by the academia advocating the creation of "independent fiscal authorities" to address the deficit bias and the pro-cyclical bias in fiscal policy making. These independent authorities would be delegated some tasks of fiscal policy making, with a view to define and monitor budgetary targets not biased by the "common pool problem" and the short-sightedness that often characterise political bodies (e.g., Wyplosz (2005)). Additionally, independent fiscal authorities are likely to be less prone to a time-inconsistency issue stemming from the difficulties that governments may have in keeping their commitments. Even in case numerical rules are in place, if enforcement is not strong enough governments may have an incentive to violate rules-based commitments ex-post if the political gain of doing so is high enough, while such an incentive will not be there for non- political bodies. These arguments apply also to numerical rules to address the pro-cyclical bias, like the definition of ex-ante arrangements on the use of windfall revenue or the establishment of rainy-day funds.[28] Although the establishment of independent authorities to whom delegate fiscal policy is vividly debated, such proposals for the time being have no real-world counterpart.

A different type of independent national institutions with a potential role in fiscal policy making are fiscal councils with the function of supplying analytical inputs to fiscal policy making, but may also have a role in providing normative indications and expressing a voice in the fiscal policy debate. Those councils that provide technical inputs generally prepare macroeconomic forecasts to be used in budgetary planning or that provide a counter-check to the official forecasts used by the government. A further relevant analytical task performed in relation with fiscal policy making is the assessment of the budgetary impact of policy measures.

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[28] The establishment of independent fiscal authorities with a specific mandate for fiscal stabilisation has been advocated, inter-alia, by Eichengreen et al. (1999) for the US and and Calmfors (2003) for the EU.

The role of this type of councils in preventing a pro-cyclical bias of fiscal policy in good times in only indirect, but potentially relevant for a number of reasons. First, independent high-quality macroeconomic forecast could help to address the pro-cyclicality of expenditure related with identification and implementation lags. As stressed previously, the issue of pro-cyclicality in good times is strongly related with the behaviour of expenditure. Disposing of high-quality and realistic growth forecast would contribute to limit expenditure growth in periods of positive output gap, where growth forecast run the highest risk of being excessively affected by recent periods of growth above trend.[29] Second, independent forecasts would increase the effectiveness of expenditure rules. Multi-year expenditure frameworks putting a cap on the growth of government outlays are among the instruments that most directly deal with the issue of excessive expenditure growth in good times. However, as already pointed out, the effectiveness of such arrangements crucially depends on the quality of the surrounding macroeconomic forecast. Related to that, a high-quality assessment of the budgetary impact of policies can contribute to address a possible optimistic bias in expenditure planning. Finally, independent fiscal councils may feed the internal debate on how to improve the existing arrangements to prevent the pro-cyclical bias and may increase awareness among the policy community, academia, and the public opinion on existing problems with the design or the implementation of fiscal rules currently in place (e.g., the use of revenue rules of rainy-day funds).

7. Concluding remarks

This paper has presented a systematic analysis of the cyclical pattern of fiscal policy in the euro-area, focusing on the different behaviour of government revenue and expenditure

Overall, the analysis uncovers a series of findings that can be summarised as follows.

- Fiscal policy at the margin appears to be a-cyclical. The change in the CAPB is not affected is a significant way by variations in the output gap. The results holds after controlling for a series of other explanatory factors that affect the fiscal stance via the estimation of fiscal reaction functions. This is a finding which is common to previous analogous research. In spite of a substantial a-cyclicality at the margin of the CAPB, the response of the revenue stance to the cycle is quite opposite to that of the expenditure stance: while the former is counter-cyclical, the latter is pro-cyclical. This result is also broadly in line with existing evidence (Gali and Perotti (2003)). Additionally, expenditure policy is more pro-cyclical at the margin the larger the output gap.

- There is evidence that fiscal policy is on average pro-cyclical in good times. Without any control, the CAPB on average falls in periods with output above potential and rises when output is below potential, denoting pro-cyclicality in both cases. When controls are introduced via the estimation of fiscal reaction functions, there is evidence of a pro-cyclical bias in good times (as captured by the constant term in the regression of the change in the CAPB), while no bias is found in bad times. Expenditure policy appears at the source of this pro-cyclical bias.

- There is no evidence that the introduction of SGP resulted into a more pro-cyclical response of fiscal policy to cyclical conditions. The separate estimation of fiscal reaction functions in good and bad times suggests that, controlling for other factors, the completion of EMU and the introduction of the SGP was associated on average with a less pro-

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[29] Jonung and Larch (2006) provide evidence that the establishment of independent fiscal authorities can contribute to contain the risk of overly optimistic growth forecast to justify high expenditure growth.

cyclical stance in bad times, while no significant impact of the EU fiscal framework is found on the average fiscal stance in good times.

- Different factors explain the risk of running pro-cyclical policies in good and bad times. While in good times deficits ad debt reduce the likelyhood of pro-cyclical behaviour, the opposite holds in bad times. In good times, the fact that the budgetary adjustment in largely expenditure-based significantly increases the probability of pro-cyclical outcomes.

In a nutshell, the behaviour of expenditure in good times seems to be the key driver for pro-cyclical outcomes in the euro area. This evidence runs counter to the often-claimed risk of pro-cyclical fiscal policy patterns in bad times associated with the SGP. Fiscal stabilisation in the euro area rather appears to fail when the objective should be that of cooling-down phases of overheating. Regarding the possible explanations underlying the observed pro-cyclical behaviour of expenditure policy, real-time errors in the estimation of the cycle, inside lags with the implementation of expenditure policy coupled with inertia in expenditure plans, over-optimistic growth projections, and inconsistent incentives are the most likely candidates.

Progress in terms of national-level fiscal governance could be helpful in containing the risk and extent of pro-cyclical expenditure policies in good times. This paper presents evidence indicating that properly designed fiscal rules could help containing the pro-cyclical bias of expenditure policy in good times.

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Figure 1. Fiscal stance and cyclical conditions. A basic scatterplot for CABPs (EU11, 1980-2005)
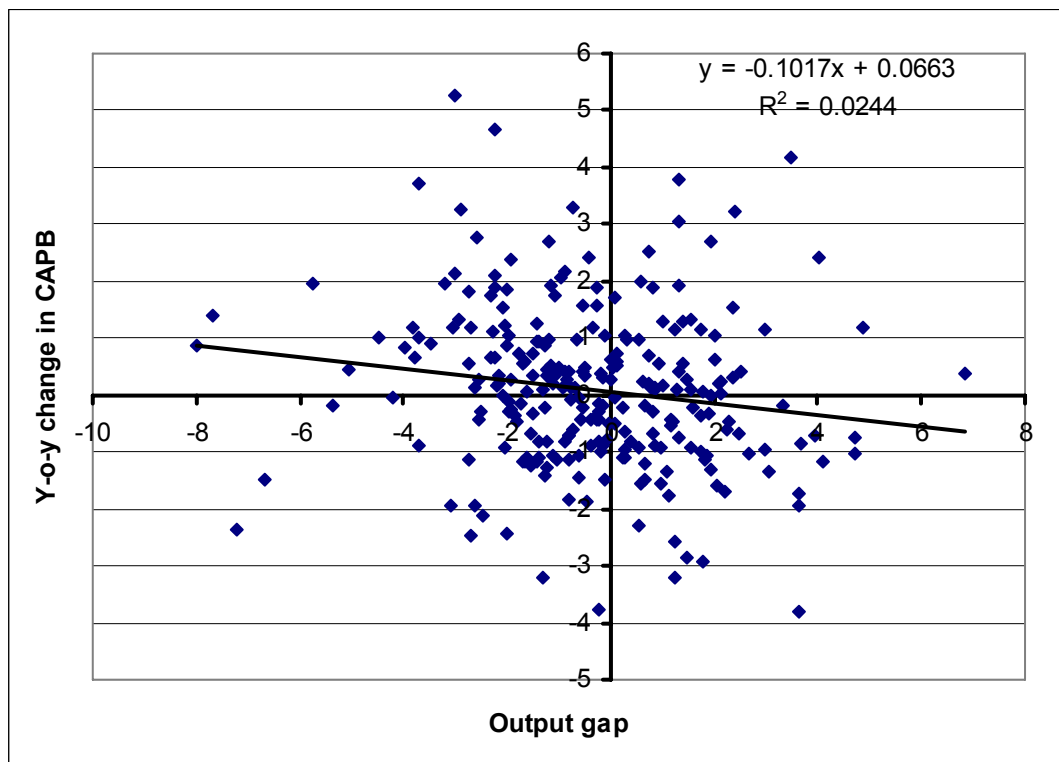
Figure 2. Fiscal stance and cyclical conditions. A basic scatterplot for cyclically adjusted revenue (EU11, 1980-2005)
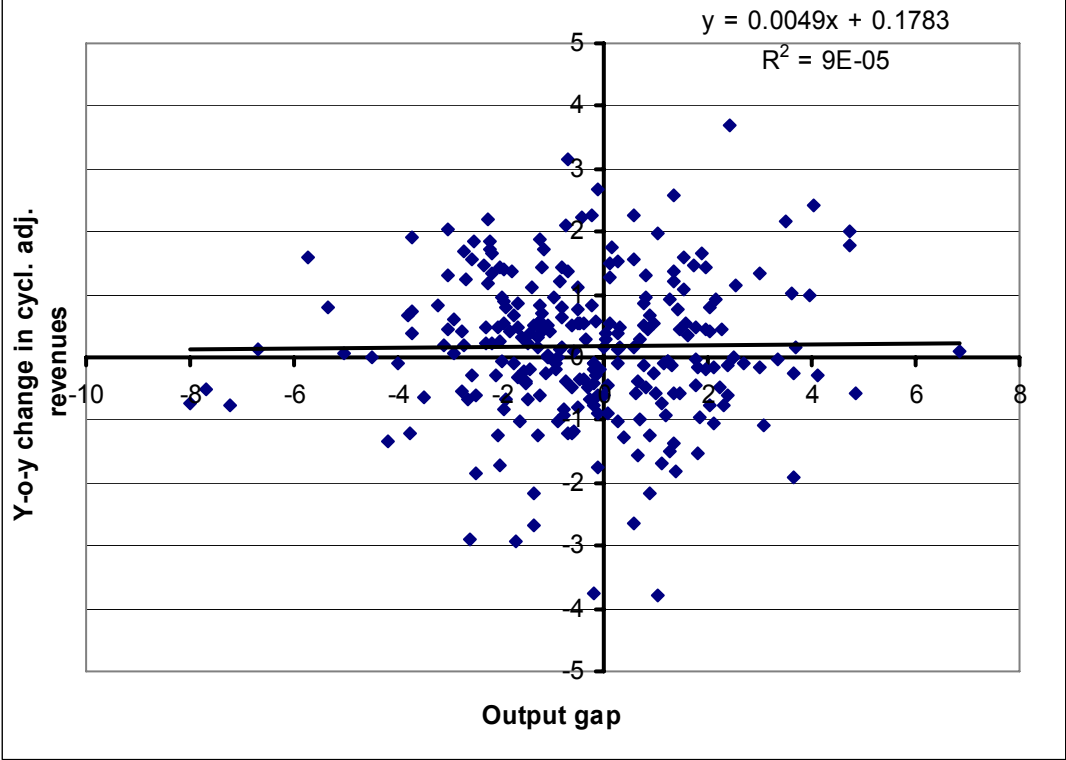
Figure 3. Fiscal stance and cyclical conditions. A basic scatterplot for primary cyclically adjusted expenditure (EU11, 1980-2005)
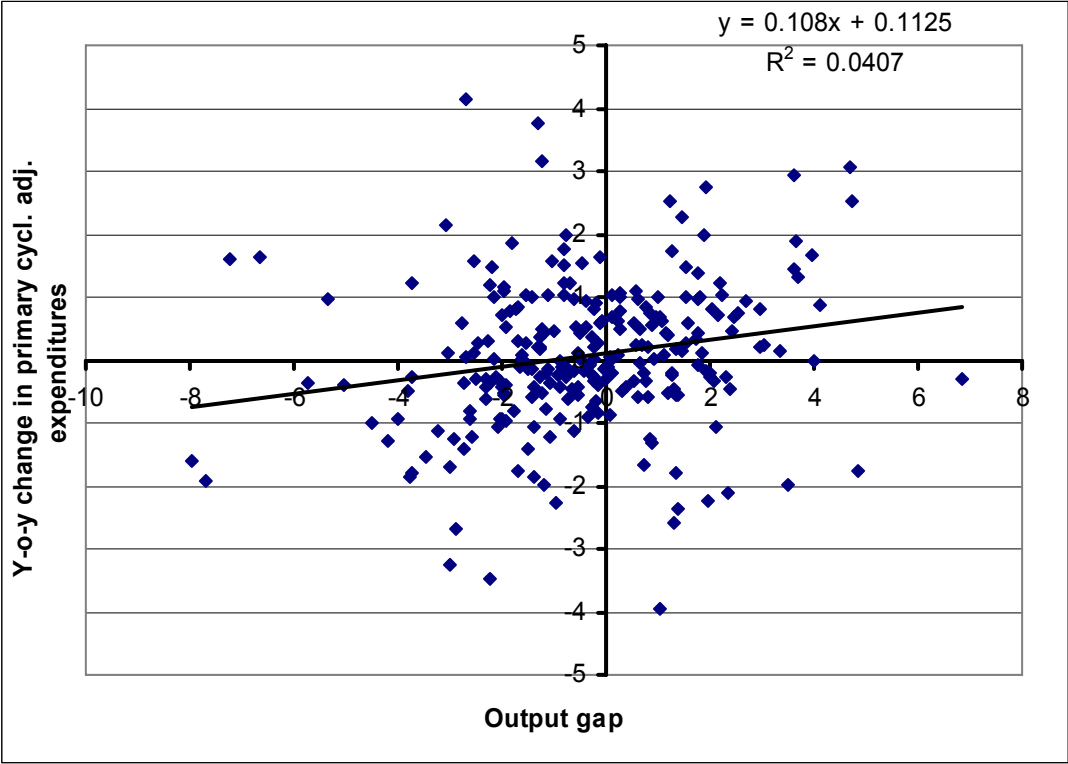
Figure 4. Change in the primary cyclically-adjusted budget balances and its components in good and bad times (EU11, 1980-2005)
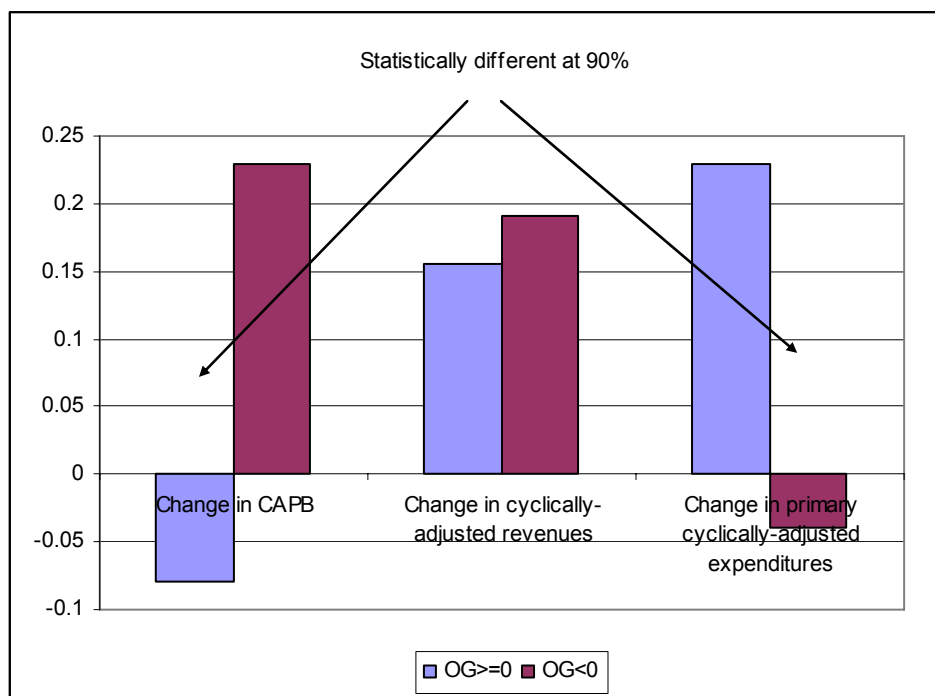
**Figure 5. Frequency of episodes of pro and counter-cyclical revenue and expenditure policy
(EU11, 1980-2005)**
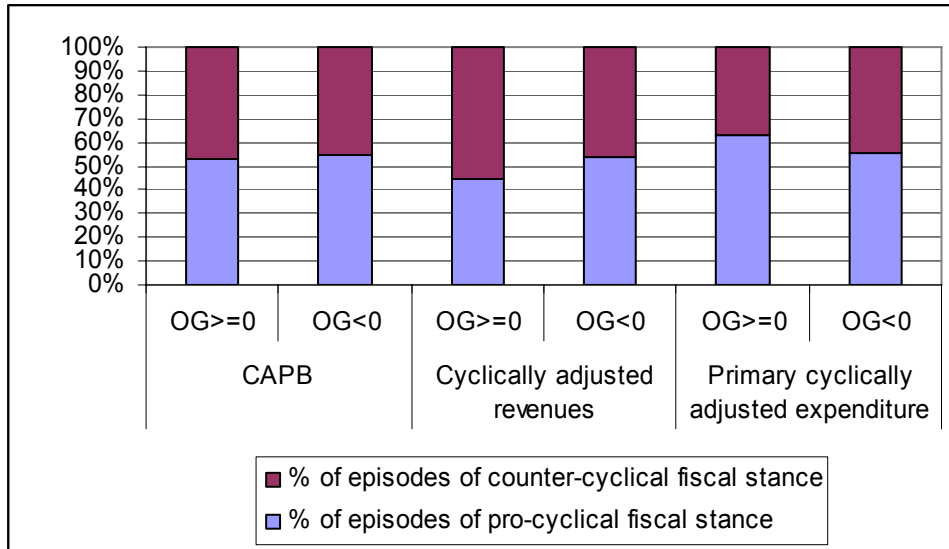
Figure 5. Fiscal stance in good and bad times (EU11, 1980-2005, different sub-periods)
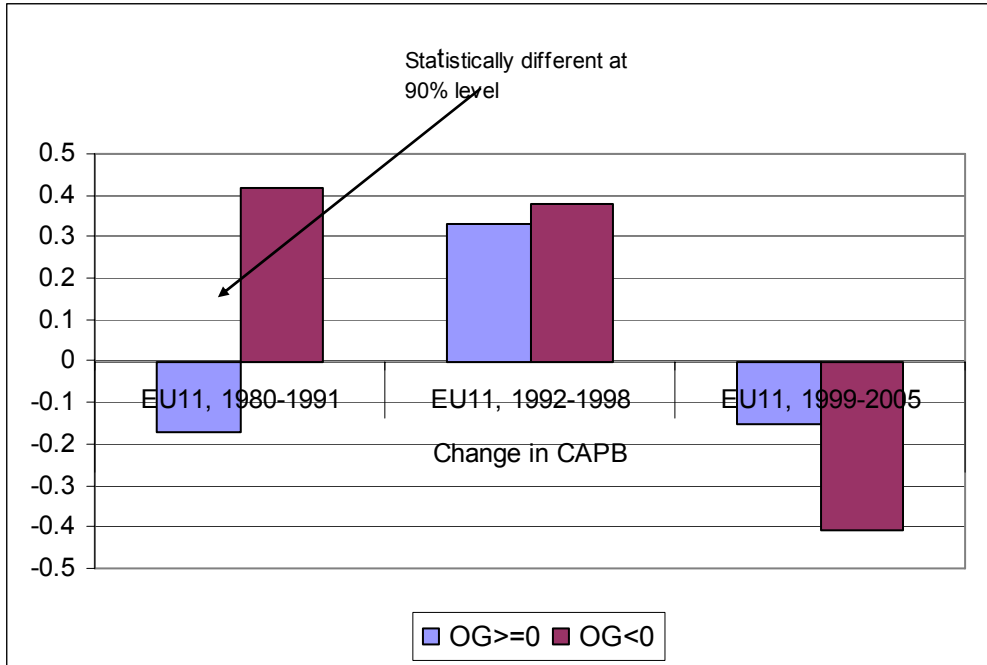
Figure 6. Frequency of episodes of pro and counter-cyclical policy (EU11, 1980-2005)
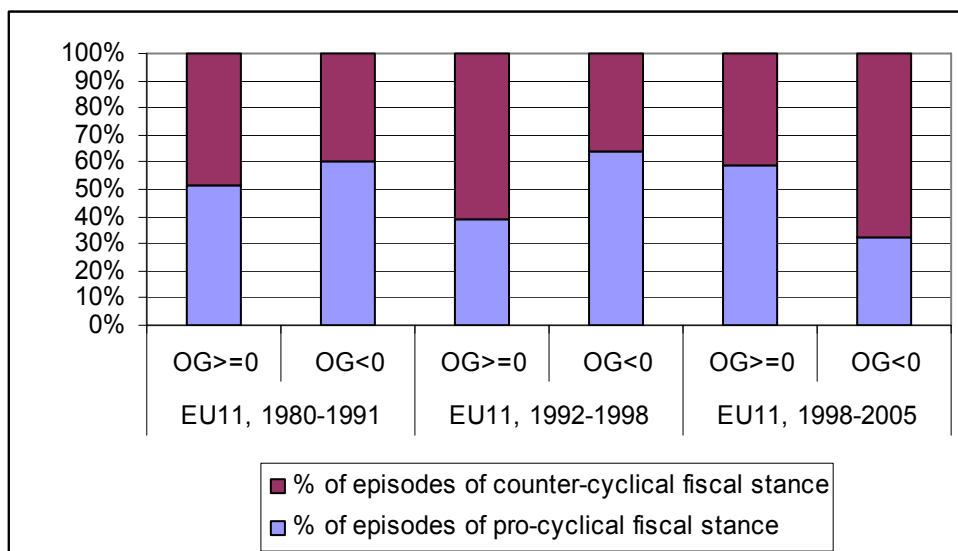
Figure 8. Fiscal stance in correspondence with different levels of the output gap (EU11, 1980-2005)

Output gap value ranges

Change in CAPB · Change in cyclically-adjusted revenues · Change in cyclically-adjusted primary expenditure · Frequency (right axis)

Figure 9. Frequency of episodes of pro and counter-cyclical behaviour of government expenditure. Weak and strong expenditure rule countries (22 EU countries, 1990-2005)
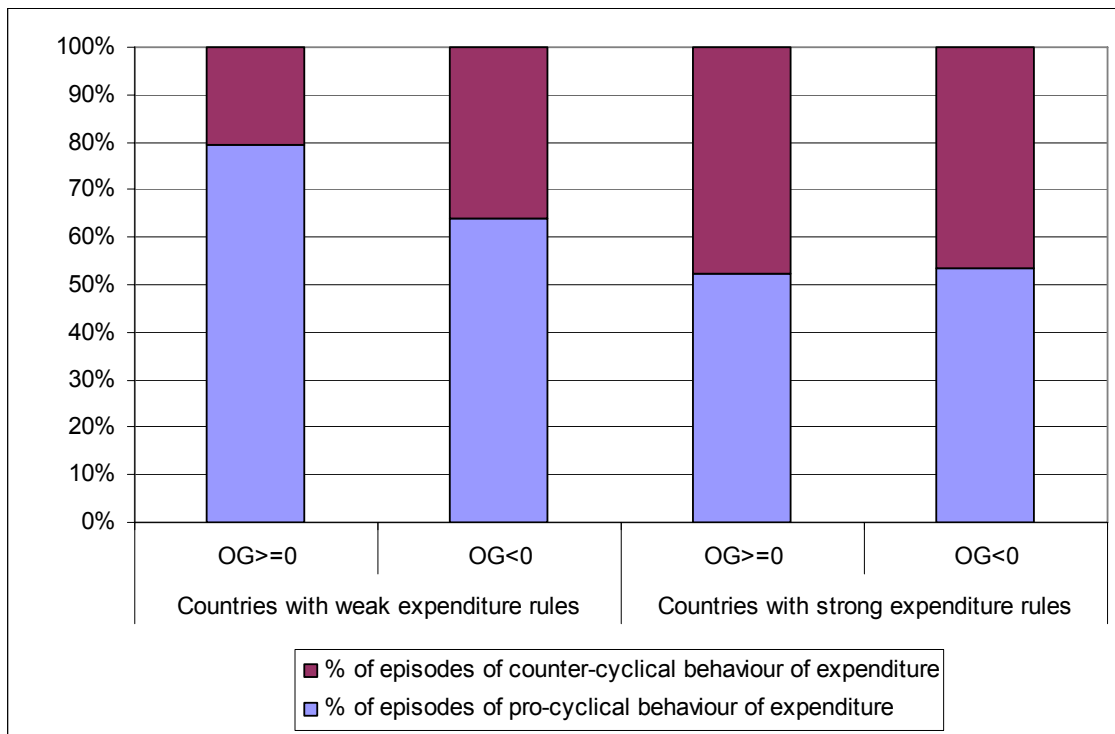
Table 1. The response of the fiscal stance over the cycle: evidence from the estimation of fiscal reaction functions (EU11, 1980-2005)

Dependent variable	Δ primary CAB		Δ adjusted revenue		Δ primary adjusted expenditure	
Explanatory variables	Basic model	Extended model	Basic model	Extended model	Basic model	Extended model
	(1)	(2)	(3)	(4)	(5)	(6)
Constant	-0.90**	-1.16**	5.22***	4.39***	4.50***	4.14***
	(-2.41)	(-2.54)	(4.21)	(3.54)	(4.02)	(3.70)
Lagged dependent variable	-0.28***	-0.24***	-0.12***	-0.11***	-0.08***	-0.07***
	(-6.27)	(-6.04)	(-3.90)	(-3.32)	(-2.88)	(-2.26)
Lagged debt	0.02***	0.02***	0.00	0.01	-0.01	-0.012
	(3.33)	(3.64)	(0.92)	(1.26)	(-1.62)	(-1.52)
Lagged output gap	-0.00	0.03	0.105***	0.13***	0.09**	0.07**
	(-0.09)	(0.66)	(2.85)	(3.09)	(2.49)	(2.00)
Dummy 1992	0.19	0.15	0.02	-0.04	-0.06	-0.08
	(0.91)	(0.64)	(0.12)	(-0.19)	(-0.34)	(-0.39)
Dummy 1999	-0.47**	-0.40	-0.40**	-0.30	0.15	0.15
	(-2.31)	(-1.61)	(-2.17)	(-1.43)	(0.95)	(0.88)
Lagged US output gap		-0.15***		-0.09***		0.09**
		(-3.10)		(-2.57)		(2.26)
Parliamentary elections		-0.63***		-0.24		0.40**
		(-3.28)		(-1.51)		(2.44)
N. obs.	254	217	254	217	254	217
R sq. within	0.21	0.28	0.16	0.18	0.15	0.21

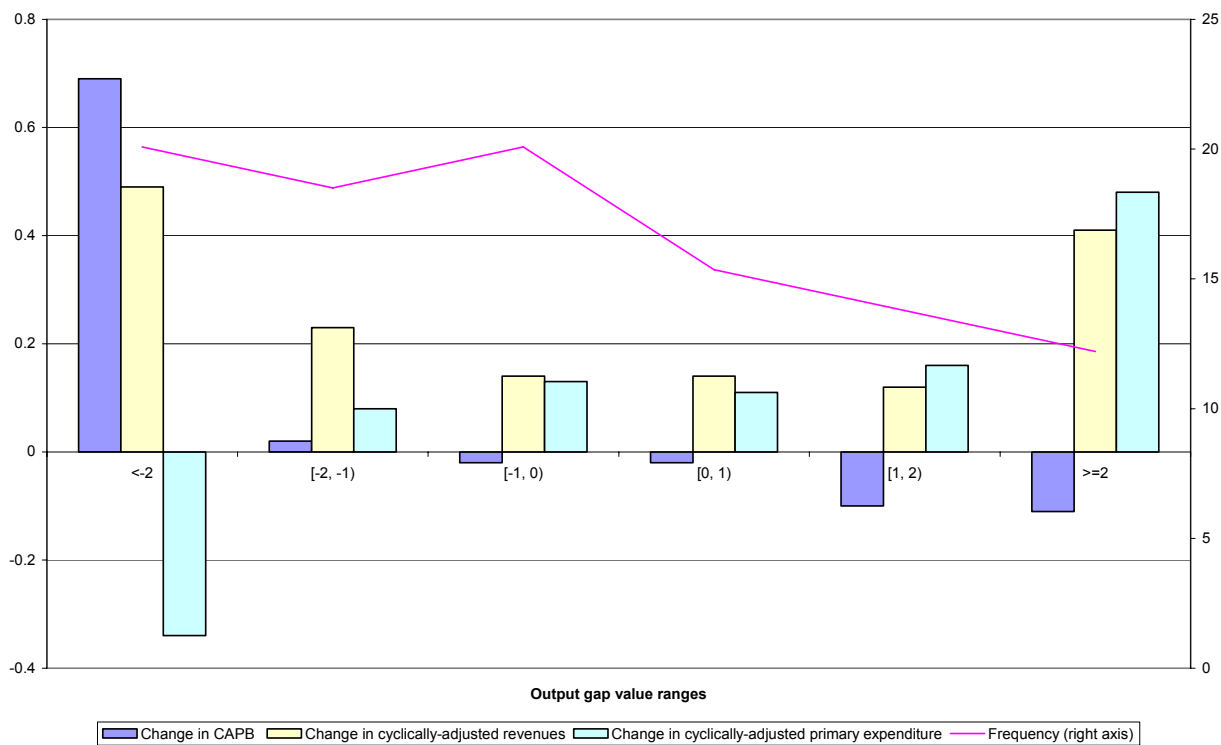Notes: Estimations method: least square dummy variables (LSDV), robust standard errors. Country fixed effects are constrained to sum to zero. All fiscal variables are expressed as shares on potential output. T tests are reported in parentheses. *, **, and *** denote, respectively, significance at the 10, 5 and 1 per cent level. Coefficients for country fixed effects are not reported.

Table 2. The response of the fiscal stance to the cycle in good and bad times: evidence from the estimation of fiscal reaction functions. (EU11, 1980-2005)

Dependent variable: Δ primary adjusted expenditure / Explanatory variables	Δ CAPB (1)	Δ adjusted revenue (2)	Δ primary adjusted expenditure (3)
Basic model (specification in Table 1)			
Output gap <0	-0.01	0.11	0.06
	(0.15)	(1.58)	(0.87)
Output gap >=0	-0.023	0.09	0.14*
	(-0.25)	(1.47)	(1.74)
Output gap < -2	0.08	0.09	-0.02
	(1.09)	(1.31)	(-0.32)
-2<= Output gap <-1	0.35**	0.17	-0.17
	(2.10)	(0.98)	(-10.9)
-1<= Output gap <0	0.74	0.36	-0.48
	(1.35)	(0.96)	(-1.34)
0<= Output gap <1	-0.99**	0.10	1.16***
	(-2.08)	(0.30)	(3.10)
1<= Output gap <=2	-0.23	0.20	0.42***
	(-1.23)	(1.38)	(2.71)
Output gap >2	-0.12	0.72	0.21**
	(-1.23)	(0.82)	(2.24)
Extended model (specification in Table 1)			
Output gap <0	0.05	0.15*	0.04
	(0.73)	(1.81)	(0.69)
Output gap >=0	-0.00	0.11*	0.12
	(-0.04)	(1.95)	(1.45)
Output gap < -2	0.10	0.09	-0.02
	(1.20)	(1.34)	(-0.33)
-2<= Output gap <-1	0.20	0.09	-0.08
	(1.09)	(0.45)	(-0.48)
-1<= Output gap <0	0.53	0.18	-0.51
	(0.86)	(0.41)	(-1.23)
0<= Output gap <1	-0.60	0.44	0.97**
	(-1.20)	(1.10)	(2.44)
1<= Output gap <=2	-0.10	0.32*	0.37**
	(-0.45)	(1.70)	(1.97)
Output gap >2	-0.07	0.14	0.19*
	(-0.62)	(1.45)	(1.89)

Notes: Estimations method: least square dummy variables (LSDV), robust standard errors. Country fixed effects are constrained to sum to zero. The table reports the coefficient of the lagged output gap obtained from the estimation of the fiscal reaction functions whose results are displayed in Tables ??-?? for different output gap intervals. Results were obtained by interacting the lagged output gap with dummies taking value 1 if the output gap is within given intervals.. T tests are reported in parentheses. *, **, and *** denote, respectively, significance at the 10, 5 and 1 per cent level.

Table 3. The estimation of fiscal reaction functions in good and bad times. Cyclically-adjusted primary balance (EU11, 1980-2005)

Dependent variable: Δ primary CAB	Basic model		Extended model	
Explanatory variables	Output below potential (OG<0)	Output above potential (OG>=0)	Output below potential (OG<0)	Output above potential (OG>=0)
	(1)	(2)	(3)	(4)
Constant	**-0.59**	**-2.17*****	-1.64*	-1.79**
	(-1.03)	(-2.73)	(-1.64)	(-2.11)
Lagged CAPB	-0.29***	-0.33***	-0.27***	-0.32***
	(-4.89)	(-4.34)	(-4.64)	(-3.77)
Lagged debt	0.023**	0.033**	0.04**	0.03**
	(0.009)	(2.29)	(2.45)	(2.60)
Lagged output gap	0.018	0.11	0.05	0.05
	(0.27)	(1.23)	(0.74)	(0.50)
Dummy 1992	**-0.149**	**0.71***	-0.14	0.67
	(0.54)	(1.85)	(-0.45)	(1.40)
Dummy 1999	-0.60**	-0.45	-0.74**	-0.42
	(-2.36)	(-1.20)	(-2.34)	(-0.90)
Lagged US output gap			-0.19**	-0.03
			(-2.42)	(-0.26)
Parliamentary elections			-0.51**	-0.70**
			(-2.09)	(-2.43)
N. obs.	149	105	124	93
R sq. within	0.27	0.23	0.34	0.27

Notes: Estimations method: least square dummy variables (LSDV), robust standard errors. Country fixed effects are constrained to sum to zero. All fiscal variables are expressed as shares on potential output. T tests are reported in parentheses. *, **, and *** denote, respectively, significance at the 10, 5 and 1 per cent level. Coefficients in bold are statistically different between good and bad times at the 10 per cent level. The test is performed running a LSDV regression under the constrained that all fixed effect sum to zero and interacting all explanatory variables for a dummy taking value 1 for positive output gaps. Coefficients for country fixed effects are not reported.

Table 4. The estimation of fiscal reaction functions in good and bad times. Cyclically-adjusted revenue (EU11, 1980-2005)

Dependent variable: Δ adjusted revenue Explanatory variables	Basic model		Extended model	
	Output below potential (OG<0) (1)	Output above potential (OG>=0) (2)	Output below potential (OG<0) (3)	Output above potential (OG>=0) (4)
Constant	5.95***	5.23***	4.92***	4.866***
	(3.43)	(3.09)	(2.63)	(2.98)
Lagged adjusted revenue	-0.13***	-0.13***	-0.11**	-0.127***
	(-3.17)	(-3.20)	(-2.48)	(-2.77)
Lagged debt	0.01	0.01	0.01	0.02
	(1.51)	(0.92)	(1.15)	(0.93)
Lagged output gap	0.15**	0.21***	0.16**	0.19**
	(2.59)	(2.88)	(2.49)	(2.37)
Dummy 1992	-0.23	0.25	-0.24	-0.10
	(-0.98)	(0.73)	(-0.87)	(-0.25)
Dummy 1999	-0.37	-0.38	-0.36	0.04
	(-1.40)	(-1.21)	(-1.02)	(0.12)
Lagged US output gap			-0.04	-0.14
			(-0.89)	(-1.62)
Parliamentary elections			-0.18	-0.40*
			(-0.85)	(-1.74)
N. obs.	149	105	124	93
R sq. within	0.21	0.20	0.20	0.23

Notes: Estimations method: least square dummy variables (LSDV), robust standard errors. Country fixed effects are constrained to sum to zero. All fiscal variables are expressed as shares on potential output. T tests are reported in parentheses. *, **, and *** denote, respectively, significance at the 10, 5 and 1 per cent level. Coefficients in bold are statistically different between good and bad times at the 10 per cent level. The test is performed running a LSDV regression under the constrained that all fixed effect sum to zero and interacting all explanatory variables for a dummy taking value 1 for positive output gaps. Coefficients for country fixed effects are not reported.

Table 5. The estimation of fiscal reaction functions in good and bad times. Cyclically-adjusted primary expenditure (EU11, 1980-2005)

Dependent variable: Δ primary adjusted expenditure Explanatory variables	Basic model		Extended model	
	Output below potential (OG<0)	Output above potential (OG>=0)	Output below potential (OG<0)	Output above potential (OG>=0)
		(2)		(4)
	(1)		(3)	
Constant	**2.94****	**7.14*****	3.66**	6.95***
	(2.01)	(4.87)	(2.43)	(4.40)
Lagged primary adjusted expenditure	**-0.04**	**-0.14*****	**-0.04**	**-0.15*****
	(-1.15)	(-4.29)	(-1.08)	(-3.44)
Lagged debt	-0.01	-0.01	-0.02	-0.01
	(-1.51)	(-1.35)	(-1.50)	(-0.73)
Lagged output gap	0.10	0.08	0.09	0.12
	(1.47)	(1.09)	(1.45)	(1.59)
Dummy 1992	0.04	-0.28	-0.09	-0.47
	(0.18)	(-0.91)	(-0.04)	(-1.30)
Dummy 1999	0.31	0.17	0.42*	0.44
	(1.47)	(0.76)	(1.78)	(1.39)
Lagged US output gap			0.17**	-0.04
			(2.59)	(-0.53)
Parliamentary elections			0.39*	0.31
			(1.88)	(1.39)
N. obs.	149	105	124	93
R sq. within	0.11	0.26	0.21	0.30

Notes: Estimations method: least square dummy variables (LSDV), robust standard errors. Country fixed effects are constrained to sum to zero. All fiscal variables are expressed as shares on potential output. T tests are reported in parentheses. *, **, and *** denote, respectively, significance at the 10, 5 and 1 per cent level. Coefficients in bold are statistically different between good and bad times at the 10 per cent level. The test is performed running a LSDV regression under the constrained that all fixed effect sum to zero and interacting all explanatory variables for a dummy taking value 1 for positive output gaps. Coefficients for country fixed effects are not reported.

Table 6. Determinants of pro-cyclical behaviour: evidence from Probit regressions (EU11, 1980-2005)

	Basic model			Extended model		
Dependent variable: 1= fiscal policy is pro-cyclical (ΔCAPB>=0 and OG<0 or ΔCAPB<0 and OG>=0) Explanatory variables	All sample (1)	Output below potential (OG<0) (2)	Output above potential (OG>=0) (3)	All sample (1)	Output below potential (OG<0) (2)	Output above potential (OG>=0) (3)
Lagged CAPB	-0.02	-0.12**	0.15***	-0.01	-0.09**	0.17***
	(-1.20)	(-2.50)	(3.11)	(-0.79)	(-2.13)	(4.68)
Lagged debt	0.002	0.01**	-0.01***	0.001	0.015***	-0.010**
	(0.91)	(2.53)	(-2.76)	(0.27)	(2.57)	(-2.01)
Lagged output gap	-0.003	0.03	-0.04	-0.005	0.03	-0.005
	(-0.38)	(1.03)	(-1.53)	(-0.54)	(1.33)	(-0.25)
Share of expenditure in budgetary adjustment	0.25	-0.34	0.91***	0.21	-0.48	1.02***
	(1.20)	(-1.03)	(3.83)	(0.91)	(-1.32)	(3.36)
Dummy 1992	0.02	-0.25	-0.10	0.03	-0.21	-0.13
	(0.22)	(-1.52)	(-0.54)	(0.42)	(-1.52)	(-0.59)
Dummy 1999	-0.08	-0.26*	0.22	-0.04	-0.31*	0.28
	(-1.00)	(-1.85)	(1.32)	(-0.58)	(-1.94)	(1.31)
Lagged US output gap				0.00	-0.04*	-0.01
				(0.04)	(-1.73)	(-0.27)
Parliamentary elections				0.03	-0.14	0.38**
				(0.52)	(-1.53)	(2.32)
N. obs.	254	149	105	217	124	93
Mc Fadden R sq.	0.06	0.25	0.31	0.04	0.25	0.38

Notes: Estimations method: probit regressions. Country fixed effects are included and coefficients not reported. Standard errors are robust with respect to clustering within countries. All fiscal variables are expressed as shares on potential output. z tests are reported in parentheses. The share of expenditure in budgetary adjustment is defined as follows: absolute value of the change in primary cyclically adjusted primary expenditure as a share of potential output over the sum of the absolute value of the change in the cyclically-adjusted primary expenditure and cyclically-adjusted revenue as a share of potential output. *, **, and *** denote, respectively, significance at the 10, 5 and 1 per cent level. Coefficients are those of marginal effects, i.e., the increase in probability of pro-cyclical fiscal policy behaviour associated with a unit increase in the explanatory variables computed at sample mean.

Table 7. National expenditure rules and the cyclical behaviour of expenditure: evidence from the estimation of fiscal reaction functions. (22 EU countries, 1990-2005)

Dependent variable: Δ cyclically-adjusted primary expenditure	Output below potential (OG<0)				Output above potential (OG>=0)			
	Basic model		Extended model		Basic model		Extended model	
	Weak rule countries	Strong rule countries	Weak rule countries	Strong rule countries	Weak rule countries	Strong rule countries	Weak rule countries	Strong rule countries
Explanatory variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Constant	12.49***	10.15***	13.8***	11.04***	11.61**	6.83	11.61**	8.76**
	(2.70)	(3.25)	(3.03)	(3.46)	(2.47)	(1.62)	(2.14)	(2.12)
Lagged cyclically-adjusted primary expenditure	-0.24**	-0.20***	-0.27**	-0.24***	-0.18*	-0.14	-0.17	-0.20**
	(-2.41)	(-2.67)	(-2.68)	(-3.12)	(-1.72)	(-1.65)	(-1.53)	(-2.30)
Lagged debt	-0.05	-0.09	-0.05	-0.00	-0.07**	0.00	-0.07**	0.01
	(-0.99)	(-0.85)	(-1.04)	(-0.15)	(-2.63)	(0.51)	(-2.19)	(1.48)
Lagged output gap	0.13	0.11	0.14	0.13	-0.06	0.05	-0.11	0.07
	(0.95)	(1.16)	(1.05)	(1.44)	(-0.79)	(0.49)	(-1.37)	(0.7)
Dummy 1992	0.13	0.08	-0.34	-0.08	-0.61	-0.79*	-0.82	-1.32***
	(0.16)	(0.08)	(-0.43)	(-0.08)	(-1.40)	(-1.76)	(-1.49)	(-2.79)
Dummy 1999	-0.41	0.14	-0.43	0.05	0.46	0.14	0.64	0.79**
	(-0.77)	(0.54)	(-0.73)	(0.15)	(1.20)	(0.46)	(1.51)	(2.10)
Lagged US output gap			-0.19	-0.28			-0.07	-0.27**
			(-1.34)	(-1.42)			(-0.94)	(-2.45)
Parliamentary elections			0.60	0.33			0.08	0.20
			(1.26)	(1.08)			(0.28)	(0.95)
N. obs.	65	85	59	74	49	61	44	61
R sq. within	0.2	0.26	0.32	0.31	0.39	0.18	0.46	0.28

Notes: Estimations method: least square dummy variables (LSDV), robust standard errors. Country fixed effects are constrained to sum to zero. All fiscal variables are expressed as shares on potential output. T tests are reported in parentheses. *, **, and *** denote, respectively, significance at the 10, 5 and 1 per cent level. Coefficients for country fixed effects are not reported.