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Fiscal Policy and Monetary Integration in Europe  
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### **ABSTRACT**

A popular view among economists, policymakers, and the media, is that the Maastricht Treaty and then Stability and Growth Pact have significantly impaired the ability of EU governments to conduct a stabilizing fiscal policy and to provide an adequate level of public infrastructure. In this paper, we investigate this view by estimating fiscal rules for the discretionary budget deficit over the period 1980-2002, using data on EMU countries and control groups of non-EMU EU countries and other non-EU OECD countries. We do not find much support for this view. In fact, we find that discretionary fiscal policy in EMU countries has become more countercyclical over time, following what appears to be a trend that affects other industrialized countries as well. Similarly, we find that the decline in public investment experienced over the last decade by EMU countries is part of a world-wide trend that started well before the Maastricht Treaty was signed.

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# 1. Introduction

The fiscal apparatus of the European Monetary Union – as embedded in the Maastricht Treaty (MT) and the Stability and Growth Pact (SGP)<sup>1</sup> – is increasingly regarded by many as an unnecessary and harmful straightjacket on national fiscal policies, or even as downright ‘stupid’.<sup>2</sup> The SGP, the argument goes, constraints the use of fiscal policy precisely when countries need it the most, because of the loss of an autonomous monetary policy. In particular, critics complain that the ceiling of a three percent deficit/GDP ratio may become dangerously harmful during downturns, since the government’s efforts to meet that target by cutting spending and raising taxes may only aggravate the recession. More generally, and given that the SGP fiscal targets are expressed in terms of the size of deficits unadjusted for cyclical conditions, the need to stabilize the budget over the cycle may be conducive to a procyclical fiscal policy, i.e., one which may unnecessarily increase the amplitude and persistence of economic fluctuations in EMU countries.

A second criticism frequently levelled at the MT and the SGP is that they have impaired the ability of EMU countries to maintain and increase the public capital stock, which could have possible long-run consequences on the growth potential of these countries that go well beyond their implications for the cyclical properties of fiscal policy.

Thus, our first objective in the present paper is to evaluate to what extent have the constraints associated with the MT and the SGP affected *in practice* the way national governments have conducted fiscal policy. More specifically, we ask whether and how those constraints may have made fiscal policy in EMU countries *effectively* more procyclical (or, equivalently, less countercyclical). The second objective is to assess empirically whether the alleged negative effects of the MT and SGP on public investment can indeed be seen in the data.

Regarding the cyclical behaviour of fiscal policy, we put forward two basic hypothesis, to be validated or refuted by the data. The first hypothesis, often associated with the criticisms mentioned above, can be stated as follows: as a result of the constraints imposed by the MT and the SGP, national fiscal policies can no longer fulfil the stabilizing role they had traditionally played; this, combined with the loss of an autonomous national

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<sup>1</sup> In section 2 below we describe briefly some key institutional aspects of the Maastricht Treaty and of the Stability and Growth Pact. For other detailed accounts we refer the interested reader to European Commission (2000) and European Central Bank (1999). Artis and Buti (2000), Buitier, Corsetti and Roubini (1993), Buitier and Grafe (2002), Buti and Giudice (2002), and Eichengreen and Wyplosz (1998) also provide good discussions of the institutional aspects of the Maastricht Treaty and of the Stability and Growth Pact, and detailed economic analyses of their rationale and impact.

monetary policy, may result in more aggregate instability, and the risk of more prolonged recessions.

An alternative hypothesis on the evolution of fiscal policy in EMU countries stresses the impact of the loss of an autonomous monetary policy. According to this view, the emergence of the common monetary policy, with a clear mandate to focus on price stability in the Euro area as a whole, leaves the objective of stabilization of national business cycles exclusively in the hands of national fiscal authorities. As a result, we should expect the process of monetary integration, initiated with the MT, to be associated with more strongly countercyclical fiscal policies in EMU countries.

In order to evaluate the validity of the above hypotheses we estimate empirical fiscal policy rules for eleven EMU countries over the period 1980-2002. More precisely, we split that sample period into two sub-periods (pre- and post- Maastricht) and perform a variety of tests for stability of the coefficient capturing the fiscal response to output gap fluctuations. Our analysis for EMU countries is supplemented with an analogous exercise for the three EU countries that did not join EMU, as well as for five OECD countries which do not belong to the EU; both sets of countries act as control groups for our analysis. We also devote special attention to the role played by public investment in those changes.

From a methodological point of view, our empirical approach attempts to overcome some of the weaknesses of earlier work that has attempted to estimate similar fiscal policy rules. First, we restrict our analysis to measures that can be reasonably interpreted as indicators of *discretionary* fiscal policy, i.e. the component of fiscal policy whose variations do not result from the automatic influence of the cycle or other non-policy influences. Second, we recognize the potential endogeneity of our cyclical indicators with respect to exogenous fiscal shocks, which leads us to use an instrumental variables procedure, with carefully chosen instruments.

To preview some of our conclusions, we detect very little evidence that the Maastricht-related constraints have significantly impaired *in practice* the stabilization role of fiscal policy in EMU countries. If anything, we find evidence for the opposite: EMU countries' fiscal policy in the pre-Maastricht period seems to have been significantly procyclical, a puzzling feature which largely disappears during the post-Maastricht period. Overall, we detect what appears to be a global trend towards more countercyclical fiscal policies. Interestingly, however, EMU countries seem to lag behind the rest of OECD

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<sup>2</sup> Interview to Romano Prodi in *Le Monde*, 17 October 2002.

countries in terms of that trend. Whether the latter observation is a consequence of the MT and SGP constraints or other factors, it may be still be too early to tell.

Regarding the effects of the MT and SGP on public investment, we find that the decline in government investment as a share of total spending appears to be a global trend that started well before Maastricht; in fact, in the post-Maastricht period government investment declined *less* than in the eighties, and *less* in EMU countries than in the other OECD countries.

The paper is organized as follows. Section 2 presents some institutional background on the fiscal policy constraints established by the Maastricht Treaty and the Stability and Growth Pact: the reader already familiar with these issues might want to skip this section. Section 3 summarizes the evolution of debt and deficit measures in EMU countries, together with countries in the two control groups, over the past two decades. Section 4 describes the indicators of discretionary fiscal policy used in the rest of the paper, and the procedures to construct them. Section 5 contains the central exercise of the paper: an empirical exploration of the practical consequences of the MT and the SGP on the cyclical properties of discretionary fiscal policy. Section 6 discusses some possible counterarguments to our interpretation of this exercise. Section 7 presents some descriptive statistics on the evolution of public investment in the EMU and the other OECD countries. Section 8 concludes.

## **2. Institutional Background**

The Maastricht Treaty and, subsequently, the Stability and Growth Pact established certain targets on the size of debt and deficits and other obligations, in order to qualify for EMU membership and, for those already in EMU, to achieve and maintain “sound” budgetary positions and avoid harsh penalties.

Art. 104 (ex Art. 104c) of the Treaty establishes that “member states shall avoid excessive government deficits” (par. 1), and that compliance with budgetary discipline will be judged on the basis of two criteria (par. 2):

“a) whether the ratio of the planned or actual government deficit to gross domestic product exceeds a reference value, unless:

- either the ratio has declined substantially and continuously and reached a level that comes close to the reference value;

- or, alternatively, the excess over the reference value is only exceptional and temporary and the ratio remains close to the reference value

(b) whether the ratio of government debt to gross domestic product exceeds a reference value, unless the ratio is sufficiently diminishing and approaching the reference value at a satisfactory pace.” As is well known, these two reference values were set at 3 percent and 60 percent, respectively.

The first criterion was also used, among other criteria like price stability, when a decision was made on which countries would be admitted to stage III of the EMU (the single currency) in July 1998.

The Stability and Growth Pact was designed to provide concrete content to several provisions of the Treaty regarding economic policies in the EU. It consists of a Resolution of the European Council and of two ECOFIN Council Regulations (No. 1466/97 and No. 1466/97).

The Resolution reaffirms the commitment to fiscal discipline and introduces the notion of “medium-term budgetary objective of positions close to balance or in surplus”, to be respected by member states, in order to “allow all Member States to deal with normal cyclical fluctuations while keeping the government deficit within the reference value of 3 % of GDP.”

Regulation No. 1466/97 clarifies the procedures to be followed for an implementation of the surveillance of the Pact, as envisioned in general terms in Art. 99 (ex Art. 103) of the Treaty. In particular, it establishes that

1. member states must submit every year an update to the **stability programme** (called convergence programme for non-EMU members), containing a **medium-term objective** for the budgetary position, and a description of the **assumptions** and of the main economic policy **measures** the country intends to take to achieve the targets.

2. The Council, on a recommendation from the Commission, delivers and **opinion** on each programme and its yearly updates and, if deemed necessary, a recommendation. There are three possible types of **recommendations**. First, a recommendation that the programme be adjusted if deemed deficient in some respect. Second, if after approving the programme the Council identifies a “significant divergence of the budgetary position from the medium-term budgetary objective, or the adjustment path towards it”, the Commission can issue a recommendation (**early warning**), in accordance with Article 103(4). Third, if the divergence persists, the Council can issue a recommendation to take corrective action, and can make the recommendation public.

Regulation 1467/97 first tries to make more precise the notion of “exceptional and temporary” excess of the deficit over the 3% of GDP threshold, as introduced by Article 104 (ex Article 104c) of the Treaty. Article 2(1) of the regulation specifies that an “exceptional and temporary” excess of the deficit is allowed “when resulting from an unusual event outside the control of the Member State concerned and which has a major impact on the financial position of the general government or when resulting from a severe economic downturn.” Articles 2(2) and 2(3) further specify that a deficit will be considered exceptional “if there is an annual fall of real GDP of at least 2 %” or if a member state can argue successfully that the circumstances are “exceptional”, based on “the abruptness of the downturn or on the accumulated loss of output relative to past trends”. The Regulation then clarifies the **Excess Deficit Procedure** set out in Article 104 (ex Art 104c) of the Treaty, including the imposition of fines.

Thus, for our purposes the key elements of the SGP can be summarized as follows:

- Each country must state and abide by a set of medium-term objectives, including a budgetary position “close to balance or in surplus”.
- A clarification of the circumstances that trigger an early warning.
- A clarification of the Excess Deficit Procedure, and in particular of the circumstances under which a deficit in excess of 3% of GDP is allowed.

In spite of all these attempts at clarification, there are many aspects of the SGP which remain ambiguous. In turn, this might have an impact on the actual stringency of the provisions of the pact. We stress three such areas of ambiguity:

1. What is a “medium-term target”? The SGP is not entirely clear on this. Initially, the expression “sound budgetary positions close to balance or in surplus” was operationally identified with the “minimal benchmark”, i.e. a position such that, if the country were subject to a “worst-case scenario”, the budget deficit would still be less than 3% of GDP if the automatic stabilizers were allowed to operate. As such, the notion of “minimal benchmark” is bound to be subjective and controversial. The Commission computes the minimal benchmark for each country based on two pieces of information: the worst-case scenario for the output gap, and the sensitivity of the budget to GDP. Operationally, the former is taken to be the largest negative output gap since 1960, or two times the standard deviation of the output gap (see for example European Commission (1999), p. 4).

However, the revised Code of Conduct on the content and format of the stability and convergence programmes, endorsed by the ECOFIN Council in 2001, introduced a clarification to the notion of medium-term targets, requiring additional margins to cope

with unforeseen budgetary risks and to reduce high debts. Thus, the safety margin as embodied in the minimal benchmarks –already an ambiguous concept-- no longer seems to constitute automatic compliance with the “sound budgetary position” envisioned in the Treaty.

The new Code of Conduct also introduces a distinction between the notions of “appropriate medium-term target” and the notion of “close to balance or in surplus” which constitutes the key obligation of the SGP. It provides that a stricter goal than close to balance might be justified in view of several considerations, like providing for the costs of an ageing population, to create rooms for discretionary fiscal policies, etc. (see European Commission (2002), p. 33) .

2. The SGP does not say how to identify an “actual or expected significant divergence of the budgetary position from the medium-term budgetary objective”, which could trigger an early warning. There is a growing consensus that, at a minimum, the cyclically adjusted budget balance should be used in making this assessment (indeed, that the whole SGP should be reformulated in terms of cyclically adjusted balances). The SGP does not refer to cyclically adjusted balances. However, the new Code of Conduct states that “..cyclically adjusted balances should continue to be used, in addition to nominal balances, as a tool when assessing the budgetary position.” Indeed, the 2002 Council Opinions on the programmes of six member mentions the notions of cyclically adjusted balances. But the implications of this acknowledgment are far from clear. For instance, the 2002 Council Opinion on Greece states “the budgetary projections remain in surplus throughout the period of the programme in both actual and cyclically adjusted terms”. In 2003, it writes that “in 2006 there may still be a small cyclically adjusted government deficit.” These are the only references to cyclical adjustment in the Council Opinions on Greece.

3. The SGP does not specify exactly what constitutes the “exceptional circumstances” that define a “severe” recession when GDP falls by less than 2%, and which might exempt a country from the 3% deficit limit for an unspecified period of time. This makes the SGP and the Excess Deficits Procedure prone to endless bargaining and controversy.



### 3. Debts and Deficits: the Record

To provide some background, we start by looking at a few descriptive statistics on the medium-term evolution of the size of debt and deficits in the current EMU countries, as well as in two control groups: the three EU countries which do not belong to the EMU (Denmark, UK, and Sweden; henceforth, the EU3 countries for short), and five non-EU OECD countries for which we were able to assemble a consistent dataset of budget data (Norway, Australia, Japan, Canada, US; henceforth the OECD5, for short). It is not obvious that Denmark, the UK, and Sweden do in fact constitute an appropriate control group as they might be considered, *prima facie*, subject to the provisions of the MT and of the SGP. In fact, their position is more nuanced (see Box 1): while many provisions of the MT and of the SGP do apply to them, it is also true that they have less teeth, as these countries are not subject to penalties in case their deficits exceed 3 percent of GDP.

#### **Box 1: Denmark, Sweden, and the UK**

The position of the three non-EMU countries is partly ambiguous. Regulation 1467/97 establishing the SGP states that paragraph 1 of Article 104 (ex Art. 104c) of the Treaty – “Member States shall avoid excessive government deficits” - does not apply to the United Kingdom unless it moves to the third stage. However, the United Kingdom is still under the obligation of paragraph 4 of Article 116 (ex Art. 109e) – “In the second stage, Member States shall endeavor to avoid excessive government deficits”. The Council has also interpreted the SGP in the sense that the obligation to pursue a goal of ‘close to balance or surplus in the medium term’ applies to the UK (see for example the ‘2002 Council Opinion’ on the updated convergence programme).

In contrast to the United Kingdom, the resolution and the two regulations establishing the SGP fail to state explicitly that Art. 104(1) does not apply to Denmark. In fact, the 2002 Council opinion on the updates convergence programme for Denmark states that “Denmark is also expected to be able to withstand a normal cyclical downturn without breaching the 3 % of GDP deficit reference value.”

However, both Denmark and the United Kingdom are explicitly exempted from the requirement of paragraphs 9 and 11 of Article 104 (ex Art. 104c), which establish the right

of the Council to request specific actions and to impose non-interest bearing deposits and fines, in case of a deficit in excess of 3%.

While Denmark and the United Kingdom have an *opt-out* from participation in stage 3 of the EMU (the single currency), technically speaking Sweden only has a *derogation*. The practical consequence for the applicability of the SGP, however, appears to be the same as for Denmark; Art. 122(3) of the Treaty establishes that paragraphs 9 and 11 of Art. 104 do not apply to countries with a derogation.

Columns (a) and (b) in Table 1 display the average deficit/GDP ratio for the above groups of countries during two different five-year periods (1988-1992 and 1997-2001); column (c) displays the difference between the first two columns. The first such period corresponds to the years immediately before the adoption of the MT, whereas the second sub-period includes the first five years for which the constraints associated with the MT and/or the SGP were in place.<sup>3</sup> The table confirms the well-known substantial decline in the deficit/GDP ratio in all EMU countries but one (Germany). The average decline in the deficit/GDP ratio in EMU countries was 4.0 percentage points; Greece had the largest adjustment – more than 11 percentage points, followed closely by Italy with 9.2 percentage points.<sup>4</sup>

To what extent was such a fiscal consolidation restricted to current EMU countries? Interestingly, a look at the performance of our control groups suggests that sizable consolidations were also taking place over the same period in non-EMU countries. The OECD5 group experienced an average decline of 3.2 percentage points in the deficit/GDP ratio, a decline that becomes much larger (6.0 percentage points) if one excludes Japan. The EU3 group shows a smaller reduction in the deficit/GDP ratio, about 0.8 percentage points; this can largely be explained by the much more favorable initial position, an average deficit ratio of 0.7 % in the 88-92 subperiod.

One interpretation of the above evidence is that, while the MT and SGP may have provided political cover and hence facilitated the necessary adjustments in EMU countries, the economic rationale for fiscal consolidation may lie beyond the requirements for monetary union: the substantial fiscal consolidations experienced by EMU countries in the

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<sup>3</sup> The decision about the set of countries qualifying to join EMU from its birth in 1999 was made in May 1998 on the basis of 1997 fiscal figures, among other factors. Greece is an exception since it did not join EMU until 200x.

<sup>4</sup> The only outlier among EMU countries, Germany, experiences a small increase of 0.2 percentage points (albeit starting from the lowest deficit ratio among EMU countries, 1.9% in the early sub-period).

90s can be seen as part of a global trend among industrialized countries (with Japan as a major outlier), and hence not restricted to the would-be EMU countries.

A look at the evolution of the debt/GDP ratios suggests a good reason for these worldwide fiscal consolidations. The last three columns in Table 1 show the value of that ratio in three selected years (1982, 1992, and 2001) points to the non-sustainability of the fiscal position that most industrialized countries were maintaining in the 80s. In particular, the average debt/GDP ratio for current EMU members increased from 48 % to 74% between 1982 and 1992, and from 52% to 62% among the OECD5 countries. Only the EU3 countries, which started their fiscal consolidation process at an earlier stage, managed to contain the rise in the debt/GDP ratio to only 3 percentage points, from 58% to 61%. It has been only after the fiscal consolidations of the 90s that most industrialized countries began to experience a decline or at least a deceleration in their debt/GDP ratios.

#### 4. Measures of Discretionary Fiscal Policy

In order to study the issues set out in the introduction we first need to distinguish between changes in fiscal policy that are due to discretionary measures taken by policymakers, and those that are due to the “automatic” response of fiscal variables to business cycle fluctuations.

We can think of the budget deficit in a given year as the sum of a “cyclical” and a “structural” component.

1) The “**cyclical**” or “**non-discretionary**” deficit is the component of the latter whose variations are due (at least in the short run) to causes outside the direct control of the fiscal authorities, like business cycle fluctuations in unemployment and in the tax bases. In the case of taxes, these variations can be interpreted as changes in tax revenues due to changes in income, for given tax rates and for given definitions of the tax bases;<sup>5</sup> among primary expenditures, only unemployment benefits probably have a non-negligible built-in response to output fluctuations. In addition, we can think of debt interest payments as an element of this component, since they are largely outside the control of the fiscal authorities.

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<sup>5</sup> For simplicity, we abstract here from automatic responses to inflation and interest rates. These are more difficult to estimate. For such an attempt, see Fatás and Mihov (2002b), Perotti (2002), and Canzoneri et al. (2002).

2) The “**structural**”, “**cyclically adjusted**” or “**discretionary**” deficit. This should be interpreted as the value of the deficit that would be observed if output were at some reference “potential” level (i.e., controlling for the cyclical component). As such, it is meant to be a measure of the fiscal stance, intentionally chosen by the policymaker, as opposed to the value it takes as a result of economic fluctuations beyond its control.

In turn, we can think of the “cyclically adjusted” or structural deficit as having two components:

2.a) A “**systematic**” or “**endogenous**” component. Policymakers may change structural spending or revenues in a systematic way in response to changes in the actual or expected cyclical conditions of the economy. For instance, if they wished to pursue an active countercyclical policy, they could reduce tax rates or increase government consumption whenever the economy is in a recession, and the opposite in an expansion. Thus, and in contrast with the cyclical or non-discretionary component of the deficit the possible countercyclical behaviour of the structural deficit is the result of a deliberate policy decision, and not a consequence of the automatic stabilizers mentioned above.

2.b) A “**non-systematic**” or “**exogenous**” component. This component captures random changes in budget variables that do not correspond to systematic responses in cyclical conditions, but are instead the consequence of exogenous political processes or extraordinary non-economic circumstances (e.g., war spending efforts).

While conceptually these definitions are quite straightforward, the actual implementation of any cyclical adjustment is subject to a large element of subjectivity. As our benchmark, we use cyclically adjusted data constructed by the OECD according to the methodology described in Box 2.

### **Box 2: The structural budget deficit**

Let  $Y^*$  be the reference value of GDP, and  $\alpha$  and  $\beta$  the output elasticity of tax revenues and spending, respectively.<sup>6</sup> Then the structural tax revenues and spending,  $T_t^*$  and  $G_t^*$ , are computed from the expressions:

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<sup>6</sup> In practice, these elasticities are constructed as weighted averages of the elasticities of individual components of tax revenues, namely individual income taxes, corporate income taxes, indirect taxes, and social security taxes.

$$\frac{T_t^*}{T_t} = \left( \frac{Y_t^*}{Y_t} \right)^\alpha; \quad \frac{G_t^*}{G_t} = \left( \frac{Y_t^*}{Y_t} \right)^\beta \quad (1)$$

In other words, in each year the revenue elasticity  $\alpha$  is used to evaluate the value revenues would take if output were at its reference level  $Y_t^*$  instead of its actual value  $Y_t$ , and similarly for government spending. Dividing  $T_t^*$  and  $G_t^*$  by the reference value of GDP, we obtain the “structural” budget deficit as a share of reference GDP

$$d_t^* = g_t^* - t_t^* \quad (2)$$

where  $d_t^*$ ,  $t_t^*$ , and  $g_t^*$  are the structural primary deficit, primary revenues, and primary spending, all as shares of reference GDP.

Thus, the output of the structural adjustment depends on the reference value of GDP used. Typically, this is some measure of smoothed output, like trend or HP-filtered GDP, or of potential output. In our benchmark results, based on data cyclically adjusted by the OECD, the reference value of GDP is potential output, constructed following a standard production function approach (see Giorno et al. (1995) or OECD (2002a)).<sup>7</sup>

For robustness we also use different cyclically adjusted fiscal data, computed by the European Commission and based on two alternative reference GDPs: HP-filtered GDP and potential output based on the Commission’s production function approach (see European Commission (2002)).<sup>8</sup>

A second source of variation in cyclical adjustment procedures is the elasticities used. The OECD elasticities are constructed starting from the tax code and the distribution of taxpayers by income brackets (see Giorno et al. (1995) and van den Noord (2002)). The same elasticities are used by the European Commission (see European Commission (2002)).<sup>9</sup>

Henceforth our empirical analysis focuses on a measure of the structural or cyclically adjusted primary deficit, which we interpret as an indicator of the fiscal policy

<sup>7</sup> The notion of potential output is subject to a large debate of its own. Indeed, any alternative reference value of GDP is open to criticism. We use potential GDP because this is the reference value used by the OECD and the European Commission to cyclically adjust budget figures.

<sup>8</sup> The European Commission has just started using potential output in its cyclical adjustment, in addition to HP-filtered GDP, with the November 2002 release of the data. We thank Gabriele Giudice for providing us with the data the very day they were released.

<sup>9</sup> Some studies use elasticities estimated from a regression of tax revenues on GDP or the tax base. If taxes have a contemporaneous effect on output (a reasonable assumption with yearly data), the estimates so obtained are inconsistent. This would impair our estimates of the reaction of discretionary fiscal policy to cyclical conditions.

stance.<sup>10</sup> As a summary indicator of the cyclical conditions of an economy at any point in time, we use a conventional, production function-based output gap measure, also constructed by the OECD using the same measure of potential output used in the construction of the cyclically adjusted figures.

## 5. Has Discretionary Fiscal Policy Changed since Maastricht?

Our objective in the present section is to ascertain the extent to which European governments have used fiscal policy as a stabilizing tool over the past two decades, and whether constraints on fiscal policy associated with Maastricht and the SGP may have hampered their ability and/or motivation to pursue active countercyclical fiscal policies.

### 5.1. Fiscal Rules

To this end, a natural starting point would be to regress an indicator of fiscal policy on a cyclical indicator. Several researchers have estimated a relation of the type (see Box 3 for a brief discussion of the recent literature on the subject):

$$d_t = \phi_0 + \phi_x x_t + u_t \quad (3)$$

where  $d_t$  is the total, cyclically unadjusted deficit as a share of GDP (or spending, or revenues, or their components) and  $x_t$  is either the output gap or GDP growth, perhaps with some additional controls. Such a regression provides a useful descriptive statistic of the cyclical relation between budget variables and economic activity. However, this regression would not be a useful starting point in identifying the systematic response of *discretionary* fiscal policy to cyclical conditions. The main reason, well understood by now, lies in the

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<sup>10</sup> We do not have a strong view on what is the appropriate measure of the fiscal stance, whether the level or the change in the deficit. The choice of the indicator of the fiscal policy stance depends very much on the underlying model of the economy and the notion on policy stance one has in mind. For instance, in a simple IS-LM model, the level of the budget surplus determines the position of the IS curve, while the change in the budget surplus determines movements of this curve. Depending on one's notion, an "expansionary" fiscal policy might be one characterized by a large deficit, or by an increasing deficit. To ease comparability with the literature, we present all our results for the level of the structural surplus. Note that, when we estimate fiscal rules in section 3, the lagged structural surplus appears as an independent variable. Whether the

fact that an important component of the budget deficit reflects the automatic, non-discretionary variations in government revenues and expenditures, as well as variations in interest payments resulting from changes in interest rates outside the control of the fiscal authorities.

Using the primary, cyclically adjusted budget deficit as an indicator of the fiscal policy stance may help in overcoming the previous problem, but it is still unsatisfactory. The reason is simple: any non-negligible exogenous component in that deficit measure, reflected in the error term of the fiscal rule, is likely to be (positively) correlated with the output gap. This correlation, which results from changes in the fiscal policy stance causing changes in the output gap, will most likely generate an upward bias (and possibly even a sign switch) in the estimate of  $\phi_x$ , the coefficient on the output gap in the fiscal policy rule. Clearly, addressing this problem calls for instrumental variable estimation, or, equivalently, regressing the deficit on a component of the output gap which is uncorrelated with exogenous discretionary fiscal shocks. This is the approach that we follow below.

An additional problem with a specification of the fiscal policy rule like (3) is that it might not take properly into account the timing of fiscal policy decisions implied by the budgetary process of most countries: many discretionary fiscal parameters (e.g., tax rates) are largely determined the year before they become effective. If this is the case, any policy rule seeking to respond to output gap variations will have to be based on the *expectation* of the latter, conditional on information available in the previous period. In practice, this calls for replacing  $x_t$  with  $E_{t-1}x_t$  in our rule specification.

Following the lead of several authors<sup>11</sup>, we also incorporate a debt stabilization motive by adding a measure of the size of the debt outstanding (relative to potential GDP) at the time of the budget decision, and which we denote by  $b_{t-1}$

Finally, we account for the likely autocorrelation of budget decisions (possibly resulting from gradual adjustment to a target budget, or just from the serial correlation in the exogenous shocks) by adding the lagged dependent variable as a regressor.

The resulting specification of the fiscal rule that we estimate is thus:

$$d_t^* = \phi_0 + \phi_x E_{t-1}x_t + \phi_b b_{t-1} + \phi_s d_{t-1}^* + u_t \quad (4)$$

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dependent variable is the level or the difference of the structural surplus, it would then make no difference for the estimate of the other coefficients of the regression.

<sup>11</sup> Many authors have incorporated debt measures in empirical fiscal policy rules and examined their relevance to budget decisions. See, e.g., Bohn (1998), Ballabriga and Martinez-Mongay (2002), and Wyplosz (2002).

A negative value of  $\phi_x$  indicates that policymakers use discretionary fiscal policy in a systematic countercyclical way: when cyclical conditions are expected to improve (an increase in  $E_{t-1}x_t$ ), discretionary fiscal policy becomes more restrictive -- the structural deficit falls. A negative value of  $\phi_b$ , as well as a value of  $\phi_s$  less than 1, indicate that policymakers are constrained by initial conditions: the higher the initial debt, or the higher the initial deficit, the lower the structural deficit policymakers set discretionarily. We will be mostly interested in studying whether there was a detectable change in the value of  $\phi_x$  in the post-Maastricht period in EU countries. More precisely, if the “hands tied” hypothesis is correct we would expect an increase in the value of  $\phi_x$  after Maastricht. i.e. we should be able to detect a fall in the countercyclicality (or an increase in the procyclicality) of fiscal policy. To this end, we estimate the following version of equation (4):

$$d_t^* = \phi_0 + \phi_{x,BM} E_{t-1}x_t + \phi_{x,AM} D_{AM} E_{t-1}x_t + \phi_b b_{t-1} + \phi_s d_{t-1}^* + u_t \quad (5)$$

where  $D_{AM}$  is a dummy variable taking the value of 1 in the post-Maastricht period (1992-2002). Thus,  $\phi_{x,BM}$  and  $\phi_{x,AM}$  are the values of the coefficient of  $E_{t-1}x_t$  in the pre-and post- Maastricht periods, respectively. To estimate equation (5) we replace  $E_{t-1}x_t$  with  $x_t$ , and instrument the latter using  $x_{t-1}$  and the lagged value of the output gap of an alternative country or group of countries.<sup>12</sup> We discuss the robustness of this benchmark specification in section 5.3 below.

Notice that equation (4) can be interpreted also as the reduced form of a structural model of determination of the structural deficit, in which policymakers have a target value of the debt/GDP ratio and there are costs in changing the structural deficit over time. Such an interpretation generates non-linear constraints among the reduced form coefficients. This is the route taken by Ballabriga and Martinez-Mongay (2002), who estimate such rules for EU countries over the whole period 1980-2000. Our focus, however, is on the

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<sup>12</sup> We use as instruments the EU15 output gap for the US, and the US output gap for all other countries. The rationale of this choice is that we need to instrument the gap of each country with that of another country (or group of countries) with which it is likely to be correlated for reasons other than the existence of coordinated fiscal policies.



difference between the pre- and post- Maastricht periods, and we also look at revenues and spending separately.

### **Box 3: The cyclical sensitivity of fiscal policy**

Several recent papers also estimate the cyclical sensitivity of fiscal policy in OECD countries. There are two main differences with our investigation. First, in all this literature the fiscal variables are cyclically unadjusted, thus making it impossible to separately identify the automatic from the discretionary responses of fiscal policy to cyclical conditions, an issue which is the focus of our analysis. Second, in most papers the indicator of cyclical conditions is not instrumented, thus preventing a structural interpretation of the coefficient of the cyclical condition if fiscal policy has a contemporaneous effect on GDP in yearly data. To facilitate a comparison with our results, we will discuss these contributions as if their dependent variable were the deficit, although in most of them it is actually the surplus.

Fatás and Mihov (2002a) and (2002b) regress the (cyclically unadjusted) primary deficit (or its first difference) on cyclical indicators like the output gap, inflation, and interest rate, and interpret the residual of this estimated equation as the indicator of the discretionary fiscal stance. In our terminology, they estimate the ‘non-systematic’ component of discretionary fiscal policy (subject to the caveat above that they do not instrument for the contemporaneous output gap on the r.h.s.). They show that the average (across countries) standard deviation of this estimated residual has fallen in the nineties, and interpret this result as evidence that EU countries have been less able to conduct countercyclical fiscal policy in the Maastricht years.

Arreaza et al. (1999), Hercowitz and Strawczynski (1999) and Lane (2002) characterize the cyclical properties of fiscal policy in OECD countries by estimating similar regressions to Fatás and Mihov (2002a) and (2002b) both on a panel of OECD countries and on individual countries. These papers also look at how the cyclical behaviour of fiscal policy is affected by institutional and political factors, and they also disaggregate the deficit into its main spending and revenue components. Like Fatás and Mihov they use cyclically unadjusted data; only Lane (2002) instruments the cyclical indicator. Both Arreaza et al (1999) and Lane (2002) find that the deficit / GDP ratio is countercyclical; Hercowitz and Strawczynski (1999) show that this is mostly due to recessions; in expansions, the deficit/GDP ratio is essentially acyclical.

A number of papers try to assess the automatic stabilizing properties of fiscal policy. Melitz (1997) and Wyplosz (1999) estimate similar regressions to Fatás and Mihov on a panel of European countries (typically including more variables on the r.h.s., in particular the debt/GDP). They also find and note a countercyclical behaviour of the deficit/GDP ratio.<sup>13</sup>

Wyplosz (2002) regresses the cyclically unadjusted deficit / GDP ratio on the output gap in 4 countries: USA, UK, Germany, and Italy. His regressions are most closely comparable to ours because he allows for a break in 1992. The differences in results are substantial. For instance, in the pre-1992 sample, he finds that the deficit is countercyclical in USA and Italy, and acyclical in Germany and UK; in contrast, we find that the structural deficit is essentially acyclical in US, UK and Italy, and procyclical in Germany (see Table 2 below).

Thus, in general we tend to find a less countercyclical behaviour of the deficit than in the studies above, particularly in the first part of the sample and for the current EMU countries. This is easy to explain, since the automatic response of revenues to the cycle would show up as a countercyclical response of the cyclically unadjusted deficit. These differences illustrate the importance of distinguishing properly the discretionary and the cyclical component of the deficit, depending on the purpose of the study.

## 5.2. Baseline Results

Table 2 displays the results for our baseline specification. Initially we estimate equation (5) over the sample period 1980-2002.<sup>14</sup> For each country, the first four columns of the table display the estimates of  $\phi_{x,BM}$  and  $\phi_{x,AM}$ , i.e. the coefficients on the expected output gap in the pre-Maastricht (1980-91) and the post-Maastricht (1992-2002) periods, respectively, with t-statistics in parentheses. The following column displays the p-value for the test of the null hypothesis of equality of the output gap coefficients between the two periods, i.e.  $\phi_{x,BM} = \phi_{x,AM}$ . The table also reports the estimates of the coefficients on lagged

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<sup>13</sup> The focus of these papers is twofold: the response of the fiscal instrument to indicators of monetary policy; and the automatic stabilizing properties of fiscal policy. For this reason, Melitz (1997) uses the unforecastable component of the gap, rather than the forecastable component as we implicitly do, to measure the cyclical conditions that affect the contemporaneous deficit.

<sup>14</sup> Our data for the benchmark regression come from the December 2002 issue of the OECD Economic Outlook, hence the figures for 2002 are forecasts based on data available in early fall of 2002.

debt and deficit, with their t-statistics. At the bottom average values for the EMU, the EU3, and the OECD5 groups are shown.

Looking at the averages, in the pre-Maastricht period discretionary fiscal policy was mildly procyclical in EMU countries. By contrast, it was strongly countercyclical in the EU3<sup>15</sup> or mildly so in the OECD5, our two control groups. Most interestingly, in all groups there is a clear trend towards a smaller value of  $\phi_x$  in the post-Maastricht period. On average, between the two subperiods  $\phi_x$  falls by about 0.5 in EMU and OECD5 countries, and by 0.3 in EU3 countries.

Notice that only in one country from the EMU group, Greece, does the point estimate of  $\phi_x$  increase in the second period, indicating a more procyclical discretionary fiscal policy after Maastricht; however, the difference is far from significant. Among the EU3 countries, only in Denmark and Australia does the point estimate of  $\phi_x$  increase, but again the difference is entirely insignificant.<sup>16</sup>

Thus, there appears to be no evidence of a less countercyclical or more procyclical discretionary fiscal policy in the EMU countries in the post-Maastricht period.

Because of the paucity of degrees of freedom, one should not expect too precise estimates from the country-specific regressions above. In order to overcome this problem we have also estimated a panel version of our fiscal rule. Table 3 displays the panel estimates of equation (5), with country fixed effects, for the three groups of countries.<sup>17</sup> Because we have more degrees of freedom, we can now allow for differences pre- and post-Maastricht in all the coefficients of the equation (and in the country dummies). For each of the three groups of countries, the first and second rows display the estimates of the coefficient on  $E_{t-1}x_t$  in the pre- and post- Maastricht periods, respectively, with their associated t-statistic in parentheses. In the third and fourth columns we report the

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<sup>15</sup> The average of the EU3 countries is highly influenced by the large negative value estimated for Denmark.

<sup>16</sup> We also find that the higher initial debt/GDP ratios, the lower the deficit, given last year's deficit; thus, the debt does exert a constraint on the deficit. In the EMU countries, we typically find that an extra 10 percentage points of debt/GDP ratio is associated with a lower deficit of about .8 percentage points the next year. The coefficient on the lagged discretionary deficit is lower than 1; on average, in the EMU countries, only about 40 percent of an increase in the structural deficit survives the next year, other things equal.

<sup>17</sup> Because we have the lagged endogenous variable on the r.h.s., the standard fixed effect estimator of equation (5) is inconsistent. However, we are mostly interested in the *difference* between the estimates of the coefficients between the two periods. If the 'inconsistency' in the estimates were approximately the same in the two subperiods, the difference would be largely unaffected. Because the small-sample properties of the consistent estimators that have been proposed in the literature are not well understood, and our sample size is small (10 years for each period), we have chosen to present results with a standard IV fixed effect estimator.

difference between the two sub-periods, and the p-value for the test of no difference. A similar structure applies to the other rows of Table 3.

The pattern that emerges is very similar to that of the country-specific regressions, but now the standard errors are considerably smaller. In all groups of countries, there is evidence of a significant *increase* in the degree of countercyclicality of discretionary fiscal policy. In the EMU group, discretionary fiscal policy was procyclical before Maastricht and becomes essentially acyclical after Maastricht; in the EU3 and OECD5 groups, it was acyclical before Maastricht and becomes significantly countercyclical after Maastricht. In all three cases, the p-value of a test of the difference in the output gap coefficient between the two periods is never higher than 0.04. Notice also that such a difference is close to the average difference from the country-specific regressions, especially for the EMU and the OECD5 countries.

The estimated coefficient of debt is negative in the EMU and EU3 groups, but essentially zero in the OECD5 group. In no case is it significantly different across the two periods. The average EMU country typically reduces the structural deficit by 0.05 percentage points for each additional percentage point of debt in the previous year.<sup>18</sup> Similarly, the estimated coefficient on the lagged deficit is very close in all three groups of countries – between 0.55 and 0.75 --, and again there is no evidence that it has increased after Maastricht. Thus, we find no evidence that, holding constant the (expected) cyclical conditions of the economy, in the post-Maastricht period the initial fiscal conditions exerted a stronger pressure on discretionary fiscal policy.

Table 4 repeats the same exercise as Table 3, but with the two main components of the budget deficit, spending and revenues, used separately as dependent variables. When cyclically adjusted primary spending is used as a fiscal indicator, the estimated value of  $\phi_x$  falls for the three group of countries in the post-Maastricht period, but only in the EMU group is the difference significant at the 10 percent level. On the other hand, when we use cyclically adjusted primary revenues as the dependent variable, we detect some evidence of an increase in the output gap coefficient (thus reflecting a more countercyclical policy) for the EU3 and OECD5 groups (though only at the 0.16 level for the latter), but not for the EMU countries. Thus, the previous evidence suggests a more important role of spending policies in EMU as a countercyclical tool in the post-Maastricht or, to be more precise, an end to their procyclical pattern, which characterized the pre-Maastricht period. In the case

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<sup>18</sup> Notice that this point estimate is consistent with what we found in the country-specific regressions.

of the EU3 and the OECD5 the evidence points to more proactively countercyclical revenue policies in the post-Maastricht period.

### **5.3. Robustness**

As discussed above, given the substantial uncertainty inherent in any cyclical adjustment procedure, it is important to make sure that our results are robust to alternative measures of cyclically adjusted budget variables.

We have replicated all the tables displayed so far with cyclically adjusted data from the European Commission, and in the two versions now available (based on HP-filtered GDP or potential output). In all cases, the results are virtually identical to those obtained with OECD data.

Our results focus on the response of discretionary fiscal policy to the indicator of cyclical conditions relevant for fiscal policy making. Since we have little information on what the latter actually is, it is also important to experiment with alternative measures. Thus, we replicated all our tables using the actual growth forecast for year  $t$ , made by the OECD in the fall of year  $t-1$ , as a proxy for the anticipated cyclical indicator in the fiscal rule (5).<sup>19</sup> In this specification, we find an even larger decline in the estimate of  $\phi_x$  in the post-Maastricht period. In the EMU countries, this coefficient declines by 0.5 points, by 1.3 in the EU3 countries, and by 0.6 in the OECD5 countries. In all cases, that difference is significant at the 5 percent level.

Note that, if the growth forecasts are “unbiased”, then the regression residual can now be viewed as an estimate of the ‘non-systematic’ or ‘exogenous’ component of the structural deficit. It is interesting to compare the behavior of this residual to the behavior of a fiscal rule like (3) (therefore, without instrumenting for GDP and with the unadjusted deficit as dependent variable), estimated by Fatás and Mihov (2002a) and (2002b). They show that the standard deviation of the residual of this equation has declined in the nineties, and interpret this finding as evidence that European countries have been less able to conduct stabilizing fiscal policy. As we discuss above, we believe this conclusion is unwarranted, because the residual of equation (3) does not have a clear interpretation. In fact, we also find that the standard deviation of the residual of equation (5), with the OECD

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<sup>19</sup> We have obtained these forecasts manually from the printed versions of the OECD *Economic Outlook*. The OECD *Economic Outlook* has started publishing forecasts of the output gap, as opposed to GDP growth, only in 1995.

growth forecast as independent variable, has fallen after Maastricht in EMU countries (although, interestingly, not in the two other groups). However, as we have seen this is not inconsistent with discretionary fiscal policy becoming more stabilizing over the same period. Indeed, the reduction of the standard deviation of the residual of equation (5) can be interpreted as another sign of improvement in fiscal policy management, in the sense that discretionary fiscal policy has become less erratic. Interestingly, this is consistent with similar evidence concerning monetary policy.

We also estimated a backward-looking version of equation (5), where the structural deficit is assumed to respond to  $x_{t-1}$  rather than  $E_{t-1}x_t$ . We view this as a plausible alternative to a forward-looking rule, given the inertia and complexity of the fiscal policymaking process. This time the decline in the estimate of the output gap coefficient is slightly smaller, but still significant at the 5 percent level in both the EMU and OECD5 groups.

We also re-estimated equation (5) allowing the sample for each country to start as early as possible, instead of in 1980, obtaining virtually identical results. One might argue that 1992-93 were rather special years, with their large realignments within the ERM system, and therefore might unduly influence the comparison between the pre- and post-Maastricht periods.<sup>20</sup> When we exclude 1992-93, we find virtually identical results to the benchmark case for EMU countries, a much larger (and statistically significant) drop in  $\phi_x$  in the EU3 countries in the post-Maastricht period (-1.68), and essentially no change in  $\phi_x$  in OECD5 countries. Thus, the main findings for EMU countries are unaffected.

One potential problem with our estimates is the possibility of cross-country correlation in fiscal policy. If for some reason countries typically move their fiscal policies together, or if fiscal policies largely respond to common shocks, this will create a correlation between the instruments we use and the disturbance in the equation we are estimating. We could not come up with clearly superior alternative instruments. But one way to address this problem is to include fixed time effects in the regressions: the year dummies would then largely absorb the common shocks. When we do this, predictably the size and especially the significance of the difference in  $\phi_x$  between the two subperiods declines. Now the difference is no longer significant in all groups. Still, there is no evidence of any decline in the countercyclicality of fiscal policy in the post-Maastricht period.

Finally, we estimated the fiscal rule (5) imposing the non-linear constraints that arise when the rule is derived from a model of target debt and deficit and costly adjustment, as in Ballabriga and Martinez-Mongay (2002), obtaining once again very similar results.

## 6. Discussion

The most natural interpretation of the above findings is that there is no statistical evidence that the Maastricht-related constraints have impaired the ability of EMU and countries to use discretionary fiscal policy as a countercyclical tool; on the contrary, Maastricht seems to have brought to an end an era of procyclical discretionary fiscal policies in those countries, whatever were the reasons behind that seemingly perverse pattern. We can think of several possible objections to this interpretation of our results. In this section, we discuss these objections in some detail, and provide what empirical evidence we can to address them.

### 6.1. *The Loss of a Self-Oriented Monetary Policy*

It is often argued that a country that has given up the monetary instrument in a monetary union might need to run *more* of a stabilizing fiscal policy than before. Hence, finding that the countercyclicality of discretionary fiscal policy has increased might not by itself be very surprising.

More generally, a common argument against tight constraints on national fiscal policies within EMU emphasizes the enhanced role and relevance of national fiscal policy once a country relinquishes an autonomous, self-oriented monetary policy. This argument should be particularly relevant in the case of EMU since the common monetary policy in place since 1999 is supposed to focus exclusively on euro area-wide conditions, and disregard national developments. Hence, one could think that in those circumstances fiscal policy should be used, at the margin, as a *surrogate* for the missing self-oriented monetary policy.

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<sup>20</sup> We thank a referee for drawing this point to our attention.

To what extent does that argument apply in practice to the EMU experience so far? In other words, and to be more specific: to what extent has the monetary policy stance of the ECB, as a result of its claimed focus on euro area-wide developments, led to a larger deviation from what would be the appropriate monetary stance given domestic conditions?

Some simple evidence suggests that this has not been the case, contrary to conventional wisdom. To be precise, we have computed the average absolute deviation between each country's short term interest rate and the rate generated by the Taylor rule

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

where  $r_t$  is the short-term nominal interest rate. This rule is generally viewed as a good first approximation to the behavior of central banks that have been successful in stabilizing inflation and the output gap<sup>21</sup>. In addition such a rule has been shown to have desirable properties when embedded in a dynamic optimizing model with realistic frictions.<sup>22</sup>

Table 5 reports those deviations from the Taylor rule for each country and sub-period, together with averages for groups of countries. On average, the absolute deviations from our baseline Taylor rule have actually declined over time in all three groups of countries, including EMU countries, contrary to the argument above. Understanding the reasons behind that result lies beyond the scope of the present paper: one possibility is the increasing correlation of inflation rates and output gaps within EMU countries.<sup>23</sup> A second explanation is simply that, before EMU, most current EMU countries had to shadow closely the monetary policy of the Bundesbank, which was only preoccupied with German conditions; now these countries have at least some say in the setting of monetary policy. In fact, note that the absolute deviation from the Taylor rule has increased albeit by little, for Germany.

Whatever the reasons, what are the implications of these findings for fiscal policy? One may actually be able to turn the conventional argument upside down: to the extent that the monetary policy stance has become more consistent with the domestic economic conditions of each country (independently of the institution in charge of monetary policy) we would expect fiscal policy to focus more on a pure stabilization role, given the lesser need to be concerned with price stability, an objective generally allocated to the monetary

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<sup>21</sup> See, e.g., Taylor (1993), Clarida, Galí and Gertler (1998, 2000).

<sup>22</sup> See, e.g., some of the contributions in Taylor (1999).

<sup>23</sup> See e.g. Fatás (1998).



authority. That conjecture seems consistent with the evidence of an increasingly countercyclical fiscal policy reported above.

In addition to such considerations, the “surrogate” hypothesis suggests introducing the deviation from a Taylor rule interest rate as an additional control variable in our empirical fiscal policy rule, while allowing its coefficient to differ across the two subperiods, as we do for the remaining variables. The results of that exercise are reported in Table 6. In the EMU countries, the decline in  $\phi_x$  becomes smaller and insignificant; in EU3 countries the decline does not change; in OECD5 countries it becomes bigger. The coefficient on the Taylor rule deviation is typically positive in both periods in EMU and EU3 groups, but close to zero for the OECD 5. That finding suggests that at least for EMU and EU3 countries fiscal policy and monetary policy may have often acted as substitutes: when monetary policy is tight, discretionary fiscal policy loosens. The coefficients, however, are not large: when the short term interest rate exceeds the Taylor rule interest rate by 1 percentage point, the discretionary deficit increases by between 0.1 and 0.3 percentage points of GDP, on average.

## ***6.2. Discretionary Fiscal Policy Is Different After the Inception of EMU***

A second and related argument is that the true test of the impact of the SGP is in the years after monetary unification became effective, or at least after the exchange rates became irrevocably locked in. Obviously we will have to wait some time for an evaluation of this argument. But we can still try to say something with the available time series. Table 7 displays estimates of our fiscal rule over the period 1992-2002 only, allowing for a structural break in the coefficients of all variables in 1998 – the year the exchange rates were locked in and decisions on membership were made. Again, we do not find any evidence that in the EMU countries fiscal policy has become more procyclical (or less countercyclical) from 1998 on.<sup>24</sup>

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<sup>24</sup> Interestingly, we do find evidence of a much higher coefficient  $\phi_x$  after Maastricht in EU3 and OECD5 countries, although the difference is not statistically significant.

### **6.3. Discretionary Fiscal Policy in Recessions**

One could rebut that the true test is indeed in the recent mini-recessions of 2001-2002, as the Maastricht-related constraints are only likely to become binding in a recession. To assess this argument, we analyze the behavior of fiscal authorities during three recession episodes.

We begin by identifying for each country the years in which its output gap experiences a decline, during the three main global recession waves since 1980: the early 80s, the early 90s, as well as the most recent global downturn in the early 2000s. For each country and recession episode we compute the cumulative output gap decline (i.e., the cumulative output losses relative to trend), and the cumulative increase in the primary, cyclically adjusted budget deficit, measured as a share of GDP. These statistics are shown in Table 8, which also reports the ratio between the cumulative deficit change and the cumulative output gap decline. The latter ratio can be interpreted as a simple statistic that captures the sign and intensity of the discretionary fiscal response. Thus, a negative sign for the ratio must be interpreted as pointing to a deliberate countercyclical fiscal stance, whereas the size of the ratio captures the strength of that response, relative to the size of the output gap decline. As usual, the Table also reports averages for each variable and group of countries (EMU and control groups).

We start by looking at the fiscal behavior of current EMU countries during the three recession episodes mentioned above. In the recession of the early 80s the average cumulative change in the primary adjusted deficit is negative, with a corresponding average ratio to cumulative GDP losses of 0.33. Only in Spain and Finland is the fiscal policy stance countercyclical. Interestingly, the countries in our control groups (EU3 and OECD5) display a fiscal behavior during that recession that does not differ significantly from the EMU countries. Only Australia and the US show a (very weak) countercyclical stance among the non-EMU countries.

During the recessions of the early 90s the average fiscal stance of EMU countries remains largely unchanged, with a ratio of cumulative deficit change to output losses of 0.27, indicating again a procyclical discretionary policy (with Austria, Finland, and most significantly, France, being the outliers). Interestingly, however, the picture now becomes

quite different for the two control groups, both showing countercyclical discretionary fiscal responses to the recession, not only on average, but uniformly (in sign) across countries.

But perhaps the most surprising result lies in the fiscal stance among EMU countries during the most recent downturn, which happens to be the first one where the constraints developed by the MT and the SGP have been effectively in place. Interestingly enough, that circumstance has not prevented EMU countries from pursuing countercyclical fiscal policies during the recent recession, the average ratio becoming negative (-0.24).<sup>25</sup>

To evaluate the recessions argument, we also re-estimated equation (5) allowing for a term in the squared gap (again with a break in 1992). We did not find evidence of a significant non-linearity in the coefficient of the expected gap in EMU countries, nor of a difference between the two periods. We recognize that this specification with squared terms and a break in the middle of the sample might suffer from overfitting and poor instruments. But the same conclusion applies to fixed effect estimates of the backward-looking version, where the independent variable is the lagged gap and its square.

#### **6.4. Reduced Stabilizing Properties of Fiscal Policy Over Time**

Fourth, the ability of discretionary fiscal policy to stabilize the economy might have fallen in the nineties. To compensate for this, EMU countries might have liked to use countercyclical discretionary policy *more intensively* after Maastricht. We do not have much to say on this point. While there is some evidence that the impact of fiscal policy shocks on GDP and its components has dampened in the last twenty years in 5 OECD countries (see Perotti (2002)), it would be extremely hard to assess whether the process has intensified in the nineties relative to the eighties.<sup>26</sup>

#### **6.5. Reduced Cyclical Sensitivity of Fiscal Policy Over Time**

Fifth, the cyclical (non-discretionary) component of fiscal policy might have become less responsive to cyclical conditions after Maastricht (for instance because of a

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<sup>25</sup> Still, this ratio is, in absolute value, lower than in the two control groups, suggesting a weaker countercyclical policy in the average EMU country. Furthermore, that pattern is not uniform across EMU countries, with Germany, France and Ireland being responsible for much of the change.

decline in the progressivity of income taxes or less generous unemployment benefits and tighter eligibility rules), thus providing less automatic stabilization. Once again, EMU countries might have liked to use discretionary fiscal policy more countercyclically than before to compensate for this effect. This argument is testable, since the cyclical component of the deficit can be constructed as the difference between the observed deficit and the structural deficit, and similarly for spending and revenues.<sup>27</sup> When we estimate a version of equation (5) with the cyclical component of the deficit as the dependent variable,<sup>28</sup> we find that in 10 EMU countries out of 11 the coefficient of the output gap *falls* in the post-Maastricht period, and in 7 of these cases the difference is significant at the 5 percent level. Nor do we find any evidence of a reduced cyclical sensitivity of the cyclical deficit in panel regressions: in fact, we find that the output gap coefficient in the EMU group *falls* by 0.25 (with the difference significant at the 1 percent level), the same decline as in the structural deficit regressions.

There is a deeper reason why we are sceptical about this counter-argument to our interpretation. It appears that both the OECD and the European Commission use the latest values of the tax elasticities to compute their cyclically adjusted figures. If in reality these elasticities have fallen over time, it is easy to show that this should lead to an underestimate of  $\phi_x$  in the fiscal rule (5) in the pre-Maastricht period with the discretionary deficit as the dependent variable. Hence, the true difference with the post-Maastricht period would be even larger than what we estimate in Tables 2 and 3.

## **7. Has Public Investment Suffered Disproportionately After Maastricht?**

It is often argued that – presumably for political economy reasons -- government investment is the easiest component of government spending to be cut in the short run. As a consequence, the claim is often made that the Maastricht-related constraints have

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<sup>26</sup> In addition, only Germany among the 5 OECD countries covered in the study by Perotti (2002) is a current member of the EMU.

<sup>27</sup> One could argue that the cyclical sensitivity of the cyclical surplus could be observed directly from the elasticities used in constructing the cyclically adjusted surplus. However, the composition of revenues changes from year to year, generating changes in the overall elasticity of the cyclical surplus even at unchanged elasticities of the individual components.

<sup>28</sup> Note that now we are interested in the response of the cyclical component of the deficit to  $x_t$ , not to  $E_{t-1}x_t$ ; still we instrument  $x_t$  because of possible joint endogeneity with the deficit.

affected disproportionately government investment, thereby imposing long-term costs far beyond the (alleged) short-run costs from reduced stabilization.

To evaluate this claim, Table 9 reports the average share of government investment<sup>29</sup> in potential output in three separate five-year periods: 1978-82, 1988-92, and 1997-2001.<sup>30</sup> The table provides this information separately for the 19 countries in our sample, and also on average for the 11 EMU countries, the 3 EU, non-EMU countries, and the 5 remaining OECD countries.

The table makes two points. Between the 1988-1992 period and the 1997-2001 periods, government investment as a share of potential GDP did fall in the EMU countries by 0.47 percentage points on average, but it also fell by 0.49 percentage points in the EU3 countries and by 0.26 percentage points in the OECD5 countries. Thus, there is a clear overall trend fall in government investment as a share of GDP. Second, this trend started well before Maastricht: between 1978-1982 and 1988-1992, the decline in the government investment / potential output share was also very similar to the decline in the next decade in the EMU and OECD5 countries, and actually considerably larger in the EU3 countries.

The claim we wanted to address, however, is a statement about the impact of the Maastricht related constraints on government investment *relative* to the rest of government spending. It could then be argued that the true test of this claim should be made by comparing the behaviour of government investment to total government spending. Table 10 displays the same information as Table 9, but this time government investment is expressed as share of total primary government spending. The conclusions are the same: here too we find an OECD-wide trend towards a fall in the share of government investment in total spending, which started well before Maastricht.<sup>31</sup>

Perhaps the impact of the Maastricht-related constraints is more on the cyclical behaviour of government investment than on its average value. Lane (2002) indeed finds

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<sup>29</sup> Notice that we use gross investment proper and not, as it is frequently done, net capital expenditure by the government. The latter includes (as a negative item) net capital transfers received. Most prominent among these were in 2000, 2001 and 2002 revenues from UMTS auctions. In some countries, these were considerable: for instance, in 2000 they were 2.5 percent of potential GDP in Germany, 1.2 percent in Italy, .7 in the Netherlands, and .4 percent in Greece (not all countries recorded the whole amount of the latter as net capital transfers received). Inclusion of net capital receipts would therefore have artificially reduced average net capital spending in the period 2000-2002. More importantly, while in general net capital transfers are small and fluctuate little, over this period net capital spending would have been a poor proxy for government investment in some countries.

<sup>30</sup> The average is taken over three years to minimize the contribution of cyclical or electoral variations in government investment.

<sup>31</sup> The figure for the EMU average is somewhat influenced by Ireland, where the share of government investment in total primary spending increased by almost 6 percentage points between 1988-1992 and 1997-2001. However, the qualitative conclusions would hold even if one excluded Ireland.

that government investment is the most cyclical component of government spending. Table 11 reports estimates of equation (5), with the cyclically adjusted deficit replaced by government investment as a share of potential output. We do find some evidence of a mildly procyclical behaviour of government investment in EMU countries: in the pre-Maastricht period, on average the government investment / potential output ratio increased by about .04 percentage points for every extra percentage point in expected gap. However, there is no evidence that the cyclical behaviour of government investment has changed in the post-Maastricht period in any group of countries. And when we compare the cyclical behaviour of government investment in the 1992-1997 and 1998-2002 periods, we find that in the EMU countries the coefficient of the expected gap declined in the second period by 0.17 (with the difference significant at the 14 percent level).

## 8. Conclusions

As the debate on the pros and cons of the SGP heats up, a highly popular view among economists is that the latter has significantly impaired the ability of EU governments to conduct an effective discretionary countercyclical fiscal policy and to provide an adequate level of government services and of public infrastructure. We do not find much support for this view. More specifically, several results and tentative associated conclusions emerge from our analysis:

1. Discretionary fiscal policy in EMU countries has become more countercyclical over time, following what appears to be a trend that affects other industrialized countries as well. Yet, there is still some room to go before EMU countries attain the degree of countercyclicality of their discretionary fiscal policy that characterizes other industrialized countries. Whether the SGP will become an impediment or not remains to be seen.
2. The decline in public investment (as a share of GDP) observed over the past decade among EMU countries can be hardly attributed to the constraints implied by the MT and the SGP, since (a) other industrialized nations not subject to those constraints have experienced an even greater decline, and (b) the decline in public investment was even greater before Maastricht

To conclude, we want to stress our desire not to read in the data more than they can tell us, and to keep in mind the necessary limitations associated with an empirical analysis of the sort provided in our paper. In particular, there is a caveat the reader must not ignore: EMU countries have experienced few real recessions during the post-Maastricht period. It could well be the case that our data cover a period when the constraint associated with the SGP were not really binding. In that case it cannot give clear indications about the impact of the SGP whenever an active countercyclical fiscal policy is really needed in the future. Hence, we prefer to interpret our findings mainly as useful caveats to a view that has by now almost unanimous support among economists, rather than a precise answer to a question that will likely remain open for some time to come.

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TABLE 1

	Deficit/GDP Ratio (%)			Debt/GDP Ratios (%)		
	88-92 (a)	97-01 (b)	(a)-(b) (c)	1982 (d)	1992 (e)	2001 (f)
AUT	2.8	1.8	-1.0	40.3	57.2	61.7
BEL	7.4	0.7	-6.7	98.9	131.4	108.2
DEU	1.9	2.1	0.2	37.5	41.8	60.3
ESP	3.9	1.5	-2.4	31.1	52.4	69.1
FIN	-2.1	-2.7	-0.6	14.1	40.6	43.6
FRA	2.6	2.0	-0.6	33.5	44.7	64.8
GRC	13.1	1.9	-11.2	29.6	97.6	99.7
IRE	2.9	-2.3	-5.2	79.2	100.1	36.5
ITA	11.4	2.2	-9.2	65.1	116.1	108.7
NLD	4.8	-0.1	-4.9	54.2	77.6	53.2
PRT	4.0	3.1	-0.9	42.6	54.8	55.6
DNK	0.8	2.0	1.2	60.2	66.3	44.7
GBR	1.6	-0.4	-2.0	53.7	49.2	52.5
SWE	-0.4	-2.1	-1.7	60.2	69.0	52.9
NOR	-1.1	-9.4	-8.3	31.9	32.4	26.8
AUS	2.3	-0.4	-2.7	18.4	14.5	10.1
JPN	-1.5	6.2	7.7	60.1	63.5	132.8
CAN	6.4	-1.6	-8.0	68.4	110.4	101.6
USA	4.4	-0.5	-4.9	49.3	74.1	59.5
ALL	3.4	0.2	-3.2	48.9	68.1	65.4
EMU	4.8	0.9	-3.9	47.8	74.0	69.2
EU3	0.7	-0.2	-0.8	58.0	61.5	50.0
OECD5	2.1	-1.1	-3.2	45.6	59.0.7	66.2

Deficit is cyclically unadjusted. Averages for different groups are unweighted.  
Source for all data: OECD *Economic Outlook*, data base, December 2002 issue.

TABLE 2

	E (gap) <sub>BM</sub>		E (gap) <sub>AM</sub>			debty{1}		defy{1}	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
aut	-0.05	(-0.24)	-0.59	(-1.17)	(0.34)	-0.02	(-0.59)	0.41	( 1.80)
bel	0.38	( 1.52)	-0.84	(-1.06)	(0.15)	-0.07	(-2.18)	0.57	( 3.17)
deu	0.41	( 3.40)	0.32	( 0.84)	(0.83)	-0.02	(-0.38)	0.46	( 3.18)
esp	0.10	( 0.92)	-0.06	(-0.37)	(0.44)	-0.05	(-2.05)	0.60	( 4.49)
fin	0.23	( 0.64)	-0.35	(-1.81)	(0.18)	-0.03	(-0.55)	0.18	( 0.64)
fra	0.14	( 1.55)	0.10	( 0.56)	(0.87)	-0.10	(-3.86)	0.34	( 1.74)
grc	0.12	( 0.55)	0.35	( 0.68)	(0.69)	-0.03	(-0.85)	0.45	( 2.49)
ire	0.26	( 1.10)	-0.07	(-0.23)	(0.21)	-0.05	(-1.05)	0.73	( 4.78)
ita	0.35	( 1.53)	-0.86	(-1.24)	(0.13)	-0.07	(-2.36)	0.08	( 0.36)
nld	0.29	( 0.98)	-0.72	(-1.11)	(0.19)	0.01	( 0.17)	0.39	( 1.69)
prt	0.49	( 5.24)	0.16	( 0.90)	(0.10)	-0.36	(-4.60)	0.06	( 0.44)
dnk	-1.40	(-2.11)	-0.24	(-0.47)	(0.25)	-0.00	(-0.06)	0.42	( 2.32)
gbr	0.11	( 1.81)	-0.90	(-2.92)	(0.01)	-0.05	(-1.01)	0.49	( 4.05)
swe	-0.52	(-1.18)	-1.61	(-2.39)	(0.06)	-0.13	(-2.21)	0.30	( 1.16)
nor	-0.39	(-1.12)	-1.22	(-2.66)	(0.12)	0.07	( 0.54)	0.44	( 1.81)
aus	-0.19	(-0.66)	-0.13	(-0.62)	(0.83)	-0.14	(-1.63)	0.87	( 6.45)
jpn	0.16	( 1.57)	-0.33	(-0.85)	(0.23)	-0.01	(-0.82)	0.81	(13.37)
can	-0.15	(-0.75)	-0.39	(-0.76)	(0.67)	-0.02	(-0.65)	0.68	( 3.06)
usa	-0.04	(-0.23)	-1.07	(-3.53)	(0.00)	0.00	( 0.04)	0.25	( 1.16)
ALL	0.02		-0.44			-0.06		0.45	
EMU11	0.25		-0.23			-0.07		0.39	
EU3	-0.60		-0.91			-0.06		0.40	
OECD5	-0.12		-0.63			-0.02		0.61	

This table displays country-specific estimates of the fiscal rule (5). Dependent variable: primary deficit, cyclically adjusted, divided by potential output. IV estimation, using own lagged output gap and the lagged output of the EU15 countries for the US, and the lagged output of the US for all other countries.

Sample: 1980-2002 for all countries. "BM" refers to 1980-91 ("Before Maastricht"); "AM" refers to 1992-2001 ("After Maastricht").

Column (1): estimate of the coefficient of expected gap in 1980-1991 period. Column (2): t-statistics. Column (3): estimate of the coefficient of expected gap in 1992-2000 period. Column (4): t-statistics. Column (5): p-value of the hypothesis that the two coefficients in columns (1) and (3) are equal. Column (6): estimate of the coefficient of the lagged debt / potential GDP ratio. Column (7): t-statistics. Column (8): estimate of the coefficient of the lagged structural deficit / potential GDP ratio. Column (9): t-statistics.

Averages for different groups are unweighted.

Source for all data: OECD *Economic Outlook*, data base, December 2002 issue.

TABLE 3

	(1)	(2)	(3)	(4)
EMU (nobs = 238)				
E (gap) <sub>BM</sub>	0.17	( 3.47)		
E (gap) <sub>AM</sub>	-0.08	(-0.98)	-0.25	( 0.01)
debty{1} <sub>BM</sub>	-0.05	(-4.70)		
debty(1) <sub>AM</sub>	-0.05	(-3.46)	0.00	( 0.95)
defy{1} <sub>BM</sub>	0.54	(10.01)		
defy(1) <sub>AM</sub>	0.55	( 6.58)	0.00	( 0.98)
EU3 (nobs = 66)				
E (gap) <sub>BM</sub>	-0.09	(-0.74)		
E (gap) <sub>AM</sub>	-0.76	(-2.62)	-0.67	( 0.04)
debty{1} <sub>BM</sub>	-0.10	(-3.30)		
debty(1) <sub>AM</sub>	-0.05	(-1.29)	0.05	( 0.34)
defy{1} <sub>BM</sub>	0.58	( 5.19)		
defy(1) <sub>AM</sub>	0.65	( 4.48)	0.08	( 0.68)
OECD5 (nobs = 110)				
E (gap) <sub>BM</sub>	-0.14	(-1.29)		
E (gap) <sub>AM</sub>	-0.72	(-3.40)	-0.58	( 0.02)
debty{1} <sub>BM</sub>	-0.00	(-0.08)		
debty(1) <sub>AM</sub>	-0.00	(-0.08)	0.00	( 0.99)
defy{1} <sub>BM</sub>	0.76	( 7.96)		
defy(1) <sub>AM</sub>	0.60	( 5.13)	-0.16	( 0.30)

This table displays panel estimates of the fiscal rule (5). Dependent variable: primary deficit, cyclically adjusted, divided by potential output. IV estimation, using own lagged output gap and the lagged output of the EU15 countries for the US, and the lagged output of the US for all other countries. Country fixed effects are included.

Sample: 1980-2002 for all countries. "BM" refers to 1980-91 ("Before Maastricht"); "AM" refers to 1992-2001 ("After Maastricht").

Column (1): value of the coefficient in each subperiod. Column (2): t-statistics. Column (3): difference "After Maastricht" – "Before Maastricht". Column (4): p-value of the test of the null hypothesis that the coefficients "Before Maastricht" and "After Maastricht" are the same.

Source for all data: OECD *Economic Outlook* data base, December 2002 issue.

TABLE 4

	SPENDING				REVENUES			
	(1a)	(2a)	(3a)	(4a)	(1b)	(2b)	(3b)	(4b)
EMU (nobs = 238)								
E(gap) <sub>BM</sub>	0.20	( 4.50)	( 0.00)		0.05	( 1.36)	( 0.17)	
E(gap) <sub>AM</sub>	0.04	( 0.49)	-0.17	( 0.06)	0.01	( 0.19)	-0.04	( 0.53)
debt <sub>y</sub> {1} <sub>BM</sub>	-0.03	(-3.40)	( 0.00)		-0.00	(-0.06)	( 0.95)	
debt <sub>y</sub> (1) <sub>AM</sub>	-0.01	(-0.88)	0.02	( 0.21)	0.03	( 2.38)	0.03	( 0.06)
spey <sub>y</sub> {1} <sub>BM</sub>	0.83	(19.58)	( 0.00)		0.82	(14.94)	( 0.00)	
spey <sub>y</sub> (1) <sub>AM</sub>	0.80	( 8.95)	-0.03	( 0.75)	0.67	( 9.14)	-0.14	( 0.12)
EU3 (nobs = 66)								
					0.01	( 0.10)	( 0.92)	
E(gap) <sub>BM</sub>	-0.19	(-2.03)	( 0.05)		0.41	( 2.22)	0.41	( 0.05)
E(gap) <sub>AM</sub>	-0.45	(-2.85)	-0.26	( 0.16)	0.05	( 2.40)	( 0.02)	
debt <sub>y</sub> {1} <sub>BM</sub>	-0.04	(-1.95)	( 0.06)		0.03	( 0.95)	-0.03	( 0.48)
debt <sub>y</sub> (1) <sub>AM</sub>	-0.02	(-0.80)	0.02	( 0.61)	0.70	( 8.17)	( 0.00)	
spey <sub>y</sub> {1} <sub>BM</sub>	0.18	( 0.91)	( 0.37)		0.45	( 2.12)	-0.26	( 0.26)
spey <sub>y</sub> (1) <sub>AM</sub>	0.66	( 6.01)	0.48	( 0.04)				
OECD5 (nobs = 110)								
E(gap) <sub>BM</sub>	-0.11	(-1.19)	( 0.24)		0.06	( 0.79)	( 0.43)	
E(gap) <sub>AM</sub>	-0.26	(-2.06)	-0.15	( 0.35)	0.27	( 2.20)	0.20	( 0.16)
debt <sub>y</sub> {1} <sub>BM</sub>	0.03	( 1.39)	( 0.17)		0.03	( 1.45)	( 0.15)	
debt <sub>y</sub> (1) <sub>AM</sub>	-0.01	(-0.49)	-0.04	( 0.16)	0.01	( 1.01)	-0.02	( 0.48)
spey <sub>y</sub> {1} <sub>BM</sub>	0.71	( 6.40)	( 0.00)		0.70	( 8.65)	( 0.00)	
spey <sub>y</sub> (1) <sub>AM</sub>	0.76	( 7.61)	0.05	( 0.74)	0.73	( 6.03)	0.03	( 0.85)

This table displays panel estimates of the fiscal rule (5). Dependent variable: primary spending, cyclically adjusted, divided by potential output in the left panel; primary revenues, cyclically adjusted, divided by potential output in the left panel. IV estimation, using own lagged output gap and the lagged output of the EU15 countries for the US, and the lagged output of the US for all other countries. Country fixed effects are included.

Sample: 1980-2002 for all countries. "BM" refers to 1980-91 ("Before Maastricht"); "AM" refers to 1992-2001 ("After Maastricht").

Column (1): value of the coefficient in each subperiod. Column (2): t-statistics. Column (3): difference "After Maastricht" – "Before Maastricht". Column (4): p-value of the test of the null hypothesis that the coefficients "Before Maastricht" and "After Maastricht" are the same.

Source for all data: OECD *Economic Outlook* data base, December 2002 issue.

TABLE 5

	ABSOLUTE DEVIATIONS FROM TAYLOR RULE		
	80-91	92-98	99-02
AUT	1.3	1.2	0.9
BEL	3.4	1.9	0.6
DEU	2.1	1.4	1.9
ESP	2.2	2.9	1.8
FIN	4.1	5.6	1.6
FRA	3.0	3.6	1.2
GRC	10.6	1.9	2.5
IRE	6.1	3.9	6.7
ITA	4.1	3.0	0.4
NLD	3.3	1.4	3.3
PRT	7.6	2.4	3.4
DNK	2.2	3.4	1.4
GBR	3.3	2.5	1.1
SWE	2.0	5.1	0.5
NOR	5.5	4.6	8.1
AUS	3.9	4.0	1.1
JPN	2.3	1.1	2.1
CAN	3.0	3.5	1.1
USA	2.7	1.2	0.8
ALL	3.8	2.9	2.1
EMU	4.3	2.7	2.2
EU3	2.5	3.7	1.0
OECD5	3.5	2.9	2.6

The table displays the average absolute deviations from the Taylor rules in each country in each subperiod. The deviation from the Taylor rule is defined as  $r_t^i = 4.0 + 1.5(\pi_t - 2.0) + 0.5x_t$

TABLE 6

	(1)	(2)	(3)	(4)
EMU (nobs = 238)				
E(gap) <sub>BM</sub>	0.20	( 3.88)	( 0.00)	
E(gap) <sub>AM</sub>	0.03	( 0.24)	-0.17	( 0.27)
debt <sub>y</sub> {1} <sub>BM</sub>	-0.06	(-5.12)	( 0.00)	
debt <sub>y</sub> (1) <sub>AM</sub>	-0.05	(-3.58)	0.01	( 0.48)
defy <sub>y</sub> {1} <sub>BM</sub>	0.60	( 9.87)	( 0.00)	
defy <sub>y</sub> (1) <sub>AM</sub>	0.50	( 5.57)	-0.10	( 0.36)
tayl dev <sub>BM</sub>	0.16	( 2.21)	( 0.00)	
tayl dev <sub>AM</sub>	0.12	( 1.05)	-0.03	( 0.82)
EU3 (nobs = 62)				
E(gap) <sub>BM</sub>	0.12	( 0.83)	( 0.41)	
E(gap) <sub>AM</sub>	-0.55	(-1.13)	-0.67	( 0.19)
debt <sub>y</sub> {1} <sub>BM</sub>	-0.14	(-3.44)	( 0.00)	
debt <sub>y</sub> (1) <sub>AM</sub>	-0.05	(-1.29)	0.08	( 0.16)
defy <sub>y</sub> {1} <sub>BM</sub>	0.72	( 5.33)	( 0.00)	
defy <sub>y</sub> (1) <sub>AM</sub>	0.68	( 4.45)	-0.05	( 0.82)
tayl dev <sub>BM</sub>	0.31	( 1.65)	( 0.00)	
tayl dev <sub>AM</sub>	0.14	( 0.55)	-0.17	( 0.59)
OECD5 (nobs = 110)				
E(gap) <sub>BM</sub>	-0.12	(-0.64)	( 0.53)	
E(gap) <sub>AM</sub>	-1.06	(-2.86)	-0.94	( 0.03)
debt <sub>y</sub> {1} <sub>BM</sub>	-0.00	(-0.08)	( 0.93)	
debt <sub>y</sub> (1) <sub>AM</sub>	0.01	( 0.32)	0.01	( 0.78)
defy <sub>y</sub> {1} <sub>BM</sub>	0.77	( 5.62)	( 0.00)	
defy <sub>y</sub> (1) <sub>AM</sub>	0.55	( 3.68)	-0.22	( 0.27)
tayl dev <sub>BM</sub>	0.03	( 0.22)	( 0.00)	
tayl dev <sub>AM</sub>	-0.20	(-1.33)	-0.22	( 0.25)

This table displays panel estimates of the fiscal rule (5), including the deviation from the Taylor rule as an independent variable. Dependent variable: primary deficit, cyclically adjusted, divided by potential output. IV estimation, using own lagged output gap and the lagged output of the EU15 countries for the US, and the lagged output of the US for all other countries. Country fixed effects are included.

Sample: 1980-2002 for all countries. "BM" refers to 1980-91 ("Before Maastricht"); "AM" refers to 1992-2001 ("After Maastricht").

Column (1): value of the coefficient in each subperiod. Column (2): t-statistics. Column (3): difference "After Maastricht" – "Before Maastricht". Column (4): p-value of the test of the null hypothesis that the coefficients "Before Maastricht" and "After Maastricht" are the same.

Source for all data: OECD *Economic Outlook* data base, December 2002 issue.



TABLE 7

	(1)	(2)	(3)	(4)
EMU (nobs = 110)				
E(gap) <sub>92-97</sub>	0.02	( 0.17)	( 0.87)	
E(gap) <sub>98-02</sub>	-0.11	(-0.27)	-0.13	( 0.76)
debty{1} <sub>92-97</sub>	-0.07	(-4.12)	( 0.00)	
debty(1) <sub>98-02</sub>	-0.10	(-1.36)	-0.02	( 0.77)
defy{1} <sub>92-97</sub>	0.36	( 3.51)	( 0.00)	
defy(1) <sub>98-02</sub>	0.38	( 1.63)	0.02	( 0.94)
EU3 (nobs = 30)				
E(gap) <sub>92-97</sub>	-0.64	(-1.21)	( 0.24)	
E(gap) <sub>98-02</sub>	0.14	( 0.16)	0.79	( 0.47)
debty{1} <sub>92-97</sub>	-0.11	(-1.29)	( 0.21)	
debty(1) <sub>98-02</sub>	0.07	( 0.70)	0.19	( 0.19)
defy{1} <sub>92-97</sub>	0.90	( 4.16)	( 0.00)	
defy(1) <sub>98-02</sub>	-0.36	(-0.59)	-1.26	( 0.07)
OECD5 (nobs = 50)				
E(gap) <sub>92-97</sub>	-1.03	(-3.20)	( 0.00)	
E(gap) <sub>98-02</sub>	-0.28	(-0.45)	0.76	( 0.28)
debty{1} <sub>92-97</sub>	-0.00	(-0.06)	( 0.95)	
debty(1) <sub>98-02</sub>	-0.05	(-0.83)	-0.04	( 0.63)
defy{1} <sub>92-97</sub>	0.75	( 5.14)	( 0.00)	
defy(1) <sub>98-02</sub>	0.73	( 1.67)	-0.03	( 0.95)

This table displays panel estimates of the fiscal rule (5). Dependent variable: primary deficit, cyclically adjusted, divided by potential output. IV estimation, using own lagged output gap and the lagged output of the EU15 countries for the US, and the lagged output of the US for all other countries. Country fixed effects are included.

Sample: 1992-2002 for all countries.

Column (1): value of the coefficient in each subperiod. Column (2): t-statistics. Column (3): difference of estimate of coefficient over 1997-2002 subperiod less estimate of coefficient over 1992-1997 subperiod. Column (4): p-value of the test of the null hypothesis that the difference in column (3) is 0.

Source for all data: OECD *Economic Outlook* data base, December 2002 issue.

TABLE 8

## FISCAL POLICY DURING RECESSION EPISODES

	EARLY 80s			EARLY 90s			EARLY 2000s		
	$\Delta$ Output Gap	$\Delta$ Deficit (pa)	Ratio	$\Delta$ Output Gap	$\Delta$ Deficit (pa)	Ratio	$\Delta$ Output Gap	$\Delta$ Deficit (pa)	Ratio
AUT	-3.45	-0.45	0.13	-3.07	0.19	-0.06	-2.78	-0.28	0.10
BEL	-5.82	-1.7	0.29	-4.88	-1.44	0.30	-3.23	-0.89	0.28
DEU	-8.08	-4.88	0.60	-4.49	-2	0.45	-2.1	1.16	-0.55
ESP	-1.83	1.1	-0.60	-6.74	-1.67	0.25	-1.08	-0.29	0.27
FIN	-2.58	0.66	-0.26	-15.85	1.81	-0.11	-4.1	1.82	-0.44
FRA	-5.78	-0.44	0.08	-3.82	1.84	-0.48	-1.52	0.86	-0.57
GRC	-13.64	-0.51	0.04	-4.51	-2.67	0.59	----	----	----
IRE	-7.74	-6.82	0.88	-7.97	-1.94	0.24	-5.04	5.09	-1.01
ITA	-6.72	-1.88	0.28	-4.46	-6.87	1.54	-1.4	-0.08	0.06
NLD	-5.5	-1.94	0.35	-2.76	-4.41	1.60	-4.25	0.42	-0.10
PRT	-12.06	-7.12	0.59	-8.37	-0.95	0.11	-3.85	-0.8	0.21
DNK	-5.01	-0.04	0.01	-2.74	1.1	-0.40	-1.68	-0.15	0.09
GBR	-8.15	-4.85	0.60	-8.41	3.84	-0.46	-1.55	2.58	-1.66
SWE	-3.36	-0.92	0.27	-10.34	8.83	-0.85	-1.83	1.24	-0.68
NOR	-4.39	-2.88	0.66	-0.36	4.46	-12.39	-0.87	-0.2	0.23
AUS	-6.59	0.32	-0.05	-5.76	4.72	-0.82	-1.58	0.93	-0.59
JPN	-3.7	-3.85	1.04	-4.43	4.87	-1.10	-2.93	-0.14	0.05
CAN	-8.45	-0.75	0.09	-7.63	1	-0.13	-2.07	0.89	-0.43
USA	-9.47	0.57	-0.06	-4.16	0.4	-0.10	-3.6	4.3	-1.19
ALL	-6.44	-1.91	0.30	-5.83	0.58	-0.10	-2.53	0.91	-0.36
EMU	-6.65	-2.18	0.33	-6.08	-1.65	0.27	-2.94	0.70	-0.24
EU3	-5.51	-1.94	0.35	-7.16	4.59	-0.64	-1.69	1.22	-0.73
OECD5	-6.52	-1.32	0.20	-4.47	3.09	-0.69	-2.21	1.16	-0.52

This table displays the cumulative change in the output gap, in the primary cyclically adjusted deficit, and the ratio between the two, in the three recession episodes in the three period indicated. Source for all data: OECD *Economic Outlook* data base, December 2002 issue.

TABLE 9

	1978-82	1988-92	1998-01	
	(1)	(2)	(3)	(3) - (2)
aut	4.40	3.16	1.67	-1.49
bel	4.52	1.91	1.65	-0.26
deu	3.53	2.67	1.82	-0.85
esp	2.12	4.63	3.21	-1.42
fin	3.35	3.47	2.77	-0.71
fra	3.22	3.57	3.05	-0.51
grc	2.81	4.97	3.78	-1.19
ire	5.57	2.01	3.38	1.37
ita	3.19	3.23	2.38	-0.85
nld	3.72	2.99	3.12	0.13
prt	3.80	3.53	4.15	0.61
dnk	3.02	1.79	1.75	-0.03
gbr	2.21	1.99	1.17	-0.83
swe	4.11	3.23	2.61	-0.61
nor	3.93	3.62	3.20	-0.42
aus	3.22	2.65	2.39	-0.27
jpn	5.86	5.02	5.31	0.29
can	3.02	2.86	2.29	-0.57
usa	3.41	3.62	3.28	-0.35
ALL	3.63	3.21	2.79	-0.42
EMU	3.66	3.29	2.82	-0.47
EU3	3.12	2.34	1.85	-0.49
OECD5	3.89	3.56	3.29	-0.26

The table displays the average government investment / potential GDP ratio in the three periods indicated. The last column displays the difference between the 1988-92 average and the 1998-01 average.

Source for all data: OECD *Economic Outlook* data base, December 2002 issue.

TABLE 10

	1978-82	1988-92	1997-01	
	(1)	(2)	(3)	(3) - (2)
aut	9.77	6.83	3.62	-3.21
bel	9.28	4.64	4.10	-0.54
deu	8.16	6.57	4.33	-2.24
esp	6.99	11.94	9.08	-2.86
fin	9.12	7.70	6.39	-1.31
fra	7.49	7.87	6.70	-1.18
grc	8.80	14.09	10.67	-3.42
ire	13.18	5.99	11.19	5.21
ita	8.27	7.69	6.06	-1.63
nld	8.07	6.69	7.88	1.19
prt	10.36	10.01	10.87	0.86
dnk	6.20	3.58	3.39	-0.19
gbr	5.84	5.36	3.36	-2.00
swe	7.66	6.00	5.30	-0.70
nor	6.94	6.12	5.39	-0.73
aus	10.92	9.23	7.78	-1.45
jpn	22.44	18.78	16.60	-2.18
can	8.83	7.75	7.28	-0.46
usa	12.45	12.73	12.09	-0.64
ALL	9.51	8.40	7.48	-0.92
EMU	9.04	8.19	7.35	-0.83
EU3	6.56	4.98	4.02	-0.96
OECD5	12.32	10.92	9.83	-1.09

The table displays the average government investment / cyclically adjusted spending ratio in the three periods indicated. The last column displays the difference between the 1988-92 average and the 1998-01 average.

Source for all data: OECD *Economic Outlook* data base, December 2002 issue.

TABLE 11

	(1)	(2)	(3)	(4)
EMU (nobs = 239)				
E (gap) <sub>BM</sub>	0.04	( 2.58)	( 0.01)	
E (gap) <sub>AM</sub>	0.04	( 1.80)	0.00	( 1.00)
debty{1} <sub>BM</sub>	-0.00	(-1.63)	( 0.10)	
debty(1) <sub>AM</sub>	-0.01	(-3.02)	-0.01	( 0.08)
giy{1} <sub>BM</sub>	0.82	(19.42)	( 0.00)	
giy(1) <sub>AM</sub>	0.54	( 6.49)	-0.28	( 0.00)
EU3 (nobs = 66)				
E (gap) <sub>BM</sub>	0.02	( 1.32)	( 0.19)	
E (gap) <sub>AM</sub>	-0.09	(-2.67)	-0.11	( 0.00)
debty{1} <sub>BM</sub>	-0.01	(-1.62)	( 0.11)	
debty(1) <sub>AM</sub>	-0.00	(-0.64)	0.00	( 0.53)
giy{1} <sub>BM</sub>	0.60	( 5.52)	( 0.00)	
giy(1) <sub>AM</sub>	0.50	( 2.92)	-0.10	( 0.61)
OECD5 (nobs = 110)				
E (gap) <sub>BM</sub>	0.03	( 1.20)	( 0.23)	
E (gap) <sub>AM</sub>	-0.04	(-1.66)	-0.07	( 0.04)
debty{1} <sub>BM</sub>	-0.00	(-0.52)	( 0.60)	
debty(1) <sub>AM</sub>	-0.02	(-5.20)	-0.01	( 0.02)
giy{1} <sub>BM</sub>	0.63	( 8.61)	( 0.00)	
giy(1) <sub>AM</sub>	0.35	( 2.92)	-0.28	( 0.05)

This table displays panel estimates of the fiscal rule (5). Dependent variable: government investment divided by potential output (“giy”). IV estimation, using own lagged output gap and the lagged output of the EU15 countries for the US, and the lagged output of the US for all other countries. Country fixed effects are included.

Sample: 1992-2002 for all countries.

Column (1): value of the coefficient in each subperiod. Column (2): t-statistics. Column (3): difference of estimate of coefficient over 1997-2002 subperiod less estimate of coefficient over 1992-1997 subperiod. Column (4): p-value of the test of the null hypothesis that the difference in column (3) is 0.

Source for all data: OECD *Economic Outlook* data base, December 2002 issue.