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New evidence on the effectiveness of Europe's fiscal restrictions

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NEW EVIDENCE ON THE EFFECTIVENESS OF EUROPE'S FISCAL RESTRICTIONS

NON-TECHNICAL SUMMARY

The Maastricht Treaty (MT) has now been in existence for more than 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 (SGP). Nevertheless, their usefulness has been hardly challenged in the literature.

This paper investigates how effective these rules have been in disciplining fiscal policy in the Euro zone. These days, such issue is even more compelling given the budgetary implications of the current financial crisis. In particular, an empirical assessment of the past effectiveness of Europe's fiscal restrictions can shed some light on how to enhance them in order to conciliate the European bail-out and fiscal stimulus plans with sustainable fiscal policy over the medium term.

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 possibility of fiscal policy being procyclical, for instance due to the misinterpretation by politicians of cyclical increases in revenues as being structural.

Our methodology follows closely that of Galí and Perotti (2003). However, different from those authors, we separate the MT period (1992-1998) and the SGP period (1999-2007), 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. The failure of several countries to comply with the deficit target imposed by the pact adds concerns about whether the SGP is indeed an effective instrument in reducing fiscal profligacy.

As main novelty, we examine 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, we investigate whether (i) the average level of this measure of stance 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 in contrast with the MT, the SGP has been ineffective in reducing fiscal profligacy in the Euro zone when the deficit limit was exceeded, i.e. it has failed to induce a contraction of the cyclically-adjusted primary deficit in response to excessive deficits. Moreover, the SGP has not prompted fiscal authorities in the region to behave countercyclically. Such results survive extensive robustness

testing, and therefore, evidence the need for improvements in the current fiscal framework, in particular to enforce countercyclical fiscal policy in the Euro zone.

We, then, discuss some proposals made in this direction. One involves establishing independent and nonpartisan government fiscal agencies (see Jonung and Larch, 2006; and Debrun et al., 2009). Other suggestions, which could be easily combined with independent agencies, consist in: (i) strengthening the role of the debt level in the SGP rules; and (ii) creating rainy day funds that would allow Member states to fall into excess deficits when necessary, provided they have previously accumulated surpluses. Those proposals could give more room for counter-cyclical policies while helping countries to comply with the Pact.

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 in contrast with the MT, the SGP has been ineffective in tackling excessive deficits in the Euro zone. Moreover, it has also not induced a countercyclical behavior of the fiscal authorities in the region. These results evince the need for reforms in Europe's fiscal restrictions in order to restore their credibility.

JEL Classification: C33, E62, E65, H62.

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

UNE MESURE DE L'EFFICACITÉ DE RÈGLES BUDGÉTAIRES EUROPÉENNES

RÉSUMÉ NON TECHNIQUE

Le Traité de Maastricht (TM) est entré en vigueur il a plus de quinze ans, ouvrant une nouvelle ère pour la politique budgétaire en Europe. Les strictes règles budgétaires introduites par ce traité ont été renforcées par l'adoption du Pacte de Stabilité et de Croissance (PSC). Néanmoins, leur utilité a été contestée dans la littérature.

Cet article cherche à établir si les règles fiscales du TM et du PSC ont effectivement discipliné les politiques budgétaires dans la zone euro. Actuellement, cette question est encore plus importante étant donné les implications budgétaires de la crise financière. En particulier, une évaluation empirique de l'efficacité passée des restrictions budgétaires permet de dégager des voies d'amélioration afin de concilier les plans de relance budgétaire Européen avec la soutenabilité à moyen terme de la politique budgétaire.

Nous suivons Fatás et Mihov (2003) et Fatás (2005), en concentrant l'étude sur deux types de biais résultant de la mauvaise gestion de politique budgétaire et en évaluant comment le cadre fiscal de l'UE les a modifiés. Le premier type de biais est l'apparition de déficits excessifs lorsque le gouvernement n'intériorise pas le coût de la dette supplémentaire ou quand il reporte l'ajustement budgétaire après une récession. Le deuxième biais, en faveur d'une politique budgétaire plus pro-cyclique, peut apparaître, lorsque le gouvernement considère comme structurelles des hausses cycliques des recettes fiscales.

Notre méthodologie suit celle de Galí et Perotti (2003). Néanmoins, contrairement à ces auteurs, nous analysons séparément la période du TM (1992-1998) et celle du PSC (1999-2007), en dégageant les effets de chaque ensemble de restrictions afin d'isoler les impacts budgétaires provenant des efforts des pays Européens pour entrer dans la zone Euro. Le fait que plusieurs pays ne se sont pas conformés à l'objectif de déficit imposé par le Pacte une fois la monnaie unique adoptée renforce les craintes que le PSC ne soit pas un instrument efficace pour améliorer la discipline budgétaire.

Notre principal apport consiste à examiner comment le déficit primaire structurel (pris comme indicateur de la politique budgétaire) a réagi quand le déficit public dépasse le niveau de référence du TM, en contrôlant pour les variables économiques et politiques pertinentes. En outre, nous étudions si (i) le niveau moyen de notre indicateur budgétaire et (ii) sa réponse à l'écart de production ont changé au cours des périodes du TM et du PSC. Ces réactions sont estimées en utilisant des techniques de pooling et de variables instrumentales. Elles sont comparées aux réponses d'autres pays "industrialisés" de l'OCDE, mettant l'expérience européenne avec la TM et PSC dans une perspective plus large. Enfin, nous isolons la période la plus récente qui suit la réforme du PSC.

Notre principal résultat est que contrairement à la MT, le PSC a été inefficace dans la réduction de la dépense budgétaire dans la zone euro quand la limite de déficit a été dépassée, c'est-à-dire elle n'a pas induit une contraction du déficit primaire structurel en réponse aux déficits excessifs. En outre, le SGP n'a pas incité les autorités fiscales à adopter un comportement contra-cyclique. Ces résultats restent valables à plusieurs tests de robustesse et montrent la nécessité de trouver des voies d'amélioration du cadre fiscal

actuel, afin notamment de renforcer le caractère contra-cyclique de la politique budgétaire dans la zone euro.

Ensuite nous examinons certaines propositions faites dans cette direction. Certains proposent d'établir des agences de surveillance indépendantes et non-partisan (voir Jonung et Larch, 2006 ; et Debrun et al., 2009). D'autres suggestions, complémentaires à la précédente, consisteraient à : (i) donner plus de poids au critère du niveau de la dette dans les règles du PSC ; et (ii) créer des "fonds pour temps difficiles" qui autoriseraient des "déficits excessifs" dès lors que les États auraient précédemment accumulé des excédents. Ces propositions pourraient favoriser les politiques contra-cycliques tout en aidant des pays à se conformer au Pacte.

RÉSUMÉ COURT

Cet article étudie l'efficacité passée du Traité de Maastricht (TM) et du Pacte de Stabilité et de Croissance (PSC) sur la discipline budgétaire en zone euro. Nous estimons des fonctions de réaction budgétaires pour un panel de 11 membres de la zone euro sur une période incluant la dernière réforme du PSC, et nous les comparons aux réponses budgétaires des autres pays "industrialisés" de l'OCDE. Contrairement au TM, le PSC a été inefficace pour éviter les déficits excessifs dans la zone euro. En outre, le PSC n'a pas encouragé un comportement plus contra-cyclique des autorités budgétaires. Ces résultats montrent la nécessité d'une nouvelle réforme des règles budgétaires en Europe afin de leur redonner de la crédibilité.

Classification JEL : C33, E62, E65, H62.

Mots clés : règles budgétaires, données de panel, Traité de Maastricht, Pacte de Stabilité et de Croissance.

NEW EVIDENCE ON THE EFFECTIVENESS OF EUROPE'S FISCAL RESTRICTIONS¹

Marcos Poplawski Ribeiro*

1. INTRODUCTION

For more than fifteen years fiscal policy in Europe has been subject to restrictions. Far from unique in the "developed" world,² 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 (1992-1998) and the SGP period (1999-2007).³ 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

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²For 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).

³For 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), Buiters (2005), Beetsma and Debrun (2007), Poplawski Ribeiro and Beetsma (2008), and Poplawski Ribeiro et al. (2008).

like Candelon et al. (2007) and Fatás and Mihov (2009) 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 budgetary implications of the current financial crisis. In particular, an empirical assessment of the past effectiveness of Europe's fiscal restrictions can shed some light on how to enhance them in order to conciliate the European bail-out and fiscal stimulus plans with sustainable fiscal policy over the medium term.

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 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.

Our methodology follows closely that of Galí and Perotti (2003). However, different from those authors, we separate 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.^{4,5} Specifically to the SGP, the failure of several countries to comply with the deficit target imposed by the Pact adds concerns about whether it 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) was exceeded, after controlling for relevant economic and political variables. Moreover, it investigates whether (i) the average level of this measure of stance 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 in contrast with the MT, the SGP has been ineffective in reducing fiscal profligacy in the Euro zone when the deficit limit was exceeded, i.e. it has failed to induce a contraction of the cyclically-adjusted primary deficit in response to *excessive deficits*. Moreover,

⁴More 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.

⁵Several 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.

the SGP has not prompted fiscal authorities in the region to behave countercyclically. Such results survive extensive robustness testing, and therefore, evidence 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, 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 fiscal authorities have discretionarily reacted to the restrictions of the MT and SGP, as it purges the actual primary deficit 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 its level during the subperiod 1980-1991?*

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.⁶ Thus, to verify this conjecture, we compare the average level of this variable during the MT period (1992-1998) and SGP period (1999-2007) with its average over the period 1980-1991 for the same set of Euro-area countries. Moreover, we also analyze the reform of the Pact in 2005 and compare the effect of the first-version of the SGP (from 1999 to 2005) with the current reformed version (from 2006 to 2007).

The second research question investigated is:

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*

⁶In 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.

when compared with its response in the previous subperiod (1980-1991)?

The idea behind Question 2 is to see whether the constraints of the MT and the SGP have interfered with the use of countercyclical fiscal policy.

Further, 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 *How did the cyclically-adjusted primary deficit react when the constraints of the Maastricht Treaty and/or the SGP were violated?*

Finally, in connection with these three questions, we compare the CAPD reactions during the MT- and SGP periods with those of two other groups of “industrialized” OECD countries: (a) the 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 (b) the OECD-6 (Australia, Canada, Iceland, Japan, Norway and the US) – a sample of “industrialized” countries that do not participate in the European Union.⁷

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 have had the same fiscal behavior, this could suggest the potential presence of some common external factor driving the discretionary fiscal policies of all countries in the sample rather than the effect of the European fiscal rules.

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:

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

where subscripts $i = 1, \dots, N$ and $t = 1, \dots, T$ denote the country and year of the observation, respectively. $capd_{i,t}$ corresponds to minus the cyclically-adjusted government primary balance (or the cyclically-adjusted primary deficit - CAPD) as percentage of potential GDP.⁸ It is obtained from OECD (2008) and aims to filter out the automatic stabilizers built into tax systems and unemployment compensation schemes, yielding an approximation of discretionary fiscal

⁷We 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. Switzerland and New Zealand are also excluded due to missing observations.

⁸Further information about the CAPD can be found in 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.

policy in OECD countries.⁹ Further, α_i represents the country-fixed effects, λ_t the time-fixed effects, and $\varepsilon_{i,t}$ is a error term.

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.

As economic control variables, we use the lagged cyclically-adjusted primary deficit, $capd_{i,t-1}$, which accounts for the autocorrelation of the dependent variable and is generally included in this type of empirical analysis.¹⁰ Its coefficient provides an estimate of the amount of inertia of fiscal policy. The lagged gross government debt (as % of actual output), $debt_{i,t-1}$, 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 CPI inflation in the conduct of fiscal policy, we include the variable $inf_{i,t}$, which the literature identifies several reasons to control fiscal deficits for inflation. They can be grouped into two conflicting effects on discretionary fiscal policy. On the one hand, the CAPD 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.¹¹ 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 $ele_{i,t}$. This dummy equals one in years of parliamentary elections in a country and zero otherwise. The intuition is that political circumstances can also

⁹For a criticism of that variable as an approximation of discretionary fiscal policy, see Alberola et al. (2003), Larch and Salto (2005), and Mélitz (2005). Roughly, those authors (in particular, Mélitz, 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.

¹⁰See Fatás and Mihov (2003), Galí and Perotti (2003), Afonso (2005) and Claeys (2005), for instance.

¹¹In 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.

explain fiscal policies changes during the MT- and/or SGP period. The output gap, $gap_{i,t}$, 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 country size and macroeconomic volatility, are relegated to Section 4, which tests the robustness of the results.

At last, when comparing Euro-11 fiscal behavior with that of the other OECD countries, some of the control variables are interacted with the country dummies $deu3_{i,t}$ and $doecd6_{i,t}$, representing the country groups, 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 ($dmt_{i,t}$ and $dsgp_{i,t}$ respectively) to address Question 1,¹² and their interaction with the country dummies $deu3_{i,t}$ and $doecd6_{i,t}$ to compare the results with the other country groups. Moreover, when analyzing the impacts of the reform of the Pact, the dummy for the period of the SGP is split in two: $dsgp1_{i,t}$ (1999-2005) and $dsgp2_{i,t}$ (2006-2007). Question 2 is then addressed by interacting all those time and country dummies with the output gap ($gap_{i,t}$).

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 and of the SGP on excessive deficits we construct the following variables:

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

$$\left\{ \begin{array}{ll} \text{for } t < 1999 : & exsgp_{i,t} = 0 \\ \text{for } 1999 \leq t \leq 2007 : & exsgp_{i,t} = tdefy_{i,t-1} - 3\% \quad \text{if } tdefy_{i,t-1} \geq 3\% \\ \text{for } 1999 \leq t \leq 2007 : & exsgp_{i,t} = 0 \quad \text{if } tdefy_{i,t-1} < 3\% \end{array} \right. . \quad (3)$$

Variables $exmt_{i,t}$ and $exsgp_{i,t}$ account only for cases when the total deficit (as a percentage of GDP - $tdefy_{i,t-1}$) in a particular year during the MT- and/or SGP period exceeded the reference level of 3%.^{13,14}

For the analysis of the reform of the SGP, moreover, we split $exsgp_{i,t}$ in two: $exsgp1_{i,t}$ and $exsgp2_{i,t}$. Those variables are computed in the same way as in Equation (3), but with the time

¹²For Greece the variable $dmt_{i,t}$ is different from zero until the year 2000 since that country joined the Euro zone only at the beginning of 2001. Moreover, the variable $dsgp_{i,t}$ is different from zero in that country only from the year 2001 onwards.

¹³For Greece, $exmt_{i,t}$ can differ from zero until the year 2000, whereas $exsgp_{i,t}$ only from the year 2001 onwards.

¹⁴Here, 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 $tdefy_{i,t-1} \geq 3\%$. Moreover, this variable averages out potential divergent responses to excessive deficits in different years of the MT period. For example, one could expect that the closer was the deadline to enter in the Euro zone, the tougher was the reaction to excessive deficits. In Section 4, we use different specifications of (2) and (3) to test the robustness of our results for those variables.

periods coinciding with those of the two versions of the Pact. Hence, $exsgp1_{i,t}$ is only different from zero during the period 1999-2005 if the total deficit in the previous year exceeds the 3% limit. Accordingly, $exsgp2_{i,t}$ 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.¹⁵

In our main estimations, we use instrumental variables for $capd(-1)$, inf and gap . Although predetermined, $capd(-1)$ is instrumented given that its inclusion in Equation (1) leads to autocorrelation, common in dynamic panel data estimations.¹⁶ The instrumental 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

Further, 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

2.3. Data and descriptive statistics

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 ($capd$) and the output gap (gap) for the sample of 20 OECD countries during five different periods: 1980-1991, 1992-1998, 1999-2007, 2006-2007, and the entire time span 1980-2007. While the CAPD differs across countries, there seems to be a general decline over time in the Euro-11 and EU-3, with the cyclically-adjusted balance turning to surpluses (indicated by a negative sign in the table) during the MT, but falling

¹⁵Similar results are obtained using Arellano-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.

¹⁶For a discussion, see Baltagi (2005, pp. 135), and Judson and Owen (1999).

¹⁷We use $capd(-2)$ as instrument for $capd(-1)$ in all cases. Further, the variables inf and gap are instrumented 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.

only marginally during the SGP periods. 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, whereas for the OECD-6 this average increases. They change 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, -1.46%, -1.82% and 1.71% 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 1999. 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 1992-1998, and has become significantly smaller in the recent period. Conversely, after 1999, 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 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 (-1.39% in the Euro-11, -1.60% in the EU-3 and -1.61% in the OECD-6). By contrast, the period 1999-2007 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 (0.25% in the Euro-11, 0.27% in the EU-3 and 0.43% in the OECD-6), even though the most recent period (2006-2007) has not been expansionary for the majority of 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

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. 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.

²⁰The positive average output gap during 1999-2007 for the Euro-11 in Table 2 and Figure 2 seems to be in part driven by Ireland.

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 Galí and Perotti (2003) and Fatás and Mihov (2009), is reinforced by the upward (albeit non significant) slope of the regression line.

Throughout the time span 1992-1998, 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 shows a acyclical 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 acyclical 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 Euro-11 countries during the SGP, showing that the Pact has not been able to enforce countercyclical behavior in the Euro zone.

Regarding Question 3, Figure 3 displays OECD's measure of total deficit (in percent of actual GDP) for our sample of countries during the period 1980 to 2007. In that figure, a horizontal dashed line marks a 3% deficit level, showing that several countries had in 1992 total deficits higher than 3% of GDP. Table 3, in turn, presents for all OECD countries the number of cases of excessive deficits according to Europe's fiscal rules - see Equations (2) and (3) - during the MT- and the SGP periods.

Greece has the highest number of excessive deficits (15 when summing both periods),²¹ followed by Italy (13 occasions). Noticeably, the number of occurrences of excessive deficits falls strongly in all OECD groups. From 1998 to 2006 that number halved to a total of 28 occurrences (out of 97 country-year pairs) in the Euro-11 countries. Nonetheless, eight Euro-11 countries had at some point in time exceeded the 3% deficit level in that period: Austria (in 2004), Germany (from 2002 to 2005), France (from 2002 to 2004), Greece (from 1998 to 2005), Italy (in 1998, and from 2001 to 2006), Netherlands (in 2003), Portugal (in 1998, 2001, and from 2004 to 2006), and Spain (in 1998). Among EU-3, only the United Kingdom exceeds the 3% level of total deficit in that period (in 2003 to 2005, and 2007), whereas among OECD-6, only Japan and the U.S. had incurred in excessive deficits in several years.

In sum, the tables and figures discussed above show an improvement in the fiscal performance of Euro-11 countries during the MT period and a fatigue or at least cessation of this process for several countries after the introduction of the SGP.

²¹Again in Table 3, for Greece the MT period finishes in 2000 and the SGP starts in 2001.

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 4 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- and the SGP period. These time dummies account for differences in the average value of the CAPD for the Euro-11 during the two periods, 1992-1998 and 1999-2007, 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 the fiscal reaction function (Equation (1)) including as additional variables the 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.²²

From Table 4, 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, $capd(-1)$, 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 $debt(-1)$ is negative and also highly significant with values equal to 0.02. An increase of one percentage point in the lagged government debt/GDP ratio causes, therefore, a decrease in CAPD by 0.02%.²³

Inflation is insignificant in all regressions. This result might be related to the expected conflicting effects of inflation in discretionary fiscal policy and 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 0.77 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 of the columns of Table 4. As Figure 2 suggests, this outcome might be attributable to the large diversity 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, the non significant coefficients of the time dummies dmt and $dsgp$ in

²²The 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.

²³Annett (2006) obtains similar estimates.

Table 4 shows that:

Result I *Ceteris paribus neither the MT nor the SGP have prompted a significant reduction on the average level of the cyclically-adjusted primary deficit in the Euro-11 countries.*

In addition, variables gap , $dmt*gap$, $dsgp*gap$ in Table 4 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 4, 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 findings, in accordance with Figure 2, indicate that:

Result II *While the MT has induced a countercyclical fiscal policy in Euro-11 countries, the SGP has not significantly affected the cyclicity of fiscal authorities' responses to the business cycle.*

Thus, the SGP has not forced Euro-11 countries to consistently “save in good times and spend in bad times”.²⁴

The last test that we make in Table 4 is on the effects of the MT and the SGP when the deficit ceiling was binding (higher than 3% of GDP). In view of the coefficients of $exmt$ and $exsgp$ in columns (6) to (8) of Table 4, we conclude that:

Result III *Fiscal policy as measured by the cyclically-adjusted primary deficit has been contractionary in instances when the deficit ceiling was binding during the run-up towards the Euro, but not after the formation of the monetary union in Europe.*

Result III, therefore, suggests that during the MT-period (1992-1998) fiscal discipline increased whenever the ceilings of the MT were binding. Nevertheless, such sound fiscal behavior did not persist after the formation of the monetary union and application of the SGP (1999-2007). This result, combined with the acyclical response of fiscal authorities to business cycle developments, demonstrates the exhaustion of the fiscal consolidation process in the Euro zone after the implementation of the SGP. In practice, this failure of the SGP has led to a reform of its fiscal rules, a first assessment of which comes next.

3.1.1. *The Reform of the SGP*

After the suspension of excessive deficit procedures against France and Germany on November 25th 2003, the previous version of the SGP became politically unsustainable (see The Economist, 2003). Hence, in an extraordinary meeting in March 2005, the EU finance min-

²⁴We also checked these results using an alternative measure of output gap that employs the real GDP and the Hodrick-Prescott (HP) filter. With such measure, the result of a countercyclical fiscal reaction during the MT is weakened. Yet, the cyclicity of the fiscal authorities' responses to the business cycle is once more not significant. The results are available upon request.

isters 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 both its preventive and corrective arm.²⁵ Under the preventive arm, the reform introduced various refinements to earlier provisions concerning the setting of a progress towards sound medium-term budgetary positions and to elements that are to be taken into account when assessing Member States' fiscal positions. As for the changes in the corrective arm, they introduced 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, the previous testing variables covering the SGP period are split in two: the SGP version (1999-2005); and reformed version (2006-2007). Following, Equation (1) is re-estimated with the new variables.

Table 5 displays the results using the Euro-11 sample of countries. While the coefficients of *dmt* and *dsgp1* are not significant, the coefficient of *dsgp2* is marginally significant (at least at 10%) and negative, indicating that *ceteris paribus* the average CAPD in the Euro area has decreased during the reformed SGP (as also suggested by Table 2).

Regarding the response of the discretionary primary deficit to the business cycle, again only during the MT-period we obtain a significant result, suggesting a more countercyclical discretionary fiscal policy in that period. In addition, the non-significant coefficients of *dsgp1*gap*, and *dsgp2*gap* show that the CAPD reaction to the output gap was acyclical in both periods of the SGP.

The most significant effects are obtained in the discretionary fiscal response to excessive deficits. As the estimated coefficient of *exsgp2* conveys, 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). This is in contrast with the non-significant coefficient of *exsgp1*, which shows again that the first version of the SGP was unable to tackle excessive deficits.

These results imply that the current version of the SGP has been more effective than the previous one in disciplining fiscal policy. Nevertheless, such conclusion should be qualified and taken only as indicative. Until the current financial crisis, the period posterior to the SGP reform was characterized by an economic expansion in the Euro zone (see Table 2). Such conjuncture eased the adoption of sound fiscal policy, not only leading to higher tax revenues, but also lowering fiscal deficits measured as a ratio to GDP. A second qualification is the freshness of the statistics for this recent period. Several studies show that fiscal values for a particular year tend to worsen

²⁵For 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).

over time as they are revised and new statistical methodologies are put in place.²⁶

Furthermore, the cyclical response of the European fiscal authorities is not yet significant during the period of the SGP's reform. This suggests that during the period of the reformed SGP fiscal policy has again not been countercyclical. That is even more remarkable given the higher growth rates ("good times") in the last two years in those countries as discussed before.²⁷

3.2. Comparison of the Euro-11 with other OECD countries

To compare the fiscal responses of the Euro-11 with the EU-3 and OECD-6 groups of countries, we merge all samples into an OECD-20 sample. Given that the coefficients of the control variables can differ among the three country groups, we estimate this merged sample allowing for differences in the coefficients of each control variable among those three groups of countries. For that, we interact the coefficients of those variables either with the dummy *deu3*, which assumes a value of 1 for Denmark, Sweden and the UK, and 0 otherwise; or with the dummy *doecd6*, equal to 1 for Australia, Canada, Iceland, Japan, Norway and the US, and 0 otherwise.

Table 6 displays the results.²⁸ There, we observe that the coefficients of *capd(-1)*, *ele*, and *gap* are indeed statistically different among Euro-11, EU-3, and OECD-6; whereas the coefficient of *debt(-1)* is statistically different only between the Euro-11 and the EU-3. Hence, when comparing the effects of the MT and SGP among the three groups of countries, we include those controls while allowing for their coefficients to differ between the groups by interacting them with the dummies *deu3* and *doecd6*.

To distinguish among the Euro-11, EU-3, and OECD-6 in terms of the effects of our testing variables, we also interact these variables with *deu3* and *doecd6*. Thus, the regressions involve three types of testing variables. Those that are neither interacted with *deu3* nor with *doecd6* measure the differences in fiscal behavior between the Euro-11 over the relevant period (1992-1998 and/or 1999-2007) and the average for the OECD-20 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. Further, those that are interacted with *doecd6* estimate deviations of the OECD-6 sample from the results of the Euro-11 during the period under examination.

The results are shown in Table 7. As for the control variables, we observe that the lagged dependent variable exerts a significantly different effect for the three groups of countries. The significant negative coefficient of *capd(-1)*deu3* conveys a lower average inertia in the fiscal policy of EU-3 countries compared to those of the Euro-11, whereas the positive coefficient of

²⁶See, among others, Candelon et al. (2007), Cimadomo (2007), and Giuliodori and Beetsma (2008a).

²⁷Indeed, Marinheiro (2004) and Candelon et al. (2007) show that fiscal policy in Europe tends to be procyclical particularly in upswing times.

²⁸Its only difference to the previous tables is the presentation of coefficient standard errors besides the coefficient estimations instead of under those values. All other statistics are presented as before.

$capd(-1)*doecd6$ shows that the average inertia in the CAPD in OECD-6 countries is higher than in the Euro-11.

The coefficient of $debt(-1)*deu3$ is significant and negative. Hence, the reaction of CAPD to the lagged government debt is statistically different and more negative on average in EU-3 countries than in Euro-11 countries. This implies that EU-3 fiscal authorities discretionarily reduces more primary deficit than Euro-11 authorities when the debt over GDP increases by one percent, suggesting that the former authorities focuses more strongly on debt sustainability than the latter. Further, the dummy for political budget cycles, ele , is another variable significantly different between the Euro-11 and the other two groups of countries. Both control groups have a significantly lower coefficient for years of parliamentary elections than the Euro-11, indicating that the Euro-11 has more profligate fiscal policy than other OECD countries in electoral years. The analysis performed for the output gap shows that there is no significant difference among the three groups of countries in the response to the output gap in the period prior to the MT (1980-1991).

Concerning the testing variables, first we find that *ceteris paribus* the average CAPD of the Euro-11 during the MT- and SGP periods were not significantly lower than that for the OECD-20 over the period 1980-1991. Further, the OECD-6 is the only group of countries that has a significantly and higher average CAPD than that for the Euro-11 during the SGP period, as the interaction term $dsgp*doecd6$ conveys. Reinforcing Figure 1, this result shows that no significant difference in the average CAPD can be observed among OECD countries during the MT-period. In turn, after 1999, OECD-6 has had a higher CAPD (on average) than the two other groups. Figure 3 reveals that this disparity of the OECD-6 can be mainly explained by expansive fiscal policies pursued by Japan and the US in the last years.

Second, the significant and negative coefficient of the variable $dmt*gap$ conveys that during the MT period, the use of counter-cyclical discretionary fiscal policy in the Euro-11 was higher than that of the OECD-20 in the period 1980-1991. In accord with Result II, this confirms that the Treaty has induced countercyclical discretionary fiscal policy in the Euro-11. Only the OECD-6 group of countries had a significantly more procyclical discretionary fiscal policy in that period. During the SGP period, none of the coefficients related to the output gap are significant. This means that Euro-11's fiscal policy has been neither more countercyclical than that of the control groups of countries in the same period nor than that of the OECD-20 in the period prior to the MT (1980-1991).

Third, we compare the fiscal responses of the three groups of countries when excessive deficits occurred by including our excessive deficit variables ($exmt$ and $exsgp$) and interaction terms ($exmt*deu3$, $exmt*doecd6$, $exsgp*deu3$, and $exsgp*doecd6$) into the regression specification of Table 7.²⁹ The negative and highly significant coefficient of $exmt$ and the other coefficients of

²⁹One can argue that the computation of those variables for the EU-3 and OECD-6 groups is meaningless. However, since our objective here is to compare the response of our "treated" group, Euro-11, with the control groups, differences in the coefficient estimates of those variables become a relevant testable hypothesis.

excessive deficit imply that while during the MT-period the discretionary primary deficit of both EU-3 and Euro-11 was tightened whenever the deficit ceiling was violated, throughout the SGP period no significant effect is observed.

The significant positive sign of $exmt*doecd6$ indicates that fiscal authorities' reaction to excessive deficits in the OECD-6 was less sound than in the other groups of countries during the MT period.³⁰ For the EU-3, an explanation for this behavior is 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.³¹ 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 $exsgp$ is not significant for the Euro-11 sample in any column. This corroborates Result III of the previous subsection. For the other groups of countries, only the EU-3 sample has in some columns significant positive coefficients for $exsgp*deu3$. Such outcome suggests that UK (the only country in the EU-3 sample to exceed the 3% limit) has also not fully abided by the rules of the SGP.

Overall, this section shows that the discretionary fiscal response to the business cycle and to excessive deficits of the Euro-11 and of other "industrialized" countries have not significantly differed during the SGP period. This reinforces our negative assessment of the Pact, given that it has not induced European authorities to act with more fiscal discipline than other developed countries, not constrained by its strict rules.

4. ROBUSTNESS TESTS

Finally, we perform several robustness tests to challenge the results discussed so far. Those are divided in two sets. The first set either splits the Euro-11 sample in different subsamples of countries, or inserts additional control variables in the estimation of the fiscal reaction function. The second set of checks uses modified testing variables in Equation (1) to examine the consistency of our findings for modified measures of effectiveness of Europe's fiscal rules.

4.1. Euro-11's sample splits and additional control variables

Some politicians and economists claim that Europe's fiscal rules are more binding in small than in larger countries (see The Economist, 2003). Therefore, our first test consists of splitting the Euro-11 sample into those two subgroups - "large" countries (Germany, France, Italy, and Spain), and "small" countries (the remaining seven countries) - and estimating Equation (1) for each one of those two subsamples separately.

³⁰In fact, the result of a Wald test (not shown here) conveys that the response of the OECD-6 to excessive deficits was not significantly different from zero during the MT-period.

³¹In 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.

Besides of splitting the Euro-11 sample, in our second test we also estimate Equation (1) for the entire Euro-11 sample allowing for individual-country coefficients for the output gap. So far, we have assumed in all estimations that the coefficients in (1) are homogenous across countries of a particular sample. However, because our data covers a large time span and because standard 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.³²

Likewise, we also test the robustness of our findings when the positive and negative values of the output gap are split (see Giuliodori 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).

The final robustness check of the first set of tests adds three economic variables to the estimation of Equation (1): (i) relative economic country size, defined as the ratio of real GDP to the sum of the real GDPs of Euro-11 countries (*size*); (ii) a spline in the debt to consider only values above 60% of GDP;³³ and (iii) economic volatility, defined as the standard deviation of real economic growth over the preceding 10 years (*vol*).³⁴

Country size is used as a control variable, since smaller countries tend to have less bargaining power and political influence in the Eurowide decisions. Moreover, country size is also found to significantly explain the size and volatility of government spending, with smaller countries having bigger and more volatile spending (see Alesina and Wacziarg, 1998; and Furceri and Poplawski Ribeiro, 2008).

A spline in the debt is included to test nonlinear responses of discretionary fiscal policy (CAPD) to different levels of debt. The idea is that fiscal authorities would react more fiercely to higher than lower debt levels. The threshold level of debt of 60% of GDP is a natural choice here given the medium-term objective of Europe's fiscal rules to bring debt levels in all countries below that value.

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

³²We also estimated the model using individual-country coefficients for inflation. Our main findings remain robust for this test.

³³As in Bohn (1998) and Mendoza and Ostry (2007), we define the spline variable on the debt as $spline_{i,t} = \max(0, debt_{i,t-1} - 60)$, where 60 represent a debt equal to 60% of GDP.

³⁴As an additional robustness test (not reported here), we include other six political variables extracted from Armingeon et al. (2005): (i) the cabinet composition; (ii) the new party composition of the cabinet; (iii) the ideological gap between the old and new cabinet; (iv) the annual number of changes in government; (v) the type of government; and (vi) the Rae's (1968) index of fractionalization of the party system. Nevertheless, none of these variables are significant in our estimations and all our results about the effectiveness of the SGP are robust to their inclusion.

macroeconomic volatility comes from Anett (2006), who claims that the SGP may act as an external anchor for countries prone to macroeconomic volatility.

Table 8 summarizes the results of the robustness tests described above.³⁵ Its first two columns, "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 the coefficient value for the parliamentary dummy for election, *ele*, is much larger for smaller than for bigger Euro-11 countries. This suggests that smaller countries have less fiscal discipline in response to political budget cycles. Regarding the testing variables, the discretionary fiscal response to the business cycle is now only significantly countercyclical during the MT period for small countries and not for big countries. Further, the excessive deficit variable for the MT is more significant for bigger than for smaller Euro-11 countries. This suggests that in the run up to the Euro zone bigger Euro-11 countries reacted more vigorously to excessive deficits than small countries. For smaller countries the effect of *exmt* is only marginally significant. Moreover, for none of these subsamples of countries is it true that the SGP has been effective in reducing excessive deficits. This important result rules out the notion that the SGP has been binding, if only for small countries.

The next two robustness tests - one relaxing the assumption of homogeneous coefficients 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, the variable accounting for the fiscal response to excessive deficits during the MT period (*exmt*) exhibits very significant and negative coefficients in those regressions, whereas no significant effect is observed in the SGP period.

The same is true when we add further economic variables to Equation (1) as reported in the last column of Table 8. There, the results over the effectiveness of Europe's fiscal rules remain robust. Besides, none of the new economic control variables displays a significant coefficient, showing that the CAPD level has not reacted significantly to them.

4.2. Modified testing variables

The second set of robustness tests includes modified testing variables to analyze whether our findings on the effectiveness of Europe's fiscal rules hold for new assessment measures.

Here, the first check includes two interaction terms between the MT- and SGP periods and the debt *spline* as additional testing variables. Such interaction terms investigate whether European authorities have reacted differently to high level of debts (higher than 60% of GDP) during the periods of each one of Europe's fiscal rules.

In the second test the debt *spline* is interacted with the excessive deficit variables for the MT and SGP (*exmt* and *exsgp*). Even if they have not reacted to excessive deficits, European fiscal

³⁵Table 8 is organized in the same way as Table 7, but with each column now displaying the results of one of the tests (identified in the head of the column).

authorities might have responded at least to the perverse combination of excessive deficits and debts during the SGP. Thus, these interaction terms could capture more accurately the role of the Medium Term Objective of the SGP, which was strengthened with the reform of the Pact.

In the third robustness check, we substitute $exmt_{i,t}$ in the estimation of the fiscal reaction function (1) by its single values for each of the seven years of the MT preceding the implementation of the SGP on year t^* (again $t^* = 1999$ for all Euro-11 countries, except for Greece where $t^* = 2001$). In other words, instead of jointly estimating $exmt_{i,t}$ for the entire MT period, which conveys the average effect of that variable; in this robustness test we estimate separately each yearly effect of excessive deficits for the last seven years of the MT period in Euro-11 countries. So, except for Greece, we now include as single regressor in (1), the variables: $exmt_{i,1992}$ (i.e. $exmt_{i,1992} = tdefy_{i,1991} - 3\%$), $exmt_{i,1993}$, $exmt_{i,1994}$, ..., $exmt_{i,1998}$.³⁶

The idea of this test is to relax the hypothesis of a homogeneous response to excessive deficits during the MT period and to check for non-linear reactions to this fiscal rule. Since the objective of the Treaty was to enforce convergence of fiscal values to its targets as a pre-requisite to enter in the Euro zone, excessive deficits might have mattered for European countries only in the years just before their entry in the Euro area. Therefore, their fiscal authorities might have reacted to excessive deficits much more strongly in the year before the adoption of the Euro than seven years earlier.

The fourth test of this subsection uses another way to test the nonlinear fiscal response to excessive deficits during the MT period. Following Forni and Momigliano (2004) and Giuliadori and Beetsma (2008a and 2008b), we modify $exmt_{i,t}$ given by (2) to the following new variable:

$$\left\{ \begin{array}{ll} \text{for } t < 1992 \text{ and } t > 1998 : & exmta_{i,t} = 0 \\ \text{for } 1992 \leq t \leq 1998 : & exmta_{i,t} = \frac{tdefy_{i,t-1} - 3\%}{1999-t} \quad \text{if } tdefy_{i,t-1} \geq 3\% \\ \text{for } 1992 \leq t \leq 1998 : & exmta_{i,t} = 0 \quad \text{if } tdefy_{i,t-1} < 3\% \end{array} \right. \quad (4)$$

The intuition for this modified variable is that starting from 1992, the bigger was the time gap between 1999 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 $exmta_{i,t}$.³⁷

Likewise, we transform our excessive deficit variable for the SGP period (3) to the following new variable:

$$\left\{ \begin{array}{ll} \text{for } t < 1999 : & exsgpa_{i,t} = 0 \\ \text{for } 1999 \leq t \leq 2007 : & exsgpa_{i,t} = \frac{tdefy_{i,t-1} - 3\%}{2} \quad \text{if } tdefy_{i,t-1} \geq 3\% \\ \text{for } 1999 \leq t \leq 2007 : & exsgpa_{i,t} = 0 \quad \text{if } tdefy_{i,t-1} < 3\% \end{array} \right. \quad (5)$$

³⁶For Greece, instead, we replace $exmt_{Greece,t}$ by $exmt_{Greece,1993}$, $exmt_{Greece,1994}$, ..., $exmt_{Greece,2000}$.

³⁷Again we compute this variable for Greece until the year 2000. Moreover, as a simplification, this new variable assumes that the disciplinary effect of the Maastricht Treaty is linear in the difference of the total deficit to the reference level if $tdefy_{i,t-1} \geq 3\%$, and linear in the time gap between the year of the violation of the rule and the deadline to enter the Euro zone - 1999.

Here, when $tdefy_{i,t-1} \geq 3\%$, the variable $exsgp_{i,t}$ 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.³⁸

The fifth test in this section uses an alternative variable to capture the reaction of European fiscal authorities to excessive deficits during the SGP period. The implementation of the SGP introduced an early-warning mechanism, turning public all Commission's and Economic Council's recommendations for EU countries based on their assessments of the stability and convergence programmes. Therefore, in this test we substitute $exsgp_{i,t}$ by a new variable $edp_{i,t}$ constructed from the publicly available information about excessive deficit procedures opened by the European Commission for a particular country. Hence, $edp_{i,t}$ equals to one for a particular country in all years that an excessive deficit procedure has existed against it in the European Commission, and zero otherwise.

Finally, as our last robustness test, we employ real-time data instead of revised data to estimate the fiscal reaction function (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.³⁹ Therefore, such robustness check is relevant to verify if our findings hold when we focus only in the intentional actions of European fiscal authorities.

Table 9 conveys the results of the second set of robustness tests.⁴⁰ There, the non-significant coefficients of $dmt*spline$ and $dsgp*spline$ in the first column indicates that European fiscal authorities have reacted similarly to debts higher or lower than 60% of GDP during the MT- and SGP periods. Thus, the hypothesis of non-linearity in debt response can be discarded. In turn, Column two ("MTO") shows that the interaction term between the debt spline and excessive deficit variables is only marginally significant during the MT period. This suggests that fiscal authorities have also not reacted to the mix of excessive deficits and high debts during the SGP period.

In addition, the third column of Table 9 confirms the existence of non-linear effects of the fiscal rule during the MT period. As expected, the coefficients for excessive deficits in the second and third year before the entry in the Euro zone (i.e. 1999 and 1998 for Greece, and 1997 and 1996 for all other Euro-11 countries) are significantly different and more negative than the other years of the Maastricht Treaty period, which indicates that most of the fiscal efforts to enter in the Euro area were made in those years.

³⁸Again, this variable assumes 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.

³⁹For 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.

⁴⁰The last line of Table 9 presents in addition the sample period analyzed in each column given the varying data samples used in the tests.

Interestingly though, the positive and significant coefficient of $exmt_{t^*-1}$ (i.e. 2000 for Greece and 1998 for all other Euro-11 countries) shows that in the year before of accession to the Euro zone itself, the reaction to excessive deficits of fiscal authorities was on average a further increase in deficits. One reason for this outcome might be the fact that European authorities knew the decision about their accession to the monetary union months in advance. So, they might have relaxed their fiscal tightening directly after learning that they would join it.

Next, the fourth column of Table 9 displays the results for the robustness tests using the non-linear alternative measures of excessive deficit variables given by (4) and (5). Again, for this test our previous results remain robust and only during the MT period a significant reaction to excessive deficits is observed.

Concerning the test with the publicly available information of the European Commission on the excessive deficit procedure (*edp*), even though more negative than the other alternatives measures of excessive deficit, the coefficient of this variable is still only marginally significant (significant at 10%) and, therefore, does not really challenge our previous results.

Finally, the last column in Table 9 ("Real Time") conveys the results for the test employing real-time data. Such data 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. $debt(-1)$ is not significant. Concerning the excessive deficits, we find that the fiscal authorities' intentional reaction to excessive deficits throughout the SGP has not been again significant. This result reinforces previous findings that the ineffectiveness 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.

All in all, the robustness tests tend to confirm that only the MT was effective in curbing excessive deficits in the Euro-11 group of countries. Concerning the discretionary fiscal response to the business cycle, fiscal authorities seem to respond countercyclically in some of the tests during the MT period, but this never occurs with the SGP period.

5. CONCLUSION

The Maastricht Treaty has now been in existence for more than 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 the empirical Results I, II, and III, and all robustness tests performed; we reach the following conclusions:

- a. *Ceteris paribus*, the average level of the CAPD in the Euro-11 has not significantly decreased

- either during the MT period or the SGP period.
- b. The SGP, in particular, have also not succeeded in making Euro zone's discretionary fiscal policy countercyclical. For the MT period, our results are mixed with some evidence of countercyclical discretionary fiscal policy in that period.
 - c. Only the MT was on average effective in reducing the CAPD when the actual deficit ceiling was exceeded in the Euro-11. In turn, the SGP has robustly failed in curbing excessive deficit in all checks performed.

This paper demonstrates, therefore, that in contrast to the MT, the SGP has been overall ineffective in enforcing fiscal discipline in the Euro zone countries. It has neither promoted countercyclical fiscal policy, nor induced a fiscal tightening in response to excessive deficits in those countries (particularly during its first version).

With the current financial crisis, the very existence of the Pact is at debate. Beyond its past ineffectiveness, the SGP has not prevented countries like Ireland to very rapidly fall into deficit when the crisis surged. Further, it does not provide any credible scheme for medium-run discipline, since no one is able to predict when the crisis will be over.

The question, then, is how to strengthen the SGP to restore its credibility. In particular, a more stringent Pact should avoid excessive deficits. Moreover, it should create incentives to countercyclical fiscal behavior in the Euro zone.

Various proposals in this sense have been made. One involves establishing independent and nonpartisan government agencies (see Jonung and Larch, 2006; and Debrun et al., 2009). These agencies could be charged with identifying changes in the cyclical state of the economy, assessing the extent to which fiscal policy is consistent with medium-term objectives, and providing advice on various policy measures (IMF, 2008). Cooperation and exchange of information among them would increase fiscal coordination in Europe without removing sovereignty of national fiscal policies, which would still be voted by national parliaments.

Other suggestions, which could be easily combined with independent agencies, consist in: (i) strengthening the role of the debt level in the SGP rules;⁴¹ and (ii) creating rainy day funds that would allow Member states to fall into excess deficits when necessary, provided they have previously accumulated surpluses.⁴² While rainy day funds would not fundamentally alter the incentive problems at the root of the difficulties in the implementation of the SGP, they could give more room for counter-cyclical policies while helping countries to comply with the Pact.⁴³

Our analysis leaves some empirical questions open to further examination. First, it would be important to investigate the source of ineffectiveness of the SGP (high government spending

⁴¹Poplawski Ribeiro et al. (2008), for example, analyze the pros and cons of a bigger role of the debt level in the SGP rules.

⁴²See Franco et al. (2007) for a formal analysis of such proposal.

⁴³For a further discussion of the current status of the SGP and its reform proposals, see Bénassy-Quéré and Poplawski Ribeiro (2009).

or low taxes revenues) in cases of excessive deficits. Second, this study neglects the role of credibility of Europe's fiscal rules, which could have also affected their effectiveness. Therefore, an empirical analysis of those issues would contribute to the debate on how to improve the SGP, guaranteeing sound fiscal policies in Europe in the longer-term.

TABLES AND FIGURES

Table 1: List of variables (in alphabetical order)

Mnemonic	Definition and Source
Variables of the Main Estimations	
<i>capd</i>	Cyclically-adjusted primary deficit. <i>Source: OECD (2008) and author's computation.</i>
<i>capd(-1)</i>	Lagged cyclically-adj. primary deficit. <i>Source: OECD (2008) and author's computation.</i>
<i>debt(-1)</i>	Lagged government debt (as % of GDP). <i>Source: OECD (2008) and author's computation.</i>
<i>deu3</i>	Country dummy for three EU members that does not belong to Eurozone: equals 1 for Denmark, Sweden and UK in all years and 0 otherwise. <i>Source: author's computation.</i>
<i>dmt</i>	Time dummy for the period 1992-1998 (Maastricht Treaty): equals 1 during the years 1992-1998 for all countries and 0 otherwise. <i>Source: author's computation.</i>
<i>doecd6</i>	Country dummy for six OECD countries that does not belong to Eurozone: equals 1 for Australia, Canada, Iceland, Japan, Norway and the US in all years and 0 otherwise. <i>Source: author's computation.</i>
<i>dsgp</i>	Time dummy for the period 1999-2007 (Stability and Growth Pact): equals 1 during the years 1999 to 2007 for all countries and 0 otherwise. <i>Source: author's computation.</i>
<i>dsgp1</i>	Time dummy for the period 1999-2005 (first version of the SGP): equals 1 during the years 1999-2005 for all countries and 0 otherwise. <i>Source: author's computation.</i>
<i>dsgp2</i>	Time dummy for the period 2006-2007 (Reform of the SGP): equals 1 during the years 2006-2007 for all countries and 0 otherwise. <i>Source: author's computation.</i>
<i>ele</i>	Dummy for years of parliamentary elections: equals 1 in years of parliamentary elections in each country and 0 otherwise. <i>Source: www.idea.int and author's computation.</i>
<i>exmt</i>	Excessive Deficits for the MT: accounts for the effects of the MT in cases when the deficit exceeds the 3% limit. See Equation 2. <i>Source: OECD (2008) and author's computation.</i>
<i>exsgp</i>	Excessive Deficit for the SGP: accounts for the effects of the SGP when total deficits exceeds the 3%. See Equation 3. <i>Source: OECD (2008) and author's computation.</i>
<i>exsgp1</i>	Excessive Deficit for initial SGP version: constructed equally to <i>sgp</i> but only between 1999-2005. <i>Source: OECD (2008) and author's computation.</i>
<i>exsgp2</i>	Excessive Deficit for the reformed SGP: constructed in the same way as <i>sgp</i> but only between 2006-2007. <i>Source: OECD (2008) and author's computation.</i>
<i>gap</i>	Output gap. <i>Source: OECD (2008).</i>
<i>inf</i>	Inflation of private consumption. <i>Source: OECD (2008) and author's computation.</i>
<i>tdefy</i>	Total deficit as % of GDP. <i>Source: OECD (2008).</i>
α	Average fixed-effect in the estimation. <i>Source: author's computation.</i>
Additional Variables of the Robustness Tests	
<i>edp</i>	Excessive Deficit Procedure: equals 1 for a country in all years that an excessive deficit procedure has existed against it in the European Commission, and 0 otherwise. <i>Source: European Commission website and author's computation.</i>
<i>exmt_{t*}-1</i>	Equals <i>exmt</i> in the year before the introduction of SGP t^* ($t^* = 1999$ for all Euro-11 countries but Greece, where $t^* = 2001$). <i>Source: OECD (2008) and author's computation.</i>
<i>exmta</i>	Alternative variable of Excessive Deficits for the MT. See Equation 4. <i>Source: OECD (2008) and author's computation.</i>
<i>exsgpa</i>	Alternative variable of Excessive Deficit for the SGP. See Equation 5. <i>Source: OECD (2008) and author's computation.</i>
<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>Source: OECD (2008) and author's computation.</i>
<i>gap_{neg}</i>	Negative output gap: equals 1 for years of negative output gap in each country and 0 otherwise. <i>Source: OECD (2008) and author's computation.</i>
<i>gap_{pos}</i>	Positive output gap: equals 1 for years of positive output gap in each country and 0 otherwise. <i>Source: OECD (2008) and author's computation.</i>
<i>size</i>	Country size in terms of actual GDP. <i>Source: OECD (2008) and author's computation.</i>
<i>spline</i>	Spline on the debt defined as $spline_{i,t} = \max(0, gglq_{i,t-1} - 60)$, where 60 represent a debt equal to 60% of GDP. <i>Source: OECD (2008) and author's computation.</i>
<i>vol</i>	GDP volatility in the previous 10 years. <i>Source: OECD (2008) and author's computation.</i>

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		1992-1998		1999-2007		2006-2007		1980-2007	
	capd ^a	gap ^b	capd ^a	gap ^b	capd ^a	gap ^b	capd ^a	gap ^b	capd ^a	gap ^b
AUT	0.45	-1.28	0.34	-0.17	-0.79	-0.05	-1.16	-0.15	0.02	-0.61
BEL	0.02	-1.04	-4.61	-0.60	-4.86	-0.20	-3.93	-0.33	-2.71	-0.66
DEU	-0.10	-0.31	-0.22	-0.32	-0.25	-0.23	-1.76	-0.06	-0.18	-0.29
ESP	2.53	-1.33	-0.15	-2.34	-2.08	-0.01	-3.09	0.10	0.38	-1.16
FIN	-2.16	1.00	0.49	-5.87	-4.03	0.22	-3.83	1.12	-2.10	-0.97
FRA	0.60	-0.32	1.28	-0.76	0.29	0.35	0.20	0.22	0.67	-0.21
GRC	4.03	0.30	-2.32	-1.16	-0.58	0.19	-0.79	0.81	0.96	-0.10
IRE	2.24	-0.55	-3.69	-1.91	-1.20	1.80	-1.46	0.19	-0.35	-0.14
ITA	3.48	-0.06	-3.67	-1.21	-2.07	-0.23	-2.16	-1.13	-0.09	-0.40
NLD	0.10	-1.12	-2.07	-0.92	-1.48	0.42	-2.49	-0.11	-0.95	-0.58
PRT	-0.08	-1.85	-0.55	-0.06	0.97	0.57	-0.52	-2.17	0.14	-0.62
DNK	-2.20	-0.33	-1.77	-0.91	-3.61	0.21	-4.19	2.08	-2.54	-0.30
GBR	-0.81	-0.31	1.45	-1.00	-0.27	0.35	0.96	0.03	-0.07	-0.27
SWE	0.81	-0.49	2.92	-2.90	-1.58	0.25	-1.80	1.10	0.57	-0.85
AUS	-0.38	-0.16	-0.65	-1.17	-2.60	0.05	-2.12	0.42	-1.16	-0.34
CAN	2.83	-0.55	-1.74	-2.71	-2.88	0.91	-1.77	0.27	-0.15	-0.62
ISL	1.55	1.52	-0.19	-3.97	-1.26	0.41	-4.02	2.32	0.21	-0.21
JPN	-0.49	-0.20	2.84	1.23	4.41	-1.13	1.27	0.27	1.92	-0.14
NOR	2.00	-4.15	7.30	-1.73	12.38	1.97	13.70	4.16	6.66	-1.58
USA	1.10	-0.82	-0.94	-1.34	0.21	0.37	1.00	0.55	0.31	-0.57
Euro-11^c	1.01	-0.60	-1.38	-1.39	-1.46	0.25	-1.91	-0.14	-0.38	-0.52
EU-3^d	-0.73	-0.38	0.87	-1.60	-1.82	0.27	-1.68	1.07	-0.68	-0.48
OECD-6^e	1.10	-0.73	1.10	-1.61	1.71	0.43	1.34	1.33	1.30	-0.58
OECD-20^f	0.78	-0.60	-0.30	-1.49	-0.56	0.31	-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: Number of cases of excessive deficits according to Europe's fiscal rules*

Countries	Period		Countries	Period	
	MT (1992-1998)	SGP (1999-2007)		MT (1992-1998)	SGP (1999-2007)
Austria	4	1	Denmark	2	0
Belgium	6	0	Sweden	5	0
Finland	5	0	UK	6	3
France	6	3	EU-3	13/21	3/27
Germany	3	4	Australia	5	0
Greece ^a	9	6	Canada	5	0
Ireland	0	0	Iceland	2	0
Italy	6	7	Japan	4	8
Netherlands	3	1	Norway	0	0
Portugal	7	5	USA	5	4
Spain	7	1	OECD-6	21/42	12/54
Euro-11 ^a	56/79	28/97	OECD-20 ^a	88/142	45/178

Source: OECD (2008) and own calculations.

Notes: * According to Europe's fiscal rules, an excessive deficit case is identified whenever the total deficit in the previous year is higher than 3% of GDP (see Equations (2) and (3)).

^a The calculations here take into consideration that for Greece the MT-period goes until the year 2000, with the SGP-period starting in 2001.

Table 4: 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)
α	1.13* (0.62)	1.31 (0.94)	0.84 (0.55)	1.17 (0.92)	1.17** (0.57)	1.23 (0.89)	0.95** (0.47)	1.17 (0.81)
<i>capd(-1)</i>	0.80*** (0.02)	0.79*** (0.02)	0.80*** (0.03)	0.79*** (0.02)	0.80*** (0.03)	0.81*** (0.03)	0.79*** (0.04)	0.80*** (0.03)
<i>debt(-1)</i>	-0.02*** (0.01)	-0.02*** (0.01)	-0.02*** (0.01)	-0.02*** (0.01)	-0.02*** (0.01)	-0.02*** (0.01)	-0.02*** (0.00)	-0.02*** (0.01)
<i>inf</i>	-0.02 (0.04)	0.00 (0.05)	0.00 (0.04)	0.01 (0.04)	-0.02 (0.05)	0.00 (0.06)	-0.01 (0.04)	-0.01 (0.04)
<i>ele</i>	0.77*** (0.14)	0.72*** (0.13)	0.78*** (0.15)	0.73*** (0.14)	0.80*** (0.13)	0.76*** (0.11)	0.81*** (0.14)	0.77*** (0.13)
<i>gap</i>	-0.04 (0.07)	0.00 (0.08)	0.04 (0.11)	0.04 (0.11)	-0.04 (0.08)	-0.02 (0.08)	0.04 (0.09)	0.04 (0.10)
<i>dmt</i>		-0.58 (0.41)		-0.67 (0.42)		-0.21 (0.43)		-0.29 (0.44)
<i>dsgp</i>		-0.32 (0.39)		-0.29 (0.42)		-0.28 (0.40)		-0.25 (0.43)
<i>dmt*gap</i>			-0.16 (0.15)	-0.15 (0.12)			-0.19 (0.12)	-0.22** (0.11)
<i>dsgp*gap</i>			-0.04 (0.16)	0.06 (0.11)			0.02 (0.16)	0.07 (0.10)
<i>exmt</i>					-0.31*** (0.09)	-0.24*** (0.07)	-0.31*** (0.09)	-0.27*** (0.06)
<i>exsgp</i>					-0.15 (0.28)	-0.24 (0.29)	-0.16 (0.22)	-0.22 (0.22)
Adjusted R^2	0.80	0.79	0.80	0.80	0.81	0.80	0.81	0.80
Sargan Test P-value ^a	1.00	1.00	1.00	0.83	1.00	0.99	1.00	0.88
Cross-Section	11	11	11	11	11	11	11	11
Observations	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 5: Effects of the reform of the SGP on the CAPD - Euro-11 (1980 - 2007)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
α	1.24 (0.84)	0.83 (0.56)	1.10 (0.76)	1.22** (0.58)	1.18 (0.83)	0.97** (0.44)	1.10 (0.70)
<i>capd(-1)</i>	0.80*** (0.02)	0.80*** (0.03)	0.79*** (0.03)	0.81*** (0.03)	0.82*** (0.02)	0.79*** (0.04)	0.79*** (0.03)
<i>debt(-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>inf</i>	0.00 (0.04)	0.01 (0.04)	0.01 (0.04)	-0.03 (0.05)	-0.01 (0.05)	-0.01 (0.04)	-0.01 (0.04)
<i>ele</i>	0.76*** (0.14)	0.78*** (0.14)	0.76*** (0.15)	0.79*** (0.12)	0.78*** (0.13)	0.80*** (0.13)	0.79*** (0.15)
<i>gap</i>	-0.01 (0.07)	0.05 (0.11)	0.06 (0.10)	-0.04 (0.08)	-0.03 (0.07)	0.04 (0.10)	0.05 (0.09)
<i>dmt</i>	-0.38 (0.28)		-0.52* (0.31)		0.02 (0.30)		-0.14 (0.31)
<i>dsgp1</i>	0.16 (0.32)		0.12 (0.33)		0.17 (0.34)		0.10 (0.35)
<i>dsgp2</i>	-0.81** (0.38)		-0.79** (0.36)		-0.66* (0.39)		-0.67* (0.39)
<i>dmt*gap</i>		-0.17 (0.15)	-0.17 (0.12)			-0.19 (0.12)	-0.24** (0.10)
<i>dsgp1*gap</i>		-0.07 (0.22)	-0.02 (0.12)			-0.01 (0.23)	0.00 (0.11)
<i>dsgp2*gap</i>		0.05 (0.16)	0.09 (0.15)			-0.03 (0.15)	-0.02 (0.17)
<i>exmt</i>				-0.31*** (0.09)	-0.24*** (0.06)	-0.31*** (0.09)	-0.27*** (0.06)
<i>exsgp1</i>				-0.01 (0.28)	-0.09 (0.23)	-0.03 (0.24)	-0.04 (0.18)
<i>exsgp2</i>				-0.44*** (0.14)	-0.48*** (0.08)	-0.40** (0.16)	-0.43*** (0.13)
Adjusted R^2	0.80	0.80	0.80	0.81	0.80	0.81	0.81
Sargan Test P-value ^a	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% respectively. White's period robust coefficient standard errors in parenthesis. ^a Sargan's test of over-identifying restrictions: under the null hypothesis the restrictions are satisfied.

Table 6: Effects of the MT and the SGP on the CAPD for the OECD-20 with heterogeneous control variable coefficients (1980 - 2007)

Estimations Variables	(1)		(2)		(3)		(4)		(5)		(6)		(7)		(8)	
	coef. ^a	std ^b	coef. ^a	std ^b	coef. ^a	std ^b	coef. ^a	std ^b	coef. ^a	std ^b	coef. ^a	std ^b	coef. ^a	std ^b	coef. ^a	std ^b
<i>capd(-1)</i>	1.05*** (0.51)		1.15 (0.93)		1.19*** (0.37)		1.62*** (0.54)		1.01*** (0.52)		0.99 (0.92)		1.21*** (0.35)		1.54*** (0.52)	
<i>capd(-1)*den3</i>	0.81*** (0.03)		0.80*** (0.03)		0.79*** (0.03)		0.79*** (0.03)		0.81*** (0.04)		0.81*** (0.04)		0.78*** (0.04)		0.80*** (0.04)	
<i>capd(-1)*doecd6</i>	-0.18 (0.14)		-0.35** (0.17)		-0.13 (0.09)		-0.18** (0.08)		-0.29** (0.11)		-0.39*** (0.15)		-0.08 (0.06)		-0.13 (0.09)	
<i>debt(-1)</i>	0.13*** (0.04)		0.14*** (0.04)		0.15*** (0.03)		0.15*** (0.03)		0.14*** (0.04)		0.15*** (0.04)		0.16*** (0.04)		0.15*** (0.04)	
<i>debt(-1)*den3</i>	-0.02*** (0.01)		-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>debt(-1)*doecd6</i>	-0.03 (0.02)		-0.04 (0.03)		-0.05** (0.02)		-0.08*** (0.02)		-0.04 (0.02)		-0.05 (0.03)		-0.05*** (0.02)		-0.05*** (0.01)	
<i>inf</i>	0.01 (0.01)		0.00 (0.01)		0.01 (0.01)		0.00 (0.01)		0.01 (0.01)		0.01 (0.01)		0.01 (0.01)		0.01 (0.01)	
<i>inf*den3</i>	0.02 (0.05)		0.03 (0.05)		0.01 (0.04)		0.03 (0.04)		0.01 (0.06)		0.03 (0.06)		0.00 (0.04)		0.01 (0.04)	
<i>inf*doecd6</i>	0.04 (0.10)		0.23 (0.25)		-0.01 (0.05)		0.00 (0.06)		0.12 (0.09)		0.23 (0.23)		0.00 (0.05)		-0.01 (0.06)	
<i>ele</i>	0.03 (0.08)		0.12 (0.14)		-0.07 (0.06)		0.04 (0.09)		0.05 (0.08)		0.13 (0.14)		0.13 (0.14)		0.05 (0.09)	
<i>ele*den3</i>	0.72*** (0.14)		0.73*** (0.13)		0.72*** (0.15)		0.66** (0.32)		0.75*** (0.13)		0.76*** (0.12)		0.75*** (0.14)		0.77*** (0.13)	
<i>ele*doecd6</i>	-0.55*** (0.22)		-0.71*** (0.20)		-0.51** (0.22)		-0.25 (1.00)		-0.67*** (0.21)		-0.78*** (0.17)		-0.47* (0.27)		-0.53** (0.24)	
<i>gap</i>	-0.53* (0.30)		-0.58** (0.26)		-0.47 (0.32)		-0.49 (0.42)		-0.57** (0.28)		-0.62** (0.25)		-0.49* (0.29)		-0.60** (0.27)	
<i>gap*den3</i>	-0.03 (0.05)		0.03 (0.07)		0.03 (0.06)		0.07 (0.07)		-0.04 (0.05)		0.02 (0.08)		0.03 (0.05)		0.05 (0.06)	
<i>gap*doecd6</i>	-0.41 (0.26)		-0.56** (0.26)		-0.34 (0.25)		-0.42* (0.25)		-0.38 (0.24)		-0.55** (0.25)		-0.30 (0.20)		-0.37 (0.24)	
<i>dmt</i>	0.01 (0.07)		-0.14* (0.08)		-0.12 (0.09)		-0.17** (0.07)		0.02 (0.08)		-0.15* (0.09)		-0.12 (0.08)		-0.17** (0.08)	
<i>dmt*den3</i>			-0.65* (0.35)				-0.86** (0.35)				-0.24 (0.37)				-0.51 (0.35)	
<i>dmt*doecd6</i>			2.06* (1.13)				0.80 (0.92)				1.54 (1.11)				0.15 (0.81)	
<i>dsgp</i>			0.74 (0.81)				0.92 (0.72)				0.44 (0.95)				0.48 (0.79)	
<i>dsgp*den3</i>			-0.41 (0.32)				-0.44 (0.31)				-0.36 (0.33)				-0.46 (0.31)	
<i>dsgp*doecd6</i>			0.97 (1.17)				-0.05 (0.26)				0.77 (1.16)				-0.16 (0.34)	
<i>dmt*gap</i>							1.12*** (0.42)				1.35** (0.64)				1.16** (0.50)	
<i>dmt*gap*den3</i>							-0.18* (0.09)				-0.23*** (0.07)				-0.24*** (0.07)	
<i>dmt*gap*doecd6</i>							-0.30 (0.38)				0.32** (0.15)				-0.47 (0.42)	
<i>dsgp*gap</i>							0.31* (0.17)				0.48*** (0.15)				0.37** (0.16)	
<i>dsgp*gap*den3</i>							0.04 (0.09)				-0.09 (0.10)				0.06 (0.08)	
<i>dsgp*gap*themu</i>							-0.03 (0.21)				0.30 (0.30)				0.05 (0.27)	
<i>dsgp*gap*doecd6</i>							-0.14 (0.20)				-0.02 (0.32)				0.05 (0.27)	
<i>exmt</i>											-0.30*** (0.09)				-0.27*** (0.06)	
<i>exmt*den3</i>							-0.43*** (0.13)				0.44*** (0.09)				0.01 (0.16)	
<i>exmt*doecd6</i>							0.35*** (0.15)				0.11 (0.15)				0.23** (0.11)	
<i>exsgp</i>							-0.09 (0.11)				-0.18 (0.29)				-0.17 (0.23)	
<i>exsgp*den3</i>							0.25 (0.34)				3.91*** (1.06)				1.10 (1.54)	
<i>exsgp*doecd6</i>							-0.14 (0.17)				0.06 (0.39)				1.10 (1.54)	
Adjusted R ²	0.86		0.86		0.87		0.86		0.87		0.86		0.87		0.86	
Sargan Test P-value ^c	1.00		0.80		1.00		0.24		1.00		0.59		1.00		0.16	
Cross-Section	20		20		20		20		20		20		20		20	
Observations	524		524		524		524		524		524		524		524	

Notes: Regressions estimated by Two-Stage Least Squares (TSLS). ^a Coefficients of the estimations where ***, **, * correspond to the level of significance at 1%, 5% and 10% respectively. ^b White's period robust coefficient standard errors in parenthesis. ^c P-values of Sargan's test of overidentifying restrictions: under the null hypothesis, the restrictions are satisfied.

Table 7: Comparison - effects of the MT and the SGP on the CAPD - OECD-20 (1980 - 2007)

Estimations Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	coeff. ^a	coeff. ^a	coeff. ^a	coeff. ^a	coeff. ^a	coeff. ^a	coeff. ^a	coeff. ^a
	std ^b	std ^b	std ^b	std ^b	std ^b	std ^b	std ^b	std ^b
α	0.92*	1.62***	0.99**	1.62***	1.06*	1.49**	1.16***	1.57***
<i>capd(-1)</i>	(0.55)	(0.61)	(0.41)	(0.49)	(0.59)	(0.67)	(0.42)	(0.51)
<i>capd(-1)*deu3</i>	0.81***	0.78***	0.82***	0.78***	0.80***	0.80***	0.80***	0.79***
	(0.03)	(0.03)	(0.03)	(0.03)	(0.04)	(0.04)	(0.04)	(0.03)
<i>capd(-1)*doecd6</i>	-0.17*	-0.26***	-0.15*	-0.18**	-0.19**	-0.27***	-0.09*	-0.14**
	(0.10)	(0.10)	(0.08)	(0.09)	(0.08)	(0.10)	(0.05)	(0.07)
<i>debt(-1)</i>	0.14***	0.15***	0.14***	0.16***	0.14***	0.15***	0.15***	0.15***
	(0.04)	(0.03)	(0.04)	(0.03)	(0.04)	(0.05)	(0.04)	(0.04)
<i>debt(-1)*deu3</i>	-0.02***	-0.02***	-0.02***	-0.02***	-0.01***	-0.02***	-0.02***	-0.02***
	(0.01)	(0.00)	(0.00)	(0.00)	(0.01)	(0.00)	(0.01)	(0.00)
<i>inf</i>	-0.04**	-0.06***	-0.05**	-0.06***	-0.05***	-0.06***	-0.05***	-0.06***
	(0.02)	(0.01)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.01)
<i>ele</i>	0.03	0.03	0.02	0.02	0.02	0.03	0.00	0.01
	(0.05)	(0.05)	(0.03)	(0.04)	(0.07)	(0.06)	(0.04)	(0.04)
<i>ele*deu3</i>	0.72***	0.72***	0.73***	0.63**	0.74***	0.76***	0.75***	0.77***
	(0.14)	(0.13)	(0.15)	(0.29)	(0.13)	(0.12)	(0.14)	(0.13)
<i>ele*doecd6</i>	-0.55***	-0.67***	-0.53***	-0.11	-0.58***	-0.70***	-0.48*	-0.54**
	(0.19)	(0.15)	(0.21)	(0.87)	(0.16)	(0.12)	(0.25)	(0.23)
<i>gap</i>	-0.53*	-0.56**	-0.49	-0.44	-0.56*	-0.59**	-0.51*	-0.58**
	(0.31)	(0.27)	(0.32)	(0.40)	(0.29)	(0.27)	(0.30)	(0.28)
<i>gap*deu3</i>	-0.02	0.02	0.04	0.05	-0.04	0.00	0.04	0.05
	(0.05)	(0.07)	(0.06)	(0.07)	(0.06)	(0.07)	(0.05)	(0.06)
<i>gap*doecd6</i>	-0.42	-0.56*	-0.36	-0.43	-0.39	-0.55*	-0.30	-0.37
	(0.26)	(0.30)	(0.26)	(0.28)	(0.24)	(0.28)	(0.20)	(0.23)
<i>dmt</i>	0.00	-0.12	-0.09	-0.17**	0.03	-0.14	-0.08	-0.17**
	(0.07)	(0.08)	(0.08)	(0.07)	(0.08)	(0.09)	(0.08)	(0.07)
<i>dmt*deu3</i>		-0.65*		-0.88**		-0.25		-0.52
		(0.33)		(0.35)		(0.35)		(0.35)
<i>dmt*doecd6</i>		1.07***		0.51		0.61*		0.23
		(0.33)		(0.65)		(0.37)		(0.60)
<i>dsgp</i>		0.36		0.77		0.03		0.37
		(0.53)		(0.58)		(0.64)		(0.64)
<i>dsgp*deu3</i>		-0.40		-0.47		-0.34		-0.46
		(0.30)		(0.30)		(0.31)		(0.30)
<i>dsgp*doecd6</i>		-0.10		-0.03		-0.25		-0.10
		(0.39)		(0.34)		(0.37)		(0.45)
<i>dmt*gap</i>		0.90***		0.98***		0.94**		1.00**
		(0.34)		(0.34)		(0.41)		(0.43)
<i>dmt*gap*deu3</i>			-0.12	-0.17*			-0.19**	-0.24***
			(0.10)	(0.09)			(0.08)	(0.07)
<i>dmt*gap*doecd6</i>			-0.45***	-0.34			-0.57***	-0.47
			(0.16)	(0.41)			(0.17)	(0.40)
<i>dsgp*gap</i>			0.24*	0.33*			0.41***	0.40**
			(0.12)	(0.18)			(0.12)	(0.16)
<i>dsgp*gap*deu3</i>			-0.10	0.05			-0.09	0.05
			(0.10)	(0.09)			(0.10)	(0.08)
<i>dsgp*gap*doecd6</i>			0.26	0.01			0.31	0.04
			(0.35)	(0.29)			(0.30)	(0.30)
<i>exmt</i>			0.11	-0.12			0.16	-0.13
			(0.20)	(0.19)			(0.21)	(0.19)
<i>exmt*deu3</i>					-0.29***	-0.23***	-0.32***	-0.27***
					(0.08)	(0.07)	(0.08)	(0.06)
<i>exmt*doecd6</i>					0.33***	0.25	0.00	0.02
					(0.12)	(0.17)	(0.15)	(0.12)
<i>exsgp</i>					0.07	0.14	0.25***	0.25**
					(0.07)	(0.13)	(0.07)	(0.10)
<i>exsgp*deu3</i>					-0.08	-0.16	-0.12	-0.18
					(0.29)	(0.30)	(0.26)	(0.23)
<i>exsgp*doecd6</i>					2.66***	2.54***	1.97***	1.21
					(0.66)	(0.63)	(0.54)	(1.24)
Adjusted R ²	0.86	0.86	0.87	0.86	0.87	0.86	0.87	0.87
Sargan Test P-value ^c	1.00	0.77	1.00	0.28	1.00	0.56	1.00	0.23
Cross-Section	20	20	20	20	20	20	20	20
Observations	524	524	524	524	524	524	524	524

Notes: Regressions estimated by Two-Stage Least Squares (TSLS). ^a Coefficients of the estimations where ***, **, * correspond to the level of significance at 1%, 5% and 10% respectively. ^b White's period robust coefficient standard errors in parenthesis. ^c P-values of Sargan's test of overidentifying restrictions: under the null hypothesis, the restrictions are satisfied.

Table 8: Summary estimations of the first set of robustness tests - Euro-11 (1980-2007)

Robustness tests variables	Big Countries ^a		Small Countries ^b		Heterog. GAP ^c		Split GAP ^d		Economic ^e	
	coeff. ^f	std ^g	coeff. ^f	std ^g	coeff. ^f	std ^g	coeff. ^f	std ^g	coeff. ^f	std ^g
α	1.04***	(0.34)	1.57	(1.20)	0.73	(0.87)	0.98	(0.84)	0.94	(1.05)
<i>capd(-1)</i>	0.82***	(0.05)	0.78***	(0.04)	0.81***	(0.04)	0.80***	(0.03)	0.79***	(0.03)
<i>debt(-1)</i>	-0.03**	(0.01)	-0.02**	(0.01)	-0.01**	(0.01)	-0.02***	(0.01)	-0.01	(0.01)
<i>inf</i>	0.05	(0.05)	-0.05	(0.04)	-0.03	(0.03)	-0.02	(0.04)	-0.01	(0.04)
<i>ele</i>	0.57***	(0.05)	0.89***	(0.20)	0.77***	(0.12)	0.77***	(0.14)	0.77***	(0.14)
<i>gap</i>	0.19	(0.28)	0.05	(0.10)					0.05	(0.11)
<i>gap_{med}</i>					0.20	(0.11)				
<i>gap_{pos}</i>							0.15	(0.12)		
<i>gap_{neg}</i>							-0.03	(0.12)		
<i>size</i>									0.00	(0.00)
<i>spline</i>									-0.01	(0.01)
<i>vol</i>									-0.13	(3.37)
<i>dmt</i>	0.45	(1.13)	-0.56	(0.61)	0.03	(0.47)	-0.15	(0.45)	-0.33	(0.42)
<i>dsgp</i>	0.48	(1.42)	-0.53	(0.60)	-0.04	(0.47)	-0.14	(0.44)	-0.34	(0.39)
<i>dmt*gap</i>	-0.27	(0.34)	-0.27***	(0.09)	-0.17	(0.12)	-0.18*	(0.11)	-0.23**	(0.11)
<i>dsgp*gap</i>	0.26	(0.48)	0.03	(0.09)	-0.05	(0.10)	0.02	(0.10)	0.06	(0.11)
<i>exmt</i>	-0.28***	(0.05)	-0.21*	(0.12)	-0.26***	(0.06)	-0.28***	(0.06)	-0.27***	(0.07)
<i>exsgp</i>	0.41	(0.84)	-0.22	(0.27)	-0.32	(0.23)	-0.26	(0.22)	-0.17	(0.22)
Adjusted R^2	0.86		0.77		0.81		0.80		0.80	
Sargan's Test ^h	0.10		0.71		-		0.92		0.82	
Cross-Section	4		7		11		11		11	
Observations	110		186		296		296		296	

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 Robustness test allowing for heterogeneous coefficients of output gap for each country in the sample. ^d Estimation splitting between positive values (*gap_{pos}*) and negative values (*gap_{neg}*) of the output gap. ^e Estimation including additional economic explanatory variables. ^f Coefficients of the estimations where ***, **, * correspond to the errors in level of significance at 1%, 5% and 10% respectively. ^g White's period robust coefficient standard parenthesis. ^h P-values of Sargan's test of overidentifying restrictions: under the null hypothesis, the restrictions are satisfied.

Table 9: Summary estimations of the second set of robustness tests - Euro-11

Robustness tests variables	Spline ^a		MTO ^b		Non-linear mas ^c		Adj. mas and sgp ^d		EDP ^e		Real Time ^f	
	coeff. ^g	std ^h	coeff. ^g	std ^h	coeff. ^g	std ^h	coeff. ^g	std ^h	coeff. ^g	std ^h	coeff. ^g	std ^h
α	1.05	(0.91)	1.08	(0.88)	1.10	(0.81)	1.13	(0.81)	1.09	(0.84)	-0.87	(1.09)
<i>capd(-1)</i>	0.78***	(0.05)	0.78***	(0.04)	0.79***	(0.03)	0.79***	(0.04)	0.81***	(0.03)	0.56***	(0.14)
<i>debt(-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)
<i>inf</i>	0.00	(0.04)	0.01	(0.04)	-0.01	(0.04)	-0.02	(0.04)	0.00	(0.04)		
<i>ele</i>	0.77***	(0.14)	0.75***	(0.13)	0.77***	(0.13)	0.76***	(0.13)	0.76***	(0.14)	0.40*	(0.22)
<i>gap</i>	0.05	(0.11)	0.05	(0.11)	0.04	(0.10)	0.05	(0.10)	0.04	(0.10)	-0.15	(0.23)
<i>dmt</i>	-0.19	(0.53)	-0.49	(0.44)	-0.25	(0.47)	-0.19	(0.42)	-0.29	(0.44)		
<i>dsgp</i>	-0.27	(0.48)	-0.31	(0.42)	-0.27	(0.43)	-0.27	(0.43)	-0.14	(0.45)	0.46	(0.53)
<i>dmt*gap</i>	-0.23*	(0.13)	-0.16	(0.12)	-0.23***	(0.08)	-0.24**	(0.10)	-0.23**	(0.11)		
<i>dsgp*gap</i>	0.05	(0.12)	0.07	(0.10)	0.07	(0.10)	0.06	(0.10)	0.02	(0.10)	0.18	(0.18)
<i>dmt*spline</i>	-0.01	(0.01)										
<i>dsgp*spline</i>	0.00	(0.01)										
<i>exmt_{t*}ⁱ - 7</i>					-0.26*	(0.15)						
<i>exmt_{t*}ⁱ - 6</i>					-0.20	(0.13)						
<i>exmt_{t*}ⁱ - 5</i>					-0.26***	(0.10)						
<i>exmt_{t*}ⁱ - 4</i>					-0.18*	(0.10)						
<i>exmt_{t*}ⁱ - 3</i>					-0.58***	(0.09)						
<i>exmt_{t*}ⁱ - 2</i>					-0.68***	(0.14)						
<i>exmt_{t*}ⁱ - 1</i>					1.98**	(0.93)						
<i>exmt</i>	-0.25***	(0.05)					-1.39***	(0.25)				
<i>exmta</i>												
<i>exmt*spline</i>			-0.004*	(0.00)								
<i>exsgp</i>	-0.20	(0.19)			-0.21	(0.21)					0.67	(0.47)
<i>exsgpa</i>												
<i>exsgp*spline</i>			0.000	(0.00)								
<i>edp</i>									-0.72*	(0.40)		
Adjusted R ²	0.80		0.80		0.81		0.81		0.81		0.74	
Sargan’s Test ^j	0.91		0.90		0.93		0.95		0.95		1.00	
Cross-Section	11		11		11		11		11		11	
Observations	296		296		296		296		296		121	
Sample Period	1980 - 2007		1980 - 2007		1980 - 2007		1980 - 2007		1980 - 2007		1995 - 2005	

Notes: Regressions estimated by Two-Stage Least Squares (TSLS). ^a Estimation interacting the debt spline variable with the time dummies for the MT- and SGP-periods. ^b Estimation interacting the debt spline variable with the excessive deficit variables for the MT- and SGP-periods. ^c Estimation including an alternative excessive deficit variable, Equation (?), and its six lags for the MT-period. ^d Estimation including alternative excessive deficit variables, Equations (4) and (5), for the MT- and SGP-periods respectively. ^e Estimation including excessive deficit procedure (*edp*) instead of (*exsgp*). ^f Estimation including real-time data as in Cimadomo (2007) and Giuiodori and Beetsma (2008). ^g Coefficients of the estimations where ***, **, * correspond to the level of significance at 1%, 5%, and 10% respectively. ^h White’s period robust coefficient standard errors in parenthesis. ⁱ For Greece $t^* = 2001$ and for all other countries of the sample $t^* = 1999$. ^j P-values of Sargan’s test of overidentifying restrictions: of overidentifying restrictions: under the null hypothesis, the restrictions are satisfied.

Figure 1: Cyclically-adj. primary deficit in the OECD regions (as % of Potential GDP)

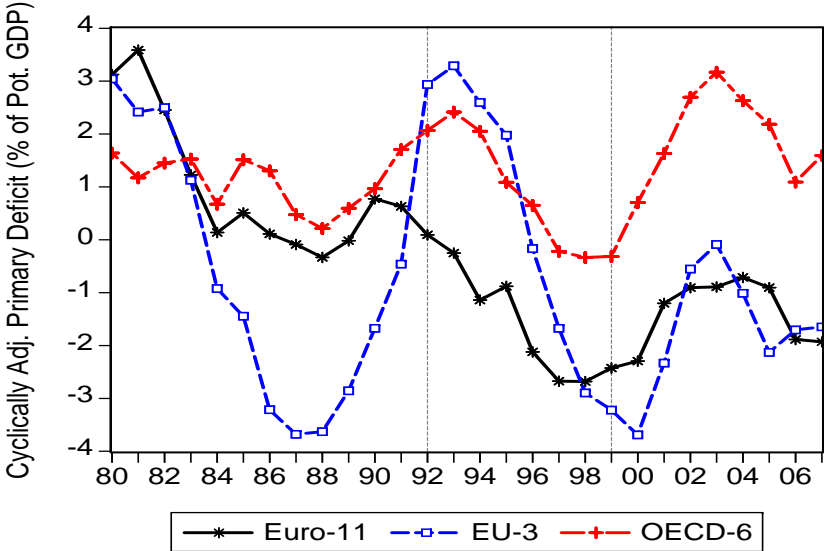


Figure 2: Scatter plots - cyclically-adjusted primary deficit x output gap

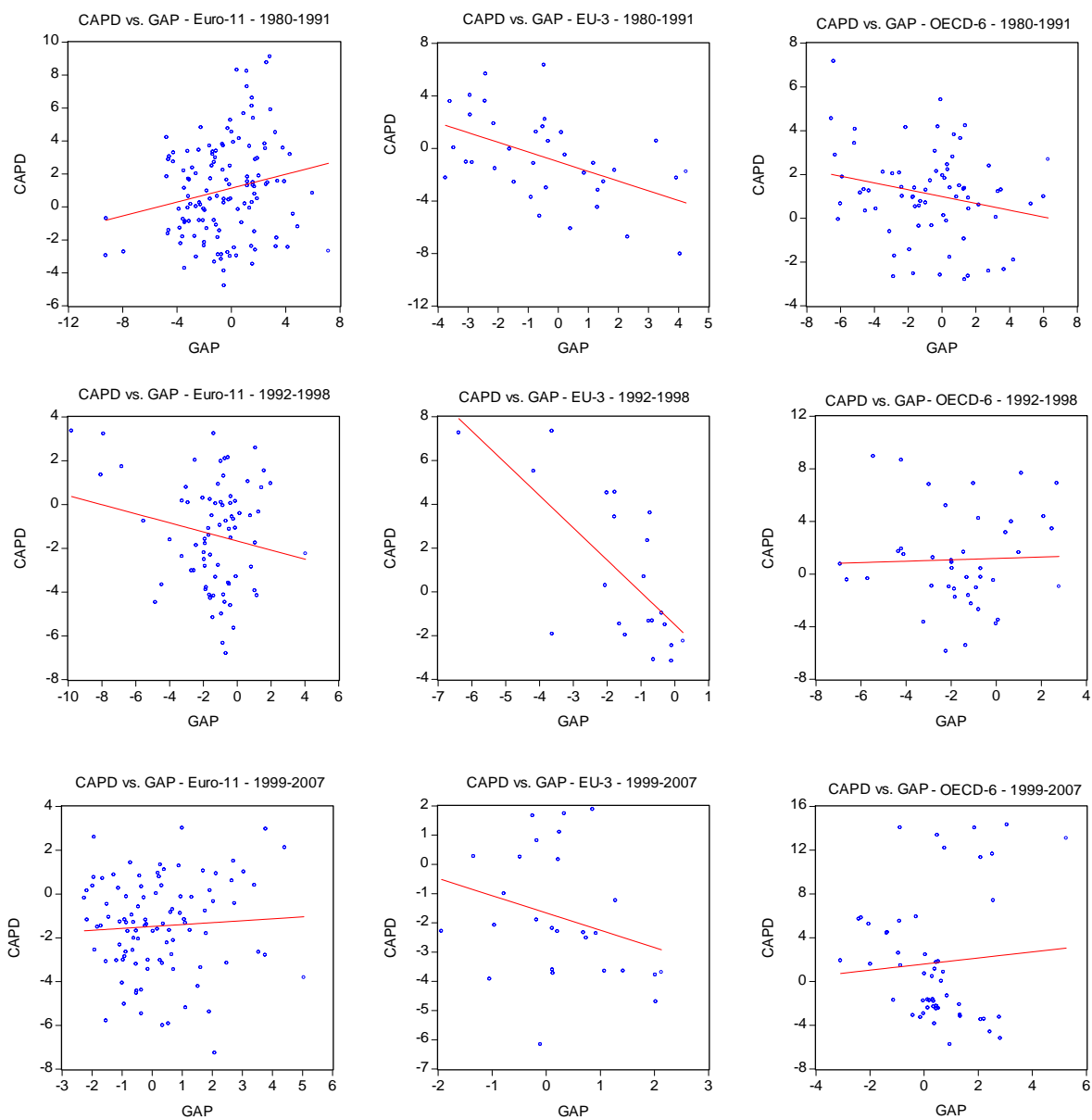
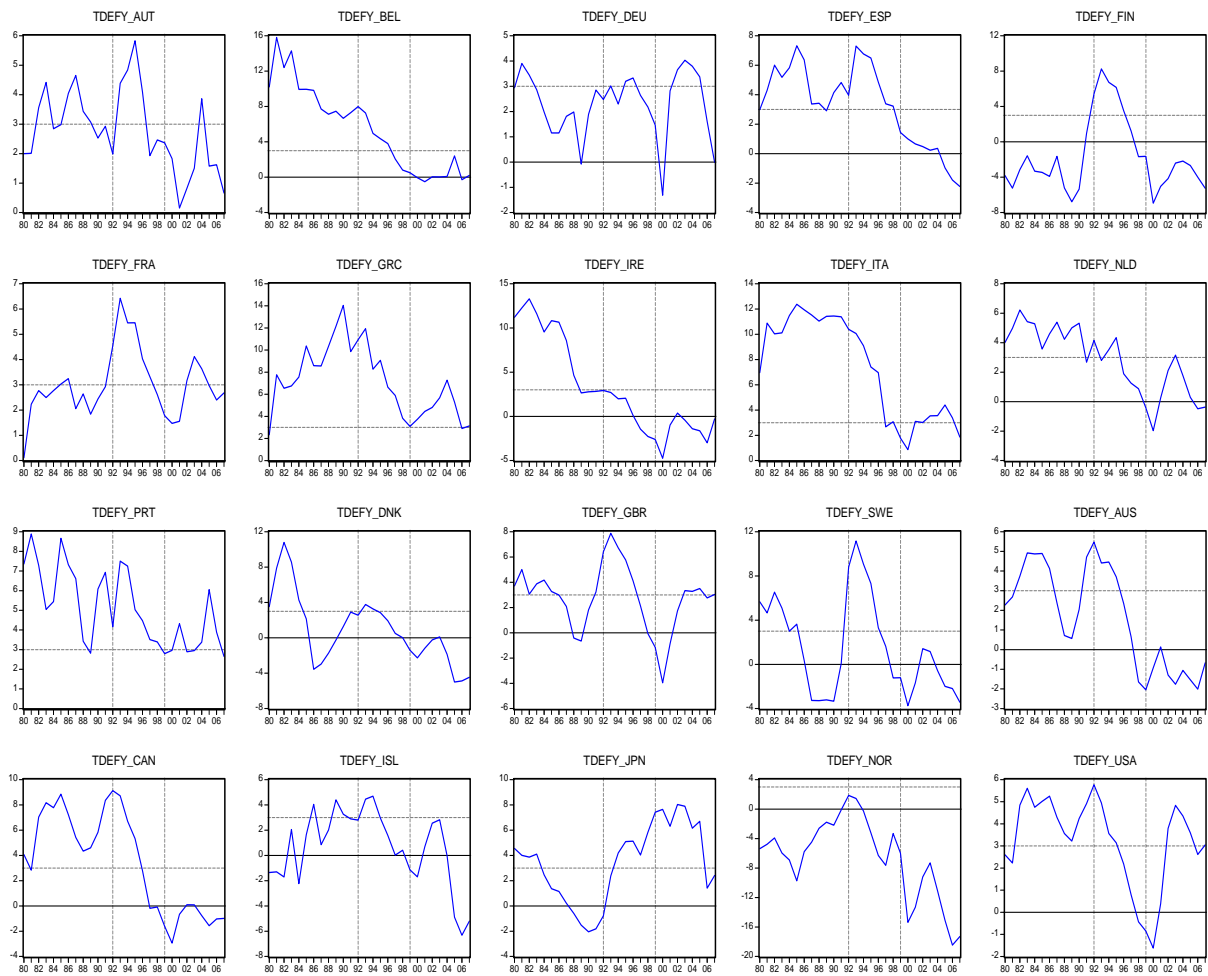


Figure 3: Total deficit in the OECD-20 countries (as % of GDP)



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