

Beyond the SGP - Features and effects of EU national-level numerical fiscal rules

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SUMMARY

This paper provides a comprehensive analysis of numerical fiscal rules implemented at the national level in 25 countries of the European Union, using a unique, survey-based dataset. It explores the possible reasons for the growing reliance on such rules and assesses the influence of numerical fiscal rules on fiscal performance. Both the introduction of the EU fiscal framework and country-specific fiscal governance features played a role on triggering the introduction of numerical fiscal rules at national level. The impact of rules on fiscal discipline appears statistically robust and quantitatively important. While unobserved social preferences for fiscal conservatism could jointly determine outcomes and rules, the analysis suggests that rules shape fiscal behaviour rather than vice versa. It also appears that the design of rules matters for their effectiveness. In particular, rules specifically designed to avoid or reduce conflicts with the stabilisation function of fiscal policy are associated with less pro-cyclical policies.

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1. INTRODUCTION

A rapidly growing literature suggests that the apparent tendency of many governments to run persistently high budget deficits (the “deficit bias”) and to conduct pro-cyclical fiscal policies (the “pro-cyclicality bias”) could be rooted in the set of incentives shaping policymakers’ behaviour (see, e.g., Persson and Tabellini (2000), and Drazen (2000)). A natural policy implication is that measures affecting decision makers’ motivations could help alleviate excessive deficits and pro-cyclicality. In practice, however, incentives stem from a wide range of political institutions, procedural arrangements, and customary practices, making it difficult to devise a one-size-fits-all policy response to fiscal biases. Besides, some of the desirable reforms suggested in the academic literature require far-reaching constitutional reforms that many elected officials would hesitate considering. This may explain the tendency to emphasise improved “fiscal governance” as a solution, i.e. changes in budgetary procedures and institutions that underlie the preparation and execution of the budget. Among them, the introduction of numerical fiscal rules setting explicit targets for fiscal indicators has been a distinct feature of EU countries in the last 15 years. This paper first documents that trend, using a new dataset on numerical fiscal rules, and then investigates the empirical link between rules and fiscal discipline. It also

explores possible determinants of the growing appetite for rules and the influence of rules on the response of fiscal policy to the cycle.

While an abundant empirical literature exists on the effectiveness of budgetary procedures in improving fiscal performance (e.g., Poterba and Von Hagen, 1999; von Hagen, 1992; Hallerberg et al. 2006; Fabrizio and Mody, 2006), there is much less analysis on the impact of numerical fiscal rules. In the EU context, both the policy debate and economic analysis have so far focused on the effects of the supranational EU fiscal framework, known as the Stability and Growth Pact (see for instance Gali and Perotti, 2003). In contrast, numerical fiscal rules adopted at national level have remained under the radar screen, in large part because of a lack of comparable data across countries. This paper contributes to filling this gap.

The effectiveness of fiscal rules remains the subject of an intense debate among economists. Sceptics not only question the capacity of numerical rules to really encourage governments to deliver less biased policies, but also argue that improvements in fiscal discipline, if any, can only be achieved at the expense of macroeconomic stabilisation. Our contribution to this debate addresses the following questions:

- (i) What are the features of the numerical fiscal rules currently in force in the EU countries? Are there common characteristics to rules applied to different types of countries or to different levels of government?
- (ii) Is there statistical evidence that rules affect the level and cyclical behaviour of deficits? And to what extent does the design of rules matter for their impact on fiscal policy?
- (iii) What economic, institutional and political factors are conducive to the introduction of fiscal rules?

Our analysis exploits a unique dataset on the national fiscal rules in force in the EU countries over the period 1990-2005. The database covers all numerical fiscal rules regardless of their statutory basis (constitutional, legal, or mere public commitment) and coverage (general, central, sub-national governments, and social security). We constructed time-varying quantitative indicators comparable across countries and reflecting the strength and coverage of these rules. Particular attention was paid to the design of the rules, their stated objective, legal foundation, as well as monitoring and enforcement procedures. To gauge their influence on the broader public debate, we also measure the extent of media visibility.

A first conclusion emerging from the data is that the number of fiscal rules in force has steadily increased over the last 15 years, a trend affecting all sub-sectors of the general government. The presumption that the introduction of fiscal rules would follow periods of recession or fiscal stress is not supported by the analysis. In contrast, both the operation of the EU fiscal framework and country-specific institutional features seem to play a role.

Concerning the impact of rules on budgetary outcomes, our econometric analysis suggests the existence of a robust link between numerical fiscal rules and fiscal performance: stronger and more encompassing fiscal rules tend to encourage higher cyclically adjusted primary balances, after taking into account other factors potentially

affecting fiscal behavior. Although such results could be driven by the intrinsic preferences of policy makers for fiscal discipline which may affect both sound budgetary outcomes and the introduction of numerical rules at the same time, statistical tests suggest that the observed link between rules and fiscal performance is not a spurious one. The key result that rules shape fiscal behaviour rather than vice versa appears statistically robust and quantitatively important. The type, coverage (i.e., the share of government finances covered by rules), and design of rules appear to matter in several respects. Specifically, rules targeting the budget balance or the general government debt have a greater influence than expenditure rules, and rules designed in such a way to reduce conflicts with the stabilisation function of fiscal policy are associated with less pro-cyclical policies.

The rest of the paper is organised as follows. The second section provides the conceptual background on numerical fiscal rules and a selected survey of literature. The third section describes the dataset, provides a descriptive analysis of the numerical fiscal rules in the EU countries, and discusses the construction of our country-specific and time-varying indexes. In section four, we investigate the relationship between numerical fiscal rules and discipline, and identify the factors that have induced the introduction of fiscal rules. Section five looks into the impact of fiscal rules on the stabilisation role of fiscal policy. The concluding remarks follow.

2. NUMERICAL FISCAL RULES: CONCEPTUAL AND EMPIRICAL BACKGROUND

This section specifies the operational definition of numerical fiscal rules adopted in the paper and discusses the features of numerical fiscal rules in force in advanced economies. It subsequently explains the rationale for the use of numerical fiscal rules and reviews literature analysing the effects of numerical fiscal rules on budgetary developments.

2.1. Numerical fiscal rules: definition, typology, trade-offs

The term fiscal rules is sometimes used in a broad sense, with reference to all the legislative and procedural elements underpinning the making of budgetary policy.¹ The focus of this paper is narrower: it considers only fiscal rules that fix *targets* or *ceilings* to budgetary aggregates expressed in numerical terms. A commonly adopted operational definition of numerical fiscal rules is provided in Kopits and Symansky (1998). According to this definition, numerical fiscal rules are "a permanent constraint on fiscal policy, expressed in terms of a summary indicator of fiscal performance". Such a definition excludes fiscal targets that are subject to regular revisions, which is typical in

¹ In some contexts, the term fiscal rule is referred to the implicit rule followed by fiscal authorities when determining budget balances in response to relevant macroeconomic or fiscal variables. The alternative terminology for this concept, which will be adopted in this paper, is "fiscal reaction function".

most of the Medium Term Budgetary Frameworks (MTBF) in force in many European countries (see, e.g., European Commission 2007 for a review of the characteristics of MTBFs in EU countries).² All the rules considered in this paper conform with the Kopits and Symansky definition.

Numerical rules may differ with respect to the *fiscal aggregate targeted*. Most rules set limits to government deficit or debt. In this case, the primary goal of deficit and debt rules is that of favouring fiscal discipline. Other types of fiscal rules, i.e. expenditure and revenue rules, generally have additional purposes: re-balancing the composition of the budget, putting a brake on the growth of specific expenditure categories, avoiding an excessive tax burden, determining ex-ante the allocation of revenue windfalls arising from positive growth surprises, etc. The *coverage* of fiscal rules may also vary significantly. Fiscal rules may cover the entire general government sector or apply only to a share of it. Debt and budget balance rules often target fiscal aggregates defined at sub-national level, while expenditure rules are more frequent at central government level. Finally, numerical fiscal rules may differ with respect to their *design*. Depending on their features or “strength”, rules could be more or less likely to have an impact on budgetary outcomes. The main argument is that breaking strong rules will impose higher political costs than renegeing on announcements or commitments. According to Inman (1996), strong rules are characterised by a statutory basis that makes them hard to modify or amend (they are enshrined in law or constitution), are enforced by a politically independent body, and imply sanctions in case of violation.³ Kopits and Symansky (1998) propose a wider set of desirable features for fiscal rules, including simplicity, transparency, flexibility (i.e., the possibility for the rules to adapt to changing conditions), coherence with their final goal, and compatibility with structural reforms.

Literature has identified a number of trade-offs inherent with the operation of fiscal rules, which have some policy relevance for the appropriate design of rules (see, e.g., Inman, 1996; Kopits and Symansky, 1998; Eichengreen and Wyplosz, 1998; Alesina and Perotti, 1999; Buti et al., 2003; Debrun, Hauner and Kumar 2007a). First, numerical rules, notably budget balance rules, may create a tension between the objective of fiscal discipline and that of achieving an appropriate fiscal policy stance over the cycle, due notably to the risk of requiring a contractionary fiscal stance during periods of slow growth. The existence of pre-defined adequate escape clauses helps alleviate the potential inconsistency between the two objectives. A second trade-off is that between low deficits and ensuring a desirable level of certain types of government expenditure, notably government investment (e.g., Blanchard and Giavazzi, 2004). The exclusion of selected “protected” categories of expenditure from the coverage of the rules is a common policy response. Finally, fiscal rules may lead to low official figures for deficits at the expense of a greater recourse to “one-off” operations and “creative accounting” practices, whereby rules are circumvented via fiscal gimmickries that compromise fiscal transparency (see, e.g., Koen and Van den Noord, 2006; Buti et al., 2006; von Hagen and

² Procedural rules governing the budget process (e.g. relative powers of Parliament and government) and rules defining policy measures (e.g. freeze in the number of civil servants over a number of years) were not considered as numerical fiscal rules.

³ Independent monitoring and enforcement procedures are notably important to identify and deter circumvention possibilities of the numerical rules, e.g. through creative accounting.

Wolff, 2006). This can be addressed via an appropriate design of the rules, or combination of rules, and by strengthening statistical agencies and setting up adequate institutions to monitor and enforce compliance.

Box 1. Numerical fiscal rules in historical perspective

For a long time, fiscal rules were not backed by law, but existed as widely accepted attitudes of governments towards debt and deficits (Buchanan, 1997). The first numerical fiscal rules having legal status go back to the mid of the 19th century. These rules were introduced in federal countries, often as a result of an autonomous initiative by individual states to gain reputation for fiscal discipline with a view to access to market-based financing (Kopits, 2001). After World War II, a series of countries (including Germany, Italy, Japan, and the Netherlands) introduced budget balance rules at central or general government level as an accompanying measure to their post-war monetary stabilisation programs.

The use of fiscal rules became widespread only starting from the nineties, against the backdrop of high debts accumulated over the seventies and eighties in most industrialised countries. In the US, numerical rules at the federal level were introduced at mid eighties with the Gramm-Rudman-Hollings Act, which was replaced in 1990 by the Budget Enforcement Act, subsequently abandoned in 2002 (Poterba, 1996; Peach, 2001). Japan introduced a numerical ceiling for the budget balance in 1997, while Canada introduced in 1991 a Federal Spending Control Act which aimed at limiting overall government spending until 1996 (Kennedy et al., 2001). A series of middle income countries, especially Latin American, introduced numerical fiscal rules over the same period (Alesina et al., 1999; Kopits, 2001).

In Europe, for the first time in history, fiscal rules were introduced at supra-national level with the 1992 Maastricht Treaty, which established numerical entry criteria for acceding to Economic and Monetary Union (EMU) and adopting the single currency. The Maastricht criteria require debt to be below 60 per cent of GDP or approaching this value at a "satisfactory pace" and deficits not to be "excessive", i.e., not to exceed a reference value defined as 3 per cent of GDP (art. 104 of the EU Treaty). In order to keep effective enforcement of the Maastricht numerical fiscal rules also after monetary unification, the Stability and Growth Pact (SGP), signed in 1997 and entered into force in 1999, introduced a sanction mechanism for euro-area countries breaching the reference value for deficits.

The EU fiscal rules were however not the first numerical fiscal rules operating in EU countries: As shown in this study, national levels fiscal rules pre-existed both at the national and at the sub-national level in several countries. Moreover, the EU fiscal framework did not aim at substituting national-level for existing national-level rules. Both the Maastricht Treaty and the SGP stress the importance of national rules and institutions for budgetary discipline. At the occasion of the reform of the SGP in 2005, the ECOFIN Council acknowledged the complementarity between the EU fiscal framework and national fiscal rules and recognised the possible role played by these rules in helping countries to fulfil the fiscal requirements of the Treaty and the SGP.

2.2. The rationale for numerical fiscal rules

2.2.1. Sources of the deficit and pro-cyclical bias

The main objective of numerical fiscal rules is to contain or eliminate the deficit bias in the conduct of fiscal policy. Several different explanations have been put forward for the deficit bias. Those rigorously grounded in economic theory and empirically tested with a certain degree of success can be re-conducted to two main lines of reasoning: governments' short-sightedness and the so-called "common pool problem".⁴

The main tenet of the first explanation is that governments unsure of being re-elected have a tendency to overlook the long-term consequences of budgetary imbalances (see, e.g., Debrun, Hauner and Kumar 2007a for a discussion). Persson and Svensson (1989) and Alesina and Tabellini (1990) have demonstrated that the inherent short-sightedness of governments associated with uncertain elections lead to deficits in excess of optimal outcomes. Moreover, the deficit bias is further exacerbated by a strategic element whereby incumbent governments may have an incentive to "tie the hands" of forthcoming governments by creating high deficits.⁵ Several papers have provided empirical evidence in support of the explanation for the deficit bias based on governments' short-sightedness (e.g., Grilli et al., 1991; Lambertini, 1996; Petterson, 1999).⁶;

According to the *common pool* explanation, the deficit bias arises because interest groups that benefit from given categories of public spending have a tendency to free-ride on others' contributions (see Weingast et al., 1981; Velasco, 1999) which leads, over time, to the occurrence of large deficits and the accumulation of debt. The common pool problem is expected to be stronger in fragmented and heterogeneous government coalitions (Alesina and Perotti, 1995).⁷ Moreover, it can lead to a pro-cyclical behaviour of budgets because spending pressures tend to be stronger in "good times", when government revenues are buoyant (Tornell and Lane, 1999). The common pool problem explanation for the deficit bias has received relatively strong support from empirical evidence. A series of analyses have demonstrated the existence of a link between the degree of government fragmentation and budgetary outcomes (Poterba, 1994; Roubini and Sachs, 1989; Perotti and Kontopoulos, 2002; Besley and Case, 2004; Fabrizio and Mody, 2006). Some papers instead test the common pool hypothesis by linking political

⁴ An alternative explanation that needs to be mentioned is lack of time consistency of fiscal policy (see, e.g., Persson et al., 1987, 2006). In analogy with arguments originally put forward for monetary policy, promises of fiscal rigour by fiscal authorities may lack credibility, due to the incentive to create inflation via expansionary fiscal policies in order to reduce the real value of outstanding government liabilities. Such arguments provide a general rationale to the deficit bias and the use of fiscal rules. However, they are hardly empirically testable.

⁵ It has also been demonstrated that incumbents may have an incentive to attempt to affect electoral outcomes via fiscal policy, which in turn creates "electoral cycles" and may provide an additional explanation for the deficit bias (e.g., Rogoff, 1990).

⁶ In spite of these supportive results, Persson and Tabellini (2000) warn against the difficulties with the implementation of the empirical tests and with the interpretation of results in analyses aimed at verifying empirically the argument for the deficit bias based on governments' short-sightedness.

⁷ Alesina and Drazen (1991) demonstrate that the persistence of large deficits could be due to inefficient political equilibria where coalition members engage in a "war of attrition" and fail to agree on a consolidation package. The implication of their model is that the higher the degree of heterogeneity of government coalitions, the higher the likelihood that consolidations are delayed.

institutions with budgetary outcomes, obtaining overall supporting evidence.⁸ Finally, a growing body of literature focuses on the link between budgetary outcomes and budgetary procedures that permit to centralize the budget process (see Von Hagen (1992) and Hallerberg et al. (2006)).⁹

The deficit bias associated with the above-mentioned explanations is further aggravated when fiscal jurisdictions fail to internalize the consequences of their fiscal laxity because the impact of deficits on interest rates spills over to other jurisdictions. This is typically the case of sub-national government levels or countries belonging to monetary unions (Beetsma and Uhlig, 1999; Detken et al., 2004; Faini, 2006; Eichengreen and Wyplosz, 1998).

2.2.2. Solutions to the deficit bias

Considering that the broader politico-institutional context is in itself hard or impossible to reform for the sole purpose of fixing fiscal biases, solutions to limit the deficit bias imply reforms in political institutions or measures aimed at improving fiscal governance. Four broad approaches can be distinguished.

First, fiscal policy makers could be made more accountable for their actions. This is the main objective of so-called Fiscal Responsibility Laws or of reforms in fiscal governance that put emphasis on *fiscal transparency*. Second, the deficit bias could be reduced by means of improved *budgetary procedures* that govern the preparation, approval, and implementation of the annual budget law and fix the respective powers of the various actors taking part in the budget process. The objective of such reforms is to ensure that the budgetary consequences of policy decisions are properly taken into account. Hallerberg and von Hagen (1999) identify two broad approaches through which the budgetary process can be centralised. In the “delegation” approach, this is achieved by delegating strong powers to the finance ministry or to the prime minister. In the “contract” approach, arrangements and procedures ensure an *ex-ante* agreement (the contract) among spending ministries and other spending authorities (e.g., local authorities) on the size of the budget and the borrowing requirement. Third, the deficit bias could be tackled by delegating fiscal policy or some aspects of it to institutions independent of political power (see for a discussion Debrun, Hauner and Kumar, 2007b). Radical proposals have been recently debated, which foresee independent fiscal authorities or *Fiscal Councils*, deciding autonomously about fiscal policy targets in conformity with their mandate (see e.g. Wyplosz, 2005). A more realistic approach, reflected in the actual experience of various EU countries, is to delegate the production of specific inputs for fiscal policy making (e.g., unbiased economic forecast for the

⁸ Grilli et al. (1991) find that deficits are larger in proportional electoral systems. Since political fragmentation is likely to be higher in proportional systems, this evidence is consistent with an interpretation based on the common pool problem. Persson (2002) finds that government spending tends to be lower in countries with a presidential system, which may indicate stronger checks and balances between the legislative and the executive power and therefore a less prominent common pool problem.

⁹ These analyses are based on indexes measuring the degree of centralisation of the various stages of the budget process. Most of these indexes also take into account the presence of numerical fiscal rules. In this section we summarise the broad evidence regarding the impact of budgetary procedures and institutions on fiscal outcomes, while we survey the existing evidence on the impact of numerical fiscal rules on budgetary outcomes in the next section.

preparation of the budget, assessment of the budgetary impact of policies) to independent institutions. Finally, the discretion of fiscal authorities prone to deficit bias could be replaced by *ex-ante fiscal rules* which fix numerical targets and ceilings for fiscal aggregates or set benchmarks for the conduct of fiscal policy (see Von Hagen and Harden, 1995, for a formal argument). These are the types of the numerical fiscal rules analysed in this paper.

Box 2. Assessing empirically the impact of fiscal rules

In parallel with the growing use of numerical fiscal rules, since the early nineties a number of studies have analysed the effectiveness of rules in driving budgetary outcomes. Early studies focus on the impact of borrowing constraints across US states. Alt and Lowry (1994) analyse changes in revenues and expenditures across US states over the 1968-1987 period. They show that the emergence of deficits in states with borrowing constraints prohibiting the carry over of deficits to subsequent years triggers a significantly stronger response in revenues or expenditures to offset the incipient deficit. Bohn and Inman (1996) show that deficits tend to be lower in states where borrowing restrictions require an ex-post balanced budget and put limitations to deficit carry over, and where enforcement is stronger. Alesina et al. (1999) conclude to a significant impact of fiscal rules across Latin American countries.

Although analyses of the impact of national fiscal governance on budgetary outcomes is abundant for European countries, most of this work considers the contribution of a wide range of budgetary procedures and institutions rather than focusing on numerical fiscal rules. Among those papers that permit to analyse separately the impact of numerical fiscal rules from that of other budgetary arrangements, Von Hagen (2005) constructs a "Fiscal Rule Index" summarising information on numerical fiscal rules and MTBFs for the EU-15 countries (see Table 1) and finds a positive cross-country correlation between the index and the average budget balance. Some analyses focus on specific types of numerical fiscal rules. Sutherland et al. (2005) build several indexes measuring the impact of numerical rules at sub-national government levels on various types of budgetary outcomes (see Table 1). The index aimed at measuring the impact of fiscal rules on debt developments exhibits a negative cross-country correlation with the change in the debt/GDP ratio over the 1999-2003 period. Deroose et al. (2006) focus on the impact of expenditure rules on developments in nominal expenditure in EU-15 countries and conclude that expenditure rules reduce significantly the increase in nominal expenditure and improve the ability of governments to stick to their medium-term expenditure targets.

While most of the existing analyses provide supporting evidence of an impact of numerical fiscal rules on budgetary variables, work on the impact of fiscal rules on the cyclical behaviour of fiscal policy is less conclusive. Most analyses at sub-national government level find some evidence of an increased pro-cyclicality associated with the operation of numerical rules (Poterba, 1994; and Sorensen et al., 2001). Alesina and Bayoumi (1996) report instead a weak cross-section relation between the ACIR index and the sensitivity of US State budget balances to GDP. Galí and Perotti (2003) find that after the signing of the Maastricht Treaty (1992) fiscal policy in EU countries stopped being pro-cyclical. Manasse (2006) finds that the existence of numerical fiscal rules reduce the degree of pro-cyclicality of fiscal policy.

3. NATIONAL-LEVEL FISCAL RULES IN EUROPE

This section presents the data and discusses the evolution over time of national numerical fiscal rules in the EU countries and in specific categories of countries. Subsequently, it explains the methodology for the construction of the synthetic indexes summarising the information on the fiscal rules, that will be used in the econometric analysis.

3.1. The data

Information on fiscal rules in EU countries was collected by means of a survey conducted by the European Commission in 2006 in the context of the Working Group on the Quality of Public Finances (WGQPF) attached to the Economic Policy Committee (EPC). Questionnaires were filled out directly by fiscal policy experts in EU capitals.

The database includes information on all types of numerical fiscal rules irrespective of the *fiscal aggregate* concerned (budget balance rules, debt rules, expenditure rules, etc.), of the *legal status* (rules enshrined in law or constitution, rules based on political commitment, etc.) and of the *sub-sector of general government* to which they apply (local and regional governments, central government, social security). The database contains information on all rules in place throughout the 1990-2005 period and on the main changes in these rules over the period. This allows consideration of the dynamic dimension in the analysis of the relation between numerical fiscal rules and budgetary outcomes. We received information for all 25 EU countries. Only in Greece, Cyprus, and Malta no numerical rules conforming to the Kopits and Symansky definition were operating over the period considered.

For each rule, the database includes information on (i) the fiscal aggregate targeted, the government sectors covered, the time frame, the statutory basis, the existence of escape clauses and the monitoring and enforcement procedures; (ii) the relevant dates for the conception and entering into force of the rule and the main changes introduced in the period under review; (iii) judgement by fiscal policy experts in the EU capitals on the importance of the rule in the public debate (media visibility, public opinion attention).

3.2. Stylised facts

The number of rules in force in the EU countries has grown continuously over the past fifteen years (see Figures 1 and 2). While the total number of rules in 1990 was 13, in 2005 it was 57. Over the period, only 4 rules already in place were scrapped. The majority of rules target the budget balance or the debt throughout the period considered, while revenue rules were never frequent. While in the early nineties expenditure rules were relatively rare, their incidence has increased considerably over time (Figure 1). Currently, about 40 per cent of the numerical rules in force in EU countries are budget balance rules, about one quarter are rules imposing restrictions on borrowing and debt,

and about another quarter are expenditure rules. The remaining 10 per cent are revenue rules.

In the early nineties, most numerical fiscal rules were applied at local or regional levels of government (Figure 2). This reflected the willingness of higher levels of government to impose constraints on local entities and the need to ensure sufficient coordination among the different tiers of the general government. Such rules continued to develop throughout the period covered by the survey and exist today in most of EU countries. In parallel, the number of numerical fiscal rules applying to the central government sector has increased considerably, reflecting especially an increased reliance on expenditure rules (see paragraph below). A relatively recent feature has been the introduction of numerical fiscal rules in the social security sector and rules covering the whole of the general government sector. These developments may be a response to the need to redirect expenditure across sub-sectors of general government, to tackle the increasing spending pressures in the social security sector, or to the introduction of the EU fiscal rules, which impose requirements for the deficit and debt of the general government as a whole.

There is considerable variation in the design of numerical fiscal rules. A number of interesting regularities deserve attention. Most budget balance and debt rules are applied to regional and local governments (see Table 2). In contrast, expenditure rules are more frequent in the central government and social security sub-sectors. Only few budget balance rules, all of them applying to the general and central government level, are defined in cyclically adjusted terms (Table 3). About two thirds of expenditure rules define ceilings for levels or growth rates in nominal terms, the remaining third being defined in real terms or in terms of a ratio to GDP. More than half of the revenue rules currently in force in the EU countries establish pre-defined principles for the allocation of higher-than-expected revenues.

Some characteristics of the rules vary markedly depending on the level of government to which they apply. Rules applied to regional and local governments rely preponderantly on annual schemes, while most of those concerning the general government and central government sectors have a time horizon that goes beyond the yearly budgetary cycle and are integrated into a multi-annual fiscal framework (see Table 2). This could be related to the fact that the stabilisation function of fiscal policy takes mainly place at central and general government level, so that there is a stronger need for fiscal rules at higher levels of government that are consistent with stabilisation objectives. The large majority of numerical fiscal rules defined at sub-national levels of governments are enshrined in law or in constitution, while rules concerning central government and the whole of the general government sector tend to be more based on political agreements (internal stability pacts or other forms of political agreement). Likewise, a majority of rules applying to local and regional governments sectors foresee either automatic correction mechanisms or the obligation for the authority responsible to adopt measures in case of non compliance with the rule (Table 2). In contrast, most rules concerning the central government sub-sector do not include ex-ante defined actions in case of non-respect. The explanation could be that enforcement of rules applying to a

wide range of actors (regional and local fiscal authorities) requires stronger statutory basis and tighter procedures. Moreover, the rules applying to central and general government levels appear to draw more public opinion and media interest than other rules. This can be expected to contribute to better compliance with the rule via reputation costs.

The survey on fiscal rules included explicit questions on the perception of whether each of the rules in place would entail a pro-cyclical bias in the conduct of fiscal policy. As expected, the replies (see Table 3) indicate that only budget balance and debt rules are frequently perceived as implying a pro-cyclical bias, while expenditure and revenue rules are generally not perceived as leading to pro-cyclical outcomes. Moreover, the rules that are perceived as leading to pro-cyclical policies are mostly found at regional or local level, the explanation being that budget balance and debt rules are relatively more frequent there (Table 2).

3.3. Synthetic indicators of numerical fiscal rules

Most of the analyses on the reasons for the growing recourse to numerical fiscal rules and on the impact of numerical fiscal rules on budgetary outcomes make use of synthetic indexes of fiscal rules. The use of such indexes permits to convey information on the numerical fiscal rules in force in a given jurisdiction at a given time, thus allowing measuring the interplay between rules and fiscal outcomes. Fiscal rules indexes incorporate information generally obtained from the analysis of national legislations and questionnaires and interviews to experts in finance ministries, parliaments, central banks. The construction of the indexes is based on assigning scores to the various features of the rules, which are subsequently weighted to obtain an aggregate figure. The criteria for assigning scores to rules' features are based on an *ex-ante* expert judgement of their relevance for the capacity of the rule to shape fiscal policy developments.¹⁰

The construction of these indicators requires dealing carefully with several issues. First, account needs to be taken of the fact that different types of rules may concur to the same objective of improving budget balances and may be present in the same country, in the same year. This implies that a *weighting scheme* is needed to *aggregate multiple coexisting rules* in a synthetic indicator.

Second, the indexes need to provide a quantification of the "intensity" in the use of fiscal rules. Notably, indexes need to take into account that the vast majority of numerical fiscal rules apply only to a *fraction of the general government sector*. Most fiscal time series of interest for our analysis are available only for the general

¹⁰ In a majority of papers, information on numerical fiscal rules is embedded in indexes that are aimed at quantifying the degree of centralisation of the budget or at summarising information on the whole complex of budgetary procedures and institutions (e.g., von Hagen, 1992; Hallerberg et al., 2006; Fabrizio and Mody, 2006). In such cases, it is difficult to disentangle the information on numerical fiscal rules from that on other aspects of the budget process. Some indexes were instead constructed with a focus on measuring the number and intensity of numerical fiscal rules proper. The ACIR index measuring the degree of borrowing autonomy of US states was among the first of such indexes (ACIR, 1987). Information on other analogous fiscal rule indexes is summarised in Table 1. Some indexes only focus on sub-national government level (e.g., Sutherland et al., 2005) or particular types of rules (Deroose et al., 2006).

government level.¹¹ However, it would be meaningless to link budgetary outcomes for the whole of the general government sector with rules applying at general government sub-sectors. The solution is to construct a synthetic indicator that accounts for the fact that individual fiscal rules may cover different sectors of the general government in such a way to differentiate between a rule applying, say, to municipalities, from a rule defining numerical ceilings for the whole of the general government sector.

Third, it must be recognized that the effectiveness of fiscal rules may also depend on a number of qualitative features which affect their "*strength*" (Bohn and Inman, 1996). A first relevant characteristic of a fiscal rule is its *statutory basis*, i.e., whether the rule is enshrined in the constitution or in law or it is simply the fruit of a political agreement. The nature of the *body in charge of monitoring* the rule is another element. When the respect of the rule is monitored by an independent body the probability that fiscal variables are adjusted to ensure compliance with the rule can be expected to be higher. The *nature of the enforcement mechanisms* also matters. In particular, the existence of automatic correction or sanction mechanisms in case of non-respect of the rule can be expected to foster compliance. Finally, it should be noted that those rules that are neither enshrined in law or in constitution nor regularly monitored and for which no enforcement mechanisms is defined may nonetheless contribute to budgetary outcomes if characterised by a high degree of *media visibility*.

Considering that almost all numerical fiscal rules are designed to contribute to fiscal discipline, our intention is to relate the synthetic indicators for the overall set of fiscal rules with general government balances. Similarly, we intend to put in relation synthetic indicators summarising information for expenditure rules only with data on government expenditure.¹²

For each country, we built two synthetic indicators. The first is aimed at measuring the degree of intensity in the use of numerical fiscal rules; the second captures also the characteristics of fiscal rules which may influence their capacity to influence budgetary outcomes. We call these indexes, respectively, *Fiscal Rule Coverage Index* and the *Fiscal Rule Index*. We provide in the following a brief description of the criteria followed for the construction of the indexes. The Annex provides a detailed description.

The Fiscal Rule Coverage Index summarises the information on the fraction of general government finances that is covered by numerical fiscal rules. In absence of a strong a priori expectation regarding which types of rules have a greater influence on fiscal outcomes, all types of rules are treated in the same way (they are given the same weight). An issue arises in case more than one rule applies to the same sub-sector of the general government. In such a case, it is likely that some rules are redundant. However, ignoring the fact that multiple rules are present may imply disregarding the impact of some of them. For this reason we adopt the "rule-of-thumb" assumption that when multiple rules coexist on the same government sub-sector, those rules with the "weaker" features (e.g.

¹¹ Actually, the OECD national income accounts have data on all levels of government for a number of OECD countries. However such data are not adjusted for the influence of the cycle - undertaking such an adjustment is far from simple - and processing such data would entail a considerable amount of extra work.

¹² We instead did not repeat a similar exercise for revenue rules only, the reasons being the relative low number of such rules in the sample and the variety of the purposes pursued by such rules (see Table 2).

rules with no legal basis, no clear monitoring and enforcement procedures, low media visibility) are given weight equal to $\frac{1}{2}$.

The Fiscal Rule Index (FRI) takes into account not only the information on the share of government finances covered by numerical fiscal rules but also the qualitative features of fiscal rules that matter for their effectiveness. To this end, for each rule, we calculated a composite Index of Strength on the basis of scores assigned to the five qualitative features mentioned before: the statutory base of the rule; whether there is an independent monitoring; the nature of the institution responsible for the enforcement of the rule; the existence of pre-defined enforcement mechanisms; and the media visibility of the rule.

In the subsequent analysis different variants of the FRI will be constructed to check the robustness of results regarding the impact of rules on budget balances. Robustness will be checked against the choices regarding: the criterion to deal with rules of different type (alternative Fiscal Rule Indexes were built considering only expenditure rules and only budget balance and debt rules); the criterion to deal with different coverage of rules (alternative indexes were built only considering rules at a given general government sub-sector); the criterion for the treatment of the overlap of rules; the weight assigned to the different qualitative features in the construction of the Index of Strength, and the criterion chosen for their aggregation (see Appendix 1).

Finally, we calculated for each country a time-varying *Fiscal Rule Cyclical Index* (FRCI) with the aim of providing synthetic information on the likely impact of the numerical rules in force on the stabilisation property of fiscal policy operating in a given country in a given year. This index takes into account the share of government finances covered by fiscal rules and the properties of each fiscal rule with respect to macroeconomic stabilisation. Scores were attributed to each rule, the higher value corresponding to an a priori better specification of the rule to ensure stabilisation. Also in this case, to check robustness, alternative indexes were built depending on the score assigned on different type of rules.¹³

All our indexes are normalised in such a way to have zero mean and unit variance. They are calculated for the period 1990-2005, which allows a tracking of the changes in the design or in the perimeter covered by the rules throughout the period. This is a major innovation compared to existing studies based on indexes varying only or mostly across countries, and not over time.

4. FISCAL RULES AND BUDGETARY DISCIPLINE

Our dataset allows for a detailed statistical analysis of the relationship between numerical fiscal rules and fiscal behaviour. We first present stylised facts documenting the trends in fiscal rule indexes over the last 15 years as well as prima facie evidence of possible linkages between such evolution and fiscal performance. We then use econometric techniques to obtain quantitative estimates of the impact of rules.

¹³ Alternative Fiscal Rules Cyclical Indexes were constructed giving relatively high weight on budget balance or expenditure rules. No alternative index was constructed to differentiate the score attributed to revenue rules, in light of the low number of such rules in our sample.

4.1. Stylised facts: which types of countries rely more on rules?

A first step in our investigation is to examine whether specific country groupings exhibit any particular appetite for numerical fiscal rules. This descriptive approach reveals broad trends in the adoption or strengthening of rules, as well as basic correlations between the apparent preference for rules and certain country characteristics. To assess the reliance on fiscal rules, we consider the Fiscal Rule Coverage Index, that provides a synthetic measure of the share of the general government sector covered by numerical rules, and the Fiscal Rule Index, that takes also incorporates information on the strength of the rules.

First, cross-country average of both indexes exhibit a clear upward trend (Figure 3). The mid 1990s stands out as particularly propitious for the introduction and strengthening of fiscal rules. In general the evolution of the indexes is strongly correlated, although there is some evidence that, on average, rules were "strengthened" especially at mid nineties (the Fiscal Rule Index rises faster than the Fiscal Rule Coverage Index), while they were "broadened" mostly at the beginning of the present decade.

Distinguishing between different country groupings, it is interesting to observe that "big" and "small" countries show somehow different trends. Specifically, larger countries (Germany, Italy, the UK, France, Spain and Poland), have increasingly relied on rules since the mid 1990s and are currently characterised by a higher value for both indexes. Of course, the group is not homogenous. For instance, at the start of the sample, Germany had an extensive system of rules that remained unchanged over the period whereas strong numerical rules were a novelty in Italy and the UK.

Grouping countries according to their (good or bad) performance in terms of fiscal discipline reveals other interesting regularities. First, we look at numerical fiscal rules in countries with above- and below-median deficits at the start of the run up to EMU. To limit the number of missing observations for the budget balance, we take 1995 as the benchmark year and split countries depending on whether their budget balance at that time was above or below the median computed across available observations. Figure 5 indicates that the value of the indexes for the two groups was quite similar throughout the period, although countries with high initial deficits appear to lag behind in terms of the adoption of fiscal rules. Replicating the exercise with 2005 as the benchmark year, it appears that countries with strong budgetary positions (above median in 2005) show both a considerably higher value of the index on average and a steeper upward trend over the period. Hence, strong performers at the end of the period were also those that increased reliance on fiscal rules the most, whereas disciplined governments at the beginning of the period had no particular penchant for rules and were on average less inclined to increase their role.

We also split countries according to their status vis-à-vis the process of monetary integration and their approach to centralise the budget process (contract vs. delegation models). Figure 7 shows that the average index for euro-area members is not different from that of non members over the period. By contrast, different ways of centralising the

budget process (*contract* versus *delegation* approaches) seem to be associated with different trends in the strengthening and widening of rules-based fiscal frameworks (Figure 8). Countries relying on a contract approach seem to have adopted numerical rules earlier than other countries. The latter instead witnessed a rapid growth in fiscal rules from mid 1990s onwards (see the statistical appendix for a description of the variables used to identify contract vs. delegation countries).

4.2. Rules and fiscal behaviour

4.2.1. Econometric analysis: approach and issues

The most natural way to assess econometrically the impact of numerical rules on fiscal discipline is to introduce our FRI into a conventional model of fiscal behaviour (a *fiscal reaction function*) and check whether the estimated coefficient is both quantitatively meaningful and statistically significant (that is, precisely estimated). To specify the model, we follow Bohn (1998) who shows that a country's fiscal policy can essentially be described as the response of the primary balance to (i) cyclical fluctuations, (ii) past developments in government debt, and (iii) institutional and political determinants and temporary events (wars, disasters, etc). In our panel context, equation (1) describes the presumed statistical relationship between our preferred fiscal indicator and its potential determinants:

$$p_{i,t} = \alpha_0 + \rho d_{i,t-1} + \gamma Rules_{i,t} + x'_{i,t} \beta + \eta_i + \varepsilon_{i,t}, \quad t=1,\dots,T, \quad i=1,\dots,N, \quad (1)$$

where $p_{i,t}$ is the ratio of the primary balance to GDP in country i and time t , $d_{i,t-1}$ is the government debt to GDP ratio at the end of period $t-1$, $Rules_{i,t}$ is one of our time- and country-specific indexes of fiscal rules, and $x_{i,t}$ is a vector of other potential explanatory variables, including measures of relevant political institutions (discussed above) and dummies capturing specific events. The η_i (the “fixed effects”) symbolises country-specific characteristics affecting fiscal policy but possibly omitted in $x_{i,t}$, while $\varepsilon_{i,t}$ is a time- and country-specific error term. Because the idea is to capture discretionary fiscal behaviour (as opposed to the automatic response of the budget to shocks), it is common to filter out the impact of automatic stabilisers on the primary balance, using the *cyclically adjusted primary balance* (CAPB) as the dependent variable (see Gali and Perotti, 2003). The model described in equation (1) assumes that a positive value for the estimated γ coefficient would *identify* a disciplinary effect of fiscal rules on fiscal policy. We also expect the response to government debt to be positive ($\rho > 0$) because this is a sufficient condition for long-run solvency, and all governments would be expected to internalise it (Bohn, 1998). We also estimate a similar model using primary expenditure (instead of the CAPB) as our indicator of fiscal behaviour to investigate the effectiveness of expenditure rules in restraining public spending.

Assessing the influence of numerical fiscal rules on budgetary outcomes raises a number of issues for which there is no perfect statistical answer. A major conceptual

issue, with profound statistical implications, is the possibility that rules might actually be a mere reflection of a deep preference for fiscal discipline.¹⁴ The counter-argument is that stretching the implementation and enforcement of rules arguably involves intrinsic costs exceeding the reputation loss incurred when renegeing on a simple promise. It follows that, at least over a medium-term horizon, numerical rules could actually affect decision makers' incentives (e.g., Alesina and Perotti, 1995; Poterba, 1996). Should the sceptics be right, a positive correlation between the FRI and fiscal performance may reflect a *reverse causality* running from fiscal performance (associated with the deep preferences for fiscal discipline) to rules. Reverse causality is a potentially serious problem because, if severe enough, it entails a statistical bias in the estimated effect of numerical fiscal rules, with standard least squares estimates exaggerating their impact on discipline. While statistical methods correcting such bias exist, they rely on the existence of variables which should be highly correlated with fiscal rules indexes but truly exogenous, namely independent of budgetary outcomes and therefore uncorrelated with the error term in (1). Although potential "good instruments" for institutional variables are preciously few and intrinsically hard to find (Acemoglu, 2005), in our subsequent analysis we succeed in isolating a small number of instruments for the Fiscal Rule Index that have a high explanatory power on the index itself and pass standard exogeneity tests.

A second issue is that our FRI could be correlated with *omitted determinants* of fiscal behaviour. As a result, standard least-squares estimates would attribute the impact of these omitted variables to the FRI, causing a statistical bias similar to reverse causality. Since the problem is essentially one of data availability for all plausible determinants of fiscal policy, to minimise the problem one needs to consider a wide range of possible determinants of the CAPB (i.e., the consider a potentially large vector of variables $x_{i,t}$). In addition, allowing for country "fixed-effects" solves for the issue of possible omitted cross-country determinants. Regarding the choice of the vector of control variables $x_{i,t}$, in line with the existing literature, we will consider a series of variables measuring possible sources of fiscal biases. These include determinants of the common pool problem such as measures of political fragmentation (see e.g. Hallerberg, von Hagen and Strauch, 2006, or von Hagen, 2005), determinants of short-sightedness such as elections (Bender and Drazen, 2005), political instability (Debrun and Kumar, 2007), ideological factors (Fabrizio and Mody, 2006). The evolution of the institutional setting for fiscal policy in Europe is captured by dummies reflecting the adoption of the stability and growth pact and the run up to EMU (Ayuso et al., 2006).

A third issue is the possibility that our synthetic *indexes may not properly capture the features of fiscal rules* that truly affect policymakers' incentives. To address this issue, we check the robustness of our results to alternative methods of construction of the index. We check both the robustness of results to changes in the treatment of possible redundancy of rules (overlap in the share of government finances covered by rules) and

¹⁴ As such, numerical rules potentially suffer from the same credibility problem as discretionary policies. Hence, according to this line of reasoning, the only credible rule would be a mere description of what the government would do under pure discretion. Analogous issues were analysed with reference to monetary policy (McCallum, 1995; Posen, 1995).

in the method for aggregating the various features of rules into a single Index of Strength (complementarity or substitutability between the different rules' features). The details on the construction of the alternative indexes are provided in Appendix 1.

Finally, the countries in our panel may be so heterogeneous that it could make little sense to lump them together. However, our primary objective is to check whether numerical rules can be an effective mechanism to encourage good fiscal behaviour in a specific *group of countries*: the EU-25. Therefore, any policy recommendation regarding rules should make sure that, on average, they appear consistent with that goal. An obvious stress test for our results would be to ignore the time-series information (and the underlying assumption that the same model prevails in all countries) and investigate the relationship between rules and fiscal performance across countries. We performed such analysis along the lines suggested by (Alesina et al. 1999) and found no evidence against the findings of the panel analysis. The latter being statistically more robust, they constitute the reference for our analysis.

4.2.2. Baseline estimation results

Panel-data estimations of equation (1), which fully exploit the rich time-series information of the dataset, are reported in Table 5. To test the robustness of our findings, we propose 6 variants of the same model. In the first column, we deliberately omit control variables and estimate a model similar to Bohn (1998), the idea being to see whether omitted variables are likely to bias our estimates of the impact of rules. Columns (2)-(4) present our benchmark specification which take into account a large number of political, institutional and circumstantial factors that may have affected fiscal behaviour over the sample period. Column (3) includes country effects to focus solely on the time-series (“within”) dimension of the panel, whereas column (4) applies an instrumental variable estimator to address the issue of possible reverse causality. To check whether the estimated link between fiscal rules budgetary outcomes is robust with respect to a different definition of the fiscal deficit, column (5) and (6) adopt the same specification but using as dependent variable, respectively, the overall budget balance as a share of GDP and the change in the debt/GDP ratio.

Overall, the estimates reveal that fiscal rules have a positive and statistically significant impact on budget balances. The coefficient of the FRI is precisely estimated, and the relation between numerical fiscal rules and budgetary outcomes is remarkably robust to the possibility of omitted variables and to the definition of the government balance. Moreover, reverse causation does not seem to be a serious issue.

The parsimonious specification in column (1) confirms a series of well-established results in the estimation of fiscal reaction functions: the lack of a systematic countercyclical response of fiscal policy, a stabilising response to debt developments, and a significant degree of persistence (see among others Gali and Perotti, 2003). The Fiscal Rule Index appears to induce a significantly positive impact on the CAPB, which rises by about 0.4 per cent of GDP for a one-standard deviation increase in the FRI, controlling for other factors. Not surprisingly, country fixed effects are highly significant in this parsimonious specification.

Once additional explanatory factors are introduced (column (2)), fixed effects become statistically insignificant, and are therefore omitted. The magnitude of the coefficient of the Fiscal Rule Index in specification (2) remains largely unaffected compared with specification (1). Among the political variables, government stability emerges as a robust determinant of fiscal discipline, suggesting that short-sighted governments (in the sense of being more likely to face an election at any point in time) indeed tend to be less disciplined. Also, a strong and robust electoral cycle emerges from the data whereas ideology has a less prominent—and statistically less precise—role. In contrast to other studies, political fragmentation and district magnitude do not appear to play an important role. This could indicate that thanks to improvements in budgetary procedures, common pool problems might have become less prominent over the last 15 years (see Hallerberg, von Hagen and Strauch, 2006). That said, the common pool problem appears to remain significant for governments characterized by greater ideological tension among coalition partners: all other things equal, such governments exhibit lower fiscal balances. Of the two dummy variables identifying the nature of the centralization process of the budget (contract vs. delegation), only the delegation variable is statistically meaningful.¹⁵ The negative sign of the delegation variable could be the result of a relatively short time span considered in the sample comprising several episodes of deteriorating fiscal performance in a number of delegation countries—including France, Germany, Hungary, Italy, Greece, and the United Kingdom.¹⁶ Finally, the run-up years to EMU led to significantly better fiscal outcomes, whereas the introduction of the SGP (after EMU) seems associated with some relaxation of fiscal policy, although that effect is weak in a statistical sense.

In order to check whether the simultaneous presence of fixed effects and additional explanatory variables could impact the magnitude or significance of the coefficient of the Fiscal Rule Index, the same specification as in (2) is estimated allowing for fixed effects, but using the Kiviet' corrected Least Squares Dummy Variable (LSDV) estimator to address the issue of biased and inconsistent estimates in dynamic panels. Results point to a remarkably robust magnitude of the coefficient of the FRI.

The results reported in column (4) comforts us into thinking that the potential bias due to reverse causation is negligible. Our discussion of the determinants of rules in Box 3 points to two potential instruments for the FRI: its own lagged value (capturing persistence in the legislative process), and a variable identifying countries having adopted the commitment approach to centralize the budget process. As discussed in Box 3 and reported in the regression results of Table 6, these two variables are statistically significant determinants of the Fiscal Rule Index. In addition, the Hansen J test indicates that these instrumental variables can be taken as exogenous.¹⁷ After instrumenting the Fiscal Rule Index, its regression coefficient remains largely significant and its magnitude

¹⁵ The contract dummy was dropped from our benchmark specification because it proved to reduce the efficiency of the computationally demanding IV and LSDVC estimators.

¹⁶ The relatively poor fiscal outcomes in delegation countries also feature in other recent studies using similar methodology, including Annett (2006).

¹⁷ Using the Fiscal Council Index as an additional instrument (which appears to be a significant explanatory variable for the Fiscal Rule Index, see Table 6) leads to the rejection of the null hypothesis of exogeneity of the instruments according to Hansen J test.

almost unchanged. The Durbin-Wu-Hausman test does not reject the null that the Fiscal Rule Index is exogenous.

We also estimated our model using the overall balance as the indicator of fiscal performance (Table 5, column (6)).¹⁸ The FRI again emerges with a positive and statistically significant sign. The coefficient is also quantitatively larger than the ones obtained for the CAPB equations. This is unsurprising since most fiscal rules target cyclically unadjusted budgetary aggregates.

A somehow different message emerges from the regression in column (6) of Table 5 where the change in debt is used as a dependent variable. While the use of the CAPB as dependent variable is meant to capture actual fiscal decisions more precisely, it ignores deliberate decisions by governments to massage deficit numbers and create the illusion of conformity with the rules' requirements (Milesi-Ferretti, 2003). However, existing analyses (von Hagen and Wolff (2005), Buti et al. (2007)) show that after the introduction of the SGP the transactions by general government having an impact on the debt but leaving unaltered the deficit (i.e., affecting the "stock-flow adjustments" (SFA)) across EU countries have become more correlated with the size of deficits, a possible indication of attempts to circumvent rules through "creative accounting".¹⁹ The regression results displayed in column (6) of Table 5 shows that while the FRI coefficient has the expected negative sign (more rules slow debt accumulation) and is quantitatively similar to the effect of rules on the CAPB, the impact is much less precisely estimated. Hence, one cannot exclude that the looser conditional correlation between the FRI and debt variations may well stem from creative accounting. Indeed, if SFAs were purely random, such noise should be captured by the error term, leaving the FRI coefficient intact.²⁰

Box 3. What motivates the adoption of fiscal rules?

Several factors may affect the willingness of a country to introduce national-level numerical fiscal rules. The existence of a fiscal problem (e.g. debt level becoming excessive or perceived as such) is an obvious candidate. The institutional setup of a country may also play a role. The introduction of rules at supra-national level (Maastricht Treaty, SGP) can be expected to trigger some changes in the institutional set-up of the countries concerned. At national level, large countries with complex administrative structures, countries with fragmented governments, and countries resorting to fiscal contracts to centralise their budget process are all expected to rely more heavily on numerical fiscal rules. The influence of independent fiscal institutions playing a role in fiscal

¹⁸ Regressions in columns (5) and (6) of Table 5 allow for the inclusion of fixed effects, which appear jointly statistically significant.

¹⁹ While SFAs are inevitable (notably, because of differences in the time of recording between cash and accrual accounting, financial operations, and valuation effects), they should be random and positively correlated with changes in the public debt, while the systematic use of "below the line" operations when deficits are high break the link between SFA and changes in public debt. The absence of correlation of SFA with changes in debt could therefore be interpreted as the outcome of creative accounting practices.

²⁰ We performed a test analogous to that in von Hagen and Wolff (2005) to assess creative accounting with our data, regressing changes in debt on its own lag, SFA operations, our Fiscal Rule Index, and an interaction term between the latter two variables. The interaction term turned out negative and statistically significant, suggesting that stronger and more encompassing rules weaken the correlation between variations in debt and SFAs. Although this could be taken as a prima-facie evidence of a possible link between rules and creative accounting practices, a careful and systematic empirical investigation of creative accounting is beyond the scope of this paper, and we leave this important issue for further research.

policy (e.g. “fiscal councils”), where they exist, is more ambiguous. They might or might not favour the presence of rules, depending on whether numerical rules and these institutions play complement or substitute roles. Finally, political variables can also be expected to have an effect on the decision to introduce rules. Among these, the ideological inclination and diversity of the government in place, the stability of governments and the dates of elections may have an influence.

To assess the influence of these factors, Table 6 reports econometric estimates of simple linear models linking our fiscal rules indexes to potential explanatory variables. The analysis focuses on the short-term dynamics of indexes over time and controls for the initial differences in levels across countries using fixed effects. The inclusion of the lagged dependent variable captures a component of inertia in the evolution of rules-based fiscal governance at country level. Because of the presence of the lagged dependent variable as a regressor, the remaining explanatory factors capture the impact on the change in the fiscal rules indexes. Both the Fiscal Rule Index and the Fiscal Rule Coverage Index are used as dependent variables. The first three columns of Table 6 report regressions for different groups of possible determinants separately. The last four columns of the table report results where all explanatory variables are included. The last two columns of the Table show results using alternative estimation methods. In addition to the LSDV estimator, the Kiviet corrected LSDV estimator is used, and probit regressions linking the probability of an increase in the Fiscal Rule Coverage Index to the selected explanatory variables is performed. Overall, the regressions explain a relatively large share of the variance of the dependent variables and the basic message remains substantially unaltered irrespective of the fiscal rule index used as dependent variable and the estimation method chosen.

Contrary to expectations, fiscal rules indexes are only loosely related to the state of countries’ public finances, be it measured by the lagged debt or other measures of the fiscal situation (results are not reported in the Tables). Both the introduction of the EU fiscal framework and country-specific institutional features had an influence on the introduction of numerical fiscal rules at national level. There is some evidence that the introduction of the EU fiscal framework has played a catalytic role in the adoption/strengthening of fiscal rules. National institutional variables also seem matter. Specifically, countries with politically fragmented coalitions seem to be more inclined to avert the common pool problem through the adoption/strengthening of rules.

Regression results suggest that contract countries have been less likely to strengthen their rules-based system. This result is explained by the fact that, *all other things equal*, commitment states were already more reliant on rules at the beginning of the sample period, and that delegation states may actually have been involved in a catch up game (as evidenced in Figures 7 and 8). Three other interesting empirical regularities emerge from the analysis. First, more rules tend to be adopted or strengthened during election years, either because an incumbent government attempts to tie the hands of the future coalition or because a newly elected government wishes to enshrine its fiscal platform into a formal set of rules. Secondly, a greater tendency to myopia (driven by political instability) seems to be addressed with rules. Finally, larger countries have tended to adopt/strengthen more rules over the sample period, in line with the *prima facie* evidence already discussed in the main text.

4.2.3. Robustness checks

As mentioned previously, one of the difficulties with our empirical analysis is associated to conversion of de jure regulations on numerical fiscal rules into quantitative indicators. A key question is whether our Fiscal Rule Index is correctly measuring the intensity in the use of numerical fiscal rules and their degree of strength. To address this issue we examine whether the baseline results described in the previous section are sensitive to the specific method adopted to construct the FRI. Table 7 displays estimated coefficients for variants of the FRI, using our benchmark specification (column (2) of Table 5).²¹ The top panel of Table 7 indicates that the estimated effect of numerical fiscal rules on fiscal behaviour is somehow affected by the corrections applied to address possible redundancy of various rules applying to the same sub-sector of general government (overlap in the share of government finances covered by rules). Ignoring those redundancies leads to a smaller magnitude for the regression coefficient of the FRI, which remains however statistically significant. The reason is related to the fact that, by ignoring the possible overlap of rules, the FRI constructed this way tends on average to exhibit a stronger upward trend, so that a smaller regression coefficient is needed to explain the average improvement in fiscal positions observed across the sample.

The bottom panel of Table 7 shows the outcome of a similar exercise, this time using variants of FRI constructed with alternative aggregation methods for the measure of rules' strength. This check is needed, because arithmetic averaging implicitly assumes substitutability among the various features of a rule (for instance stronger enforcement could make up for a weaker statutory basis). We stress test our baseline assumption in four different ways: simple geometric averaging (which assumes complementarity); taking the lowest score of all components (i.e., a "Leontieff" aggregator which presupposes perfect complementarity); using the enforcement dimension as a "censor" element (obtained as the product of enforcement times the arithmetic average of the four remaining features). Results in Table 7 appear remarkably robust with respect to these alternative methods for aggregating rules' features.

4.2.4. Assessing the role of rules' type, coverage and design

Our results show that higher values of the Fiscal Rule Index contribute to improved budget balances. However, these indexes encapsulate a broad set of information, including the share of government finances covered by fiscal rules, the type of budgetary aggregate affected by the rule, and other relevant features of the rules, including the strictness of the enforcement procedure, or the legal base of the rule (constitutional, statutory, coalition agreement among political parties). Our dataset allows for an examination as to whether specific characteristics of fiscal rules matter more than others. We again do this by re-estimating our benchmark equation but using alternative indexes that only capture particular characteristics of the rules. This would also serve as a robustness check of the baseline results obtained with the FRI.

²¹ We only report pooled least-squares fixed effects are rejected for all regressions.

We first check we perform is whether the share of government finances covered by numerical fiscal rules has by itself a significant impact on budgetary performance. To that purpose, we estimate our baseline equation (see column (2) in Table 5) using the Fiscal Rule Coverage Index as indicator of fiscal rules (top-panel of Table 8). The impact of the index appears largely significant. This can be interpreted as a manifestation of the truly constraining nature of fiscal rules because a wider coverage naturally limits possibilities of circumvention and opportunities to shift the burden of a fiscal adjustment between different government sectors (for instance, central government expenditure cuts that effectively result in greater commitments for sub-national governments).

Second, we are interested in examining whether the type of fiscal aggregate targeted by a numerical rule matters for its effectiveness (mid-panel of Table 8). It appears that expenditure rules per se do not materially affect budget balances whereas rules targeting the budget balance or the public debt have a strong and significant impact. Since the performance of expenditure rules should be evaluated not only in terms of their impact on budget balances but primarily on the basis of their effectiveness in curbing government expenditure, we repeat the estimation of an analogous fiscal reaction function to that in specification (2) of Table 5 this time using the share of primary expenditure on GDP as dependent variable. Results indicate that although expenditure rules appear to somehow reduce expenditure after controlling for other factors, the regression coefficient is barely significant, not robust with respect to the inclusion of additional regressor (compare column (1) and (2) and (3) in Table 9), and potentially subject to a reverse causation issue (as suggested by the use on instrumental variables estimation, column (4)).

Next, we assess whether rules are more effective when applied to specific government sectors. Although it could be expected that fiscal rules operating at sub-national level could be more effective on fiscal discipline because characterised in general by a greater frequency of budget balance rules (which appear to be more effective, as discussed above), and stronger statutory basis and enforcement (see the stylised facts summarised in section 3.2.), our results, reported in the bottom panel of Table 8, do not support this expectation. While the rules defined at the general government, and at the central government and social security sectors both appear to have a statistically significant impact on budgets, this is not the case for rules defined sub-national level. Although one needs to interpret such results with caution (notably due to a lack of robustness with respect to the inclusion of fixed effects), there is a broad indication that rules applying at higher levels of government contribute more to aggregate fiscal discipline than those applying at local levels of government.²²

Finally, we analyse whether the effectiveness of rules on fiscal outcomes is associated with any particular qualitative feature such as their statutory basis, monitoring, enforcement, and media visibility. To that purpose, indexes capturing separately and exclusively these various dimensions in the determination of rules' strength have been

²² Fixed effects are jointly non-significant and therefore excluded from the regressions displayed in the bottom panel of Table 8. However, the inclusion of fixed effects appears to affect the magnitude and significant of the regression coefficient of the alternative versions of the fiscal rules indexes. In particular, the coefficient of the index for rules at sub-national government level is significant at the 5 per cent level and of a relatively large magnitude (0.51) once fixed effects are included.

constructed, and used as explanatory variables in the estimation of our baseline reaction function. The results, displayed in Table 10, suggest that no specific feature stands out as much more relevant than others. However, looking at the magnitude of regression coefficients there is some indication that while aspects related to the statutory basis of rules and their enforcement are relatively more important, the media impact of rules scores less high.²³

5. FISCAL RULES AND THE CYCLICAL STANCE OF FISCAL POLICY

While rules seem to provide incentives to maintain fiscal discipline, their effectiveness may not come as a free lunch. A potential drawback of rules-based discipline is a weaker contribution of fiscal policy to macroeconomic stabilisation. Of course, that argument presupposes that discretionary policies are not themselves pro-cyclical, in which case the adoption of a strict rule could actually provide benefits (see, e.g., IMF, 2004, and European Commission, 2006, for recent assessments and surveys of existing literature).

5.1. Which rules are more cycle-friendly than others?

In the case of *budget balance or debt rules*, there is a common presumption that numerical rules could induce pro-cyclical behaviour in bad times. This was always one of the major concerns with the SGP, and most of the efforts carried out by EU policy makers in recent times were aimed at revising the letter and the interpretation of the original SGP in such a way to reduce the risk of pro-cyclical behaviour (see European Commission, 2005). The extent to which deficit and debt rules interfere with the stabilisation function of fiscal policy depends to some extent on their design. Notably, the presence of *escape clauses* or a medium-term time frame for application may soften the possible induced pro-cyclical bias. Budgetary targets could be specified in cyclically-adjusted terms or the time period considered for assessing compliance with the rule could extend over several years, in such a way to allow some degree of variation in fiscal variables depending on cyclical fluctuations. As illustrated in section 3, while most deficit and debt rules that apply at sub-national level are not defined in terms of cyclically-adjusted balances and are applied yearly, those applying at the central or general government level more often take into account cyclical conditions in the definition of the fiscal aggregate targeted and have a multi-annual horizon.

The case of numerical *expenditure rules* is quite different. Such rules are not likely to prevent the operation of the automatic stabilisers. Moreover, they could help curbing a possible pro-cyclical bias in good times related to the presence of implementation and identification lags and strong pressures for additional spending in the presence of budgetary windfalls (European Commission, 2006). As in the case of budget balance

²³ These results are confirmed in regressions including country fixed effects. Regression coefficients for the indexes capturing the various alternative features are all statistically significant at least at the 5 per cent level and the magnitude is as follows: statutory basis: 0.44; body in charge of monitoring: 0.36; body in charge of enforcement: 0.57; enforcement procedure: 0.51; media impact: 0.30.

rules, it may matter whether the rule excludes cyclically-sensitive items and whether the time frame for its application extends over the medium-term. In addition, the specification of the expenditure ceilings could be relevant. Ceilings defined as a maximum expenditure ratio on GDP may be less effective than ceilings defined in terms of maximum expenditure growth rates. In the former case, during good times expenditure could grow faster in nominal terms without violating the ceiling, while this is not the case in the latter case.

Finally, regarding *revenue rules*, their impact on the cyclical stance of fiscal policy crucially depends on the purpose of the rule. While the rules that define conditions for the use of windfall revenues ensuing from better than expected cyclical conditions are potentially effective in curbing pro-cyclicality in good times, those that target minimum or maximum amount of tax revenues may actually induce pro-cyclicality.

Although a-priori there are arguments as to why numerical fiscal rules may interfere with the contribution of discretionary fiscal policy to cyclical stabilisation, providing empirical support to such arguments is not trivial, and the overall evidence arising from existing studies is not strongly conclusive (see Box 2). Among the major difficulties in detecting an impact of numerical fiscal rules on the cyclical stance of fiscal policy there is the need to satisfactorily take into account the design of fiscal rules and the way multiple fiscal rules interact to produce an overall impact on the behaviour of fiscal policy over the cycle.

With the view to make a first step in overcoming the above difficulties, we have constructed a Fiscal Rule Cyclicity Index which provides information on the likely impact of the whole set of numerical fiscal rules in place in a given country in a given year. As mentioned in section 3.3 and explained in Appendix 1, this index takes into account both the fiscal aggregate targeted by the rules in force in a given country, in a given year, and their design. A higher value of the index signals a less likely pro-cyclical impact on the stance of fiscal policy. Consistently with the arguments provided above, the index is higher if budget balance rules are defined in cyclically-adjusted terms, applied over the cycle or a medium-term horizon, if expenditure rules define caps on expenditure growth rates rather than on ratios on GDP, and if revenue rules aim at defining conditions for the use of revenue windfalls.²⁴ What is somehow less obvious is how the different types of rules should weigh in the construction of the index. In absence of a clear *a priori*, we construct a baseline index and alternative indexes assigning a lower score, alternatively, to expenditure or budget balance rules (see Appendix 1).

5.2. Empirical analysis

Equipped with our battery of indexes, we aim at answering two main questions. First, do the data support a trade-off between the strength of numerical fiscal rules and their compatibility with fiscal policy to be run in a counter-cyclical fashion? Second, do the data confirm that systems of fiscal rules with characteristics that a-priori appear to be

²⁴ The design features taken into account are those on which there is a clear a-priori on the impact for the cyclicity of fiscal policy and for which more complete information is available (COFIRM??)

more “cycle-friendly” are associated with fiscal policies that are actually run in a more counter-cyclical fashion? In our analysis, we proceed in three steps. First, we analyse the evolution over time of the Fiscal Rule Cyclical Indexes (FRCI). Subsequently, we put in relation these indexes with other indexes aimed at capturing the impact of rules on fiscal discipline and with the apparent elasticity of the CAPB with respect to the cycle, a time-varying prima-facie measure of the cyclical stance of fiscal policy. Finally, by estimating fiscal reaction functions separately for different country groups, we assess whether fiscal policy in countries with rules designed in a more cycle-friendly fashion is less pro-cyclical and whether rules are more or less effective in fostering fiscal discipline. As will be clear in the following analysis, results are quite sensitive to the way the FRCI is constructed. Hence, together with the baseline specification for the FRCI we also analyse results for the alternative specifications of the FRCI.

Figure 9 displays the time evolution of the cross-country simple average of the FRCI indexes. The index exhibits a hump-shaped pattern, irrespective of the specification used for its construction: rules appear to be less cycle-friendly at the beginning and at the end of the period considered. This evidence seems to suggest that the overall tendency towards more and stronger numerical fiscal rules over the past decades in EU countries did not always coincided with rules' based fiscal governance becoming less and less compatible with counter-cyclical fiscal policy. A number of factors, relating to the composition of the rules by fiscal aggregates targeted, and to the specific design of the rules, need to be accounted for to fully capture the reasons underlying the evolution of the index. The difference in the evolution of the alternative FRCI specifications reflects that the mix of rules in terms of type of fiscal aggregate subject to numerical constraint matters. While the specification putting lower scores on expenditure rules exhibits a clear downward trend, the values of the index with lower scores on budget balance rules at the end of the period are slightly above those at the start of the nineties. This is an indication that while increasing reliance on budget balance rules contributed to make rules' systems less cycle-friendly, expenditure rules rather played in the opposite sense.

Table 11 displays Spearman rank correlation coefficients between our FRCI indexes and various specifications of indexes aimed at measuring the impact of numerical rules on fiscal discipline. These simple correlations permit to gauge whether our indexes reveal a-priori a trade-off between the impact of rules on fiscal discipline and on fiscal cyclicalities. The Table shows that the correlation between the FRCI and the FRI is negative across the whole sample. However, the correlation is significantly negative only when the FRCI index assigns lower scores on expenditure rules. Moreover, the negative correlation is mostly found over time, since there is no evidence that the countries characterised on average by stronger rules are also those with less cycle-friendly rules.

The correlation of the FRIs with the Expenditure Rule Index (measuring the coverage and strength of expenditure rules only) is positive, while that with the Budget Balance Rule Index (which provides a measure of the coverage and strength of budget balance and debt rules only) is negative. This confirms the presumption that those rules that are mostly responsible for a possible negative impact on fiscal policy cyclicalities are budget balance and debt rules. The Table also shows that the FRCI index is strongly negatively

related to a measure of Fiscal Rule Index taking into account only rules at sub-national government level (both regional and local government level). This evidence is consistent with the fact that it is especially at this government level that budget balance and debt rules are designed in such a way to have a possible pro-cyclical impact on fiscal policy.

The last section of Table 11 shows the correlation between the FRCIs and the apparent elasticity of the CAPB with respect to the output gap, obtained as the ratio of the time variation in the two variables. A positive (negative) apparent elasticity denotes counter-(-pro) cyclical fiscal policy.²⁵ Results show that, consistently with expectations, higher values of the FRCIs are associated with a more counter-cyclical fiscal stance. In particular, the FRCI computed assigning lower scores to budget balance rules displays a stronger positive relation.

The final step in the analysis consists of estimating fiscal reaction functions for countries with cycle-friendly and cycle-unfriendly rules separately. Table 12 reports the results for the estimation of the basic specification in column (2) of Table 5 for two country groups: those with their average FRCI index above the sample mean and those below.²⁶ All the three variants of the FRCI are considered. Only the coefficients of the lagged output gap and the Fiscal Rule Index are reported, since those are the parameters of interest. Overall, it appears that the countries with rules that are structured in an a-priori more cycle-friendly fashion are also those where discretionary fiscal policy is characterised by a less pro-cyclical behaviour. In line with the analysis above, the evidence from fiscal reaction functions suggests that fiscal policies are less pro-cyclical especially in those countries with a more cycle-friendly design of expenditure and revenue rules (lower scores on budget balance rules). Results in Table 12 also point to a possible trade-off between rules' cyclicity properties and their impact on fiscal discipline. The coefficient of the Fiscal Rule Index appears to be of a smaller magnitude in countries with more cycle-friendly rules.²⁷

Overall, there is some evidence that rules that, by type or design, are expected to be more cycle-friendly a-priori, are also associated with a less pro-cyclical behaviour of fiscal authorities. In particular, countries with expenditure and revenue rules with more favourable characteristics in terms of fiscal policy stabilisation appear to have benefited from a less pro-cyclical fiscal stance. There is also some evidence of a possible trade-off between the impact of rules on fiscal discipline and on cyclicity. Notably, strong reliance on budget balance and debt rules, which appear to have the most significant performance in terms of fostering fiscal discipline) is associated with an overall

²⁵ A positive value of this ratio indicates that discretionary fiscal policy is counter-cyclical, i.e., it becomes tighter if the cycle improves and loosens when output falls compared with potential. Although this is a very rudimentary measure of the reaction of discretionary fiscal policy to the cycle, it is time-varying, and permits to compute correlations using many data points both along the cross-country and the time series dimension. Since the measure of the apparent elasticity so obtained is highly sensitive to the presence of outliers (notably, observations where the variation in the output gap at the denominator is close to zero), values of the variable exceeding the 5 and the 95 per cent percentiles are disregarded.

²⁶ Although the choice of using the sample mean of the FRCI as a benchmark (which is equal to zero by construction since the indexes are standardised) leads to country groups of different size, it permits to obtain more homogenous groups compared with those that would be obtained by using the median of the country-specific average FRCI as a benchmark. Splitting the sample on the basis of the median yields qualitatively similar results. However, exactly the same groupings are obtained for the baseline version of the index and for the FRCI assigning lower scores to expenditure rules and a very similar sample split to that of the baseline index is obtained for the FRCI assigning low scores to budget balance rules.

²⁷ The same results hold qualitatively unchanged by estimating the same equations as in Table 12 but allowing the inclusion of fixed effects.

configuration of fiscal rules that is expected a-priori to be less cycle-friendly (low values for the Fiscal Rules Cyclicity Index). Moreover, the estimation of fiscal reaction functions reveal that the impact of fiscal rules on budget balances appears to be somehow smaller in countries with more cycle-friendly fiscal rules.

6. CONCLUSIONS

This paper exploits a unique dataset on the national fiscal rules in force in the EU countries over the period 1990-2005. To analyse the determinants and effects of fiscal rules across our panel, we constructed time-varying quantitative indicators comparable across countries and reflecting the strength and coverage of these rules. We construct distinct indicators for rules targeting different fiscal aggregates, for rules applying to different sub-sector of the general government, and for rules characterised by different qualitative features that are likely to matter for their ability to affect budgetary outcomes.

Over the past fifteen years, EU countries have made an increasing use of numerical fiscal rules. In the early nineties, most numerical fiscal rules were applied at local or regional levels of government, while rules at the general and central government sector were introduced more recently. In general, rules applied at sub-national government level are enshrined in law, have strong enforcement mechanism and a design that appears a priori less compatible with the stabilisation function of fiscal policy (e.g. a short-term rather than a medium-term time frame for their operation).

Regarding the analysis of the determinants of the growing reliance on numerical rules across EU countries, the data do not support the presumption that the introduction of fiscal rules would follow major crises, recessions or marked deteriorations in government finances, while there is evidence that the operation of the EU fiscal framework and country-specific institutional features seem to play a determinant role.

While the econometric analysis does not suggest significant causation running from budgetary performance to the introduction of fiscal rules, national fiscal rules appear to affect fiscal performance. This conclusion, which is the main policy message of our analysis, appears to be robust with respect to the specification of the empirical equations estimated, the estimation method employed, and the criteria used to construct the various indexes. When using the change in the debt as a dependent variable instead of the budget balance, the impact of fiscal rules weakens. Further analysis could investigate whether such result is related with creative accounting practices aimed at circumventing rules.

The empirical work also shows that the type, and design of rules appear to matter somehow for their effectiveness. Notably, while rules targeting the budget balance or the general government debt have a significant and sizable impact on deficits, expenditure rules do not appear by themselves to affect significantly budget balances, and even their impact on government expenditure is not statistically robust. Moreover, our analysis provides some evidence that countries in which rules are designed in such a way to avoid or reduce conflicts with the stabilisation function of fiscal policy exhibited on average less pro-cyclical policies.

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Figures

Figure 1. Number of numerical fiscal rules in force in the EU countries since 1990 by type

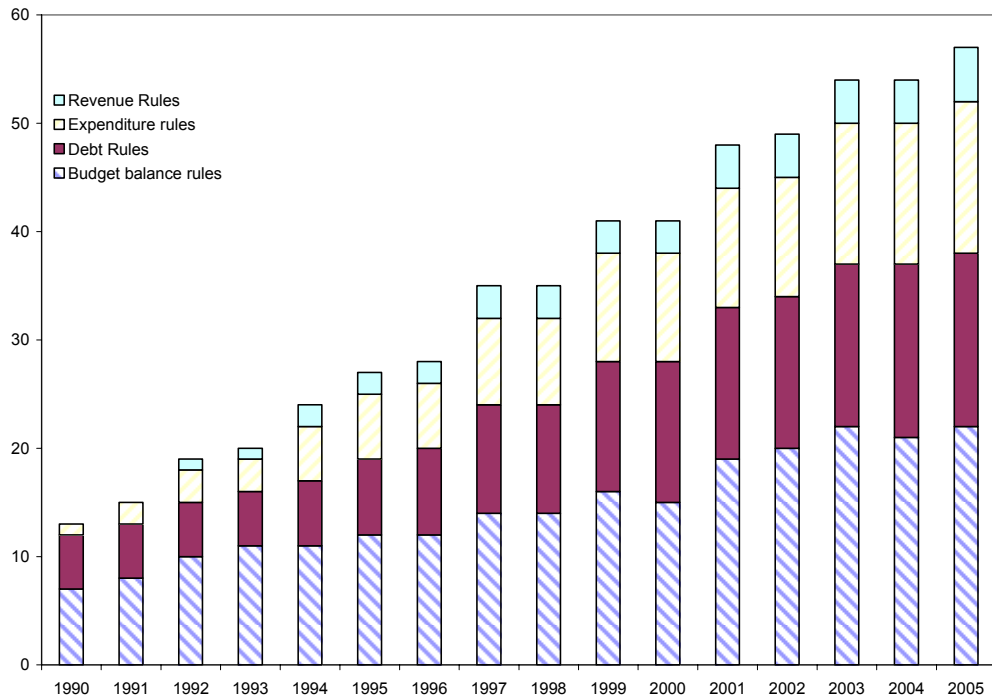


Figure 2. Number of numerical fiscal rules in the EU countries since 1990 by level of government

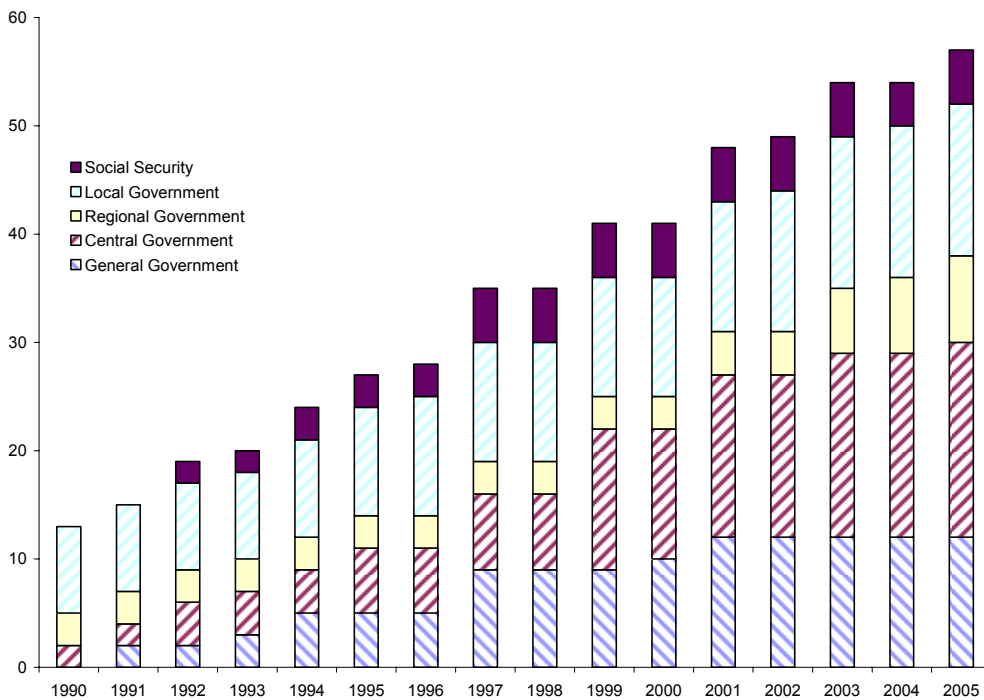


Figure 3. Evolution of level and change in the simple cross-country average of the Fiscal Rule Index and the Fiscal Rule Coverage Index

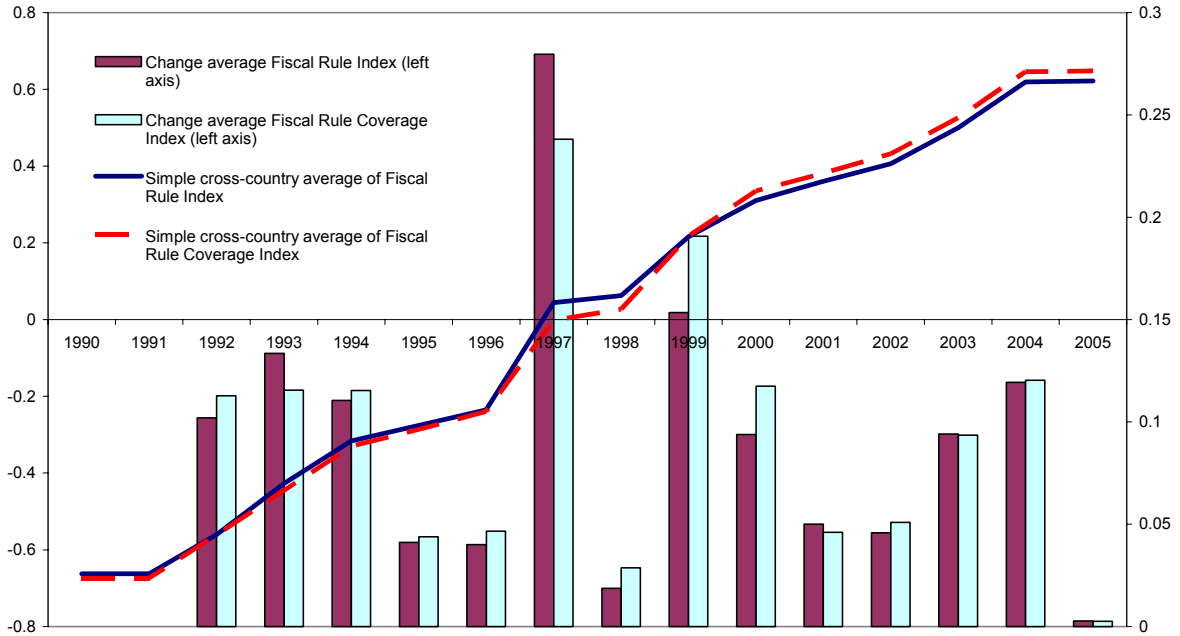


Figure 4. Evolution of the Fiscal Rule Index and the Fiscal Rule Coverage Index in "big" and "small" EU countries

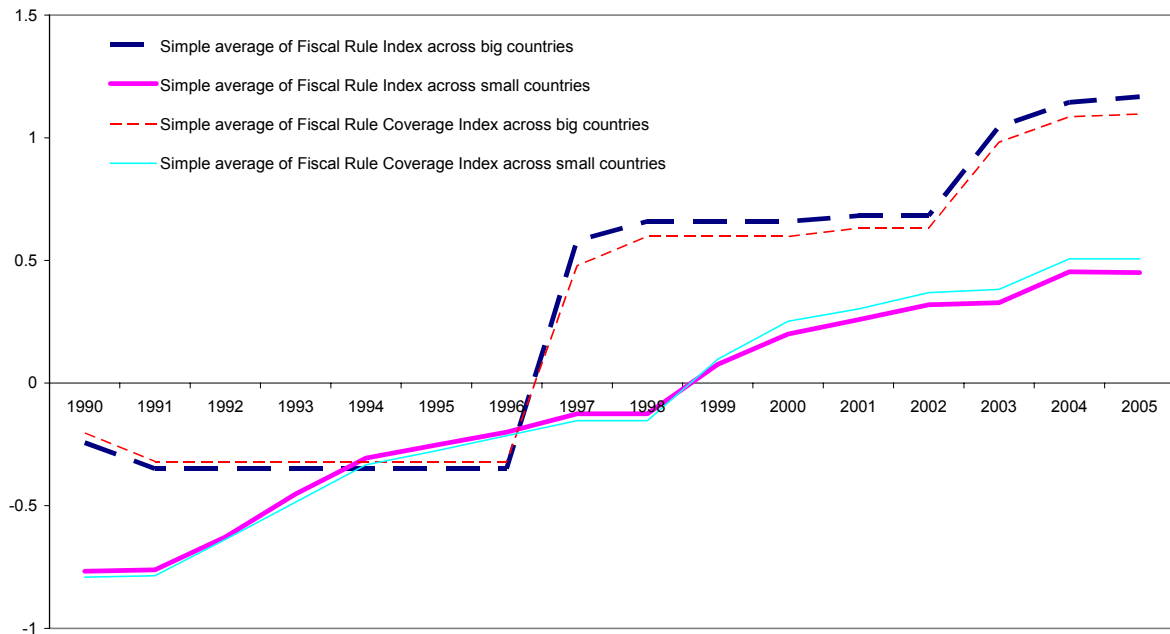


Figure 5. Evolution of the Fiscal Rule Index and the Fiscal Rule Coverage Index in countries with a budget balance above and below the cross-country median in 1995

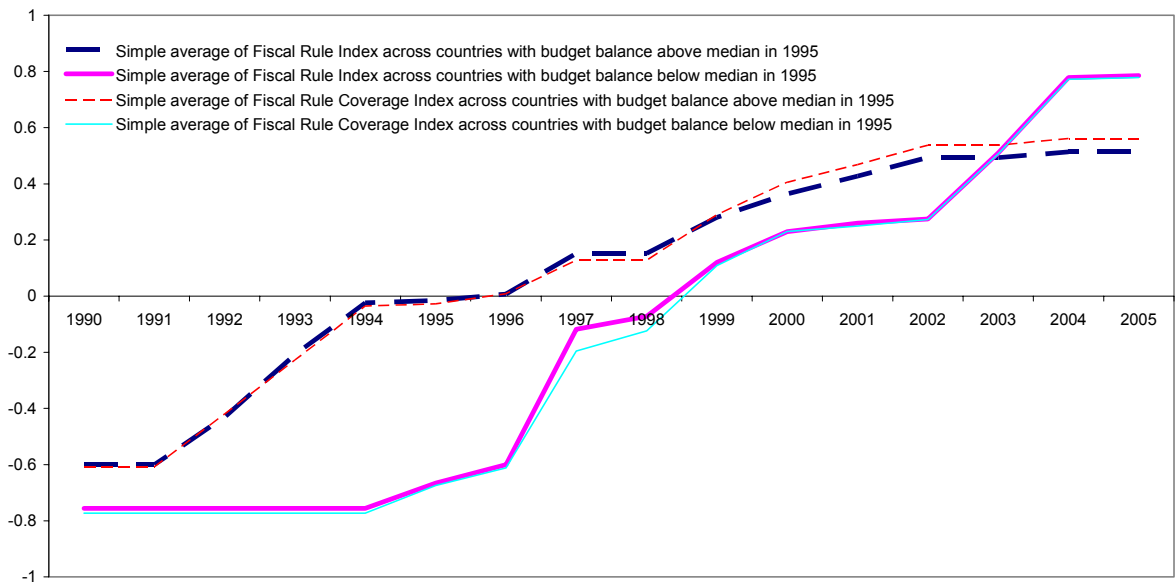


Figure 6. Evolution of the Fiscal Rule Index and the Fiscal Rule Coverage Index in countries with a budget balance above and below the cross-country median in 2005

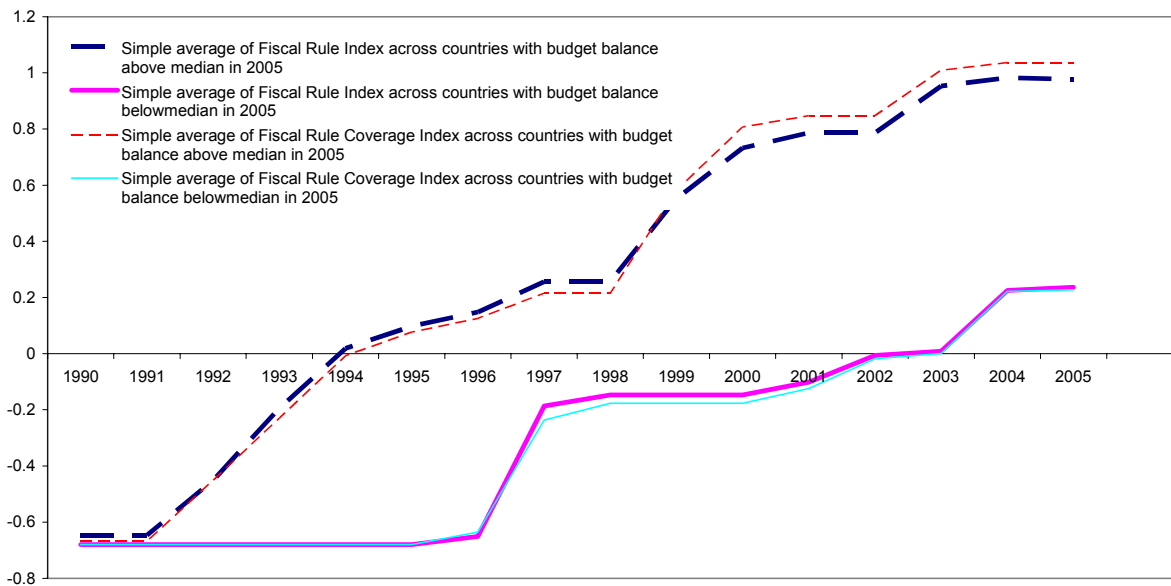


Figure 7. Evolution of the Fiscal Rule Index and the Fiscal Rule Coverage Index in countries belonging and non belonging to the euro area in 2005

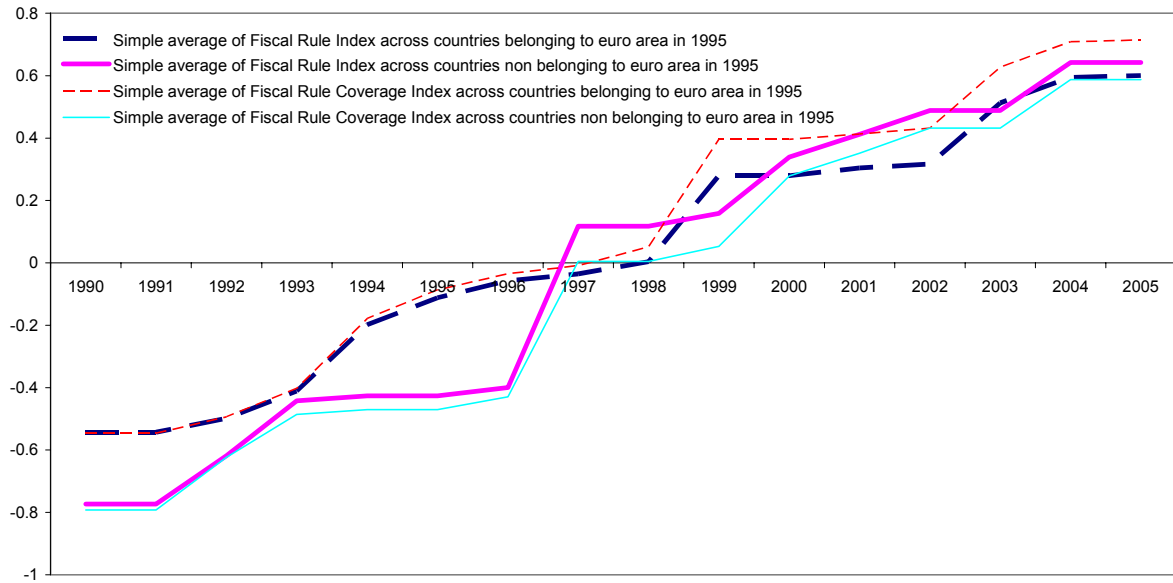


Figure 8. Evolution of the Fiscal Rule Index and the Fiscal Rule Coverage Index in countries with and without contract status in 1995

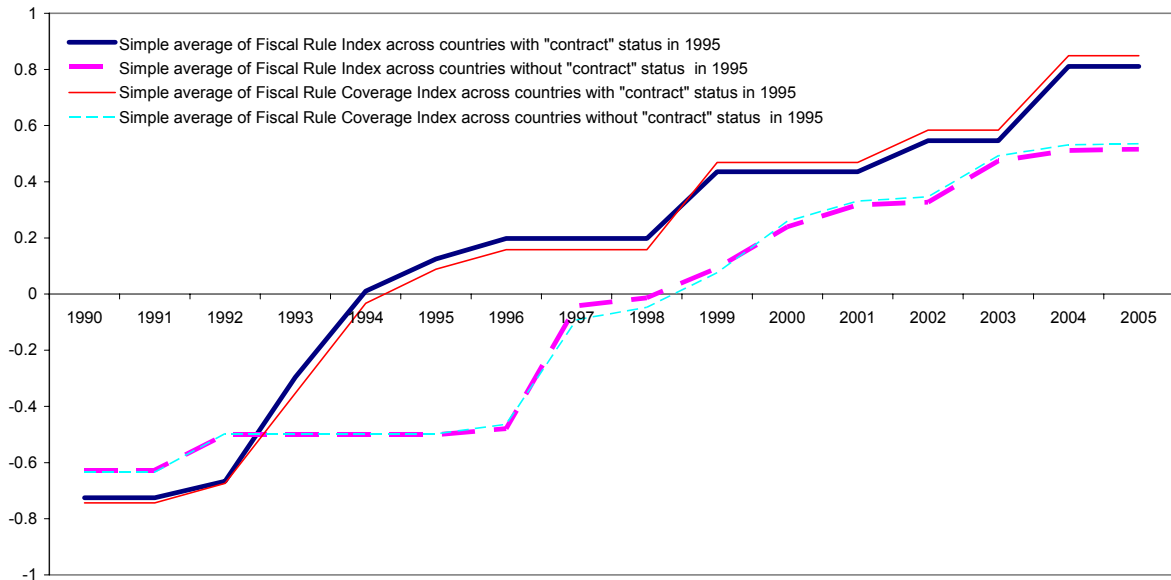
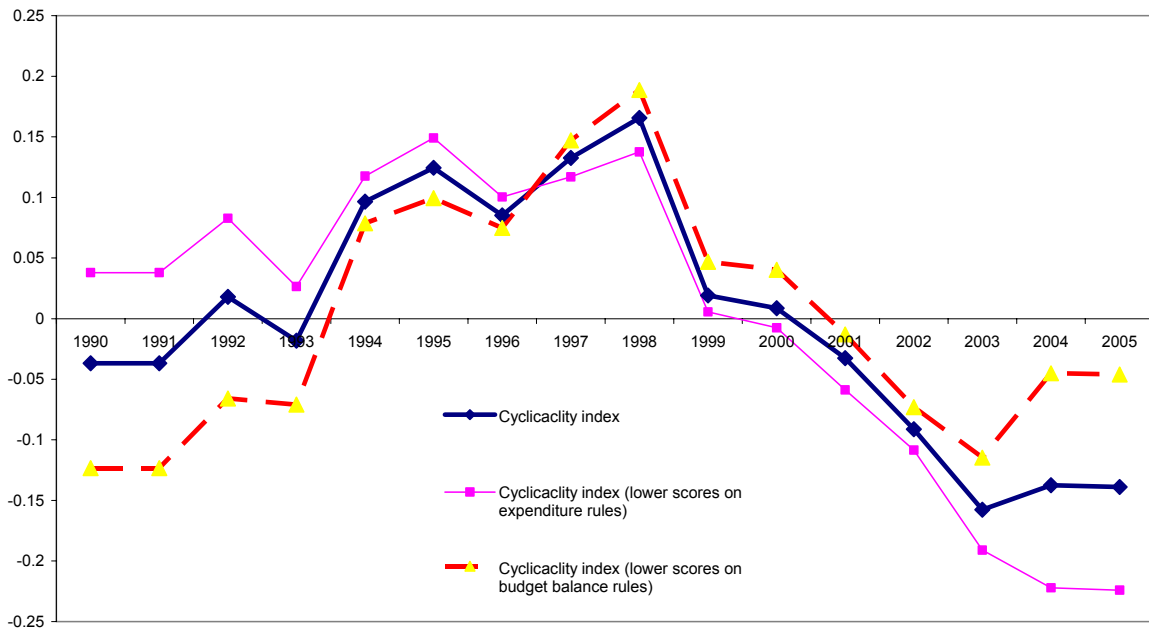


Figure 9. Evolution of Fiscal Rule Cyclicity Index



Tables

Table 1. Review of selected indexes of fiscal rules

Author, year, country	Original name of the index or sub-index containing information on fiscal rules	Type of rules considered	Features of rules considered
ACIR (1987), USA Federal States	"Stringency Index"	Borrowing constraints at state level	Statutory basis Type of budget balance requirement (governor only has to submit a balanced budget or legislative has to approve pass a balanced budget) Possibility to carry over deficit to subsequent years
Alesina, Hausmann, Hommes, Stein (1999) 20 Latin American countries	"Borrowing Constraint Sub-index", further aggregated into an "Index of Budget Institutions", comprising also an "Agenda-setting index" and a "Transparency Index".	Constraints on fiscal deficit, MTBFs, borrowing constraints	Type of constitutional constraint in force; existence and degree of commitment of a macro-programme preceding the submission of the budget; existence and origin of borrowing constraints; procedures for modifying the budget after legislative approval.
Von Hagen (2005) EU-15 and Japan	"Fiscal Rule Index"	Constraints on fiscal policy, MTBFs	Time horizon of rules; degree of commitment; connection between national budget and Stability Program; existence of exceptions to deal with shocks to expenditures; strength of fiscal minister to enforce budget law
Sutherland, Price, Jourmard (2005), 18 OECD Countries	"Composite Indicator" of fiscal rules for sub-central governments, further disaggregated into sub-indexes capturing the impact of fiscal rules on "Restraining the Size of the Public Sector", "Supporting Allocative Efficiency", "Ensuring Debt Sustainability", and "Coping with Shocks".	Deficit rules, expenditure rules, revenue rules at lower levels of government	Coverage of rules; statutory basis; monitoring; enforcement; transparency; existence of escape clauses; autonomy of lower levels of government in raising revenues.
Deroose, Moulin, and Wierts (2006), EU-15	"Index of Strength of National Expenditure Rules"	Expenditure rules	Coverage of rules; statutory basis; media visibility; monitoring; enforcement; compliance record
Hallerberg et al. (2006), EU-15	"Target Index"	MTBFs	Fiscal aggregate targeted by the MTBF; planning horizon; nature of targets; degree of commitment.

Table 2. Distribution of numerical fiscal rules in the EU by government sector and rules' type and main properties (year 2005)

Rules	Government sector	General government	Central government	Social security	Regional government	Local government	Total
Type of rule							
Budget balance rule		5	4	2	3	8	22
Debt rule		3	3	0	4	6	16
Expenditure rule		2	9	2	1	0	14
Revenue rule		2	2	1	0	0	5
Time horizon							
Annual		1	7	2	5	12	27
Multiannual		11	11	3	3	2	30
Statutory basis							
Legal act or Constitution		5	8	3	5	12	33
Coalition agreement or political commitment		7	10	2	3	2	24
Enforcement							
Automatic correction mechanisms or sanctions		8	4	2	6	8	28
Obligation to take measures or submit proposals if no compliance		0	3	2	0	1	6
No ex-ante defined action in case of non-compliance		4	11	1	2	5	23
Media monitoring							
Closely monitored and public debate		6	5	2	1	3	17
High interest media but no public debate		4	5	2	3	2	16
Modest or no media interest		2	8	1	4	9	24
Total		12	18	5	8	14	57

Note: Among the rules classified in the central government sector are included 2 rules that apply both to central and regional government, 1 rule that applies both to central government and social security, and 1 rule that applies to central and regional government sector and to social security. Among the rule classified in the regional government sector there are 3 rules that apply both to the regional and local government sector.

Table 3. Distribution of numerical fiscal rules in the EU by fiscal aggregate targeted and design (year 2005)

Type of rule	Design					Total
Budget Balance Rules	Golden rule	Balanced budget rule	Nominal ceiling	Ceiling as a percentage of GDP	Rules defined in structural terms	
	5	8	5	1	3	22
Debt Rules	Debt ceiling in nominal terms	Debt ceiling as a percentage of GDP	Debt ceiling related to repayment capacity	Other		Total
	5	2	7	2		16
Expenditure Rules	Nominal expenditure ceiling	Real expenditure ceiling	Cap on nominal expenditure growth	Cap on real expenditure growth	Other	Total
	5	2	3	3	1	14
Revenue rules	Cap on tax rates	Allocation of extra revenues	Other			Total
	1	3	1			5

Table 4. Distribution of numerical fiscal rules in the EU by perceived impact on pro-cyclicality of fiscal policy (year 2005)

Type of rule	Rule perceived to introduce a clear pro-cyclical bias		Rule perceived not to introduce a clear pro-cyclical bias	
	Total number of rules in 2005	Percentage on total by type/sector	Total number of rules in 2005	Percentage on total by type/sector
Budget balance rules	11	0.50	11	0.50
Debt rules	13	0.81	3	0.19
Expenditure rules	1	0.07	13	0.93
Revenue rules	0	0.00	5	1.00
Sector of government				
General government	4	0.33	8	0.67
Central government	3	0.17	15	0.83
Regional government	5	0.63	3	0.38
Local government	11	0.79	3	0.21
Social security	2	0.40	3	0.60

Note: Among the rules classified in the central government sector are included 2 rules that apply both to central and regional government, 1 rule that applies both to central government and social security, and 1 rule that applies to central and regional government sector and to social security. Among the rule classified in the regional government sector there are 3 rules that apply both to the regional and local government sector.

Table 5. Fiscal rules and fiscal performance: evidence from panel data

Dependent variable:	Cyclically-adjusted primary balance				Overall balance	Change in debt
	LSDV	OLS	LSDVC 1/	IV 2/	LSDVC 1/	LSDV
	(1)	(2)	(3)	(4)	(6)	(6)
Lagged dependent variable	0.49*** (8.73)	0.61*** (14.55)	0.67*** (10.67)	0.61*** (14.59)	0.59*** (9.31)	-0.02 (-0.20)
Lagged government debt	0.04*** (4.36)	0.02*** (5.67)	0.03 (1.59)	0.02*** (5.71)	0.00 (0.22)	-0.04 (-1.22)
Lagged output gap	-0.03 (-0.49)	-0.02 (-0.50)	-0.01 (-0.18)	-0.02 (-0.52)	-0.06 (-0.85)	-0.10 (-0.71)
Fiscal Rule Index	0.40*** (2.88)	0.43*** (4.15)	0.40** (1.96)	0.42*** (3.51)	0.52** (2.04)	-0.45 (-0.92)
Government stability	-	0.16*** (3.48)	0.15** (2.01)	0.16*** (3.60)	0.39*** (4.41)	-0.65*** (-3.15)
Government fragmentation	-	0.60 (1.35)	0.52 (0.51)	0.63 (1.40)	0.64 (0.52)	-2.10 (-0.85)
District magnitude	-	-0.00 (-1.05)	0.04 (0.33)	-0.00 (-1.06)	0.16 (1.15)	0.03 (0.19)
Ideology	-	0.05* (1.81)	0.07 (1.24)	0.05* (1.86)	0.03 (0.49)	0.19* (1.63)
Ideological range	-	-0.18** (-2.43)	-0.19 (-1.38)	-0.18** (-2.51)	-0.05 (-0.31)	-0.11 (-0.44)
Parliamentary election (dummy)	-	-0.57*** (-3.11)	-0.59** (-2.52)	-0.57*** (-3.22)	-0.65** (-2.23)	0.74 (1.34)
Fiscal governance: delegation	-	-0.81*** (-2.97)	-1.21** (-2.24)	-0.81*** (-3.06)	-0.27 (-0.40)	-0.12 (-0.09)
Run up to EMU (dummy)	-	0.46** (2.05)	0.52 (1.34)	0.45** (2.08)	-0.02 (-0.05)	1.08 (0.97)
SGP (dummy)	-	-0.30 (-1.18)	-0.18 (0.43)	-0.31 (-1.22)	0.38 (0.72)	0.52 (0.58)
Enlargement (dummy)	-	0.38 (1.05)	0.58 (0.80)	0.38 (1.09)	1.71* (1.90)	2.12* (1.65)
Country size (population)	-	-0.58** (-2.51)	-0.91 (-0.04)	-0.57** (-2.51)	-9.91 (-0.40)	-37.63 (-0.85)
Number of observations	297	243	243	243	243	243
R ² ("within" for fixed-effects estimators)	0.40	0.80	0.56	0.80	0.70	0.30
Fixed effects (F-test)	2.47***	0.86	-	-	1.87**	2.27**
Hansen J-test (p-value)	-	-	-	0.67	-	-
Exogeneity test (for rule index, p-value)	-	-	-	0.79	-	-
Random effects (Hausman test)		13.85				

1/ LSDVC accounts for the small sample bias in dynamic panels with country fixed-effects. Results refer to Kiviet's corrected LSDV estimator. The R² refers to LSDV estimation.

2/ Omitted instruments are the lagged fiscal rule index and a dummy for the commitment form of fiscal governance. Standard specification tests indicate that instruments are valid and strong.

Note: Constants are not reported. Robust t or z-statistics are in parentheses. *, **, and *** denote, respectively, significance at the 10, 5 and 1 per cent level. Hausman test: under the null hypothesis, both fixed effects and random effects estimators are consistent but random effects estimators are more efficient. Random effects estimates (not reported) are very close to OLS, suggesting that unobserved country effects are negligible. Exogeneity: Durbin-Wu-Hausman test.

All fiscal variables are ratios on potential output. Dummy run-up to EMU: 1 for EU-15 countries and years between years 1994 and 1998. Dummy SGP: 1 for euro-area countries and years after year 1998. Enlargement: 1 for EU-10 countries after year 2003. Election year: 1 if parliamentary elections took place. Contract/delegation dummies: 1 if contract/delegation country respectively. Government fragmentation: sum of squared seat shares of all parties in the government. Ideology: degree of political conservatism spanning between 0 (single-party, leftwing government) and 8 (single-party, rightwing government). Ideological range: difference between the two extreme ideological scores of parties in coalition governments (0 if single-party government). District magnitude: measures the average number of Parliament seats per electoral district. Government stability: time-varying index spanning between 0 and 12.

Table 6. Determinants of the Fiscal Rule Index

	Fiscal Rule Index				LSDVC 1/	Fiscal Rule Coverage Index	Dummy=1 if positive change in Fiscal Rule Coverage Index
	LSDV		LSDV			LSDV	Probit DV 2/
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Lagged Fiscal Rule Index	0.79*** (12.24)	0.80*** (12.59)	0.77*** (11.60)	0.70*** (9.43)	0.87*** (13.90)	0.68*** (9.10)	-0.05*** (-3.61)
District magnitude	-0.02** (-2.07)	-	-	-0.06 (-1.21)	-0.06** (-2.10)	-0.06 (-1.29)	-0.01* (-1.65)
Government fragmentation	0.00 (0.03)	-	-	0.40** (1.96)	0.09 (0.44)	0.41** (2.09)	0.11** (2.09)
Fiscal Council Index	0.13** (2.35)	-	-	0.11** (2.13)	0.09 (1.55)	0.15** (2.27)	0.01 (1.42)
Fiscal governance: delegation (dummy)	0.11 (1.05)	-	-	-0.02 (-0.11)	-	-0.03 (-0.25)	0.82** (2.33)
Fiscal governance: commitment (dummy)	-0.20 (-1.37)	-	-	-0.41** (-2.31)	-0.38** (-2.04)	-0.39** (-2.30)	-0.01 (-0.62)
Government stability	-	0.04* (1.93)	-	0.05* (1.89)	0.04* (1.73)	0.05* (1.88)	0.00 (0.79)
Ideological range	-	-0.02 (-0.75)	-	-0.02 (-0.48)	-	-0.01 (-0.34)	0.01 (1.35)
Ideology	-	0.00 (0.19)	-	-0.00 (-0.19)	-	-0.00 (-0.21)	-0.00 (-1.28)
Parliamentary election (dummy)	-	0.13* (1.85)	-	0.14** (2.07)	0.17*** (3.32)	0.14** (2.09)	0.05*** (3.59)
Enlargement (dummy)	-	-	0.07 (0.80)	0.24 (1.27)	0.21 (1.04)	0.24 (1.29)	0.38 (1.36)
SGP (dummy)	-	-	0.18** (2.16)	0.02 (0.26)	-	0.04 (0.44)	0.01 (0.42)
Lagged government debt	-	-	0.00** (2.37)	0.00 (0.57)	-	0.00 (0.80)	0.00 (0.99)
Run up to EMU	-	-	0.01 (0.15)	0.15 (1.44)	0.19** (1.97)	0.13 (1.26)	0.03* (1.80)
Country size (log of population)	-	-	-0.04 (-0.47)	9.28** (2.12)	4.72 (1.15)	9.83** (2.23)	2.69** (1.97)
Number of observations	307	266	310	248	248	248	198
R ² (within)	0.71	0.71	0.71	0.74	-	0.75	0.43
Fixed effects (F-test)	2.38***	1.50*	2.25***	3.08***	-	3.03***	
Random effects (p-value of Hausman test)	-	-	-	0.00	-		

1/ LSDVC accounts for the small sample bias in dynamic panels with country fixed-effects. Results refer to Kiviet's corrected LSDV estimator. The R² refers to LSDV estimation.

2/ For the fixed effect probit regression in column (7) marginal probit coefficients are reported, and the R² is the McFadden's pseudo R². Marginal probit coefficients represent the marginal contribution of the explanatory variables (measured at sample mean) to the probability of an increased use of fiscal rules (measured by a positive change in the Fiscal Rule Coverage Index).

Note: LSDV estimators, except column (5) and (7), see above notes. Constants are not reported. Robust *t*- or *z*-statistics are reported in parentheses; constants and country-effects are not reported. *, **, and *** denote, respectively, significance at the 10, 5 and 1 per cent level. Fiscal Council index: time-invariant index increasing with the influence of an independent fiscal council on the budget process (range: 0-10).

Table 7. Impact of numerical fiscal rules on fiscal performance: robustness to construction method of the Fiscal Rule Index
(dependent variable: CAPB; estimation: OLS)

Treatment of overlapping rules			
No correction for overlapping rules	0.13*** (2.82)	-	
Correction for overlapping rules on the basis of coverage	-	0.44*** (4.07)	
R ²	0.79	0.80	
Fixed effect (F-test)	1.21	0.87	
Aggregation method to construct the Index of Strength			
Geometric average of features	0.43*** (4.12)	-	-
Feature with lowest score	-	0.42*** (3.72)	-
Enforcement as “censor” element	-	-	0.38*** (3.74)
R ²	0.80	0.80	0.80
Fixed effect (F-test)	0.85	0.84	1.09

Note: All results are obtained using the baseline specification reported in column 2 of table 5 estimated by OLS and using a version of the Fiscal Rule Index modified as indicated. Robust t or z-statistics are in parentheses. *, **, and *** denote, respectively, significance at the 10, 5 and 1 per cent level.

Table 8. Impact of numerical fiscal rules on fiscal performance: the importance of rules' type, coverage and government sub-sector
(dependent variable: CAPB; estimation: OLS)

Extent of public sector covered by numerical fiscal rules				
Coverage of rules only (Fiscal Rule Coverage Index)				0.42*** (4.15)
R ²				0.80
Expenditure vs. budget-balance and debt rules				
Expenditure rules only	0.14 (1.59)	-	-	0.14 (1.46)
Budget balance and debt rules only	-	0.41*** (3.96)	-	0.41*** (3.93)
R ²	0.79	0.80	0.80	0.81
Fixed effect (F-test)	1.17	1.08	1.08	0.98
Numerical fiscal rule index by government sub-sectors				
Rules applying at the general government sector only	0.23** (2.26)	-	-	0.34*** (3.23)
Rules applying at the central government and social security sectors only	-	0.22** (2.29)	-	0.28*** (2.56)
Rules applying at the level of sub-national governments only	-	-	0.14 (1.47)	0.14 (1.32)
R ²	0.79	0.79	0.79	0.81
Fixed effect (F-test)	1.10	1.21	1.40	0.93

Note: All results are obtained using the baseline specification reported in column 2 of table 5 estimated by OLS and using a version of the Fiscal Rule Index modified as indicated. Robust t or z-statistics are in parentheses. *, **, and *** denote, respectively, significance at the 10, 5 and 1 per cent level.

Table 9. Expenditure rules and fiscal performance
(dependent variable: primary expenditure)

Estimator:	LSDV	LSDV	LSDVC 1/	IVDV 2/
	(1)	(2)	(3)	(4)
Lagged dependent variable	0.71*** (11.23)	0.78*** (16.81)	0.90*** (11.97)	0.79*** (17.19)
Lagged government debt	-0.01 (-1.22)	-0.01 (-1.36)	-0.02 (-1.55)	-0.02 (-1.51)
Lagged output gap	0.00 (0.06)	0.02 (0.60)	0.05 (0.92)	0.03 (0.73)
Expenditure Rule Index	-0.23** (-1.96)	-0.18 (-1.48)	-0.11 (-0.68)	-0.01 (-0.04)
Government stability	-	-0.10** (-1.97)	-0.07 (-1.00)	-0.10** (-2.08)
Government fragmentation	-	-0.56 (-0.80)	-0.52 (-0.58)	-0.70 (-1.01)
Ideology	-	-0.05 (-1.52)	-0.05 (-1.07)	-0.06 (-1.59)
Ideological range	-	0.05 (0.60)	0.10 (0.79)	0.03 (0.30)
Parliamentary election (dummy)	-	0.51*** (2.82)	0.51** (2.35)	0.50*** (2.82)
Fiscal governance: delegation	-	0.86** (1.82)	1.07** (2.09)	0.87* (1.90)
Run up to EMU (dummy)	-	-0.29 (-1.06)	-0.34 (-0.92)	-0.26 (-0.98)
SGP (dummy)	-	-0.14 (-0.47)	-0.18 (-0.49)	-0.23 (-0.79)
Enlargement (dummy)	-	-0.26 (-0.48)	-0.16 (-0.25)	-0.35 (-0.62)
R ² (overall)	0.90	0.93	-	0.94
Fixed effects (F-test)	2.71***	3.45***	-	-
Hansen J-test (p-value)	-	-	-	0.10*
Exogeneity test (for rule index, p-value)	-	-	-	0.18
Random effects (Hausman test)		22.90**	-	-

1/ Kiviet's corrected LSDV estimator.

2/ Omitted instruments are the lagged Expenditure Rule Index and a dummy for the commitment form of fiscal governance.

Note: Constants are not reported. Robust t or z-statistics are in parentheses. *, **, and *** denote, respectively, significance at the 10, 5 and 1 per cent level. Hausman test: under the null hypothesis, both fixed effects and random effects estimators are consistent but random effects estimators are more efficient. Exogeneity: Davidson-McKinnon test.

Table 10. Impact of numerical fiscal rules on fiscal performance: role of specific features of the rules
(dependent variable: CAPB; estimation: OLS)

Feature:	Statutory base of the fiscal rules	Independent body in charge of monitoring	Independent body playing a role in enforcement	Strength of enforcement procedure	Media impact of the fiscal rule
Regression coefficient of fiscal rule index considering each feature separately	0.41*** (4.05)	0.39*** (3.83)	0.45*** (4.24)	0.39*** (3.86)	0.36*** (3.90)
R ²	0.80	0.80	0.81	0.80	0.80
Fixed-effects (F-test)	0.95	0.88	0.99	1.11	0.80

Note: All results are obtained using the baseline specification reported in column 2 of table 5 estimated by OLS and using a version of the Fiscal Rule Index in which only the features indicated were considered. Robust t or z-statistics are in parentheses. *, **, and *** denote, respectively, significance at the 10, 5 and 1 per cent level.

Table 11: Cycle-friendly fiscal rules and fiscal behaviour: rank correlations

	Fiscal Rule Cyclicality Index	Fiscal Rule Cyclicality Index (high scores on budget balance rules)	Fiscal Rule Cyclicality Index (high scores on expenditure rules)
Fiscal Rule Index			
Across the whole sample (number of observations: 400)	-0.16**	-0.20***	0.00
Across countries (number of observations: 25)	0.00	-0.10	0.16**
Expenditure Rule Index			
Across the whole sample (number of observations: 400)	0.30***	0.23***	0.50***
Across countries (number of observations: 25)	0.41**	0.25	0.54***
Budget Balance Rule Index			
Across the whole sample (number of observations: 400)	-0.38***	-0.42***	-0.21***
Across countries (number of observations: 25)	-0.31	-0.39*	-0.15
Fiscal Rule Index (rules at general government level only)			
Across the whole sample (number of observations: 400)	0.09*	0.09*	0.08
Across countries (number of observations: 25)	0.18	0.19	0.17
Fiscal Rule Index (rules at central government and social security level only)			
Across the whole sample (number of observations: 400)	-0.04	-0.1**	0.19***
Across countries (number of observations: 25)	-0.01	-0.14	0.12
Fiscal Rule Index (rules at sub-national government level only)			
Across the whole sample (number of observations: 400)	-0.50***	-0.55***	-0.26***
Across countries (number of observations: 25)	-0.38*	-0.49**	-0.21
Apparent elasticity of CAPB to the output gap			
Across the whole sample (number of observations: 270)	0.10	0.09	0.10*
Across countries (number of observations: 25)	0.26	0.20	0.30

Note: Spearman rank correlations. Across countries: the correlation concerns the average value for each country over the sample. The apparent elasticity of the CABP to the output gap is obtained as $\Delta CAPB / \Delta y_{gap}$. Outliers above and below, respectively, the 95 and the 5% percentile for this variable are eliminated. *, **, and *** denote, respectively, significance at the 10, 5 and 1 per cent level.

Table 12. Cycle-friendly fiscal rules and fiscal behaviour: evidence from the estimation of fiscal reaction functions

	Fiscal Rule Cyclical Index		Fiscal Rule Cyclical Index (lower scores on expenditure rules)		Fiscal Rule Cyclical Index (lower scores on budget balance rules)	
	High	Low	High	Low	High	Low
Lagged output gap	-0.087 (-1.25)	-0.005 (-0.08)	-0.123 (-1.55)	0.02 (0.35)	-0.081 (-1.26)	0.131* (1.92)
Fiscal Rule Index	0.519** (2.36)	0.165 (1.29)	0.463** (2.03)	0.311** (2.42)	0.316* (1.85)	0.213 (1.45)
Number of observations	114	129	98	145	143	100
R square	77	0.84	0.77	0.83	0.78	0.86
Fixed effects (F-test)	0.28	0.77	0.32	1.29	0.84	1.49

Note: All results are obtained using the baseline specification reported in column 2 of table 5 estimated by OLS. Regressions are performed separately for the countries with the average value of the Fiscal Rule Cyclical Index above ("High") and below ("Low") the sample mean. Coefficients that are statistically significant at least at the 10 per cent level across the different sample of countries are reported in bold. The test is the t statistics obtained from a regression including all the observations of the sample and in which each variable is interacted by a dummy taking value 1 for countries with a high FRCI index. The t statistics of the interacted term indicates whether the coefficients for high and low-FRCI countries are statistically different from each other. Robust t -statistics are in parentheses. *, **, and *** denote, respectively, significance at the 10, 5 and 1 per cent level.

APPENDIX 1: THE CONSTRUCTION OF THE SYNTHETIC INDEXES FOR NUMERICAL FISCAL RULES

The Fiscal Rule Coverage Index

This index provides, *for each country and each year*, information on the number of rules in place and on what part of general government finances is covered by each rule. The construction of the indicator is based on the following assumptions.

- **Aggregation of rules of different type.** In absence of a strong prior regarding which types of rules have a greater influence on budgetary outcomes (e.g., a budget balance rule, a debt rule or an expenditure rule), equal weighting was used as a transparent and straightforward criterion.
- **Information on rules' coverage.** Numerical fiscal rules have been aggregated on the basis of the share of the total expenditure of the general government covered. Direct information on the share of the general government covered by each rule was provided by fiscal experts in EU countries.
- **Overlapping.** In constructing the Fiscal Rule Coverage Index, the possible redundancy among rules was dealt as follows: whenever more than one rule applies to the same sub-sector of general government, the index gives full weight only to the rule with the highest Index of Strength (see next section of this Appendix) and a weight of 0.5 to any additional rule. For instance, if in a given country, in a given year, a strong expenditure rule applied to the whole of the general government coexists with a weak budget balance applied to local governments (which account for 10% of general government expenditure), the Fiscal Rule Coverage Index will be equal to $100\% + 10\% * 0.5 = 1.05$.

For each country, a time-varying Expenditure Rule Coverage Index measuring the share of government finances covered by expenditure rules was constructed following the same methodology, but restricting the sample to numerical expenditure rules.

The Index of Strength of Numerical Fiscal Rules

With a view to take into account the characteristics of the individual fiscal rules, an index of ‘strength’ of numerical fiscal rules was calculated *for each rule*. The index takes into account five features: the statutory basis of the rule; the body in charge of monitoring the rule; the body in charge of enforcing the rule; the functioning of the enforcement mechanism; the media visibility of the rule. For each criterion, scores were attributed as follows.

Feature 1: statutory basis of the rule

The score of this criterion index is constructed as a simple average of the two elements below.

Statutory or legal base of the rule

- 4 is assigned for a constitutional base
- 3 if the rule is based on a legal act (e.g. Public finance Act, Fiscal Responsibility Law)
- 2 if the rule is based on a coalition agreement or an agreement by different general government tiers
- 1 for political commitment by a given authority (central or local government, Minister of Finance)

Room for setting or revising objectives

- 3 if there is no margin for adjusting objectives (they are encapsulated in the rule)
- 2 there is some but constrained margin in setting or adjusting objectives
- 1 there is complete freedom in setting objectives (the statutory base of the rule only contains principles)

Feature 2: Body in charge of monitoring respect of the rule

The score of this criterion index is calculated as follows:

- 3 monitoring by an independent authority (Fiscal Council, Court of Auditors...) or national Parliament
- 2 monitoring by the Ministry of Finance or any other government body
- 1 no regular public monitoring of the rule (there is no report systematically assessing compliance)

The score of this variable is augmented by 1 point in case there is a real time monitoring of compliance with the rule ('alert mechanisms')

Feature 3: Body in charge of enforcement of the rule

The score of this criterion index is calculated as follows.

- 3 enforcement by an independent authority (Fiscal Council or any Court) or the National Parliament

- 2 enforcement by the Ministry of Finance or any other government body
- 1 no specific body in charge of enforcement

Feature 4: Enforcement mechanism of the rule

The score of this criterion index is calculated as follows.

- 4 automatic correction and sanction mechanisms in case of non-compliance
- 3 automatic correction mechanism in case of non-compliance and the possibility of imposing sanctions
- 2 Obligation to present corrective proposals to the relevant authority
- 1 there is no ex-ante defined actions in case of non-compliance

The score of this variable is augmented by 1 point in case escape clauses are foreseen and clearly specified.

Feature 5: Media visibility of the rule

The score of this criterion index is calculated as follows.

- 3 if the rule observance is closely monitored by the media, and if non-compliance is likely to trigger a public debate
- 2 for high media interest in rule-compliance, but non-compliance is unlikely to invoke a public debate
- 1 for no or modest interest of the media

In order to avoid that the weight of the features in the overall index is affected by the score range, scores are re-normalized in such a way to have the maximum score equal to 10 to each feature. In absence of strong a-priori regarding the weight to be given to each feature, the Index of Strength was computed using equal weights.

The Fiscal Rule Index

The purpose of this index is to summarise information on the coverage and on the strength of rules *in each country and each year*. The indicator is constructed in two steps. First, the potential contribution of each rule to the Fiscal Rule Index is computed by multiplying the share of government finances covered by the rule by the Index of Strength of the rule. Second, these rule-specific indicators are summed up over all the rules in place in a given country in a given year. In case several rules apply to the same general government sub-sector, we follow the same methodology as for the calculation of the Fiscal Rule Coverage Index. Weight 1 is given to the rule with the highest Index of Strength and a weight 0.5 is given to all the other rules. Hence, formally, the value of the Fiscal Rule Index in country C in year t ($FRI_{C,t}$) is given by

$$FRI_{C,t} = \sum_{i=1}^{N_{C,t}} \alpha_i S_i I_i,$$

where $N_{C,t}$ is the number of rules which operate in country C in year t , α_i is the share of general government expenditure covered by rule i , S_i is the index of strength of rule i , and I_i is an indicator function such that $I_i = 0.5$ if there exists a rule i' which operates on a same government sub-sector as rule i and such $S_{i'} > S_i$, while $I_i = 1$ otherwise.

Following the same approach, but taking into account only expenditure rules, a time-varying Expenditure Rule Index was constructed.

The Fiscal Rule Cyclical Index

The purpose of this index is to summarise the likely impact of the system of numerical fiscal rules prevailing in *each country and each year* on the cyclical stance of fiscal policy. The index is constructed in the same way as the Fiscal Rule Index, except that in this case the information on the strength of individual fiscal rules is replaced by information on the properties of each fiscal rule with respect to stabilisation. Positive numbers imply a counter-cyclical impact; negative numbers a pro-cyclical impact (note that as opposed to the Fiscal Rule Index, the effect of different fiscal rules may offset each other as far as their impact of on cyclical stability is concerned). In case several rules of the same type apply, unit weight is given to the rule with the highest Index of Strength and a weight equal to 0.5 is given to all the other rules. The scoring assigned to different types of rules is as follows.

Expenditure rules

- 2 is assigned for a rule capping expenditure growth or level (in nominal or real terms)

- 2 if the rule is defined in terms of an expenditure to GDP ratio

Budget balance, borrowing and debt rules

- 1 if the rule is defined in cyclically-adjusted terms or if the period for assessing compliance is a full business cycle
- 1 for rules defined over a medium-term horizon
- 2 for rules with a short time horizon (1 year)

Revenue rules

- 2 is assigned if the rule ensures that cyclical revenues are used for debt reduction, or favours it (the government has to specify in advance how cyclical revenues will be used)
- 2 is assigned to other types of rules

Robustness checks

As a robustness check, alternative indexes were constructed as follows.

Fiscal Rule Index

- **Criterion to deal with rules of different type.** Alternative Fiscal Rule Indexes were constructed only considering expenditure rules or budget balance and debt rules.
- **Criterion to deal with different coverage of rules.** Alternative indexes were used considering only rules applying at one of the following government sub-sectors: central government, regional government, social security, local government.
- **Criterion to deal with overlapping rules.** Two alternatives considered: (i) no scaling down in case of overlapping; (ii) full weight given to the rules having the highest coverage rather than the highest Index of Strength.
- **Criterion to take into account the strength of rules.** Two robustness checks were considered: (i) to check for the robustness to possible different weight assigned to the 5 features considered in the construction of the Index of Strength, the Fiscal Rule Index was constructed in 5 different ways, each taking into account only one the 5 qualitative features considered to measure the strength of the rules; (ii) to check robustness to the criterion adopted to aggregate the scores of the 5 features into a single Index of Strength, the following aggregation criteria alternative to simple averaging were considered: geometric average, feature with the minimum score (Leontieff aggregation), enforcement as a "censor" element (feature 4 times the average of the remaining features).

Fiscal Rule Cyclicity Index

- **Criterion to define cyclicity scores of rules.** Alternative scoring criteria were considered as follows:

Alternative 1 (lower scores on expenditure rules)

Expenditure rules

- 1 is assigned for a rule capping expenditure growth or level (in nominal or real terms)
- 1 if the rule is defined in terms of an expenditure to GDP ratio

Budget balance, borrowing and debt rules

- 1 if the rule is defined in cyclically-adjusted terms or if the period for assessing compliance is a full business cycle
- 1 for rules defined over a medium-term horizon
- 2 for rules with a short time horizon (1 year)

Revenue rules

- 2 is assigned if the rule ensures that cyclical revenues are used for debt reduction, or favours it (the government has to specify in advance how cyclical revenues will be used)
- 2 is assigned to other types of rules

Alternative 2 (lower scores on budget balance rules)

Expenditure rules

- 2 is assigned for a rule capping expenditure growth or level (in nominal or real terms)
- 2 if the rule is defined in terms of an expenditure to GDP ratio

Budget balance, borrowing and debt rules

- 0.5 if the rule is defined in cyclically-adjusted terms or if the period for assessing compliance is a full business cycle
- 0.5 for rules defined over a medium-term horizon
- 1 for rules with a short time horizon (1 year)

Revenue rules

- 2 is assigned if the rule ensures that cyclical revenues are used for debt reduction, or favours it (the government has to specify in advance how cyclical revenues will be used)
- 2 is assigned to other types of rules

APPENDIX 2. VARIABLE AND DATA SOURCES

Numerical fiscal rules

The source of the information are the replies to questionnaires submitted in Autumn 2005 to experts in Finance Ministries in EU countries in the framework of the Economic Policy Committee Working Group on the Quality of Public Finances (QWG).

Fiscal and macroeconomic variables

The source of all fiscal and macroeconomic data used in the analysis is the European Commission DG ECFIN AMECO database, Autumn 2006 vintage.

Fiscal governance variables

- Time-varying dummies for contract, delegation or mixed status of countries. Data for Cyprus and Malta are not available. Data for 2005 are not available and the same data as for 2004 are used for that year. Source: Annett (2006).
- Fiscal councils: time-invariant index increasing with the influence of an independent fiscal council on the budget process (0-10) constructed on the basis of Questionnaires collected within the activities of the EPC QWG. Source: Debrun and Kumar (2007).

Political variables

- Election dummies for the legislative, Herfindahl index of fragmentation of the government majority, district magnitude, and proportional voting rule: World Bank Political Database (Beck et al., 2001), updated in 2005. Source: World Bank Political Database (Beck et al., 2001).
- Government Stability Index: index spanning between 0 and 12. Source: International Country Risk Guide (by the PRS Group).
- Government fragmentation: sum of squared seat shares of all parties in the government. Source: World Bank Political Database (Beck et al., 2001).
- District magnitude: measures the average number of Parliament seats per electoral district. Source: World Bank Political Database (Beck et al., 2001).
- Ideology: index of political conservatism spanning between 0 and 8, considering the two main political parties in the coalition. For main coalition partner, a score of 4 is attributed to right-wing parties, 2 to center parties and 0 to left-wing parties. Junior coalition parties get half those scores. A single-party right-wing government gets a score of 8. Source: World Bank Political Database (Beck et al., 2001).
- Ideological range: difference between the two extreme ideological scores of parties in coalition governments (0 if single party government). Source: World Bank Political Database (Beck et al., 2001).