

New evidence on the effectiveness of Europe's fiscal restrictions*

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Abstract

This paper investigates the past effectiveness of the Maastricht Treaty (MT) and Stability and Growth Pact (SGP) in disciplining fiscal policy in the Euro zone. We estimate fiscal reaction functions for a panel of 11 members of the Euro zone including the more recent period of the reformed SGP, and compare them with fiscal responses from other “industrialized” OECD countries. Our main finding is that even though both fiscal rules are effective in tackling excessive deficits in the Euro zone, such effect is more significant during the MT-period. Moreover, neither of those fiscal rules has induced a countercyclical behavior of the fiscal authorities in the region. These results imply the need for further improvements in the SGP, despite of the more encouraging outcomes after its reform.

Keywords: fiscal policy, panel data models, Maastricht Treaty, Stability and Growth Pact.

JEL Codes: C33, E62, E65, H62

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1 Introduction

In the last fifteen years, fiscal policy in Europe has been subject to restrictions. Far from unique in the "developed" world,¹ these rules have been very controversial. The fiscal framework is enshrined in the Maastricht Treaty (MT), which was signed by the Finance and Foreign ministers of the European Union in February of 1992. Treaty Articles 101 to 104 were designed to keep public deficits low and to ensure budgetary discipline on the part of member states. Further, to guarantee that sound fiscal policies would be continued during Stage 3 of the Economic and Monetary Union and to make the Treaty provisions more precise and operational, in June of 1997, the European Council accepted a draft resolution of the Stability and Growth Pact (SGP). In its first draft, the pact comprised two Council Regulations and a Resolution of the European Council, which together formed a package with two main branches, one aimed at the surveillance of fiscal policy and one aimed at the dissuasion of fiscal profligacy. The surveillance part entered in force on 1 July 1998, whereas the dissuasive arm effectively came into force on 1 January 1999.

So far, most of the literature assessing empirically the performance of these restrictions finds differences in the level of fiscal deficits between the MT-period (1992-1997) and the SGP-period (1998-2007).² After a strong increase in fiscal discipline in most of the nineties due to entry criteria for admission to the Euro-area, the SGP-period has witnessed a fatigue in fiscal consolidation as suggested by the rising deficits (Fatás and Mihov, 2003, and Hughes-Hallet and Lewis, 2005). The empirical conclusions regarding the fiscal responses to business cycle fluctuations, however, are still mixed. Some authors, such as Galí and Perotti (2003) find a acyclical or even countercyclical fiscal behavior after the Maastricht Treaty was signed, whereas others like Candelon et al. (2007) find that the EMU policy rules have remained procyclical.

This paper investigates how effective the fiscal framework has been in disciplining fiscal policy in the Euro zone. These days, such issue is even more compelling given the current financial crisis and its potential budgetary implications for Euro zone countries. In particular, the empirical assessment of past effectiveness can shed some light on how to enhance the existent fiscal rules in order to conciliate the announced European bail-out and economic recovery programs with sustainable fiscal policy.

In accordance with Fatás and Mihov (2003) and Fatás (2005), we concentrate on two types of biases that are the result of poor fiscal policy management and assess how the EU fiscal framework has affected them. The first type of bias is the possibility of *excessive deficits* that arise either when governments do not internalize the cost of additional debt or when they postpone fiscal adjustment after a cyclical downturn. The second bias is the

¹For a survey of some of the fiscal restrictions and rules implemented recently in other developed countries, such as Australia and Canada, see Kennedy and Robbins (2001). For the particular case of Japan, see Von Hagen (2005).

²For a theoretical analysis of those restrictions see, for instance, Chari and Kehoe (1997), Beetsma and Uhlig (1999), Buti et al.(2003), Fatás et al. (2004), Buitier (2005), Beetsma and Debrun (2007), Poplawski Ribeiro and Beetsma (2008), and Poplawski Ribeiro et al. (2008).

possibility of fiscal policy being *procyclical*. The argument is that in good times spending goes up in excess of the rise in tax revenues due to the misinterpretation by politicians of cyclical increases in revenues as being structural.

The analysis separates the MT-period and the SGP-period, disentangling the effects of each set of restrictions and isolating the fiscal impacts stemming from the efforts of European countries to enter the Euro zone.^{3,4} Specifically to the SGP, the failure of some countries to comply with the deficit target imposed by the pact, and its consequent reform in 2005, have added concerns about whether the Pact is indeed an effective instrument in reducing fiscal profligacy.

As main novelty, this paper examines how the cyclically adjusted primary deficit (our measure of fiscal stance) reacted when the reference deficit level of the Treaty (or Pact) were exceeded, after controlling for relevant economic and political variables. Moreover, it also investigates whether (i) the average level of this measure of fiscal instance and (ii) its response to the output gap have changed during the MT- and SGP periods. These reactions are estimated using pooling and instrumental variables techniques. They are compared with responses of other “industrialized” OECD countries, putting the European experience with the MT and the SGP into a broader perspective. Further, the more recent period after the reform of the SGP is also scrutinized.

Our main finding is that both fiscal rules have been effective in reducing fiscal profligacy in the Euro zone when the deficit limit was exceeded, i.e. they have induced a contraction of the fiscal stance in response to *excessive deficits*. However, this effect is stronger during the MT-period, despite of the more encouraging outcomes of the reformed SGP. Moreover, neither of those rules have prompted fiscal authorities in the region to behave countercyclically. Such results survive extensive robustness testing, and therefore, imply the need for improvements in the current fiscal framework, in particular to enforce countercyclical fiscal policy in the Euro zone.

The remainder of the paper is organized as follows. Section 2 details the empirical strategy and the methodology used in this paper. In this section we also describe the dataset and present some descriptive statistics of the main variables. Section 3 reports and discusses our empirical findings. In Section 4 these findings are subjected to further robustness testing. At last, Section 5 concludes the main body of the paper.

2 Empirical strategy and methodology

Our analysis focuses on the effects of the MT and of the SGP on eleven member countries of the Euro zone (the “Euro-11”): Austria, Belgium, Finland, France, Germany, Greece,

³More precisely, the Treaty applies during the entire period (1992-2007) under consideration, while the Pact has been introduced to give an operational content to the Treaty provisions.

⁴Several authors argue that throughout the MT-period the fiscal targets were more binding and resulted in more fiscal discipline than during the SGP-period. The reason is that during the MT period the EU countries had to restrain their fiscal behavior in order to qualify for entry into the Euro zone. Once in, the incentive to adhere to the fiscal limits weakened.

Ireland, Italy, The Netherlands, Portugal and Spain. Luxembourg is left out of the analysis due to missing data.

To investigate the behavior of fiscal policy in those countries, we use the cyclically adjusted primary deficit (CAPD). This variable shows how the fiscal authorities have reacted to the restrictions of the MT and SGP, as it purges the actual fiscal stance of automatic fiscal responses to business cycles developments. Hence, the first research question we address is:

Question 1 *Has the average cyclically adjusted primary deficit in the Euro-11 fallen during the MT-period and/or the SGP-period when compared with: (i) the level during the subperiod 1980-1991? (ii) the level of the corresponding variable for our two control groups of countries that have not joined the Euro zone over the same period?*

The motivation for addressing this issue is that the MT and the SGP should have had an impact on reducing the average level of the cyclically-adjusted primary deficit in the Euro zone.⁵ Thus, to verify this conjecture, we compare the average level of this variable during the MT-period (1992-1997) and SGP-period (1998-2007) with its average over the period 1980-1991 for the same set of Euro-area countries. Moreover, we also look at the effect of the recent reform of the Pact in 2005 and compare the effect of the first-version of the SGP (from 1998 to 2005) with the current reformed version (from 2006 to 2007).

In connection with Question 1-ii, we compare the average level of the CAPD during the MT- and SGP-periods with that of the (a) EU-3 (Denmark, Sweden and UK) – the set of countries that have been in the EU since at least 1995 but do not participate in the Euro zone; and the (b) OECD-6 (Australia, Canada, Iceland, Japan, Norway and the US) – a sample of “industrialized” countries that do not participate in the European Union.⁶ The aim is to investigate whether the fiscal behavior of the Euro-11 during these periods has been different from that of other groups of countries with roughly similar economic and political characteristics, but that were not constrained by Europe’s fiscal restrictions. If these countries had the same fiscal behavior, this could suggest the potential presence of some common external factor driving the fiscal stances of all countries in the sample rather than the effect of the European fiscal rules.

The second research question analyzed is:

⁵In our analysis, we assume that the fiscal restrictions are exogenous. Braun and Tommasi (2004) and Poterba (1994) account for the possibility that states or countries in which voters have a preference for fiscal prudence not only tend to have low deficits but also pass balanced budget rules. However, given the heterogeneity of the EU countries in terms of fiscal discipline at the moment of initial adoption of the EU fiscal restrictions, we believe that this possibility is not relevant for our sample.

⁶We restrict ourselves to this sample of “industrialized” countries in order to limit potential cross-country heterogeneity. So, we exclude the Czech Republic, Hungary, Poland, Slovakia, Mexico, South Korea and Turkey since these OECD countries are or were relatively less developed and joined the OECD much later than the countries in our sample. Moreover, some of them have been during a long period part of a different economic system. Luxembourg, Switzerland and New Zealand are also excluded due to missing observations.

Question 2 *Has the cyclically adjusted primary deficit response to the business cycle in the Euro-11 become more or less countercyclical during the MT-period and/or the SGP-period when compared with: (i) its level in the previous subperiod (1980-1991)? (ii) the level of the corresponding variable for the two control groups of countries (EU-3 and OECD-6) over the same period?*

The idea behind Question 2 is that the loss of monetary independence should have strengthened the need for more countercyclical fiscal stabilization. Furthermore, the MT and the SGP should have given the Euro-11 fiscal authorities an incentive to become more countercyclical when compared to the average discretionary fiscal policy in EU-3 and OECD-6. At least the SGP requires countries to adopt minimal benchmarks (i.e. median-term fiscal balances) that are sufficiently prudent to allow for some leeway to the 3% deficit limit when the business cycle worsens.

Finally, it might be the case that, albeit the overall average level of discretionary primary deficit has not decreased, the sanctions of the MT and/or the SGP have been effective in leading to fiscal adjustments when the deficit ceilings imposed by these restrictions were exceeded (i.e. became binding). This is what motivates our final research question:

Question 3 *(i) How did the cyclically adjusted primary deficit react when the constraints of the Maastricht Treaty and/or the SGP were violated? (ii) How has this response differed between the countries belonging to the Euro-11 and the two other control groups, EU-3 and OECD-6?*

2.1 The fiscal reaction function

We address empirical Questions 1, 2 and 3 via the estimation of a fiscal reaction function of the format:

$$pdfay_{i,t} = \alpha_i + \lambda_t + \beta * X_{i,t} + \gamma * Z_{i,t} + \varepsilon_{i,t}, \quad (1)$$

where subscripts $i = 1, \dots, N$ and $t = 1, \dots, T$ denote the country and year of the observation, respectively. $pdfay_{i,t}$ corresponds to minus the cyclically adjusted government primary balance (or the cyclically adjusted primary deficit - CAPD) as percentage of potential GDP.⁷ It is obtained from the OECD (2008) and aims to filter out the automatic stabilizers built into tax systems and unemployment compensation schemes, yielding an approximation of discretionary fiscal policy in OECD countries.⁸ Further, α_i represents the country-fixed effects, λ_t the time-fixed effects, and $\varepsilon_{i,t}$ is a error term.

⁷Further information about the CAPD can be found in Appendix A (available upon request), *Giorno et al. (1995)* and *OECD (2004)*. Notice that in our main estimations, we use revised data for the CAPD as well as for all explanatory variables. However, as robustness test in Section 4, we check if our findings also hold using real-time data.

⁸For a criticism of that variable as an approximation of discretionary fiscal policy, see *Alberola et al. (2003)*, *Larch and Salto (2005)*, and *Méltiz (2005)*. Roughly, those authors (in particular, *Méltiz, 2005*) claim that CAPD does not take into account several other fiscal variables (such as payments for pensions, health, subsistence and subsidies of all sorts) that respond automatically to the cycle.

Vector $X_{i,t}$ contains five economic and political control variables in our main estimations that, in accordance with the economic literature, explains the deficit behavior in industrialized countries. Those, as well as the testing variables related to our empirical questions (vector $Z_{i,t}$), are presented in Table 1 and discussed in detail in Appendix A (available upon request to the author).

As economic control variables, we use the lagged cyclically adjusted primary deficit, $pdefay(-1)$, which accounts for the autocorrelation of the dependent variable and is generally included in this type of empirical analysis⁹. Its coefficient provides an estimate of the amount of inertia of fiscal policy. The lagged government debt (as % of actual output), $ggflq(-1)$, deals with potential debt stabilization policies guiding the determination of CAPD. As suggested by Bohn (1998), a negative estimate for its coefficient indicates a fiscal policy aiming at debt sustainability.

To control for the effects of inflation of private consumption in the conduct of fiscal policy, we include the variable inf . The literature identifies several reasons to control fiscal deficits for inflation. In sum, they can be grouped into two conflicting effects on discretionary fiscal policy. On the one hand, the cyclically adjusted primary deficit falls with inflation due to bracket creep in taxes (tax brackets are not fully adjusted or only adjusted with a lag to inflation); seigniorage revenues; and, to the extent that it is unexpected, the effect on the real debt servicing costs when debt is nominal. On the other hand, higher inflation can also increase the CAPD because of its effect on the nominal interest rate, as Fatás and Mihov (2003), Woo (2003) and Claeys (2005) claim. In fact, the increase in the nominal interest rate can be larger than the inflation increase if the central bank applies the Taylor principle.¹⁰ An additional argument – motivated by the Optimum Currency Area (OCA) literature – for controlling for inflation is that in a monetary union with asymmetric shocks or diverging inflation preferences, national fiscal policy makers should take over the role of monetary policy in stabilizing the country-specific component of inflation (see Beetsma and Jensen, 2005, and Claeys, 2005).

Political factors can also affect fiscal deficits. Thus, we consider potential political budget cycles (PBC) by including the dummy ele . This dummy equals one in years of parliamentary elections in a country and zero otherwise. The intuition is that political circumstances can also explain fiscal policies changes during the MT- and/or SGP-period. The output gap, gap , is also included in the set of explanatory variables for the CAPD since fiscal authorities may react in a systematic way to changes in the output gap, in addition to the presence of automatic stabilizers. Other control variables that can explain CAPD, such as the real interest rate and trade openness, are relegated to Section 4, which

⁹See Fatás and Mihov (2003), Galí and Perotti (2003), Afonso (2005) and Claeys (2005), for instance.

¹⁰In addition, the empirical literature on fiscal policy often makes a distinction between anticipated inflation (which leads to a lower deficit due to seigniorage, but does not affect real debt servicing costs due to the reaction of the nominal interest rate) and unanticipated inflation (which leads to a reduction in the real value of the debt-servicing costs of nominal debt). However, since the effects of inflation on our deficit variable are not the focus of this paper, we disregard this difference and only control for the effect of the ex-post inflation rate.

tests the robustness of the results.

At last, when analyzing part (ii) of Questions 1, 2 and 3, some of the control variables are interacted with the country dummies $deu3$ and $doecd6$, representing our control groups of countries, EU-3 and OECD-6 (see Table 1). This interaction is introduced because different groups of countries can present divergent responses to some of the control variables.

Regarding the testing variables of vector $Z_{i,t}$, we use time dummies referring to the period of the Maastricht Treaty and SGP ($d9297$ and $d9807$ respectively) to address item (i), and their interaction with the country dummies $deu3$ and $doecd6$ to answer item (ii) of Question 1. Moreover, when analyzing the impacts of the reform of the Pact, the dummy for the period of the SGP is split in two: $d9805$ and $d0607$. Question 2 is then addressed by interacting all those time and country dummies with the output gap (gap).

Our final test (Question 3) concerns the impacts of the Treaty and SGP when their deficit ceiling is binding. So, in order to capture the effects of the Treaty, we construct the following variable based on Forni and Momigliano (2004) and Giuliadori and Beetsma (2008a and 2008b):

$$\left\{ \begin{array}{ll} \text{for } t < 1992 \text{ and } t > 1997 : & mas_{i,t} = 0 \\ \text{for } 1992 \leq t \leq 1997 : & mas_{i,t} = \frac{tdefy_{i,t-1} - 3\%}{1998-t} \quad \text{if } tdefy_{i,t-1} \geq 3\% \\ \text{for } 1992 \leq t \leq 1997 : & mas_{i,t} = 0 \quad \text{if } tdefy_{i,t-1} < 3\% \end{array} \right. \quad (2)$$

This variable accounts only for cases when the total deficit (as a percentage of GDP) in the previous year, $tdefy_{i,t-1}$, exceeded the reference level of 3%. In addition, starting in 1992 (the first year in which the Maastricht Treaty applied), the bigger is the time gap between 1998 (the starting date of the Euro zone) and the year that a particular country surpassed the fiscal target, the longer was the amount of time available for the country to adjust its deficit to the ceiling imposed by the Treaty and, hence, the smaller is $mas_{i,t}$.¹¹

Likewise, we create another variable capturing the cases when the deficit exceeds the reference level during the SGP-period. It is given by:¹²

$$\left\{ \begin{array}{ll} \text{for } t < 1998 : & sgp_{i,t} = 0 \\ \text{for } 1998 \leq t \leq 2007 : & sgp_{i,t} = \frac{tdefy_{i,t-1} - 3\%}{2} \quad \text{if } tdefy_{i,t-1} \geq 3\% \\ \text{for } 1998 \leq t \leq 2007 : & sgp_{i,t} = 0 \quad \text{if } tdefy_{i,t-1} < 3\% \end{array} \right. \quad (3)$$

Here, when $tdefy_{i,t-1} \geq 3\%$, the variable $sgp_{i,t}$ is divided by two since the Excessive Deficit Procedure allows for a two-year period to eliminate the excess in the deficit before financial sanctions take place.¹³

¹¹Here, as a simplification, we assume that the disciplinary effect of the Maastricht Treaty is linear in the difference of the total deficit to the reference level if $pdefy_{it-1} \geq 3\%$, and linear in the time gap between the year of the violation of the rule and the deadline to enter the Euro zone - 1998.

¹²For simplicity, we compute this variable for Greece also from the year 1998 onwards, although that country joined the Euro zone only at the beginning of 2001.

¹³Again, by constructing this variable in this way, we assume for simplicity that the sanctions of the SGP hit the country linearly, and that the amount of adjustment in the deficit is equal in each of the two years.

For the analysis of the reform of the SGP, we split $sgp_{i,t}$ in two: $sgp1_{i,t}$ and $sgp2_{i,t}$. Those variables are computed in the same way as in equation (3), but with the time periods coinciding with those of the two versions of the pact. Hence, $sgp1_{i,t}$ is only different from zero during the period 1998 to 2005 if the total deficit in the previous year exceeds the 3% limit. Accordingly, $sgp2_{i,t}$ can only be different from zero during the years 2006 and 2007.

2.2 Estimation procedure

In order to address the endogeneity of some explanatory variables, we estimate the fiscal reaction function (1) for the period 1980-2007 via Two-Stage Least Square (TSLS) with country- and period-fixed effects.¹⁴

In our main estimations, we use instrumental variables for $pdefay(-1)$, inf and gap . Although predetermined, $pdefay(-1)$ is instrumented given that its inclusion in equation (1) leads to autocorrelation, common in dynamic panel data estimations.^{15,16} The instrument variables are found by running OLS regressions of those three variables on potential proxies for all samples under consideration. The significant proxies are then included as instruments in the estimation of (1) by TSLS.¹⁷

To test for the validity of the overidentifying restrictions, we report the p-values of the Sargan's test of over-identifying restrictions for all regressions.¹⁸ Further, since we are interested in comparing differences in fiscal behavior between different groups of countries and time periods, we also perform Wald tests to see whether the corresponding regression coefficients differ across those groups and periods.

2.3 Data and descriptive statistics

The economic variables are retrieved from OECD (2008). The parliamentary election dummy (ele), is obtained from the site of the International Institute for Democracy and Electoral Assistance (IDEA – <http://www.idea.int/vt/parl.cfm>) combined with the information from the site <http://electionresources.org>.

Tables 2 displays the unweighed averages of the CAPD ($pdefay$) and the output gap

¹⁴Similar results are obtained using Aurellano-Bond and Blundell-Bond estimators. Further, we restrict our sample to the period 1980-2007 given that the number of missing observations would become too large if we extend the sample to earlier years.

¹⁵For a discussion, see Baltagi (2005, pp. 135), and Judson and Owen (1999).

¹⁶For more information on econometric issues related to the explanatory variables, see Appendices A and H.

¹⁷Table 9 of Appendix B shows the results. $pdefay(-2)$ is highly significant and is used as instrument for $pdefay(-1)$ in all cases. We also instrument inf and gap by the first two lags of inflation, $inf(-1)$ and $inf(-2)$, the first two lags of the long-term interest rate, $irlrc(-1)$ and $irlrc(-2)$, and the first two lags of output gap, $gap(-1)$ and $gap(-2)$. In the EU-3 case, $inf(-2)$ is not significant at 5% and, therefore, not included as an instrument. In that sample, we also exclude $irlrc(-2)$, since the explanatory power of the Sargan's test of over-identifying restrictions falls sharply when that variable is included.

¹⁸For more information on tests of overidentifying restrictions see Johnston and Dinardo (1997), pp. 336-338. The null hypothesis of the Sargan's test is that the overidentifying restrictions are satisfied.

(*gap*) for the sample of 20 OECD countries during five different periods: 1980-1991, 1992-1997, 1998-2007, 2006-2007, and the entire time span 1980-2007. While the CAPD differs across countries, there seems to be a general decline over time, with the cyclically-adjusted balance turning to surpluses (indicated by a negative sign in the table) during the MT and the SGP periods. This is the case, for instance, for Spain where the average CAPDs as percentage of potential GDP is respectively 2.53% during the period 1980-1991, 0.09% during 1992-1997, -2.03% during 1998-2007, and -3.09% during the most recent period 2006-2007 of the reformed SGP. By contrast, the countries in the OECD-6 show rather mixed developments during those periods.

Further, the last four lines of Table 2 convey averages for each group of countries. For the Euro-11 and EU-3 the average cyclically adjusted primary deficit decreases over time, for the OECD-6 these average increases, going from 1.01% for the Euro-11, -0.73% for the EU-3 and 1.10% for the OECD-6 during the period 1980-1991 to, respectively, -1.58%, -1.93% and 1.51% during the SGP period.¹⁹

The same effect can be observed in Figure 1 that displays the dynamics of the average CAPD for the three groups of countries under consideration. There, the MT and SGP periods are separated by the two vertical dashed lines in the years 1992 and 1998. That figure shows that just after 1992 there was an abrupt fall in the averages values of the CAPD for all groups of countries. During the SGP period, however, the CAPDs have gone up, albeit they stayed at a lower level than during the period 1980-1991 (except for the OECD-6, for which the CAPDs have on average gone to a higher level than that during the first subperiod). That figure also shows that the difference between the average CAPD levels of Euro-11 and EU-3 was larger throughout 1992-1997, and has become significantly smaller in the recent period. Conversely, after 1997, the OECD-6 has run higher cyclically-adjusted levels of deficit than the other two groups.

In addition, Table 2 and Figure 2 provide a simple analysis of Question 2 and the discretionary fiscal policy response to the business cycle in the OECD “industrialized” countries. Table 2 also displays the unweighed averages of the output gap among OECD developed countries during the period 1980-2007 and its subperiods. There, we observe that for all three groups of countries, the MT-period was characterized by a recession with large negative average values of the output gap (-1.61% in the Euro-11, -1.82% in the EU-3 and -1.90% in the OECD-6). By contrast, the period 1998-2007 constitutes an upturn phase with a boost in GDP growth rates in the end of the nineties in those economies. As a consequence, the average output gaps for all three groups of countries were positive (0.22% in the Euro-11, 0.21% in the EU-3 and 0.40% in the OECD-6), even though the most recent period (2006-2007) has not been expansionary for the majority of

¹⁹Although the numbers for the CAPD look rather small during the first subperiod and the MT period, in both periods the stock of debt grew fast, especially for the Euro-11 and the EU-3. Table 8 of Appendix A illustrates this fact by displaying large total deficit averages during those two subperiods for these groups of countries. The difference between the CAPD and total deficit is accounted for by the effect of the automatic stabilizers and interest outlays on the stock of debt.

the countries in the Euro zone.²⁰

Figure 2, in turn, displays scatter plots of the CAPD against the output gap. The charts are separated by group of countries and period of analysis. Each one of them presents a regression line estimated by simple OLS. The figure and the non-significance of the regression lines in the figure reveal the heterogeneous behavior of fiscal authorities with respect to the business cycle. For the first period of analysis (1980-1991), the scatter plot suggests that Euro-11 fiscal authorities provided on average a discretionary procyclical response to the output gap. The CAPD generally went up when the output gap was positive. This outcome, in line with the findings of Gali and Perotti (2003), is reinforced by the upward (albeit non significant) slope of the regression line.

Throughout the time span 1992-1997, the relationship between discretionary fiscal policy and the output gap among Euro-11 countries has become even more heterogeneous. The regression line shows a countercyclical response for the Euro-11 during the MT, even though the fiscal authorities did not respond cohesively to the business cycle. For the EU-3 and the OECD-6 fiscal policy evolves into more countercyclical and acyclical responses, respectively, conveying a clear distinction between those two groups during that period. During the SGP period, however the Euro-11 discretionary fiscal response returns again to its procyclical trend. This outcome goes against what one would expect if the provisions of the SGP are abided, in particular if it aims for countries to strive for medium term balance or surplus. This procyclical tendency is also shared by the OECD-6 group of countries, whereas EU-3 continues to show a countercyclical response after 1998. Those results already suggest that the European countries outside of the Euro area have had a better fiscal behavior than the procyclical Euro-11 countries during the SGP, showing that the Pact has not been able to correct this undesired behavior for Euro-11.

Finally, Figure 3 displays the OECD measure of the total deficit (in percent of actual GDP) for our sample of countries during the period 1980 to 2007. There, a horizontal dashed line marks the 3% deficit ceiling. We observe from the figure that several countries started in 1992 with total deficit higher than 3% of GDP. After 1998, the number of countries above that level dropped to just a few. Among EU-3, only the United Kingdom exceeds the 3% level of total deficit as measured by the OECD (in 2003 to 2005, and 2007). Among OECD-6, after 1998, the 3% deficit level was only exceeded by Japan and the U.S. in several years. During the period of implementation of the SGP, eight countries have at some point in time exceeded the 3% deficit level : Austria (in 2004), Germany (in 2002 to 2005), France (in 2002 and 2004), Greece (in 1998 to 2005, and 2007), Italy (in 1998, and 2001 to 2006), Netherlands (in 2003), Portugal (in 1998, 2001, 2004 to 2006), and Spain (in 1998).

In sum, these tables and figures show an improvement in the fiscal performance of Euro-11 countries during the MT period and a fatigue or at least stabilization of this

²⁰The positive average output gap during 1998-2007 for the Euro-11 in Table 2 and Figure 2 seems to be in part driven by Ireland as well.

process for several countries after the introduction of the SGP.

3 Estimation results

3.1 Effects of the MT and the SGP on the Euro-11

Our econometric analysis start by estimating equation (1) using only the Euro-11 sample of countries. Table 3 displays the results. There, each column reports the results of a different specification of the fiscal reaction function (1) using various combinations of testing variables. In all of them, we report the average fixed-effect for the regression, α , as well as the vector $X_{i,t}$ of control variables. Thus, Column (1) reports the estimations only with control variables included. Column (2) includes the time dummies for the MT-period and the SGP-period. These time dummies account for differences in the average value of the cyclically adjusted primary deficit for the Euro-11 during the two periods, 1992-1997 and 1998-2007, when compared to the previous period of 1980-1991. Column (3) accounts for differences in the responses of our discretionary deficit variable to the output gap during the periods of the fiscal rules. This is done by interacting our time dummies with the output gap variable. Column (4) incorporates the two aforementioned sets of variables together. Column (5) estimates equation (1) including as additional variables the (adjusted) excessiveness of the deficits when the deficit ceiling is binding during the MT- and SGP-periods. Columns (6) and (7) combine this set of testing variables with each of the previous testing sets, namely the dummies for the MT- and SGP-periods and their interactions with the output gap, respectively. Finally, in Column (8) the three sets of testing variables are all jointly included.²¹

From Table 3, we observe that in all columns the average fixed effect α for Euro-11 is positive and around 1 percent of potential GDP. The lagged cyclically adjusted primary deficit, $pdefay(-1)$, is highly significant and positive with values close to 0.8. This outcome demonstrates the strong persistence in the CAPD in the Euro-11 countries. The coefficient of $ggflq(-1)$ is negative and also highly significant with values equal to 0.02. Therefore, an increase of one percentage point in the lagged government debt/GDP ratio causes a decrease in CAPD by 0.02%.²²

Private consumption inflation is insignificant in all regressions. This result might be related to the expected conflicting effects of inflation in discretionary fiscal policy, and therefore, to the heterogeneity of the fiscal responses to inflation among the Euro-11 countries. Further, the highly significant coefficient for ele in all columns indicates the existence of political budget cycles in the Euro-11. In electoral years the average CAPD rises by around 0.76 percentage points in those countries. Finally, the response of our deficit variable to the output gap is not statistically significant for the Euro-11 in any

²¹The standard errors of the coefficients of all estimations are based on White's (1980) correction. This procedure corrects for autocorrelation, which typically arises in panels with a large time span.

²²Annett (2006) obtains similar estimates.

of the columns of Table 3. As Figure 2 suggests, this outcome might be attributable to the large heterogeneity in the discretionary fiscal responses to the output gap in those countries.

Regarding the effects of the MT and the SGP on the level of the cyclically adjusted primary deficit in the Euro-11, Table 3 shows that those fiscal rules have generally not been effective in reducing the CAPD. This finding, confirmed by the robustness tests in Section 4, is derived from the non significant coefficients of the time dummies $d9297$ and $d9807$.

Variables gap , $d9297*gap$, $d9804*gap$ in Table 3 explore the issue whether the MT and the SGP have affected the fiscal responses to the business cycle in the Euro-11. Thus, in columns (3), (4), (7) and (8) of Table 3, the coefficient on gap represents the response of the CAPD during the period 1980-1991, while the two interaction terms correspond to differences in the responses during the MT- and SGP-periods. The results, in accordance with Candelon et al. (2007), suggest that neither the MT, nor the SGP, has significantly affected the cyclicity of the fiscal authorities' responses to the business cycle. Thus, the fiscal restrictions have not forced countries to consistently "save in good times and spend in bad times".

The last test that we make in Table 3 is on the effects of the MT and the SGP when the deficit ceiling was binding (higher than 3 percent). In view of the significant and negative coefficients of mas and sgp in columns (6) to (8) of Table 3, we conclude that:

Result I *Fiscal policy as measured by the primary cyclically adjusted deficit has been contractionary in instances when the deficit ceiling was binding, more strongly during the run-up towards the Euro, but also after the formation of the monetary union in Europe.*

Therefore, Result I suggests that during both periods, 1992-1997 and 1998-2007, fiscal discipline increased whenever the ceilings of the MT and SGP were binding. Nevertheless, this effect seems to be stronger during the MT than during the SGP, which can be inferred by the lower value and significance (at most at 5 percent) of the coefficient of sgp .

3.2 Comparison of the Euro-11 with other OECD countries

3.2.1 The Euro-11 versus the EU-3

To compare the fiscal responses of the EU-3 and Euro-11 groups of countries, we first merge the two samples into an EU-14 sample. Given that some of the coefficients of the control variables can differ between the Euro-11 and the EU-3 samples, we estimate this merged sample allowing for differences in the coefficients of each control variable between those two groups of countries.²³ For that, we interact the coefficients of those variables

²³We also estimate the fiscal reaction function (1) for the aggregate sample EU-14 without any distinction between the coefficients of the control variables for Euro-11 and EU-3. The estimates are displayed in Table 10 in Appendix C. Roughly, the coefficients are closer to those in Table 3 since the Euro-11 sample contains almost four times more countries than the EU-3.

with the dummy *deu3*, which assumes a value of 1 for Denmark, Sweden and the UK, and 0, otherwise. The results, relegated to Table 11 in Appendix C, show that the coefficients of *ggflq(-1)*, *ele*, and *gap* are indeed statistically different for the Euro-11 and the EU-3. Hence, when comparing the effects of the MT and SGP between Euro-11 and EU-3 in Table 4, we include those controls while allowing for their coefficients to differ between the two groups by interacting them with the dummy *deu3*.

To distinguish between the Euro-11 and EU-3 in terms of the effects of our testing variables, we also interact these variables with *deu3* in Table 4. Thus the regressions in this table involve two types of testing variables. Those that are not interacted with *deu3* measure the differences in fiscal behavior between the Euro-11 over the relevant period (1992-1997 and/or 1998-2007) and the average for the EU-14 over the period 1980-1991. Those that are interacted with *deu3* estimate departures of the EU-3 sample from the outcomes of the Euro-11 during the period under examination.

Furthermore, since the interaction terms only check for statistical differences between the EU-3 and the Euro-11, at the end of Table 4 we also sum the coefficients of a relevant variable with and without the interaction term, and then use the Wald coefficient test to check if this sum is statistically different from zero. This analysis tests whether the coefficient of the particular variable is statistically different from zero for the EU-3. Other than the Wald tests, we arrange Table 4 in the same way as Table 3.

The results in Table 4 show that the coefficient of lagged government debt is statistically different and more negative to the EU-3 countries than to the Euro-11. This means that the former set of countries aims their fiscal policy more strongly towards debt sustainability than the latter. Further, the political budget cycle in the EU-3 countries seem to be slightly smaller than in the Euro-11 countries. Even though the difference between those two groups of countries is not really significant. The same analysis is also performed for the output gap but again the differences between the two groups are marginal.²⁴

Concerning the differences of effects of the MT and SGP on the average fiscal stance, we find that the average fiscal stance of the Euro-11 during the MT- and SGP-period were not significantly tighter than that for the EU-14 over the period 1980-1991. However, over the MT-period, the EU-3 had a statistically higher average CAPD than that for the Euro-11 group of countries, as the interaction term *d9297*deu3* conveys. Wald tests are also used to check whether during the MT-period, the EU-3 average fiscal stance (the sum of the variables *d9297* and *d9297*deu3*) was different from zero. The results show that this test is not significant, suggesting that the average fiscal stance of the EU-3 has not changed after the start of the MT. Regarding the SGP-period, no statistical difference is observed between the average fiscal stances of the two groups of countries. So, those two groups have a similar average fiscal stance, which does not statistically differ from that of the period 1980-1991 as well.

²⁴We do not explicitly test whether the coefficient of *ggflq(-1)* is different from zero in Table 4, since the coefficient for the EU-3 is statistically different and more negative than the one for the Euro-11.

Next, we investigate how the Euro-11 and EU-3 differ in the response of their fiscal stances to the output gap during the MT and SGP periods. To this end, we incorporate into the regressions the interaction terms $d9297*gap$, $d9807*gap$, $d9297*deu3*gap$, and $d9807*deu3*gap$. When the coefficients of gap and $gap*deu3$ are estimated in the absence of the other interaction terms, they provide us with the cyclically-adjusted fiscal responses to the output gap for Euro-11 and EU-3 over the entire sample period (1980-2007).

The coefficient estimates of $gap*deu3$ in Columns (1), (4) and (5) of Table 4 are not highly significant, indicating unimportant differences between the Euro-11 and EU-3 in their responses for the entire sample period. However, during the MT-period, Denmark, Sweden and the UK seem to have followed a more countercyclical fiscal response on average than the Euro zone countries, as the highly significant coefficient of $d9297*gap*deu3$ and the rejection of the Wald test for $d9297*gap + d9297*gap*deu3$ equal to zero, suggest. The coefficient of $d9297*gap$ in Column (8) also indicates that on average the fiscal response of the Euro-11 during the MT period was different and slightly more countercyclical than that in the period before 1991.

Further, for both groups of countries, the fiscal responses to the output gap during the SGP period do not seem to have differed from that during the period 1980-1991, nor from each other. Hence, the SGP has not led to significant differences in fiscal responses between the two groups of countries. Beyond that, during this recent period, countries seem to have shifted to a slightly more procyclical fiscal behavior.

Finally, we compare the fiscal responses of the two groups of countries when the deficit ceiling was binding by including the interaction terms $mas*deu3$ and $sgp*deu3$ into the regression specification of Table 4.²⁵ The negative and highly significant coefficient of mas and, in addition, the significant coefficient of $mas*deu3$ imply that:

Result II *During the MT-period, the fiscal stance of both the EU-3 and the Euro-11 was tightened whenever the deficit ceiling was violated, with this effect being more pronounced for the EU-3 group of countries.*

A possible explanation for this behavior in the EU-3 could be that those countries did not know in advance if they would join the Euro area at some point. In particular, Denmark and Sweden held referenda regarding potential participation in the Euro zone.²⁶ Hence, fiscal policy in those countries might have been influenced at least to some extent by the provisions of the Maastricht Treaty.

In turn, the variable sgp is significant and negative for the Euro-11 sample at least in Column (7) of Table 4. This corroborates Result I of the previous subsection. For the EU-3 sample, however, the coefficient of $sgp*deu3$ displays positive values suggesting that

²⁵Of course, one can argue that the computation of those variables for the EU-3 group is meaningless. However, since our objective here is to compare the response of our "treated" group, Euro-11, with a control group, EU-3, differences in the coefficient estimates of those variables become a relevant testable hypothesis.

²⁶In a referendum on September 28, 2000, the Danish rejected with a narrow margin the proposal to join the Euro. The same happened in Sweden on September 14, 2003.

UK (the only country in the EU-3 sample to exceed the 3% limit) has not fully abided by the rules of the SGP.

3.2.2 The Euro-11 versus the OECD-6

To compare the Euro-11 with the OECD-6, we substitute the EU-3 by the OECD-6 sample of countries and perform a similar analysis to that done above. Thus, we merge the samples Euro-11 and OECD-6 (sample OECD-17), and estimate once more the model of Table 3 to test for statistically significant differences in each one of the control variables between the two groups of countries. The distinction between them is carried out via the interaction of each one of the control variables with the dummy *doecd6* (see Table 1).²⁷ The coefficients of the control variables that present relevant statistical differences between Euro-11 and OECD-6 are then estimated separately.

Table 5 presents the results with the OECD-17 sample of countries. There, we observe that the lagged dependent variable exerts a significantly different effect for the two groups of countries, with the coefficient of *pdefay(-1)*doecd6* conveying a higher average inertia in the fiscal policy of OECD-6 countries compared to those of the Euro-11. The dummy for political budget cycles, *ele*, is another variable significantly different, but now weaker for the OECD-6 than for the Euro-11. This is also confirmed by a Wald test showing that the coefficient of the election variable for the OECD-6 is not significantly different from zero.

As regards to the comparison of the average fiscal stances, the positive and significant coefficient of *d9807*doecd6* indicates that the average CAPD levels of the Euro-11 and the OECD-6 are slightly statistically different (in most of the cases at 10%), with the Euro-11 displaying on average a marginally tighter fiscal stance than the OECD-6 during the SGP-period. Figure 3 reveals that this disparity in the average fiscal stance between the Euro-11 and the OECD-6 can be mainly explained by the expansionary fiscal policies pursued by the US and Japan in the last years.

In turn, the response of the CAPD to the output gap for the two groups of countries during the MT- and SGP-periods do not differ from each other. That conclusion gives support to the one contrasting the Euro-11 with the EU-3 and evinces that the European fiscal constraints have not induced Euro-11's fiscal authorities to react more counter cyclically than other "industrialized" countries.

Moreover, comparing the fiscal behavior of the two country groups in cases when the total deficit ratio was higher than 3%, we obtain that during the MT, the average Euro-11 fiscal stance became significantly tighter than that of the sample of OECD-17 countries in the period 1980-1991. However, that fiscal response to *excessive deficits* was not significantly different from the one of the OECD-6 group of countries. Such finding,

²⁷The results of both procedures are presented in Appendices D and E – see Tables 13 and 14, respectively. Further, Appendix E presents estimations similar to those underlying Table 3 for the OECD-17 with homogenous coefficients on the control variables, i.e. without allowing for differences between the Euro-11 and the OECD-6 as regards to their control variables. Table 15 shows the results.

corroborated by Figures 1 and 3, reinforces Result II and suggests that the sharp reduction in fiscal deficits during the mid-1990s, in particular in cases of *excessive deficits* was a common trend among “industrialized” countries rather than an unique impact of the MT in the Euro-11.

Regarding the effectiveness of the SGP to tackle *excessive deficits*, even though the variables *sgp* and *sgp*doecd6* have the expected signs in Table 5, their coefficients are not statistically significant. This finding, combined with the result of the Wald test for the *sgp* in the OECD-6, suggests that during the SGP-period excessive deficits have not significantly affected either the behavior of the Euro-11 or OECD-6 fiscal authorities.

In sum, the findings of this section convey that the fiscal behavior of the Euro-11 and of other “industrialized” countries have not significantly differed during the SGP-period. Moreover, discretionary fiscal responses to the business cycle in the Euro-11 have not changed after the Treaty was signed and, if anything, they have been more procyclical than in EU-3 groups of countries.

3.3 The Reform of the SGP

In an extraordinary meeting in March 2005, the EU finance ministers reached a deal on reforms to the SGP that were made official in the EU summit of heads of state meeting in June of the same year. Such reform changed several items of the previous pact in its both preventive and corrective arm.²⁸ Under the preventive arm, the reform introduced various refinements to the earlier provisions concerning the setting of a progress towards sound medium-term budgetary positions and to the elements that are to be taken into account when assessing Member States’ fiscal positions. Regarding the changes in the corrective arm, they went in direction of introducing more flexibility into the excessive deficit procedure (EDP), in particular by relaxing, adding specificity, or clarifying the availability of various escape clauses.

This section provides a first empirical assessment of the impacts of this reform. In order to do so, it splits the previous time dummy for the years of the Pact (*d9807*) in two, covering the two different phases of the SGP. Hence, a new time dummy *d9805* equals to one during the period in which the first version of the SGP was in place (1998-2005), whereas the time dummy *d0607* values one throughout the more recent period of the reformed SGP (2006-2007).

Table 6 displays the estimation results using the Euro-11 sample of countries. There, we observe that within the time span of the new reformed SGP, the average fiscal stance in the Euro area has decreased (as also suggested by Table 2), although not highly significantly. A stronger effect is obtained in the discretionary fiscal response to excessive deficits. As the estimated coefficients of *sgp1* and *sgp2* convey, throughout the period in which the first version of the SGP was in place, the fiscal response to total deficits higher than 3%

²⁸For a description and analysis of the reformed SGP see, among others, Buti et al. (2005), Coeuré and Pisani-Ferry (2005), Buti and Sapir (2006), Chang (2006), and Morris et al. (2006).

in the previous year was not significant. However, in the more recent years (from 2006 to 2007) that response has been highly significant and negative towards lower cyclically adjusted primary deficits (or even primary surpluses).

These results suggest that the significance of *sgp* in Table 3 is mainly due to the more recent period of the reformed SGP. This way, they imply that the current version of the SGP has been more effective than its previous one in disciplining fiscal policy. Nevertheless, such conclusion should be qualified and taken only as indicative. That is because of the still short period after the SGP's reform (just two years), which in fact, has been characterized by an expansionary, or at least, less contractionary period for the Euro zone (see Table 2). Such conjuncture eases the adoption of sounder fiscal policy, not only leading to higher tax revenues, but also lowering fiscal statistics measured as a ratio to GDP. A second qualification for the result is the fact that fiscal statistics for a particular year tend to worsen over time as they are revised and new statistical methodologies are put in place.²⁹

Furthermore, the cyclical response of the European fiscal authorities is not yet significant during the period of the SGP's reform. This suggests that such reform has not prompted again European fiscal authorities to follow a countercyclical fiscal policy. That is even more remarkable given the higher growth rates ("good times") in the last two years in those countries as discussed before.³⁰

4 Robustness tests

Several robustness tests challenge the results discussed so far in this section. The first test splits the Euro-11 sample of countries into two subgroups, one formed by "large" countries (Germany, France, Italy, and Spain) and another composed of "small" countries (the remaining seven countries). Hence, it estimates the fiscal reaction function (1) separately for each one of these subgroups.

The second robustness test employs real-time data instead of revised data to estimate the fiscal reaction (1). An argument for such check is that with real-time data, one can better evaluate the intentional stance of fiscal policy based upon all the information available to policymakers at the time of the fiscal planning.^{31,32}

So far, we have assumed that the coefficients in the fiscal reaction function (1) are equal across countries. Because our sample covers a large time span and because standard

²⁹On the impacts of revisions in fiscal statistics see, among others, Candelon et al. (2007), Cimadomo (2007), and Giuliadori and Beetsma (2008a).

³⁰Indeed, Marinheiro (2004) and Candelon et al. (2007) shows that fiscal policy in Europe tends to be procyclical particularly in upswing times.

³¹It is important to stress that notwithstanding this test, the focus of this paper remains on the evaluation of the actual fiscal policy conduction by European fiscal authorities.

³²For empirical analysis employing real-time data and more on the rationale for its use, see Golinelli and Momigliano (2006), Cimadomo (2007), Bernoth et al. (2008), and Giuliadori and Beetsma (2008a and 2008b). Jacopo Cimadomo and Massimo Giuliadori are here gratefully acknowledged for providing their datasets, updated by the author.

pooled estimators (such as fixed effect models) for our dynamic panel model are subject to potential bias when the parameters are heterogenous across countries and the regressors are serially correlated, it may be preferable to estimate the coefficients of some of the control variables separately for each country. Therefore, we also estimate function (1) for the Euro-11 sample allowing for individual-country coefficients for the output gap.³³ In the same way, another interesting test is to check the impact of our testing variables when the positive and negative values of the output gap are split (see Giuliadori and Beetsma, 2008b). For that, we define two new variables gap_{pos} and gap_{neg} that are equal to gap if the value of this latter variable is positive and negative respectively and zero otherwise (see Table 1).

Two final robustness checks add firstly five economic and then more six political variables to the estimation of the function (1).³⁴ The economic variables are the ex-post real long-term interest rate based on the private consumption deflator ($irlrc$), the share of non-working population (nwp), trade openness ($open$), the relative economic country size defined as the ratio of real GDP to the sum of the real GDPs of the countries in the relevant sample ($size$), and economic volatility defined as the standard deviation of real economic growth over the preceding 10 years (vol).

The literature identifies two opposite reasons to control for real long-term interest rate. On the one hand, as Roubini and Sachs (1989) explain, the budget deficit may be a positive function of $irlrc$, because an increase in this variable reflects higher debt servicing costs, which, if transitory, should be accommodated by a temporary increase in the budget deficit. On the other hand, Fatás and Mihov (2003) point out that, besides its direct effect on interest payments, interest rates may also affect the budget negatively via their effects on public infrastructure investments. The higher is the real interest rate, the smaller is the net present value of the investment and thus the weaker is the incentive to invest.

The share of the non-working population (i.e. the sum of those younger than 14 and older than 64 divided by the total population) captures potential implications of "baby booms" and ageing for the budget, because these demographic variables affect spending on education, health care and pension benefits.³⁵ Trade openness is included in the analysis, because there are reasons to believe that this variable interacts with fiscal policy. For instance, Rodrik (1998) argues that open economies are particularly vulnerable to risk. Hence, it may be important for the government to facilitate consumption smoothing by operating a counter-cyclical fiscal policy.

Two arguments support the use of the relative economic country size as a control variable. As Annett (2006) explains, from the political side, small countries are simply

³³We also tested estimations allowing for individual-country coefficients for inflation. The outcomes of this test, relegate to Appendix G.3, show that our main findings do not change.

³⁴Table 1 defines in detail these variables, while Appendix G describes their construction and intuition.

³⁵Because large peaks in the number of children are absent in our sample, it would be more interesting to control only for the effects of the ageing process. However, this variable is not available on a regular basis for all the countries of our sample. Therefore, we have used nwp instead. See Appendix G for more details.

more accustomed to external influences over policy. They also tend to have less bargaining power so that the loss of reputation from violating the fiscal rule is greater. Second, smaller countries could also fear tangible pecuniary losses such as reductions in structural funds. Large countries may view the cost of profligate fiscal policy to be low, given that they suffer little diminution in reputation. Moreover, country size is also found to significantly explain the size and volatility of government spending, with smaller countries having a positive effect on these two variables (see Alesina and Wacziarg, 1998; and Furceri and Poplawski Ribeiro, 2008).

We also control for macroeconomic volatility since Talvi and Vegh (2000) predict that fiscal procyclicality is positively correlated with that variable. Their argument is based on the political infeasibility of running large surpluses during booms. Another argument to control for macroeconomic volatility comes from Anett (2006), who claims that the SGP may act as an external anchor for countries prone to macroeconomic volatility. In this sense, the pact can garner credibility for more volatile countries and take over the role once played by exchange rate coordination mechanisms such as the Bretton Woods system.

The six political variables, extracted from Armingeon et al. (2005) and available until 2003, are the cabinet composition, *gpart*; the new party composition of the cabinet, *gnew*; the ideological gap between the old and new cabinet, *ggap*; the annual number of changes in government, *gchan*, the type of government, *gtype*;³⁶ and the index of fractionalization of the party system, *rae*.

The first three variables capture the political ideology (left or right) of the cabinet in power, and changes in this ideology due to new cabinet formations. These variables might affect fiscal policy because different ideological views about the government's role affect the amount of public spending. So, given the demands of their electorate, we would expect countries with a predominance of left governments (or recent changes into this ideological direction) to be associated with higher public spending. The frequency of changes in the government is often used to explain budget deficits.³⁷ As Roubini and Sachs (1989) argue, the shorter is the expected tenure of the government, the more difficult it may be to achieve cooperation among the coalition partners. Thus, a higher frequency changes in government exposes the fragility of the political governance in a country, increasing the effective rate at which politicians discount the future.³⁸ In the same way, the type of government and the index of fractionalization of the party system capture the fragility of the government and the political structure of the country, thereby affecting the determination of fiscal

³⁶The classification of this variable takes into account whether the government has a majority in the parliament as well as the number of parties that forms the coalition. The intuition is that if a government has a majority and the lower is the number of parties forming it, the greater is its governability. For details, see Appendix G.

³⁷Woo (2003), for example, expects that public deficits should be larger in countries with more frequent changes in the governing party.

³⁸This variable is also strongly correlated with the frequency of elections in countries with a parliamentary system, which forms the majority of the countries in our sample. So, whenever *gchan* was included, the dummy for parliamentary elections *ele* was removed from the regressions.

deficits.³⁹ This argument is in line once more with Roubini and Sachs (1989) who find that the size and persistence of the budget deficits in the industrial countries in the seventies were greater when the government was divided (for example, in the case of multiparty fragmented coalitions rather than one-party governments or governments with fewer and stronger parties).

Table 7 summarizes the results of all robustness tests. There, each column displays the results for each one of the tests, identified in the head of the column. Moreover, for each explanatory variable, its White's period robust coefficient standard error (in parenthesis) is reported besides its estimated coefficient value. The last line of Table 7 presents the sample period analyzed in each column, given the discrepant data samples used in each test. All other statistics reported in the previous tables are also presented there.

The first two columns of Table 7, "Big Countries" and "Small Countries", display the results of the regressions for the samples of large and small Euro-11 countries. There, we observe that lagged government debt $ggflq(-1)$ is not significant for large Euro-11 countries. This indicates that discretionary fiscal policy is on average not significantly responsive to debt sustainability during the sample analyzed (1980-2007) in those countries. For small countries, however, that variable is significant and displays the correct negative sign. Regarding the testing variables, only *mas* is significant in the sample of large countries. This variable is, in addition, more significant for this group of countries than for the sample of small countries. Further, the fiscal reaction to the output gap in the MT-period and the *sgp* variable are also both negative and significant for smaller countries. These findings indicate that large countries were only reactive to the excessive deficits in the MT-period, whereas small countries kept their responsiveness throughout the SGP. Moreover, the latter group of countries also conducted countercyclical fiscal policies during the MT. These findings suggest that European's fiscal rules have been more effective in this group of countries than in the former one, in special during the SGP.

Next column conveys the results for the test employing real-time data. Such dataset is only available during the period from 1995 to 2005 for our sample of countries. Thus, in this test, we skip the variables related to the MT- and focus only on the SGP-period. The results, in accordance with Cimadomo (2007), show that European policymakers have not been intentionally responsive to debt sustainability, i.e. $ggflq(-1)$ is not significant. Further, fiscal policy is significantly countercyclical prior to the SGP-period when using this dataset. Yet, after the introduction of the Pact, this intentional response loses significance and becomes acyclical. Concerning the excessive deficits, we find that only during the MT-period, fiscal authorities intentionally reacted significantly to them, whereas throughout the SGP their response has lost again significance. Such findings point out that the lower effectiveness of the SGP compared to the MT can be traced back to the intentional fiscal reactions and is not only explained by data revisions or bad shock surprises.

Next two robustness tests, one relaxing the assumption of homogeneous coefficients

³⁹The index of fractionalization of the party system is computed using the formula in Rae (1968).

for output gap in all Euro-11 countries and the other splitting output gap in positive and negative values, present very similar estimation results. In particular, both variables accounting for the fiscal response to excessive deficits exhibit very significant and negative coefficients in those regressions.

The same is true when we instead add further economic and political variables as reported in the last two columns of Table 7. By including only the additional economic variables, as reported in the Column "Economic", we further observe that the coefficient of trade openness, *open*, is significant and negative.⁴⁰ Hence, more trade openness seems to lead to a lower CAPD among Euro-11 countries. According to Annett (2006), a possible explanation for that result is the economic vulnerability associated with more openness, which forces fiscal authorities to be more disciplined in order to have more flexibility in case of negative trade shocks. A final finding with the robustness test including additional economic variables is the significance and negative value of the coefficient of output gap during the MT-period. Such outcome, even though not highly significant and robust, points out to a more countercyclical fiscal response in Euro-11 countries throughout the MT-period than during the SGP-period.

Finally, by adding further the political variables to this augmented set of control variables (last column of Table 7), we obtain a marginal significance of the variable for country size (*size*) and a more significant effect for the political variable *ggap*. The dummy for parliamentary years of election (*ele*) instead loses its significance due to multicollinearity with other political variables.⁴¹

The significance of *size* reinforces the finding that fiscal policy reactions differ in large and small countries in Europe. Further, the positive value of *ggap* unexpectedly suggests that changes in the political cabinet from leftist to rightist parties are associated with more discretionary fiscal deficits in the Euro-11 countries. That is because variable *ggap* calculates the ideological gap between the old and new political cabinet formed in the Euro-11 countries and assigns a higher positive value the more leftist is the old party in power compared to new incumbent cabinet.

All in all, these robustness tests tend to confirm that both European fiscal rules MT and SGP were effective in curbing excessive deficits in the Euro-11 group of countries, even though the MT had a stronger effect than the SGP. Concerning the countercyclical fiscal response, in some of these tests the MT-period appears as a significant period for this type of fiscal response, but never does the SGP-period.

⁴⁰In Table 7, we present the estimations of equation (1) including the additional economic variables altogether. In Appendix G.1 we have also tested the isolated impact of each additional variable, by including each one per time in different estimations.

⁴¹We also perform estimations including each one of the additional political variables per time in the regressions. The results are relegated to Appendix G.2.

5 Conclusion

The Maastricht Treaty has now been in existence for fifteen years. Its creation marked a new era for European fiscal policy with the introduction of strict fiscal rules and restrictions that were later reinforced with the introduction of the Stability and Growth Pact. This paper investigates the economic effects of those fiscal rules and restrictions on discretionary fiscal policy in Europe.

Based on our empirical results, we reach the following conclusions:

- a. On average, the level of the CAPD in the Euro-11 has not significantly decreased during the MT-period or SGP-period, indicating that those rules have not been effective in reducing Euro-11's fiscal stance.
- b. The MT and the SGP have also not succeeded in making Euro zone fiscal policy countercyclical. In addition, throughout the MT-period fiscal policy in the EU-3 became more countercyclical than that of the Euro-11 while the average fiscal response to the business cycle of the OECD-6 did not differ from that of the Euro-11. During the SGP-period the fiscal responses of both control groups (EU-3 and OECD-6) were also not statistically different from that of the Euro-11.
- c. Favorably, our results demonstrate that the MT and the SGP have been on average effective in reducing the CAPD when the actual deficit ceiling was exceeded in the Euro-11. However, the MT has a more significant effect than the SGP, in particular for big Euro-11 countries. Further, during the MT-period, the EU-3 responded even stronger to excessive deficits than the Euro-11, suggesting a common trend in tackling excessive deficits among European countries rather than an unique impact of the MT in the Euro-11.
- d. The reform of the SGP has induced so far a more significant and negative response of Euro-11 countries to excessive deficits than the previous version of the Pact.

This paper demonstrates, therefore, that both the MT and the SGP have been effective in inducing a fiscal tightening in response to excessive deficits. However, if we just focus on big Euro-11 countries, or if the reduction of the average level of deficits and countercyclical fiscal behavior are also considered as measures of effectiveness of the EU fiscal framework, then our verdict is less positive. In addition, the MT seems to have been more stringent than the SGP, although the response to excessive deficits was also observed in other EU countries and not only in the Euro-11.

These conclusions imply the need for improvements of the SGP, especially if the enforcement of countercyclical fiscal policies in the Euro zone is seen as an objective of the SGP. An amended pact should enforce more fiscal discipline (lower deficits) in big Euro-11 countries. Moreover, it should create incentives to countercyclical fiscal behavior in the Euro zone with lower deficits (or higher surpluses) during boom phases of the business

cycle and more flexibility in the application of sanctions during recessions. This is in line with the recent revision of the Pact in 2005, which has already presented more encouraging results. However, the real test for the reformed SGP is still to come in the aftermath of the current financial crisis, when such countercyclical behavior will be key to conciliate economic growth with fiscal sustainability in the Euro zone.

Our analysis also leaves some empirical questions open to further examination. For example, a comparison of the Euro-11 only with other countries that have also adopted strict fiscal rules (Australia, Canada and the UK, for instance) would help us to understand differences in their outcomes. Second, it would be important to investigate which tools (increase in taxation or cut in expenditures) fiscal authorities have used to reduce the CAPD in cases of excessive deficits.

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Tables and figures

Table 1: List of Variables (in alphabetical order)

Variables of the Main Estimations	
α	Average fixed-effect in the estimation.
<i>d0607</i>	Time dummy for the period 2006 to 2007 (Reform of the SGP): equals one during the years 2006 to 2007 for all countries and zero otherwise.
<i>d9297</i>	Time dummy for the period 1992 to 1997 (First Phase of EMU or Maastricht Treaty): equals one during the years 1992 to 1997 for all countries and zero otherwise.
<i>d9807</i>	Time dummy for the period 1998 to 2007 (Stability and Growth Pact): equals one during the years 1998 to 2007 for all countries and zero otherwise.
<i>deu3</i>	Country dummy for three EU member countries that does not belong to Euro zone: equals one for Denmark, Sweden and UK in all years and zero otherwise.
<i>doecd6</i>	Country dummy for six OECD countries that does not belong to Euro zone: equals one for Australia, Canada, Iceland, Japan, Norway and the US in all years and zero otherwise
<i>ele</i>	Dummy for years of parliamentary elections: equals one in years of parliamentary elections in each country and zero otherwise.
<i>gap</i>	Output gap.
<i>ggflq(-1)</i>	Lagged government debt (as % of actual output).
<i>inf</i>	Inflation of private consumption.
<i>mas</i>	Excessive Deficits variable for the Maastricht Treaty: accounts for the effects of the MT in cases when the deficit exceeded the 3% limit. See equation 2.
<i>pdefay</i>	Cyclically adjusted primary deficit (dependent variable).
<i>pdefay(-1)</i>	Lagged cyclically adjusted primary deficit.
<i>spp</i>	Excessive Deficit variable for the SGP: accounts for the effects of the SGP when total deficits exceeded the 3% limit during 1998-2007. See equation 2.
<i>spp1</i>	Excessive Deficit variable for the former SGP version: constructed in the same way as <i>spp</i> but only between 1998-2005. See equation 2.
<i>spp2</i>	Excessive Deficit variable for the reformed SGP: constructed in the same way as <i>spp</i> but only between 2006-2007. See equation 2.
Additional Variables of the Robustness Tests	
Economic Variables	
<i>gap_{med}</i>	Median value of the coefficients of output gap <i>gap</i> , when that variable is estimated with heterogeneous coefficients per country.
<i>gap_{neg}</i>	Negative output gap: equals one for years of negative output gap in each country and zero otherwise.
<i>gap_{pos}</i>	Positive output gap: equals one for years of positive output gap in each country and zero otherwise.
<i>irlrc</i>	Ex-post real long-term interest rate, based on Private Consumption Deflator, in %.
<i>nwp</i>	Share of the non-working population.
<i>open</i>	Trade Openness.
<i>size</i>	Country size in terms of actual GDP
<i>vol</i>	GDP volatility in the previous ten years.
Political Variables	
<i>gchan</i>	Number of changes in government per year.
<i>ggap</i>	“Ideological gap” between new cabinet and old one.
<i>gnew</i>	New party composition of cabinet.
<i>gpart</i>	Cabinet Composition: index representing the political color (right or left) of the Cabinet in power.
<i>gtype</i>	Type of Government Coalition.
<i>rae</i>	Index of fractionalization of the party-system according to Rae (1968).

Table 2: Unweighed average of the Cyclically Adjusted Primary Deficit and Output Gap in the OECD-20 countries (as % of Potential GDP)

Country	1980-1991		1992-1997		1998-2007		2006-2007		1980-2007	
	<i>pdefay</i> ^a	<i>gap</i> ^b	<i>pdefay</i> ^a	<i>gap</i> ^b	<i>pdefay</i> ^a	<i>gap</i> ^b	<i>pdefay</i> ^a	<i>gap</i> ^b	<i>pdefay</i> ^a	<i>gap</i> ^b
AUT	0.45	-1.28	0.48	-0.32	-0.76	0.03	-1.16	-0.15	0.02	-0.61
BEL	0.02	-1.04	-4.25	-0.59	-5.06	-0.24	-3.93	-0.33	-2.71	-0.66
DEU	-0.10	-0.31	-0.06	-0.30	-0.33	-0.26	-1.76	-0.06	-0.18	-0.29
ESP	2.53	-1.33	0.09	-2.41	-2.03	-0.20	-3.09	0.10	0.38	-1.16
FIN	-2.16	1.00	1.18	-6.76	-3.99	0.15	-3.83	1.12	-2.10	-0.97
FRA	0.60	-0.32	1.61	-0.85	0.20	0.29	0.20	0.22	0.67	-0.21
GRC	4.03	0.30	-2.02	-1.22	-0.93	0.09	-0.79	0.81	0.96	-0.10
IRE	2.24	-0.55	-3.61	-2.43	-1.50	1.73	-1.46	0.19	-0.35	-0.14
ITA	3.48	-0.06	-3.45	-1.26	-2.36	-0.30	-2.16	-1.13	-0.09	-0.40
NLD	0.10	-1.12	-1.94	-1.22	-1.62	0.46	-2.49	-0.11	-0.95	-0.58
PRT	-0.08	-1.85	-0.80	-0.40	0.97	0.71	-0.52	-2.17	0.14	-0.62
DNK	-2.20	-0.33	-1.65	-1.05	-3.49	0.18	-4.19	2.08	-2.54	-0.30
GBR	-0.81	-0.31	2.21	-1.15	-0.55	0.30	0.96	0.03	-0.07	-0.27
SWE	0.81	-0.49	3.92	-3.28	-1.73	0.16	-1.80	1.10	0.57	-0.85
AUS	-0.38	-0.16	-0.14	-1.36	-2.71	0.05	-2.12	0.42	-1.16	-0.34
CAN	2.83	-0.55	-1.13	-2.93	-3.14	0.69	-1.77	0.27	-0.15	-0.62
ISL	1.55	1.52	-0.14	-4.61	-1.18	0.36	-4.02	2.32	0.21	-0.21
JPN	-0.49	-0.20	2.61	1.57	4.39	-1.10	1.27	0.27	1.92	-0.14
NOR	2.00	-4.15	7.36	-2.47	11.83	2.04	13.70	4.16	6.66	-1.58
USA	1.10	-0.82	-0.51	-1.57	-0.16	0.34	1.00	0.55	0.31	-0.57
Euro-11 ^c	1.01	-0.60	-1.16	-1.61	-1.58	0.22	-1.91	-0.14	-0.38	-0.52
EU-3 ^d	-0.73	-0.38	1.49	-1.82	-1.93	0.21	-1.68	1.07	-0.68	-0.48
OECD-6 ^e	1.10	-0.73	1.34	-1.90	1.51	0.40	1.34	1.33	1.30	-0.58
OECD-20 ^f	0.78	-0.60	-0.01	-1.73	-0.71	0.27	-0.90	0.48	0.08	-0.53

Source: OECD (2008) and own calculations.

Notes: ^a Cyclically Adjusted Primary Deficit. ^b Output Gap. ^c Euro-11 consists of Netherlands (NLD), Austria (AUT), Belgium (BEL), Finland (FIN), France (FRA), Germany (DEU), Greece (GRC), Ireland (IRE), Italy (ITA), Portugal (PRT), and Spain (ESP). ^d EU-3 consists of Denmark (DNK), Canada (CAN), UK (GBR), and Sweden (SWE). ^e OECD-6 corresponds to Australia (AUS), Norway (NOR), Iceland (ISL), Japan (JPN), and the USA. ^f OECD-20 consists of Euro-11 + EU-3 + OECD-6.

Table 3: Effects of the MT and the SGP on the Cyclically Adjusted Primary Deficit - Euro-11 (1980 - 2007)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
<i>a</i>	1.13*	1.33	0.78	1.12	1.15*	1.25	0.78	1.06
	(0.62)	(0.94)	(0.53)	(0.91)	(0.62)	(0.92)	(0.52)	(0.83)
<i>pdefay(-1)</i>	0.80***	0.79***	0.79***	0.79***	0.80***	0.79***	0.78***	0.78***
	(0.02)	(0.02)	(0.03)	(0.02)	(0.03)	(0.03)	(0.04)	(0.04)
<i>ggflq(-1)</i>	-0.02***	-0.02***	-0.02***	-0.02***	-0.02***	-0.02***	-0.02***	-0.02***
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
<i>inf</i>	-0.02	0.00	0.01	0.01	-0.03	-0.02	-0.01	-0.02
	(0.04)	(0.05)	(0.04)	(0.04)	(0.05)	(0.06)	(0.04)	(0.04)
<i>ele</i>	0.77***	0.73***	0.77***	0.73***	0.78***	0.74***	0.79***	0.75***
	(0.14)	(0.13)	(0.15)	(0.14)	(0.13)	(0.12)	(0.14)	(0.13)
<i>gap</i>	-0.04	0.00	0.05	0.05	-0.04	-0.01	0.05	0.05
	(0.07)	(0.08)	(0.10)	(0.11)	(0.07)	(0.08)	(0.10)	(0.10)
<i>d9297</i>		-0.59		-0.74*		-0.12		-0.26
		(0.40)		(0.41)		(0.39)		(0.39)
<i>d9807</i>		-0.34		-0.29		-0.36		-0.33
		(0.39)		(0.43)		(0.43)		(0.45)
<i>d9297*gap</i>			-0.17	-0.18			-0.21	-0.21*
			(0.14)	(0.14)			(0.13)	(0.12)
<i>d9807*gap</i>			-0.02	0.07			0.06	0.08
			(0.17)	(0.12)			(0.18)	(0.11)
<i>mas</i>					-0.66***	-0.69***	-0.71***	-0.73***
					(0.25)	(0.20)	(0.24)	(0.19)
<i>sgp</i>					-0.59	-0.77*	-0.61*	-0.67**
					(0.41)	(0.43)	(0.33)	(0.31)
<i>Adjusted R-squared</i>	0.80	0.79	0.80	0.80	0.81	0.80	0.81	0.81
<i>Sargan Test p-value^a</i>	1.00	1.00	1.00	0.97	1.00	1.00	1.00	0.99
<i>Cross-Section</i>	11	11	11	11	11	11	11	11
<i>Observations</i>	296	296	296	296	296	296	296	296

Notes: Regressions estimated by Two-Stage Least Squares (TSLS). ***, **, * Level of significance at 1%, 5%, and 10% respectively. White's period robust coefficient standard errors in parenthesis. ^a Sargan's test of over-identifying restrictions. Under the null hypothesis the over-identifying restrictions are satisfied.

Table 4: Comparison - Effects of the MT and the SGP on the CAPD - EU-14 (1980 - 2007)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
α	1.86** (0.87)	1.43*** (0.50)	1.78** (0.71)	1.63** (0.68)	1.77** (0.87)	1.53*** (0.48)	1.78*** (0.66)
<i>pdefay(-1)</i>	0.73*** (0.05)	0.75*** (0.04)	0.73*** (0.05)	0.76*** (0.04)	0.74*** (0.05)	0.77*** (0.04)	0.76*** (0.04)
<i>ggflq(-1)</i>	-0.02** (0.01)	-0.02*** (0.01)	-0.02*** (0.01)	-0.02*** (0.01)	-0.02*** (0.01)	-0.02*** (0.00)	-0.02*** (0.01)
<i>ggflq(-1)*deu3</i>	-0.05*** (0.02)	-0.05** (0.02)	-0.06*** (0.02)	-0.04*** (0.01)	-0.05*** (0.01)	-0.05*** (0.02)	-0.05*** (0.01)
<i>inf</i>	0.02 (0.06)	0.00 (0.04)	0.02 (0.04)	-0.01 (0.06)	0.00 (0.07)	-0.02 (0.04)	-0.02 (0.04)
<i>ele (A)</i>	0.71*** (0.13)	0.73*** (0.16)	0.72*** (0.15)	0.74*** (0.14)	0.72*** (0.12)	0.74*** (0.15)	0.74*** (0.14)
<i>ele*deu3 (B)</i>	-0.38* (0.19)	-0.42 (0.27)	-0.38* (0.22)	-0.41* (0.23)	-0.31 (0.21)	-0.35 (0.30)	-0.30 (0.23)
<i>gap (C)</i>	0.01 (0.09)	0.04 (0.08)	0.07 (0.10)	-0.04 (0.06)	0.00 (0.08)	0.02 (0.07)	0.04 (0.08)
<i>gap*deu3 (D)</i>	-0.30* (0.17)	-0.23 (0.15)	-0.26 (0.16)	-0.30* (0.17)	-0.30 (0.19)	-0.21 (0.16)	-0.22 (0.16)
<i>d9297 (E)</i>	-0.61* (0.33)		-0.82** (0.37)		-0.14 (0.31)		-0.35 (0.34)
<i>d9297*deu3 (F)</i>	1.27*** (0.49)		0.96 (0.87)		1.55** (0.63)		1.02** (0.44)
<i>d9807 (G)</i>	-0.43 (0.32)		-0.41 (0.34)		-0.44 (0.34)		-0.47 (0.36)
<i>d9807*deu3 (H)</i>	0.14 (0.43)		0.16 (0.43)		0.09 (0.41)		0.07 (0.36)
<i>d9297*gap (I)</i>		-0.17 (0.13)	-0.20 (0.14)			-0.17 (0.11)	-0.20** (0.10)
<i>d9297*gap*deu3 (J)</i>		-0.49*** (0.16)	-0.20 (0.40)			-0.78*** (0.17)	-0.38 (0.27)
<i>d9807*gap (K)</i>		-0.04 (0.16)	0.06 (0.11)			0.03 (0.16)	0.09 (0.10)
<i>d9807*gap*deu3 (L)</i>		0.23 (0.34)	-0.09 (0.24)			0.22 (0.31)	-0.08 (0.22)
<i>mas</i>				-0.73*** (0.28)	-0.69*** (0.21)	-0.77*** (0.25)	-0.75*** (0.19)
<i>mas*deu3</i>				0.18 (0.23)	-0.53* (0.29)	-0.67** (0.31)	-0.68** (0.29)
<i>sgp</i>				-0.28 (0.48)	-0.56 (0.48)	-0.45 (0.34)	-0.61** (0.31)
<i>sgp*deu3</i>				2.67** (1.29)	1.60 (1.12)	2.08* (1.14)	1.09 (1.23)
<i>ele EU-3 (A+B)^a</i>	0.33**	0.31	0.34*	0.33*	0.41**	0.39	0.44**
<i>gap EU-3 (C+D)^a</i>	-0.29*	-0.19	-0.19	-0.34**	-0.30*	-0.19	-0.18
<i>d9297 EU-3 (E+F)^a</i>	0.65		0.14		1.41*		0.67
<i>d9297*gap EU-3 (I+J)^a</i>		-0.66***	-0.40			-0.95***	-0.58**
Adjusted R^2	0.79	0.81	0.80	0.81	0.80	0.82	0.81
Sargan Test P-value ^b	1.00	1.00	0.70	1.00	1.00	1.00	0.45
Cross-Section	14	14	14	14	14	14	14
Observations	379	379	379	379	379	379	379

Notes: Regressions estimated by Two-Stage Least Squares (TSLS). ***, **, * Level of significance at 1%, 5% and 10%. White's period robust coefficient standard errors in parenthesis. ^a Wald test of coefficient restrictions whose null hypothesis is that the estimated coefficient is equal to zero. ^b Sargan's test of overidentifying restrictions. Under the null hypothesis the overidentifying restrictions are satisfied.

Table 5: Comparison - Effects of the MT and the SGP on the CAPD - OECD-17 (1980 - 2007)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
α	1.39** (0.64)	0.69* (0.41)	1.37** (0.55)	0.84 (0.55)	1.40** (0.66)	0.80* (0.46)	1.35** (0.60)
$pdefay(-1)$	0.79*** (0.03)	0.82*** (0.04)	0.79*** (0.03)	0.82*** (0.03)	0.78*** (0.04)	0.80*** (0.04)	0.77*** (0.04)
$pdefay(-1)*doecd6$	0.13*** (0.04)	0.13*** (0.03)	0.14*** (0.03)	0.11*** (0.04)	0.13** (0.05)	0.14*** (0.04)	0.15*** (0.05)
$gflq(-1)$	-0.02*** (0.01)	-0.02*** (0.00)	-0.02*** (0.00)	-0.02*** (0.01)	-0.02*** (0.00)	-0.02*** (0.00)	-0.02*** (0.00)
inf	0.03 (0.05)	0.03 (0.04)	0.03 (0.04)	0.00 (0.06)	0.01 (0.07)	0.00 (0.04)	0.01 (0.05)
$ele (A)$	0.72*** (0.13)	0.75*** (0.14)	0.73*** (0.14)	0.75*** (0.13)	0.73*** (0.12)	0.75*** (0.14)	0.74*** (0.13)
$ele*doecd6 (B)$	-0.54** (0.26)	-0.56* (0.32)	-0.53* (0.28)	-0.59* (0.30)	-0.56** (0.25)	-0.58* (0.31)	-0.55** (0.27)
gap	-0.02 (0.05)	0.00 (0.04)	0.00 (0.05)	-0.04 (0.04)	-0.03 (0.05)	0.01 (0.04)	0.00 (0.05)
$d9297$	-0.91*** (0.30)		-1.06*** (0.34)		-0.43 (0.31)		-0.62* (0.34)
$d9297*doecd6$	0.41 (0.51)		0.67 (0.60)		-0.01 (0.60)		0.29 (0.73)
$d9807$	-0.59** (0.28)		-0.60** (0.30)		-0.61** (0.30)		-0.65** (0.32)
$d9807*doecd6$	0.73* (0.39)		0.78** (0.36)		0.66 (0.44)		0.77* (0.44)
$d9297*gap$		-0.10 (0.10)	-0.12 (0.09)			-0.16* (0.09)	-0.16** (0.08)
$d9297*gap*doecd6$		0.16 (0.10)	0.18 (0.16)			0.26*** (0.10)	0.23 (0.17)
$d9807*gap$		-0.07 (0.10)	0.12 (0.09)			-0.04 (0.11)	0.12 (0.09)
$d9807*gap*doecd6$		-0.05 (0.15)	-0.29* (0.17)			0.01 (0.17)	-0.27 (0.21)
$mas (C)$				-0.48** (0.20)	-0.67*** (0.19)	-0.59*** (0.21)	-0.71*** (0.19)
$mas*doecd6 (D)$				0.06 (0.27)	0.38 (0.31)	0.35* (0.20)	0.40 (0.34)
$sgp (E)$				-0.53 (0.41)	-0.65 (0.48)	-0.51 (0.35)	-0.58 (0.37)
$sgp*doecd6 (F)$				0.69 (0.50)	0.73 (0.60)	0.70* (0.42)	0.53 (0.55)
$ele OECD-6 (A+B)^a$	0.18	0.19	0.19	0.16	0.17	0.18	0.18
$mas OECD-6 (C+D)^a$				-0.43**	-0.29	-0.24**	-0.31
$sgp OECD-6 (E+F)^a$				0.16	0.08	0.19	-0.05
Adjusted R^2	0.87	0.87	0.87	0.87	0.87	0.88	0.88
Sargan Test P-value ^b	0.99	1.00	0.78	1.00	1.00	1.00	0.83
Cross-Section	17	17	17	17	17	17	17
Observations	441	441	441	441	441	441	441

Notes: Regressions estimated by Two-Stage Least Squares (TSLS). ***, **, * Level of significance at 1%, 5% and 10%. White's period robust coefficient standard errors in parenthesis. ^a Wald test of coefficient restrictions whose null hypothesis is that the estimated coefficient is equal to zero. ^b Sargan's test of overidentifying restrictions. Under the null hypothesis the overidentifying restrictions are satisfied.

Table 6: Effects of the Reform of the SGP on the CAPD - Euro-11 (1980 - 2007)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
α	1.26 (0.84)	0.75 (0.54)	1.06 (0.76)	1.17* (0.62)	1.21 (0.82)	0.71 (0.51)	1.00 (0.70)
<i>pdefay(-1)</i>	0.81*** (0.02)	0.79*** (0.04)	0.80*** (0.03)	0.80*** (0.03)	0.80*** (0.03)	0.78*** (0.05)	0.79*** (0.04)
<i>ggftq(-1)</i>	-0.02** (0.01)	-0.02*** (0.01)	-0.02*** (0.01)	-0.02*** (0.01)	-0.02*** (0.01)	-0.01*** (0.01)	-0.02*** (0.01)
<i>inf</i>	0.00 (0.04)	0.01 (0.04)	0.01 (0.04)	-0.03 (0.05)	-0.03 (0.05)	-0.01 (0.04)	-0.01 (0.04)
<i>ele</i>	0.76*** (0.14)	0.78*** (0.14)	0.76*** (0.16)	0.78*** (0.12)	0.77*** (0.13)	0.79*** (0.13)	0.77*** (0.15)
<i>gap</i>	-0.01 (0.07)	0.06 (0.10)	0.06 (0.10)	-0.04 (0.07)	-0.02 (0.07)	0.06 (0.10)	0.05 (0.09)
<i>d9297</i>	-0.39 (0.30)		-0.59* (0.34)		0.03 (0.27)		-0.16 (0.28)
<i>d9805</i>	0.10 (0.29)		0.06 (0.31)		0.00 (0.30)		-0.07 (0.32)
<i>d0607</i>	-0.80** (0.38)		-0.77** (0.37)		-0.76* (0.39)		-0.75* (0.39)
<i>d9297*gap</i>		-0.18 (0.14)	-0.18 (0.14)			-0.22* (0.13)	-0.21* (0.12)
<i>d9805*gap</i>		-0.03 (0.24)	0.01 (0.15)			0.07 (0.26)	0.04 (0.15)
<i>d0607*gap</i>		0.04 (0.16)	0.11 (0.15)			-0.07 (0.15)	-0.05 (0.15)
<i>mas</i>				-0.66*** (0.25)	-0.67*** (0.19)	-0.71*** (0.24)	-0.71*** (0.18)
<i>sgp1</i>				-0.47 (0.44)	-0.61 (0.37)	-0.54 (0.46)	-0.52 (0.32)
<i>sgp2</i>				-0.92*** (0.27)	-1.04*** (0.18)	-0.87** (0.37)	-0.99*** (0.32)
Adjusted R^2	0.80	0.80	0.80	0.81	0.81	0.81	0.81
Sargan Test P-value ^b	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Cross-Section	11	11	11	11	11	11	11
Observations	296	296	296	296	296	296	296

Notes: Regressions estimated by Two-Stage Least Squares (TSLS). ***, **, * Level of significance at 1%, 5% and 10%. White's period robust coefficient standard errors in parenthesis. ^a Wald test of coefficient restrictions whose null hypothesis is that the estimated coefficient is equal to zero. ^b Sargan's test of overidentifying restrictions. Under the null hypothesis the overidentifying restrictions are satisfied.

Table 7: Summary Estimations of Robustness Tests - Euro-11

Robustness tests variables	Big Countries ^a	Small Countries ^b	Real Time Data ^c	Heterog. GAP ^d	Split GAP ^e	Economic ^f	Political ^g
	coeff. ^h	coeff. ^h	coeff. ^h	coeff. ^h	coeff. ^h	coeff. ^h	coeff. ^h
	std ⁱ	std ⁱ	std ⁱ	std ⁱ	std ⁱ	std ⁱ	std ⁱ
α	0.02 (0.89)	1.76 (1.24)	0.72 (1.44)	0.70 (0.91)	0.94 (0.87)	0.18 (2.45)	6.41* (3.86)
<i>pdefay(-1)</i>	0.77*** (0.06)	0.77*** (0.04)	0.64*** (0.13)	0.80*** (0.04)	0.78*** (0.03)	0.75*** (0.03)	0.79*** (0.06)
<i>gflaq(-1)</i>	-0.01 (0.01)	-0.02** (0.01)	-0.01 (0.02)	-0.01* (0.01)	-0.02*** (0.01)	-0.03*** (0.01)	-0.04*** (0.01)
<i>inf</i>	0.07 (0.06)	-0.06 (0.04)		-0.04 (0.04)	-0.03 (0.04)	-0.04 (0.04)	0.05 (0.04)
<i>ele</i>	0.55*** (0.07)	0.88*** (0.19)	0.53** (0.22)	0.75*** (0.12)	0.75*** (0.13)	0.63*** (0.14)	0.16 (0.28)
<i>gap</i>	0.22 (0.33)	0.03 (0.11)	-0.42** (0.20)			0.04 (0.08)	0.04 (0.20)
<i>gap_{med}</i>				0.22 (0.11)			
<i>gap_{pos}</i>					0.13 (0.13)		
<i>gap_{neg}</i>					-0.01 (0.12)		
<i>virrc</i>							
<i>nwp</i>						0.03 (0.10)	-0.18 (0.13)
<i>open</i>						0.09 (0.06)	0.08 (0.12)
<i>size</i>						-2.00** (1.00)	-3.26 (2.05)
<i>vol</i>						0.00 (0.00)	0.00* (0.00)
<i>gchan</i>						-5.67 (3.76)	-10.94 (9.02)
<i>ggap</i>							0.35 (0.31)
<i>gnew</i>							0.29** (0.12)
<i>gpart</i>							0.10 (0.27)
<i>gtype</i>							-0.02 (0.06)
<i>rac</i>							0.09 (0.12)
<i>d9297</i>	0.19 (1.15)	-0.49 (0.53)		0.10 (0.48)	-0.15 (0.41)	-0.01 (0.32)	-0.43 (0.47)
<i>d9807</i>	0.01 (1.36)	-0.68 (0.64)	-0.56 (0.43)	-0.13 (0.49)	-0.24 (0.46)	0.49 (0.31)	-0.20 (0.60)
<i>d9297*gap</i>	-0.20 (0.28)	-0.22** (0.11)		-0.16 (0.13)	-0.17 (0.12)	-0.22** (0.09)	-0.28 (0.19)
<i>d9807*gap</i>	0.08 (0.39)	0.07 (0.12)	0.33** (0.13)	-0.03 (0.10)	0.04 (0.11)	0.10 (0.11)	0.09 (0.20)
<i>mas</i>	-0.79*** (0.20)	-0.59** (0.27)	-0.85*** (0.24)	-0.75*** (0.19)	-0.74*** (0.19)	-0.61*** (0.10)	-0.64*** (0.11)
<i>sgp</i>	0.41 (1.37)	-0.74** (0.37)	-0.18 (0.95)	-0.85** (0.34)	-0.75*** (0.28)	-0.64** (0.31)	-1.48*** (0.38)
Adjusted R^2	0.86	0.78	0.76	0.81	0.81	0.81	0.79
Sargan's Test ^j	0.07	0.91	1.00	-	1.00	1.00	1.00
Cross-Section	4	7	11	11	11	11	11
Observations	110	186	121	296	296	279	211
Sample Period	1980 - 2007	1980 - 2007	1995 - 2005	1980 - 2007	1980 - 2007	1980 - 2007	1980 - 2003

Notes: Regressions estimated by Two-Stage Least Squares (TSLS). ^a Estimation including only the sample of big Euro-11 countries: Germany, France, Italy, and Spain. ^b Estimation including only the sample of small Euro-11 countries: Austria, Belgium, Finland, Greece, Ireland, The Netherlands, and Portugal. ^c Estimation including real-time data as in Cimadomo (2007) and Giuliadori and Beetsma (2008). ^d Robustness test allowing for heterogeneous coefficients of output for each country in the sample. ^e Estimation splitting between positive values (*gap_{pos}*) and negative values (*gap_{neg}*) of the output gap. ^f Estimation including additional economic explanatory variables. ^g Estimation including additional economic and political explanatory variables. ^h Coefficients of the estimations where ***, **, * correspond to the level of significance at 1%, 5% and 10% respectively. ⁱ White's period robust coefficient standard errors in parenthesis. ^j P-values of Sargan's test of overidentifying restrictions. Under the null hypothesis, the overidentifying restrictions are satisfied.

Figure 1: Cyclically Adj. Primary Deficit in the OECD Regions (as % of Potential GDP)

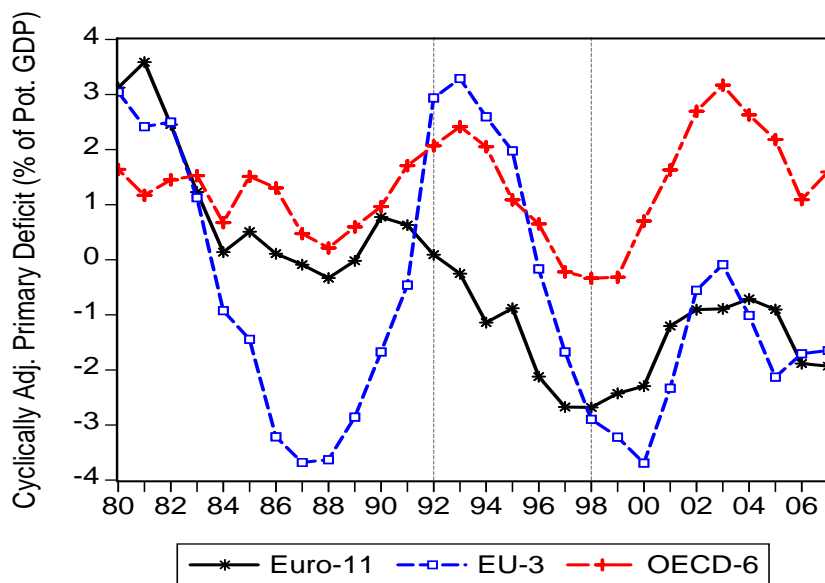


Figure 2: Scatter Plots - Cyclically Adjusted Primary Deficit x Output Gap

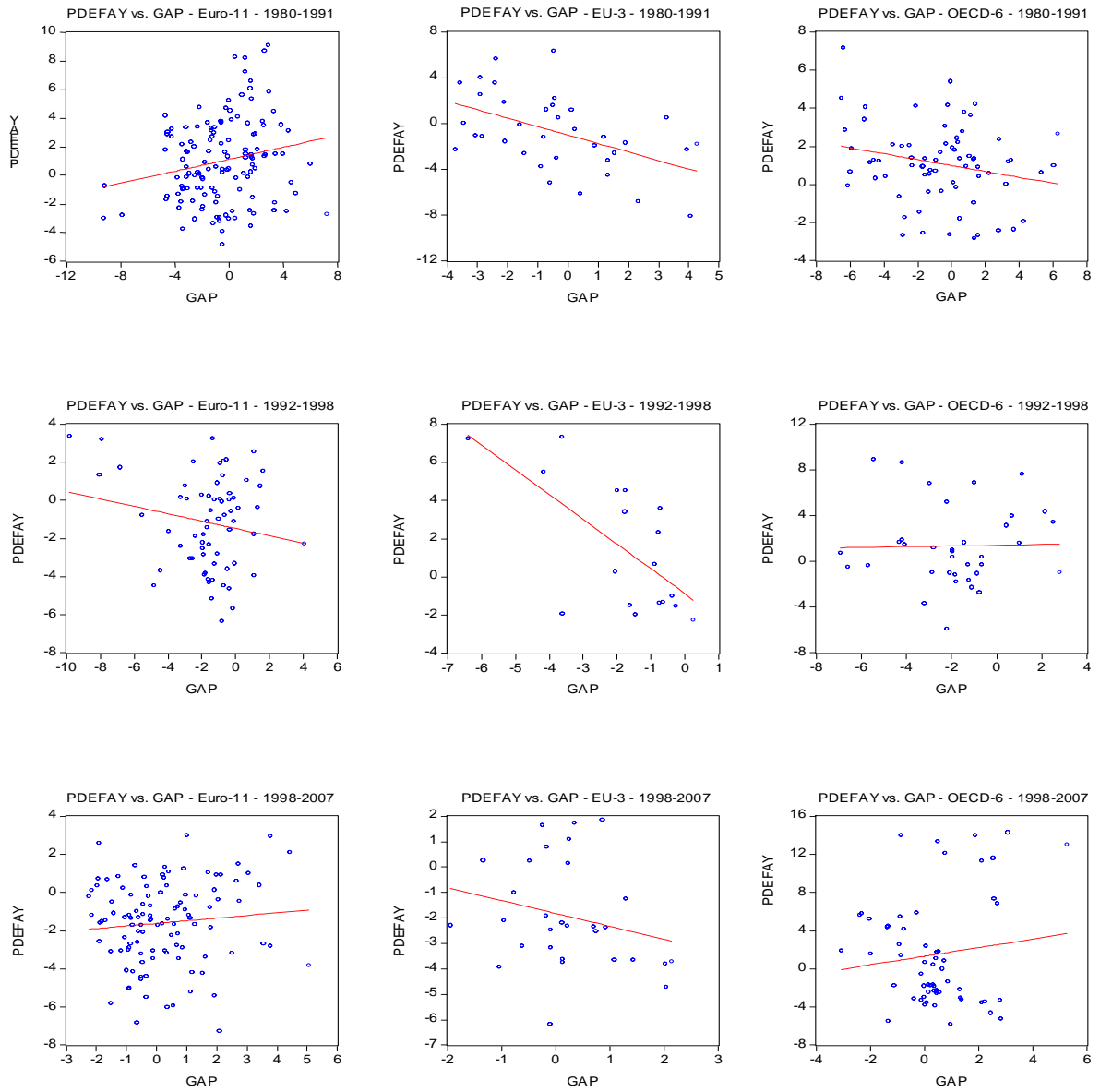


Figure 3: Total Deficit in the OECD-20 countries (as % of GDP)

