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# THE DESIGN OF NATIONAL FISCAL FRAMEWORKS AND THEIR BUDGETARY IMPACT

Carolin Nerlich and Wolf Heinrich Reuter



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### **Carolin Nerlich**

European Central Bank; e-mail: [carolin.nerlich@ecb.europa.eu](mailto:carolin.nerlich@ecb.europa.eu)

### **Wolf Heinrich Reuter**

Vienna University of Economics and Business; e-mail: [wolf.reuter@wu.ac.at](mailto:wolf.reuter@wu.ac.at)

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<b>Address</b>	Kaiserstrasse 29, 60311 Frankfurt am Main, Germany
<b>Postal address</b>	Postfach 16 03 19, 60066 Frankfurt am Main, Germany
<b>Telephone</b>	+49 69 1344 0
<b>Internet</b>	<a href="http://www.ecb.europa.eu">http://www.ecb.europa.eu</a>
<b>Fax</b>	+49 69 1344 6000

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### **Abstract**

This study analyses the link between fiscal frameworks and their budgetary impact. We look at different features of national numerical fiscal rules in combination with fiscal councils and medium-term budgeting frameworks. We construct our own time-varying dataset for national fiscal frameworks for the period 1990-2012 covering all 27 EU Member States and estimate a dynamic panel on aggregate and disaggregated fiscal policy variables. We find strong support that numerical fiscal rules help to improve the primary balance, and that the budgetary impact can be further strengthened when supported by independent fiscal councils and an effective medium-term budgeting framework.

JEL-Classification: E61, E62, H60

Keywords: Fiscal policy, Fiscal rules, Fiscal framework, Fiscal Council, Medium Term Budgeting Framework

## Non-technical summary

As a consequence of the sovereign debt crisis many initiatives were brought forward to strengthen the EU's fiscal governance framework. While most proposals addressed fiscal governance at the supranational level, notably in the context of the revised Stability and Growth Pact, some of the new regulations also aim at improving the design of fiscal frameworks at the national level, namely the Fiscal Compact. All these new regulations are intended to soften inherent incentive and coordination problems which came apparent in the euro area given the setting of a common monetary policy and many national fiscal policies and more generally to be able to better counteract the deficit bias of governments. Well-designed fiscal frameworks should help to lead to more sustainable public finances and internalise the costs of fiscal indiscipline.

The paper analyses the link between well-designed fiscal frameworks and their budgetary impact. It indirectly tries to provide some insights on how these recent changes to the EU fiscal governance framework are likely to impact fiscal discipline in the future. We analyse the budgetary impact of different features of national fiscal frameworks in the EU member states over the past two decades. Concretely, we focus on three key elements of fiscal frameworks, namely numerical fiscal rules, fiscal councils and medium-term budgeting frameworks. The study looks at different features of national numerical fiscal rules and analyses whether the budgetary impact of fiscal rules can be further strengthened when supported by an independent fiscal council and an effective medium-term budgeting framework. To better understand the budgetary impact we look at both, aggregated as well as disaggregated fiscal policy variables.

We contribute to the existing literature by first, constructing our own time-varying dataset of fiscal frameworks covering all 27 EU countries from 1990 to 2012, which enables us to run dynamic panel regressions with approximately twice as many observations as in comparable studies. Second, we use dummy variables instead of the composite indices employed in the existing literature, which allows us to quantify the fiscal impact of changes in fiscal frameworks. Third, we assess the budgetary consequences of fiscal frameworks by looking at disaggregated (expenditure and revenue) data to uncover hidden effects and the origin of the aggregated findings. Fourth, we complement the analysis by including fiscal councils and medium-term budgetary frameworks as explanatory variables.

We find that fiscal rules have mostly the intended disciplinary effect on public expenditures, which thereby helps to improve the primary balance compared to countries without a fiscal rule. Moreover, the analysis shows that depending on the specification of the numerical fiscal rules, their impact differs across certain expenditure and revenue components. While balanced budget rules affect almost every category of fiscal policy, debt rules seem to allow for intertemporal shifts and thus only have a pronounced effect on specific categories. We find that the positive effect on the primary balance can be further strengthened when numerical fiscal rules are enacted in law or constitution and supported by independent fiscal councils and an effective medium-term budgeting framework. In general our findings suggest that well-designed fiscal frameworks provide a disciplinary device on public spending and support a better fiscal planning over the medium-term.

# 1 Introduction

As a consequence of the sovereign debt crisis many initiatives were brought forward to strengthen the EU fiscal governance framework. While most proposals addressed fiscal governance at the supranational level, notably in the context of the revised Stability and Growth Pact, some of the new regulations also aim at improving the design of fiscal frameworks at the national level, namely the Fiscal Compact<sup>1</sup>. All these new regulations are intended to soften inherent incentive and coordination problems that became apparent in the euro area given the setting of a common monetary policy and many national fiscal policies and more generally to be able to better counteract the deficit bias of governments<sup>2</sup>. Well-designed fiscal frameworks should help to lead to more sustainable public finances and internalise the costs of fiscal indiscipline.

This paper indirectly tries to provide some insights on how these recent changes to the EU fiscal governance framework are likely to impact fiscal discipline in the future. We analyse the budgetary impact of different features of national fiscal frameworks in the EU member states over the past two decades. Concretely, we focus on three key elements of fiscal frameworks, namely numerical fiscal rules (as defined in Kopits and Symanski)<sup>3</sup>, fiscal councils and medium-term budgeting frameworks. The study looks at different features of national numerical fiscal rules and analyses whether the budgetary impact of fiscal rules can be further strengthened when supported by an independent fiscal council and an effective medium-term budgeting framework. To better understand the budgetary impact we look at both, aggregated as well as disaggregated fiscal policy variables.

We constructed our own time-varying dataset for national fiscal frameworks, which is largely based on four different datasets available from the European Commission (2010c, 2012b), the OECD (2003, 2008), the IMF (2012) and an ESCB-internal dataset on national fiscal frameworks (2011, 2012). Our dataset covers the period 1990-2012 for all 27 EU countries and we estimate a dynamic panel using Kiviet (1995)'s bias corrected LSDV dynamic panel estimator for unbalanced panels.

The literature on the budgetary impact of numerical fiscal rules has grown in the last decade as more such rules have been enacted and more data has become available.<sup>4</sup> One of the studies most closely related to our research is the one by Debrun *et al.* (2008). They use a dynamic panel setting for 25 EU countries

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<sup>1</sup>The Fiscal Compact (as part of the Treaty on Stability, Coordination and Governance in the Economic and Monetary Union) entered into force on January 1, 2013 and requires all EU countries (except UK and Czech Republic) to implement a balanced budget rule in national legislation by end-2013.

<sup>2</sup>See Ayuso-i Casals *et al.* (2007) or Debrun *et al.* (2008) for a review of the literature about the deficit bias.

<sup>3</sup>Kopits & Symanski (1998) define fiscal rules as "a permanent constraint on fiscal policy, expressed in terms of a summary indicator of fiscal performance".

<sup>4</sup>A detailed survey of the literature can be found e.g. in Ayuso-i Casals *et al.* (2007). The historic development of fiscal frameworks is thoroughly discussed e.g. in European Commission (2006) and Schaechter *et al.* (2012).

from 1990 to 2005 and find that stricter and broader national numerical fiscal rules lead to improved cyclically adjusted primary balances. Ayuso-i Casals *et al.* (2007) in a similar setting find that an increase in the share of government finances covered by fiscal rules leads to lower deficits. Afonso & Hauptmeier (2009) focus on government decentralisation, while Wierds (2011), Turrini (2008) and Holm-Hadulla *et al.* (2012) concentrate on expenditure rules. Most of these studies find that fiscal rules limit to some extent the deficit and/or expenditure bias. They use EU country data until 2005, rely on the composite fiscal rule indices published by the European Commission, and look at aggregated fiscal policy measures like the primary balance or primary expenditures.

We contribute to the existing literature by first, constructing a larger dynamic dataset, which includes approximately twice as many observations. Second, we use dummy variables instead of composite indices, which enables us to quantify the fiscal impact of changes in fiscal frameworks. Third, we assess the budgetary consequences of fiscal frameworks by also looking at disaggregated (expenditure and revenue) data to uncover hidden effects and the origin of the aggregated findings. Fourth, we complement the analysis by looking at fiscal councils and medium term budgeting frameworks in combination with national numerical fiscal rules.

On the latter aspect, Wyplosz (2012) strongly advocates this combination, and emphasises that credible fiscal institutions can help to overcome the time inconsistency and transparency problem of numerical fiscal rules. Apart from Debrun *et al.* (2012) there is to our knowledge no other empirical study using fiscal councils or medium-term budgeting frameworks as explanatory variable. Nevertheless there are various reviews and case-studies of existing fiscal councils e.g. by Calmfors & Wren-Lewis (2011) or Debrun *et al.* (2009). Debrun & Kumar (2007) use fiscal councils as instrumental variable for fiscal rules, implying that the existence of a fiscal council leads to stricter national numerical fiscal rules. Debrun *et al.* (2012) find in a panel setting for 7 EU countries from 2003-2010 no direct effect of fiscal councils per se on the fiscal outcome and only a weak correlation between their media impact and the changes in fiscal policy.

Our main findings suggest that the introduction of numerical fiscal rules lowers public expenditures in countries with fiscal rules compared to their peers as well as revenues, but the latter to a smaller extent, such that indeed the primary balance is improving. This budgetary impact can be further strengthened when numerical fiscal rules are enacted in law or constitution and supported by independent fiscal councils and an effective medium-term budgeting framework. On a disaggregated level we can also report on the composition of adjustment and find that numerical fiscal rules have their strongest effects on social benefits, compensation of employees, general public services and defence expenditures. Thereby balanced budget rules have an effect on almost every expenditure category, while the effect of debt rules is strongly concentrated on a few specific categories and expenditure rules do not have any significant impact.

The paper is structured as follows: Section 2 briefly defines our elements of fiscal frameworks and summarises the different types of national fiscal frameworks prevailing in the EU. Section 3 presents the empirical framework that

we use to estimate the budgetary impact of fiscal rules in the EU, both at the aggregated and the disaggregated level. Our main findings are summarised in section 4 and 5. Section 6 concludes with an outlook on possible avenues for future research.

## 2 The dataset on national fiscal frameworks and stylised facts

National fiscal frameworks can have very different features and may change over time. To assess their effectiveness, we constructed our own time-varying dataset for national fiscal frameworks. Our dataset includes data on numerical fiscal rules, fiscal councils and medium-term budgetary frameworks. The dataset includes dummies for certain characteristics for national fiscal frameworks. It covers 27 EU countries for the period 1990-2012 (except for medium-term budgetary framework for which data is only available from 1999 onwards).

### 2.1 National numerical fiscal rules (NFRs)

Regarding national numerical fiscal rules (NFRs), the dataset is based on four different datasets available from the European Commission (2010c, 2012b), the OECD (2003, 2008), the IMF (2012) and an ESCB-internal dataset on national fiscal frameworks (2011, 2012)<sup>5</sup>. The dataset includes dummies ( $\mathcal{R}$ ) for certain characteristics of fiscal rules, covering the 27 EU countries for the period 1990-2012. The dummy variable is one if the country in a specific year has a national fiscal rule in place with certain characteristics. We look at four different characteristics of national fiscal rules: the type, the status, the coverage, and the enforcement. Regarding the different types of fiscal rules, we consider balanced budget (*BBR*), debt (*DR*), expenditure (*ER*) and revenue rules<sup>6</sup>. Regarding the status, we differentiate whether a fiscal rule is just stipulated in a political or coalitional agreement or laid down in law or constitution (*LC*). The coverage of a fiscal rule can relate to the central or general government (*CGGG*), to the regional or local government (*RLG*) or to the social security. And finally regarding the enforcement, fiscal rules can be linked to the (automatic) activation of sanctions or correction mechanisms (*SCM*). A list of the national numerical fiscal rules dummy variables can be found in Appendix A.1.

A few interesting observations can be made when looking at the statistics of our dataset. First, as shown in Figure 1, the number of countries with any kind of fiscal rule in place increased steadily between 1990 and 2012. By now almost

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<sup>5</sup>Although these databases often cover the same pool of countries and similar time periods they show several differences in the existence and characteristics of numerical fiscal rules in the EU. They were only considered, when the majority of data sources showed similar features of NFRs in year  $t$ .

<sup>6</sup>Our data set does not include information about the content of the fiscal rules, e.g. if variables are used in cyclically adjusted or un-adjusted terms, the numerical value of the constraints or exact definitions of the targets.

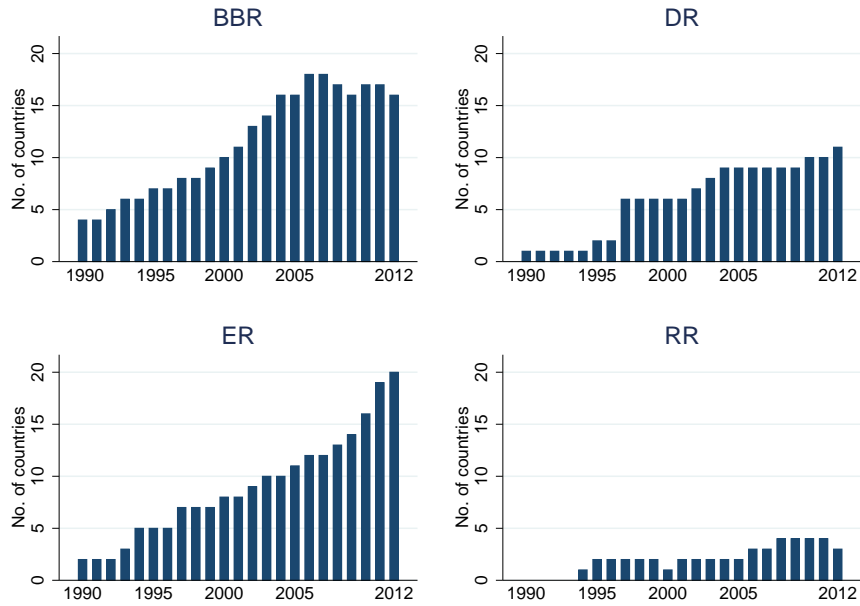


Figure 1: Number of countries for different types of NFRs (per year)

all EU27 countries have some kind of fiscal rule in place, either at the central government level, the regional level or at the level of social security<sup>7</sup>. Second, expenditure rules and balanced budget rules are the most common fiscal rules in place among EU countries. In turn, less than half of the countries have debt rules in place, of which only some relate to the general or central government, while there are generally only very few revenue rules in place. For this reason, our empirical analysis will not focus on revenue rules separately. Third, the status of fiscal rules has changed over time, thereby increasing the credibility of fiscal rules. While at the beginning of the sample period most countries only had fiscal rules which were based on political or coalition agreement, this has shifted to almost 90% of the countries having a numerical fiscal rule being settled in law or constitution in 2012. Of those countries having fiscal rules at the central or general government level, in particular in the non-euro area countries, the rules are mostly at statutory or constitutional level. Fourth, with respect to the coverage of the fiscal rules in place, there are as many countries having rules that cover the central or general government as countries with rules that cover the local or regional level. However, there are large differences across countries regarding the coverage of different types of rules: while in 2012 almost twice as many countries have balanced budget rules linked to regional or local

<sup>7</sup>The number of fiscal rules increased particularly strongly between 1996 and 1999 and between 2001 and 2004.



governments instead of the central or general government, the contrary is true in the case for expenditure rules, which are mostly linked to the central or general government.

## 2.2 Fiscal councils (FCs)

Our dataset also includes data on fiscal councils.<sup>8</sup> We base our dataset on the information available from the European Commission (2010a), Calmfors & Wren-Lewis (2011) and the ESCB-internal dataset on national fiscal frameworks (2011, 2012). The dataset covers dummies ( $\mathcal{FC}$ ) for the same time and country sample as for numerical fiscal rules. It distinguishes between some key characteristics of fiscal councils which were generally found to be important<sup>9</sup>: i) preparation of macroeconomic or fiscal forecasts, ii) issuance of normative statements, iii) public assessment of government programs, iv) obligation for a government to comply or react to assessments, v) legal status, vi) freedom from influence of the finance ministry, and vii) independent resources and nomination of staff. We assume that the characteristics of a fiscal council stay the same over its lifetime, i.e. from the establishment of the fiscal council until its termination or the end of the sample period, as those are often predefined in the law establishing the institution.<sup>10</sup>

We have information on 14 fiscal councils in our sample. The number of fiscal councils has increased strongly in recent years (from five in 2007 to 14 by 2012). In half of the countries with fiscal councils the governments are obliged to comply with their recommendations or, if this is not the case, they need to publicly explain why they do not comply. Moreover, around half of the fiscal councils have independent resources and access to information.<sup>11</sup> However for the empirical analysis we only use a general dummy for fiscal councils and a dummy for fiscal councils with independent resources, appropriate access to information and independent nomination of staff, as data availability on the other specifications is too limited.

## 2.3 Medium-term budgetary frameworks (MTBFs)

Effective medium-term budgeting frameworks (MTBFs) should entail the following elements<sup>12</sup>: i) a planning horizon of at least three years; ii) provisions of medium-term fiscal developments and a multi-annual character of budget planning; iii) a binding character; and iv) medium-term fiscal plans should be made

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<sup>8</sup>We only focus on fiscal councils as opposed to fiscal agencies (to which parts of fiscal policy is delegated) or fiscal monitoring agencies (like courts of auditors).

<sup>9</sup>See e.g. Debrun & Kumar (2007). These characteristics are partly reflected in EU Council regulation No. 473/2013 on draft budgetary plans, which entered into force on 30 May 2013.

<sup>10</sup>We abstract from the case of Hungary as a notable exception.

<sup>11</sup>According to Debrun & Kumar (2007) independent resources and access to information are the most important characteristics of a fiscal council, i.e. they found a positive relationship between a fiscal council with de jure guarantees of independence and the impact on fiscal policy.

<sup>12</sup>See also the Council Directive 2011/85/EU on medium-term budgetary frameworks.

public annually. To our knowledge no time-varying database on medium term budgeting frameworks is available<sup>13</sup>. Therefore we construct a proxy variable which closely covers the above mentioned four elements.

In the context of the Stability and Growth Pact the EU member countries are obliged to publish "stability or convergence programmes" (SCP), which include budgetary forecasts for a three-year horizon, which can be interpreted as their medium-term budgetary strategy. Thus points i) and iv) seem to be fulfilled by all EU member states. Now we assume that a country which fulfils points ii) and iii) has a good estimate of future primary expenditures (unless there are unexpected changes in the business cycle). We use this to construct a proxy variable for MTBFs by calculating the estimation error of primary expenditures as percentage of GDP adjusted by unexpected changes in the business cycle for every year and country submitting a SCP, i.e. the smaller the estimation error the more effective is the medium-term budgetary framework.<sup>14</sup> Our constructed proxy is broadly in line with the index constructed by the European Commission (2010b) for the year 2010. If we compare the two measures, we get a reassuringly high negative correlation of -0.68<sup>15</sup>. And as one would expect the correlation gradually declines when comparing the 2010 index of the European Commission with our measure for the years 2009, 2008 and earlier.

## 2.4 Effects of national numerical fiscal rules: stylised facts

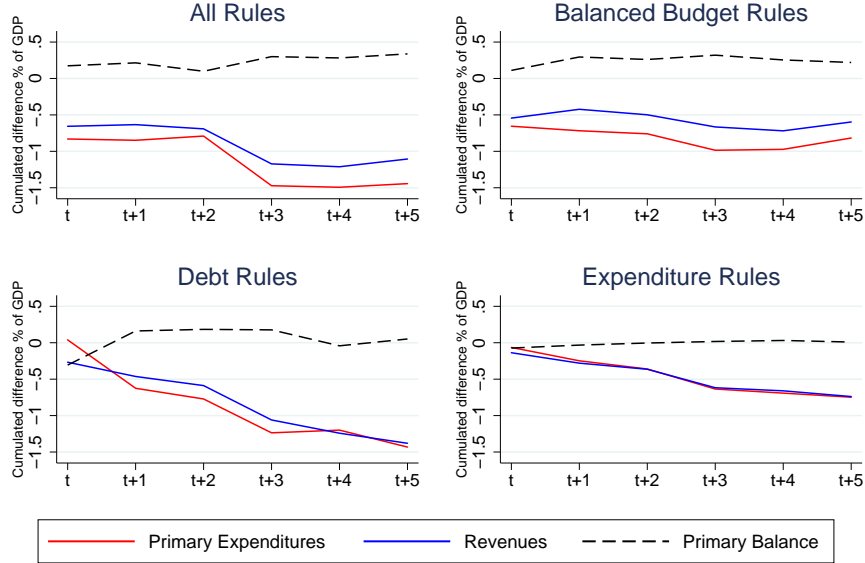
The impact of numerical fiscal rules can be already observed directly in the data. Figure 2 shows the average accumulated difference of countries after the introduction of a numerical fiscal rule to the mean of all countries in the main fiscal policy aggregates for different types of fiscal rules. At first glance we notice that expenditures as well as revenues are lower than the mean after the introduction of any type of numerical fiscal rule. The effect on the primary balance is positive for balanced budget and debt rules, as revenues are lowered to a smaller extent than expenditures. Contrary after the introduction of an expenditure rule both expenditures and revenues are lower than the mean to the same extent which leaves the primary balance similar to the mean. As these results can also be driven by several factors outside of this simple analysis we investigate the relationship between numerical fiscal rules and fiscal policy variables in an econometric exercise in Section 3.

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<sup>13</sup>The European Commission (2010b) published a non-time varying database covering medium-term budgeting frameworks for 2010 and Hallerberg *et al.* (2009) present data on multi-annual targets for 1991 and 2000/2004.

<sup>14</sup>Concretely the estimation error is derived from the difference between the estimated nominal level of primary expenditures and the actual nominal level of primary expenditures as percentage of GDP for every year and country and adjusted by the difference of the estimated nominal GDP and actual nominal GDP. From that we construct our MTBF dummy variable being one if the five-year-average of the error is below 1% of GDP. A more detailed description is given in Appendix A.5.

<sup>15</sup>For the dummy index we still get a quite high correlation of 0.59.



Note: Average cumulated difference to year mean of all countries;  $t$  is the year when rule is in place for first time,  $t+1$  the following year, etc.; NFR are constitutional or statutory (CL); fiscal variables are cyclically adjusted; countries with rule already in place before 1991 or introduced after 2006 are ignored.

Figure 2: Average cumulated difference (% of GDP) to year mean over all countries of change in cyclically adjusted primary budgetary variables

### 3 The baseline model

We use a standard empirical setup often used in the literature (see e.g. Debrun *et al.*, 2008; Hallerberg *et al.*, 2009; de Haan *et al.*, 2012), which describes a basic fiscal reaction function. We estimate the following Equation 1 for the 27 EU member states for the period 1990 to 2012, in which we regress various fiscal policy aggregates on numerical fiscal rules:

$$\mathcal{F}_{i,t}^* = \beta_0 + \beta_1 \mathcal{F}_{i,t-1}^* + \beta_2 \mathcal{R}_{i,t}^* + x'_{i,t} \gamma + \eta_i + \epsilon_{i,t} \quad (1)$$

with the dependent variable  $\mathcal{F}$  being the respective fiscal policy variable,  $\mathcal{R}$  being the dummy of the numerical fiscal rule and  $x$  being a set of control variables.  $\epsilon_{i,t}$  is the standard time and country specific error.

The fiscal policy variable is in our analysis either the primary balance ( $\mathcal{F}^{PB}$ ), primary expenditures ( $\mathcal{F}^{PE}$ ), revenues ( $\mathcal{F}^R$ ) or various disaggregated expenditure and revenue components. All fiscal policy variables are cyclically adjusted (as common in this strand of literature to capture discretionary fiscal policy instead of the working of automatic stabilizers, see e.g. Debrun *et al.*, 2008 or Gali & Perotti, 2003) in line with the potential GDP method used by the European Commission (2012a), described in Appendix A.6. The fiscal policy variables are

taken from Eurostat and the dummy variable is taken from our dataset<sup>16</sup>. As past fiscal policy outcomes can be expected to determine the current ones we include the lagged dependent variable.

In principle also the reverse causality could hold as countries might change their numerical fiscal rules in reaction to the government's fiscal performance. This would imply an endogeneity bias.<sup>17</sup> However, as it is a very cumbersome and lengthy process to change fiscal frameworks (in particular if they are strengthened), we assume this bias to be relatively small. There can be assumed to be a significant time lag between the decision to introduce a fiscal rule and the time the rule entered into force. Thus to address the potential issue of an endogeneity bias due to reverse causality, we use - similar to other studies, e.g. de Haan *et al.* (2012) - annual data while the dummy for the fiscal rules relates to the time the rule already entered into force. Furthermore e.g. Debrun *et al.* (2008) did not find strongly differing results when doing robustness checks with instrumental variable estimation techniques.

Similar to other studies our set of control variables  $x$  contains three different categories of variables: i) economic, ii) political and iii) institutional variables<sup>18</sup>. The economic variables control for changes in fiscal policy that go beyond cyclical developments. They include the (lagged) debt level, as fiscal policy in countries with higher debt levels might be geared towards debt reduction to contain fiscal sustainability risks. They also contain, the (lagged) output gap, as governments might try to close the output gap via e.g. expansionary fiscal policy in times of crisis. We also include inflation and the dependency ratio (i.e. the percentage of population aged below 15 or above 64 to total population) as some parts of public expenditures or revenues of the general government might be indexed or relate on the number of people depending on the social security system. Furthermore we include population, as there might be economies of scale in public services, and the degree of openness, as more open countries might be confronted with lower tax and expenditure elasticities.

The political variables control for differences in the countries' preferences for fiscal soundness which could explain national differences in fiscal institutions and fiscal outcomes, and thus be another source of biased estimates due to omitted variables. As argued e.g. by Inman (1996), if political variables are not included, this would make cross-sectional (or panel) studies with several countries subject to endogeneity concerns due to omitted variables<sup>19</sup>. We address this issue similar to Debrun *et al.* (2008), by including a variety of control variables to approximate political tastes of voters, as well as by including country fixed effects ( $\eta_i$ )<sup>20</sup>. Dafflon & Pujol (2001) and Krogstrup & Wälti

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<sup>16</sup>A detailed list of variable sources is given in Appendix A.4.

<sup>17</sup>The reverse causality problem has been raised by Poterba (1994) and empirically shown for several European countries in de Haan *et al.* (1999). Both studies rely on cross-sectional models.

<sup>18</sup>All data sources are given in Appendix A.4.

<sup>19</sup>In particular, Besley & Case (2003) argue that differences in fiscal institutions and fiscal policy outcomes (across US states) are related simply as a result of an underlying correlation between voter tastes and fiscal policies.

<sup>20</sup>Including country fixed effects is also confirmed by the Hausman test on systematic dif-

(2008) show that voters' fiscal preferences are largely time-invariant, thus also captured by country fixed effects, unless there are significant electorate changes. To account for those time variations in the electorates' or voters' fiscal preferences we specifically add the following political control variables, which are also used in similar studies: i) the ideology of the government (on a left - center - right scale), ii) the ideological distance of the parties in government, iii) the size of government (to capture a country's preference regarding the government's involvement), iv) the fragmentation of the government (as an indication of how fragmented the preferences of the voters are), v) a dummy for election years to address a political business cycle and vi) the district magnitude (i.e. the number of representatives elected from one district, as an indicator of how detailed the voters' preferences are represented in parliament). Following Hallerberg & Marier (2004) we also add the district magnitude variable linked to a variable describing countries' representation system, i.e. whether a country uses closed or open list representation systems.<sup>21</sup>

The third part of our control variables describes the institutional setting of a country. In line with the approach followed by Hallerberg *et al.* (2009) we include two (of the three available) variables which indicate if a country follows the delegation or the contract approach<sup>22</sup> in centralising budgetary decisions. The delegation approach favours a strong finance minister making central decisions while the contract approach favours strong contracts between the various players in budgetary decisions. Both variables are also added in interaction with the fragmentation of the government, as more fragmented governments require the contract approach while single-party or homogenous governments prefer the delegation approach to increase the effectiveness of fiscal policy (Hallerberg *et al.*, 2009). Furthermore we include a variable reflecting the quality of a country's institutions (apart from fiscal institutions). We also add a dummy indicating whether a country is part of the euro area in the respective year to capture to what degree the country is exposed to the provisions of the Stability and Growth Pact (SGP). In addition, we include a variable which measures the difference between the fiscal deficit to GDP ratio five years before joining the euro area and the 3%-benchmark, to capture the country's fiscal effort required prior to joining the euro area<sup>23</sup>.

Finally, when analysing different specifications of fiscal rules (i.e. regarding the type, status, coverage and enforcement of a fiscal rule) we control for the countries, which in the respective year are not in the specific subgroup, but in the same main group. For example, if we investigate the impact of balanced budget rules in law or constitution ( $\mathcal{R}_{LC}^{BBR}$ ), we control for the countries having a balanced budget rule which are not in law or constitution ( $\mathcal{R}^{BBR} - \mathcal{R}_{LC}^{BBR}$ )

ference in coefficients of random and fixed effects models.

<sup>21</sup>Hallerberg & Marier (2004) show that if countries have open list proportional representation systems, a high district magnitude increase the deficit bias caused by the common pool problem, while under closed lists a low district magnitude decreases the bias.

<sup>22</sup>A third variable available, which is not included here, captures the countries which follow neither a clear delegation nor a contract approach, but some mixture of both.

<sup>23</sup>See also Hallerberg *et al.* (2009).

and the countries having a fiscal rule which is not a balanced budget rule ( $\mathcal{R} - \mathcal{R}^{BBR}$ ). We proceed in a similar way for interacted fiscal framework variables<sup>24</sup> and fiscal rule variables with more than one specification.

As the standard fixed effects estimator might be biased in a dynamic model, we use Kiviet (1995)'s bias corrected LSDV dynamic panel estimator for unbalanced panels, as described in Bruno (2005a) with the bias correction initialized by a standard fixed effects estimation<sup>25</sup>. As shown e.g. in Bruno (2005b) the bias corrected LSDV estimator outperforms the original LSDV and widely used IV and GMM consistent estimators in relatively small macro panels similar to ours. But for robustness check purposes we also estimate our model using fixed effects, pooled OLS or Arellano-Bond estimators. Similar to Debrun & Kumar (2007), we find very similar or even higher coefficients and significance levels, especially for the coefficient of the fiscal framework variable we are most interested in<sup>26</sup>.

## 4 Baseline model findings

The main results of the baseline estimation of Equation 1 are shown in Table 1. The three columns display the results for different dependent variables, namely the primary balance, the primary expenditures and revenues (all in cyclical-adjusted terms). We find that the coefficient of the numerical fiscal rule dummy  $\mathcal{R}$ , which is one if a country has some kind of numerical fiscal rule in place in the respective year, is significant and positive for the primary balance and negative for primary expenditures and revenues. The coefficient suggests that countries with a numerical fiscal rule have a yearly cyclically adjusted primary balance which is 0.55 percentage points of GDP higher than that of their peers. Likewise, primary expenditures are 1.27 and revenues are 0.80 percentage points of GDP lower compared with their peers. Thus, if numerical fiscal rules are in place the primary balance is significantly improved, because expenditures are decreased to a stronger extent than revenues - a phenomenon we observe throughout the paper. If we account for the auto-correlation of the dependent variable we find the long-run impact<sup>27</sup> of fiscal rules to be +1.49 pp of GDP for the primary balance, -7.06 pp of GDP for the primary expenditures and -4.71 pp of GDP for the revenues.

<sup>24</sup>If we report for example the coefficient for interacted variables  $\mathcal{FC} \times \mathcal{R}$  we include in the control variables  $(\mathcal{R} - \mathcal{FC} \times \mathcal{R})$  and  $(\mathcal{FC} - \mathcal{FC} \times \mathcal{R})$ .

<sup>25</sup>As standard errors of the bias corrected LSDV estimator can be severely downward biased when not initialized by one of the Arellano-Bond, Blundell-Bond or Anderson-Hsiao estimators we check for robustness of our results in this respect. Indeed our standard errors turn out to be lower than when using another estimator, but only very slightly such that none of the significance levels would change.

<sup>26</sup>The respective regression results are presented in Appendix A.7 and the differences in the coefficients for the numerical fiscal rule index mainly stem from different auto-correlation coefficient, but thus the long-term effects stay approximately the same.

<sup>27</sup>We calculate the long-run impact by dividing the short-run coefficient by one minus the coefficient of the lagged dependent variable.

Table 1: Panel data estimation of the effects of NFRs on fiscal performance

Dependent Variable:	$\mathcal{F}^{PB}$	$\mathcal{F}^{PE}$	$\mathcal{F}^R$
Lagged Dependent Var.	0.63*** (0.04)	0.82*** (0.03)	0.83*** (0.03)
$\mathcal{R}$	0.55* (0.33)	-1.27*** (0.47)	-0.80** (0.39)
Debt level (-1)	0.02*** (0.01)	-0.01 (0.01)	0.01 (0.01)
Output Gap (-1)	-0.05* (0.03)	0.07** (0.04)	0.02 (0.03)
Inflation rate	0.03 (0.02)	-0.04 (0.03)	-0.02 (0.03)
Dependency Ratio	-0.02 (0.04)	-0.13** (0.06)	-0.19*** (0.05)
Population	-0.14 (0.13)	0.23 (0.17)	0.20 (0.14)
Openness	0.30 (0.77)	-2.74** (1.08)	-2.33*** (0.89)
Ideology	0.09 (0.06)	-0.05 (0.09)	0.04 (0.07)
Ideology Range	0.01 (0.15)	-0.25 (0.21)	-0.30* (0.16)
Government Size	0.06 (0.14)	-0.22 (0.21)	-0.16 (0.17)
Government Fragmentation	-2.02 (1.86)	3.68 (2.61)	1.21 (2.13)
Majority Fragmentation	0.37 (1.54)	1.20 (2.16)	1.40 (1.77)
Year of Parliamentary Election	-0.33** (0.17)	-0.09 (0.24)	-0.43** (0.19)
District Magnitude	-0.02 (0.02)	0.08** (0.03)	0.06** (0.03)
District Magnitude x Open/Closed List	0.06 (0.05)	-0.11 (0.07)	-0.06 (0.06)
Delegation	-0.94 (0.70)	0.51 (0.97)	-0.77 (0.80)
Delegation x Government Fragmentation	2.25 (1.49)	-2.75 (2.06)	-0.02 (1.70)
Contract	-0.32 (0.90)	-0.40 (1.29)	-1.36 (1.06)
Contract x Government Fragmentation	2.40** (1.17)	-2.82* (1.70)	0.54 (1.39)
Institutional Quality	0.47* (0.26)	-1.17*** (0.37)	-0.97*** (0.30)
SGP	-0.63** (0.26)	0.48 (0.38)	-0.26 (0.32)
RunUp to EMU	0.30** (0.12)	0.04 (0.16)	0.37*** (0.13)
R <sup>2</sup> (within)	0.457	0.710	0.734
Obs	490	490	490

Notes: Results of estimation of Equation 1 using Kiviet's corrected LSDV estimator for unbalanced dynamic panels as in Bruno (2005a); Constants are included in every regression but not shown. Dependent variables:  $\mathcal{F}^{PB}$  - cyclical adjusted primary balance,  $\mathcal{F}^{PE}$  - cyclical adjusted primary expenditures,  $\mathcal{F}^R$  - cyclical adjusted revenues; An overview of the fiscal framework dummy variables can be found in Appendix A.1. Bootstrapped standard errors (using 100 repetitions) are in parentheses. R<sup>2</sup> is taken from fixed effects estimation. Significance at the 10%, 5% and 1% level is indicated by \*, \*\* and \*\*\* respectively.

Looking at the primary balance, the coefficients and significance of the lagged dependent and the control variables are in line with the results in the existing literature. In particular, we find high autocorrelation of the dependent variable and a significantly positive, although small reaction to past debt levels. We observe a significant negative effect of the electoral business cycle and a positive effect in countries with highly fragmented government which use the contract approach for budgetary decisions. Furthermore we find a negative effect of the membership in the euro area (i.e. the SGP) and a positive effect of deficits above 3% of GDP in the run-up to EMU. This suggests that the disciplinary device for countries that wish to join the euro area is considerably stronger than for those already in the euro area. Only weakly significant we also find a positive effect of the institutional quality and a negative effect of the output gap. The  $R^2$  is well within the range of similar estimations in other studies and the F-Test for keeping the fixed effects is significant.

Turning to the columns on primary expenditure and revenues, we can observe that expenditures and revenues are often influenced at the same magnitude, which might explain that some effects of fiscal rules could not be identified at the budget balance level. Our baseline estimation results on revenues and expenditures find an even higher auto-correlation of the dependent variables. The positive effect of the lagged debt level on the primary balance can be explained by a negative effect on primary expenditures and a positive effect on revenues. The output gap has a significant positive impact on primary expenditures but not on revenues. A significant effect on primary expenditures and revenues can be observed for the dependency ratio, openness, district magnitude and institutional quality. In all those cases the respective control variables significantly influences expenditures and revenues in the same direction and in a similar magnitude. Finally, the negative impact of the electoral cycle on the primary balance suggests to be mainly due to a negative impact on revenues (e.g. caused by tax cuts). Likewise, the better primary balance explained by the run-up to EMU is due to higher revenues.

## 5 Impact of different specifications of fiscal frameworks

In the previous section we showed that fiscal rules in general have a significant impact on fiscal variables such as the primary balance, primary expenditure and revenues. In the following we are interested in assessing and comparing the impact of different features of fiscal frameworks (in particular related to fiscal rules) on fiscal variables. We first look at the impact of different specifications of fiscal rules. Then we apply the model to disaggregated components of public expenditures and revenues. Finally, we extend the model by also including fiscal councils and the effectiveness of medium-term budgetary framework into the analysis.

We first apply the baseline model with different specifications of fiscal rules,



Table 2: Impact of fiscal rules on fiscal policy aggregates

	$\mathcal{F}^{PB}$	$\mathcal{F}^{PE}$	$\mathcal{F}^R$		$\mathcal{F}^{PB}$	$\mathcal{F}^{PE}$	$\mathcal{F}^R$
$\mathcal{R}$	0.55*	-1.27***	-0.80**	$\mathcal{R}_{LC}$	0.63*	-1.44***	-0.87**
	(0.33)	(0.47)	(0.39)		(0.36)	(0.50)	(0.41)
$\mathcal{R}^{BBR}$	0.60	-1.45***	-0.86*	$\mathcal{R}_{LC}^{BBR}$	0.84**	-1.76***	-1.05**
	(0.40)	(0.56)	(0.46)		(0.41)	(0.59)	(0.48)
$\mathcal{R}^{DR}$	0.71	-1.66**	-1.04*	$\mathcal{R}_{LC}^{DR}$	0.79	-1.42**	-0.71
	(0.47)	(0.65)	(0.53)		(0.50)	(0.70)	(0.56)
$\mathcal{R}^{ER}$	0.46	-1.17**	-0.76*	$\mathcal{R}_{LC}^{ER}$	0.36	-1.31**	-0.92**
	(0.37)	(0.50)	(0.42)		(0.39)	(0.54)	(0.45)
$\mathcal{R}_{CGGG}$	0.56*	-1.31***	-0.83**	$\mathcal{R}_{SCM}$	0.34	-0.92*	-0.58
	(0.33)	(0.47)	(0.39)		(0.39)	(0.55)	(0.46)
$\mathcal{R}_{CGGG}^{BBR}$	1.21***	-1.68**	-0.58	$\mathcal{R}_{SCM}^{BBR}$	0.30	-1.14*	-0.84
	(0.42)	(0.61)	(0.50)		(0.45)	(0.64)	(0.52)
$\mathcal{R}_{CGGG}^{DR}$	0.75	-1.60**	-0.93*				
	(0.49)	(0.68)	(0.56)				
$\mathcal{R}_{CGGG}^{ER}$	0.46	-1.21**	-0.79*				
	(0.37)	(0.50)	(0.42)				

Notes: Results using Kiviet's corrected LSDV estimator for unbalanced dynamic panels as in Bruno (2005a); Dependent variables:  $\mathcal{F}^{PB}$  - cyclical adjusted primary balance,  $\mathcal{F}^{PE}$  - cyclical adjusted primary expenditures,  $\mathcal{F}^R$  - cyclical adjusted revenues; An overview of the fiscal framework dummy variables can be found in Appendix A.1; Only coefficients for national numerical fiscal rules indices  $\mathcal{R}$  are reported out of full estimation results of Equation 1 similar to Table 1. Bootstrapped standard errors (using 100 repetitions) are in parentheses. Significance at the 10%, 5% and 1% level is indicated by \*, \*\* and \*\*\* respectively.

which reflect the type (balanced budget, debt or expenditure rule), the status (political commitment or enshrined in law/constitution), the coverage (general government or regional/local government), the existence of enforcement mechanism or combinations of all these specifications (see Table 2). Each specification of a fiscal rule is represented by a dummy variable and we estimate their impact on the primary balance, primary expenditures and revenues. We find, as generally expected, that for countries with numerical fiscal rules enshrined in law or constitution the impact on fiscal variables is larger than when looking at all fiscal rules. Likewise, for fiscal rules enshrined in law or constitution the coefficient indicates that primary expenditures are lower by 1.44 pp of GDP and revenues by 0.87 pp of GDP lower compared to its peers.

When distinguishing between different types of rules (*BBR*, *DR*, *ER*) we find the strongest effects for balanced budget rules and in particular when they are enshrined in law or constitution. Some significant effects can also be found for the debt rule (on expenditure and revenues), while the results for expenditure rules are weak and mostly not significant. Overall, these results are broadly in line with other findings in the literature. For example Debrun *et al.* (2008) found that balanced budget and debt rules significantly determine fiscal policy, while the impact of expenditure rules is not significant.

At first sight it is surprising that expenditure rules have only a limited impact on the fiscal variables. One explanation for the limited impact on the primary budget balance could be, however, that expenditure rules only constrain

one side of the budget, while governments might lower the tax burden in their constituencies to compensate for the cut in expenditures. For example Hansson-Brusewitz & Lindh (2005) and Boije (2002) show that tax expenditures, i.e. negative taxes, increased after Sweden introduced an expenditure rule.

Table 3: Coefficients of fiscal rules on disaggregated fiscal variables

	$\mathcal{F}^{TIN}$	$\mathcal{F}^{DTX}$	$\mathcal{F}^{SCP}$	$\mathcal{F}^{THN}$	$\mathcal{F}^{INTERM}$	$\mathcal{F}^{SIN}$	$\mathcal{F}^{COE}$	$\mathcal{F}^{GIN}$
$\mathcal{R}$	-0.04 (0.16)	-0.40*** (0.15)	-0.32*** (0.11)	-0.36** (0.15)	-0.20** (0.10)	-0.10** (0.04)	-0.38*** (0.11)	-0.12 (0.09)
$\mathcal{R}^{BBR}$	-0.27 (0.19)	-0.37** (0.18)	-0.39*** (0.14)	-0.45** (0.18)	-0.29*** (0.11)	-0.11*** (0.04)	-0.46*** (0.13)	-0.20* (0.11)
$\mathcal{R}^{DR}$	-0.24 (0.22)	-0.58*** (0.20)	-0.40** (0.16)	-0.70*** (0.20)	-0.35*** (0.13)	-0.11** (0.05)	-0.48*** (0.15)	-0.18 (0.13)
$\mathcal{R}^{ER}$	-0.04 (0.17)	-0.45*** (0.16)	-0.37*** (0.12)	-0.32** (0.16)	-0.21** (0.10)	-0.12*** (0.04)	-0.33*** (0.11)	-0.10 (0.10)
$\mathcal{R}_{LC}$	-0.11 (0.17)	-0.41** (0.16)	-0.34*** (0.12)	-0.42*** (0.16)	-0.24** (0.10)	-0.11*** (0.04)	-0.42*** (0.11)	-0.15 (0.10)
$\mathcal{R}_{LC}^{BBR}$	-0.29 (0.19)	-0.47*** (0.18)	-0.38*** (0.14)	-0.54*** (0.19)	-0.23* (0.12)	-0.11*** (0.04)	-0.52*** (0.13)	-0.25** (0.12)
$\mathcal{R}_{LC}^{DR}$	-0.16 (0.23)	-0.51** (0.21)	-0.28 (0.17)	-0.64*** (0.22)	-0.31** (0.14)	-0.08 (0.05)	-0.48*** (0.16)	-0.14 (0.14)
$\mathcal{R}_{LC}^{ER}$	-0.09 (0.18)	-0.56*** (0.17)	-0.36*** (0.13)	-0.29* (0.17)	-0.28** (0.11)	-0.11*** (0.04)	-0.36*** (0.12)	-0.11 (0.10)

Notes: Results using Kiviet's corrected LSDV estimator for unbalanced dynamic panels as in Bruno (2005a); Dependent variables (cyclically adjusted):  $\mathcal{F}^{TIN}$  - Indirect taxes;  $\mathcal{F}^{DTX}$  - Direct taxes;  $\mathcal{F}^{SCP}$  - Social contributions;  $\mathcal{F}^{THN}$  - Social benefits other than in kind;  $\mathcal{F}^{INTERM}$  - Intermediate consumption;  $\mathcal{F}^{SIN}$  - Subsidies;  $\mathcal{F}^{COE}$  - Compensation of employees;  $\mathcal{F}^{GIN}$  - Government investment; An overview of the fiscal framework dummy variables can be found in Appendix A.1; Only coefficients for national numerical fiscal rules indices  $\mathcal{R}$  are reported out of full estimation results of Equation 1 similar to Table 1. Bootstrapped standard errors (using 100 repetitions) are in parentheses. Significance at the 10%, 5% and 1% level is indicated by \*, \*\* and \*\*\* respectively.

As the next step we analyse the impact of fiscal rules using disaggregated fiscal variables (see Table 3). This enables us to explain some of the effects observed at the aggregated level. Concretely we look on the expenditure side at social benefits ( $\mathcal{F}^{THN}$ ), intermediate consumption ( $\mathcal{F}^{INTERM}$ ), subsidies ( $\mathcal{F}^{SIN}$ ), compensation of employees ( $\mathcal{F}^{COE}$ ) and government investment ( $\mathcal{F}^{GIN}$ ). On the revenue side we look at the impact on direct taxes ( $\mathcal{F}^{DTX}$ ), indirect taxes ( $\mathcal{F}^{TIN}$ ) and social contributions ( $\mathcal{F}^{SCP}$ ). Looking at the results for the disaggregated fiscal variables (Table 3), the coefficients in sum approximately match the results we found for the aggregate variables. Moreover, on the expenditures side the strongest negative effects were found for social benefits and compensation of employees (-0.36 pp and -0.38 pp of GDP, respectively), while on the revenue side the strongest effect was found for direct taxes (-0.40 pp of GDP).

These results are even stronger when only looking at the impact of fiscal rules enshrined in law or constitution (see lower part of Table 3). When comparing the impact for different types of fiscal rules we see some interesting differences: i) the impact of balanced budget rules is particularly pronounced for direct taxes, social benefits, (intermediate consumption) and compensation of employ-

ees. The impact on direct taxes, social benefits and intermediate consumption is even stronger with a debt rule. In contrast, for compensation of employees the impact of balanced budget rules is relatively stronger than that of debt rules; ii) only balanced budget rules significantly lower government investment; iii) expenditure rules have a pronounced effect on revenue variables (in particular direct taxes), while on the expenditure side in particular compensation of employees is impacted.

Table 4: Coefficients of fiscal rules on expenditure areas

	$\mathcal{F}^{DEF}$	$\mathcal{F}^{EDU}$	$\mathcal{F}^{GPS}$	$\mathcal{F}^{HEA}$	$\mathcal{F}^{HOU}$	$\mathcal{F}^{POS}$	$\mathcal{F}^{SOC}$
$\mathcal{R}$	-0.21*** (0.04)	-0.14*** (0.05)	-0.25*** (0.09)	-0.16*** (0.06)	-0.10*** (0.03)	-0.08*** (0.02)	-0.50*** (0.16)
$\mathcal{R}^{BBR}$	-0.23*** (0.04)	-0.16*** (0.06)	-0.25** (0.11)	-0.16** (0.07)	-0.12*** (0.04)	-0.08*** (0.03)	-0.50*** (0.18)
$\mathcal{R}^{DR}$	-0.25*** (0.05)	-0.06 (0.07)	-0.41*** (0.13)	-0.17* (0.09)	-0.11** (0.05)	-0.09*** (0.03)	-0.83*** (0.22)
$\mathcal{R}^{ER}$	-0.19*** (0.04)	-0.08 (0.07)	-0.27** (0.11)	-0.08 (0.08)	-0.09** (0.04)	-0.07** (0.03)	-0.34* (0.19)
$\mathcal{R}_{LC}$	-0.22*** (0.04)	-0.16*** (0.05)	-0.26*** (0.10)	-0.17** (0.07)	-0.11*** (0.04)	-0.08*** (0.02)	-0.53*** (0.16)
$\mathcal{R}_{LC}^{BBR}$	-0.25*** (0.04)	-0.22*** (0.07)	-0.29*** (0.11)	-0.19** (0.08)	-0.20*** (0.04)	-0.11*** (0.03)	-0.68*** (0.19)
$\mathcal{R}_{LC}^{DR}$	-0.29*** (0.06)	-0.01 (0.09)	-0.48*** (0.17)	-0.24** (0.11)	-0.09 (0.06)	-0.10** (0.04)	-0.80*** (0.28)
$\mathcal{R}_{LC}^{ER}$	-0.20*** (0.05)	-0.09 (0.08)	-0.45*** (0.13)	-0.10 (0.09)	-0.08 (0.05)	-0.09*** (0.03)	-0.40* (0.23)

Notes: Results using Kiviet's corrected LSDV estimator for unbalanced dynamic panels as in Bruno (2005a); Dependent variables (cyclically adjusted):  $\mathcal{F}^{DEF}$  - Defence,  $\mathcal{F}^{EDU}$  - Education,  $\mathcal{F}^{GPS}$  - General public services,  $\mathcal{F}^{HEA}$  - Health,  $\mathcal{F}^{HOU}$  - Housing and community amenities,  $\mathcal{F}^{POS}$  - Public Order and Safety,  $\mathcal{F}^{SOC}$  - Social protection; No significant results for economic affairs, environmental protection, recreation, culture and religion (not shown here). An overview of the fiscal framework dummy variables can be found in Appendix A.1; Only coefficients for national numerical fiscal rules indices  $\mathcal{R}$  are reported out of full estimation results of Equation 1 similar to Table 1. Bootstrapped standard errors (using 100 repetitions) are in parentheses. Significance at the 10%, 5% and 1% level is indicated by \*, \*\* and \*\*\* respectively.

To complement the analysis we also look at the impact of fiscal rules on different areas of expenditures, such as defence ( $\mathcal{F}^{DEF}$ ), general public services ( $\mathcal{F}^{GPS}$ ), health ( $\mathcal{F}^{HEA}$ ) and social protection ( $\mathcal{F}^{SOC}$ ), see Table 4. Also here does the sum of the significant coefficients approximately resemble the coefficient found at the aggregate level. The by far highest effect can be seen for expenditures on social protection, which is by -0.50 pp of GDP lower in countries with numerical fiscal rules compared to their peers. Also expenditures on defence and general public services are significantly lower (by -0.21 pp and -0.25 pp of GDP, respectively). Balanced budget rules have a significant impact on almost every category, while debt rules affect only specific categories (especially social benefits and general public services). One possible explanation is the fact that with a balanced budget rule governments have to obey a specific limit every year, while other rules also allow for some inter-temporal shifts of expenditures.

Finally, we analyse how the impact of fiscal rules changes when comple-

Table 5: Coefficients of fiscal rules combined with fiscal councils and MTBFs

	$\mathcal{F}^{PB}$	$\mathcal{F}^{PE}$	$\mathcal{F}^R$
$\mathcal{FC} \times \mathcal{R}$	1.10** (0.56)	-1.58** (0.78)	-0.25 (0.63)
$\mathcal{FC}_{\text{INDEP}} \times \mathcal{R}$	1.46** (0.60)	-2.30*** (0.83)	-0.42 (0.68)
$\mathcal{FC}_{\text{INDEP}} \times \mathcal{R}^{BBR}$	1.67** (0.69)	-2.62*** (0.96)	-0.51 (0.78)
$\mathcal{FC}_{\text{INDEP}} \times \mathcal{R}_{LC}$	1.53** (0.60)	-2.42*** (0.84)	-0.47 (0.68)
$MTBF \times \mathcal{FC} \times \mathcal{R}$	2.13** (1.22)	-1.22 (1.56)	1.51 (1.19)
$MTBF \times \mathcal{FC}_{\text{INDEP}} \times \mathcal{R}_{LC}$	2.39** (1.36)	-1.16 (1.71)	1.81 (1.31)

Notes: Results using Kiviet's corrected LSDV estimator for unbalanced dynamic panels as in Bruno (2005a); Dependent variables:  $\mathcal{F}^{PB}$  - cyclical adjusted primary balance,  $\mathcal{F}^{PE}$  - cyclical adjusted primary expenditures,  $\mathcal{F}^R$  - cyclical adjusted revenues; An overview of the fiscal framework dummy variables can be found in Appendix A.1; Only coefficients for national numerical fiscal rules indices  $\mathcal{R}$  are reported out of full estimation results of Equation 1 similar to Table 1. Bootstrapped standard errors (using 100 repetitions) are in parentheses. Significance at the 10%, 5% and 1% level is indicated by \*, \*\* and \*\*\* respectively.

mented with fiscal councils and medium-term budgeting frameworks (see Table 5). Fiscal councils and an effective medium-term budgeting framework are - together with fiscal rules - widely acknowledged as important elements of a good fiscal framework. Therefore, by including fiscal councils and medium-term budgeting frameworks in the analysis, a more pronounced effect on the fiscal variables can be expected. Due to the relatively small number of countries having a fiscal council in place and the relatively small time span (2000 - 2009) for which we could construct the MTBF proxy variable we can only look at the aggregated fiscal rule indices. We use the dataset for fiscal councils and medium-term budgeting frameworks (MTFBs) as described in Section 2<sup>28</sup>. On fiscal councils, we only look at the summary indicator of fiscal councils and fiscal councils with independent resources and nomination of staff, due to limited data availability.<sup>29</sup> The results are shown in Table 5.

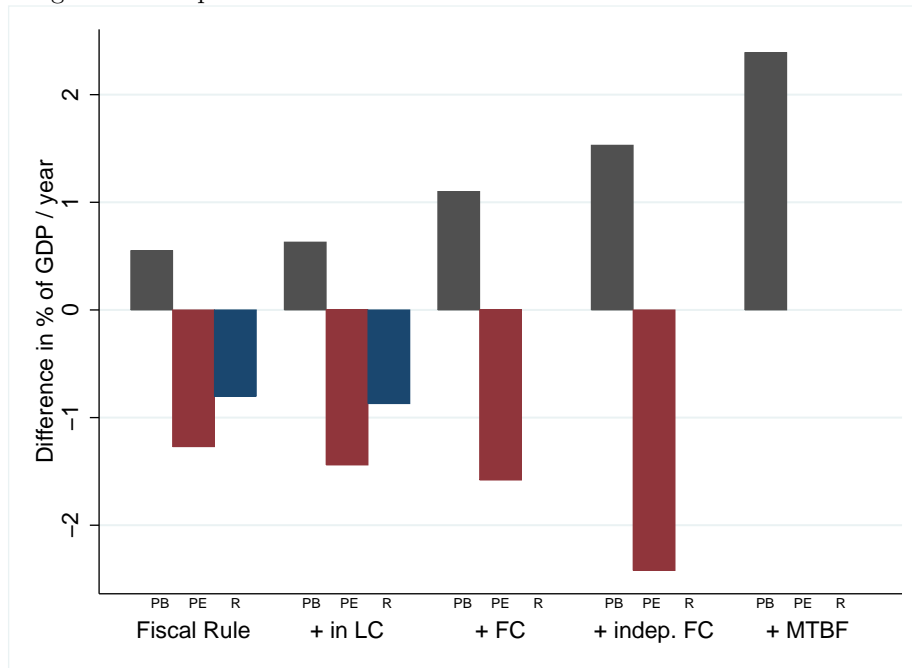
Indeed we find that the effects of fiscal rules are stronger when combined with a fiscal council, in particular if the fiscal council is considered independent in terms of resources and nomination of staff and has appropriate access to information. The effect on the primary balance is twice as strong as in the case without a fiscal council and even three times as strong when complemented with an independent fiscal council and an effective medium term budgeting framework. With a combination of fiscal rules in law or constitution and an independent fiscal council there is a positive impact on the primary balance of 1.53 pp of GDP, which is achieved through a strong reduction in expenditures (by -2.42 pp of GDP). As shown in Figure 3 which compares the coefficients for

<sup>28</sup>For the estimation method using interaction effects see also Section 3 and Footnote 24

<sup>29</sup>All fiscal councils in our database have their status in law or constitution. Thus we omit this variable from our analysis. It should be noted, however, that the fiscal council differ in terms of mandate, capacity and visibility across countries.

the various fiscal frameworks, the main difference between countries with a fiscal council and countries which do not have a fiscal council, is that in the former case there is no simultaneous significant effect on the revenues. Fiscal councils are assumed to increase the transparency of fiscal policy making. Therefore, the existence of an independent fiscal council might limit the ability of governments to compensate any expenditure cuts with tax expenditures or cuts in the tax burden. Effective MTBFs, in turn, are likely to strengthen the predictability and accountability of public finances. As a consequence fiscal council in combination with fiscal rules enshrined in law or constitution and effective MTBF can be expected to strongly contribute to fiscal consolidation in a sustainable manner.

Figure 3: Comparison of estimated coefficients for various fiscal frameworks



To check the robustness of our results with respect to the time and country selection we looked at a range of different sub-samples. Two of those are presented in Table 6: a sub-sample without the financial and sovereign debt crisis and a sub-sample looking only at the EU15. Overall, our results are broadly confirmed. The only difference is that our baseline results are sometimes less significant or have lower coefficients than the results with different sub-samples. The same holds true for all other robustness checks.<sup>30</sup> Thus, the results pre-

<sup>30</sup>In Appendix A.7 we show the robustness regarding the estimation method and when using the dependent variables in differences - as another robustness check - the same fiscal rule indices turn out to be significant as in our baseline results and the signs of the coefficients

sented in our baseline specification can be seen as being at the lower end as regards significance and quantitative effects.

Table 6: Coefficients for Subsamples

	1990-2007			EU15		
	$\mathcal{F}^{PB}$	$\mathcal{F}^{PE}$	$\mathcal{F}^R$	$\mathcal{F}^{PB}$	$\mathcal{F}^{PE}$	$\mathcal{F}^R$
$\mathcal{R}$	0.57* (0.31)	-1.46*** (0.48)	-0.96** (0.39)	0.83** (0.37)	-1.67*** (0.44)	-0.91*** (0.34)
$\mathcal{R}_{LC}$	0.62* (0.33)	-1.55*** (0.51)	-1.00** (0.41)	0.85** (0.40)	-1.90*** (0.47)	-1.10*** (0.37)
$\mathcal{R}_{LC}^{BBR}$	0.64* (0.37)	-1.58*** (0.57)	-1.06** (0.46)	0.91* (0.44)	-2.03*** (0.52)	-1.20*** (0.41)
$\mathcal{R}_{LC}^{DR}$	0.62 (0.55)	-2.49*** (0.80)	-1.68** (0.67)	1.14 (0.74)	-2.67*** (0.91)	-1.72** (0.70)
$\mathcal{R}_{LC}^{ER}$	-0.15 (0.55)	-1.21 (0.86)	-1.60** (0.68)	0.59 (0.54)	-2.11*** (0.67)	-1.67*** (0.51)

Notes: Results using Kiviet's corrected LSDV estimator for unbalanced dynamic panels as in Bruno (2005a); Dependent variables:  $\mathcal{F}^{PB}$  - cyclical adjusted primary balance,  $\mathcal{F}^{PE}$  - cyclical adjusted primary expenditures,  $\mathcal{F}^R$  - cyclical adjusted revenues; An overview of the fiscal framework dummy variables can be found in Appendix A.1; Only coefficients for national numerical fiscal rules indices  $\mathcal{R}$  are reported out of full estimation results of Equation 1 similar to Table 1. Bootstrapped standard errors (using 100 repetitions) are in parentheses. Significance at the 10%, 5% and 1% level is indicated by \*, \*\* and \*\*\* respectively.

## 6 Outlook

The study analyses the link between well-designed fiscal frameworks and their budgetary impact. Based on a newly constructed time-varying dataset on fiscal frameworks covering the period 1990 to 2012 for 27 EU countries, we run dynamic panel regressions of various fiscal framework variables on aggregated and disaggregated fiscal policy variables. We find that fiscal rules have mostly the intended reducing effect on public expenditures, which thereby helps to improve the primary balance. Moreover, the analysis shows that depending on the specification of the numerical fiscal rules, their impact differs across certain expenditure and revenue components. While balanced budget rules affect almost every category of fiscal policy, debt rules seem to allow for intertemporal shifts of fiscal policy and thus only have a pronounced effect on specific categories. We find that the positive effect on the primary balance can be further strengthened by supporting the numerical fiscal rules with independent fiscal councils and an effective medium-term budgeting framework. In general our findings suggest that well-designed fiscal frameworks provide a disciplinary device on public spending and support a better fiscal planning over the medium-term.

Against this background, our analysis is reassuring with respect to the Fiscal Compact, which requires as of 2014 the implementation of a national balanced budget rule - preferably at constitutional level - with an automatic correction mechanism in place. Moreover, in line with our findings it would be also beneficial to further advance with on-going discussions to establish independent

national fiscal councils and to strengthen the effectiveness of medium-term budgetary frameworks.

Looking ahead, there are also other elements of national fiscal frameworks for which the budgetary impact would be worthwhile to analyse. This relates in particular to the role of independent forecasts and the importance of budget co-ordination between different governmental layers. Additional areas of future research could be the analysis of the impact of fiscal frameworks on other economic variables like output, unemployment and sovereign bond spreads.

## References

- Afonso, A., & Hauptmeier, S. 2009. Fiscal behaviour in the European Union - rules, fiscal decentralization and government indebtedness. *European Central Bank Working Paper Series*, **1054**.
- Ayuso-i Casals, J., Gonzalez, D., Moulin, L., & Turrini, A. 2007. Beyond the SGP: Features and Effects of EU National-level Fiscal Rules. In: Commission, European (ed), *The Role of Fiscal Rules and Institutions in Shaping Budgetary Outcomes*. Economic Papers.
- Besley, T., & Case, A. 2003. Political Institutions and Policy Choices: Evidence from the United States. *Journal of Economic Literature*, **41**(1), 7–73.
- Boije, R. 2002. Should Tax Expenditures be Integrated into the Budget Process? *Sveriges Riksbank Economic Review*, **2**.
- Bruno, G.S.F. 2005a. Approximating the bias of the LSDV estimator for dynamic unbalanced panel data models. *Economics Letters*, **87**, 361–366.
- Bruno, G.S.F. 2005b. Estimation and inference in dynamic unbalanced panel data models with a small number of individuals. *Universit Bocconi-CESPRI Working Paper*, **165**.
- Calmfors, L., & Wren-Lewis, S. 2011. What Should Fiscal Councils do? *Economic Policy*, **26**(68), 649–695.
- Dafflon, B., & Pujol, F. 2001. Fiscal preferences and fiscal performance: Swiss cantonal evidence. *International Public Management Review*, **2**, 54–76.
- de Haan, J., Moessen, W., & Volkerink, B. 1999. Budgetary Procedures - Aspects and Changes: New Evidence for Some European Countries. *Pages 265–299 of: Poterba, J., & von Hagen, J. (eds), Fiscal Institutions and Fiscal Performance*. Chicago: University of Chicago Press.
- de Haan, J., Jong-A-Pin, R., & Mierau, J.O. 2012. Do budgetary institutions mitigate the common pool problem? New empirical evidence for the EU. *Public Choice*.

- Debrun, X., & Kumar, M. 2007. Fiscal Rules, Fiscal Councils and All That: Commitment Devices, Signaling Tools or Smokescreens? *Pages 479–512 of: d’Italia, Banca (ed), Fiscal Policy: Current Issues and Challenges*. Papers presented at the Banca d’Italia workshop held in Perugia.
- Debrun, X., Moulin, L., Turrini, A., i Casals, J. Ayuso, & Kumar, M.S. 2008. Tied to the mast? National fiscal rules in the European Union. *Economic Policy*, **23**, 297362.
- Debrun, X., Hauner, D., & Kumar, M. 2009. Independent Fiscal Agencies. *Journal of Economic Surveys*, **23**, 44–81.
- Debrun, X., Gérard, M., & Harris, J. 2012. Fiscal Policies in Crisis Mode: Has the Time for Fiscal Councils Come at Last? *paper presented at the OECD 4th annual meeting of OECD Parliamentary Budget Officials and independent fiscal institutions (Paris)*.
- Denis, C., McMorrow, K., & Röger, W. 2002. Production function approach to calculating potential growth and output gaps - estimates for the EU Member States and the US. *European Economy, Economic Papers*, **176**.
- European Commission. 2006. Public Finances in EMU. *European Economy*, **3**.
- European Commission. 2010a. Database on independent fiscal institutions in the EU Member States.
- European Commission. 2010b. Database on medium-term budgetary framework in the EU Member States.
- European Commission. 2010c. Fiscal rules database.
- European Commission. 2012a. Cyclical adjustment of budget balances. *Directorate General ECFIN, Spring*.
- European Commission. 2012b. Fiscal frameworks across Member States: Commission services country fiches from the 2011 EPC peer review. *European Economy, Occasional Papers*, **91**.
- Gali, J., & Perotti, R. 2003. Fiscal policy and monetary integration in Europe. *Economic Policy*, **18**(37), 533–72.
- Gwartney, J., Hall, J., & Lawson, R. 2011. Economic Freedom Dataset. *published in Economic Freedom of the World: 2010 Annual Report, Economic Freedom Network*.
- Hallerberg, M., & Marier, P. 2004. Executive Authority, the Personal Vote, and Budget Discipline in Latin American and Caribbean Countries. *American Journal of Political Science*, **48**(3), 571–87.
- Hallerberg, M., Strauch, R., & von Hagen, J. 2009. *Fiscal Governance in Europe*. Cambridge: Cambridge University Press.



- Hansson-Brusewitz, U., & Lindh, Y. 2005. Expenditure Ceilings and Fiscal Policy the Sweden Experiences. *In: d'Italia, Banca (ed), Public Expenditure. Papers presented at the Banca d'Italia workshop held in Perugia.*
- Holm-Hadulla, F., Hauptmeier, S., & Rother, P. 2012. The impact of expenditure rules on budgetary discipline over the cycle. *Applied Economics*, **44**(25), 3287–3296.
- IMF. 2012. IMF Fiscal Rules Dataset.
- Inman, R.P. 1996. Do Balanced Budget Rules Work? U.S. Experience and Possible Lessons for the EMU. *NBER Working Paper*, **5838**.
- Kiviet, J.F. 1995. On Bias, Inconsistency and Efficiency of Various Estimators in Dynamic Panel Data Models. *Journal of Econometrics*, **68**, 53–78.
- Kopits, G., & Symanski, S. 1998. Fiscal Policy Rules. *International Monetary Fund, Occasional Paper*, **162**.
- Krogstrup, S., & Wälti, S. 2008. Do fiscal rules cause budgetary outcomes? *Public Choice*, **136**, 123–136.
- OECD. 2003. International Budget Practices and Procedures Database 2003.
- OECD. 2008. International Budget Practices and Procedures Database 2007/2008.
- Poterba, J. 1994. State responses to fiscal crises: The effects of budgetary institutions and politics. *Journal of Political Economy*, **102**, 799–821.
- Schaechter, A., Kinda, T., Budina, N., & Weber, A. 2012. Fiscal Rules in Response to the Crisis - Toward the 'Next-Generation' Rules. A New Dataset. *IMF Working Paper*, **12**(187).
- Turrini, A. 2008. Fiscal policy and the cycle in the Euro Area: The role of government revenue and expenditure. *European Economy - Economic Papers*, **323**.
- Wierds, P. 2011. How do expenditure rules affect fiscal behaviour? *DNB Working Paper*, **166**.
- Wyplosz, C. 2012. Fiscal Rules: Theoretical Issues and historical Experiences. *National Bureau of Economic Research Working Paper*, **17884**.

# A Appendix

## A.1 List of national fiscal framework dummy variables

Table 7: Fiscal framework dummy variables

Dummy variable is one (zero otherwise), if the respective country has in the respective year in place at least one national ...

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$\mathcal{R}$	numerical fiscal rule of any kind
$\mathcal{R}^{BBR}$	numerical balanced budget rule
$\mathcal{R}^{DR}$	numerical debt rule
$\mathcal{R}^{ER}$	numerical expenditure rule
$\mathcal{R}^{RR}$	numerical revenue rule
$\mathcal{R}_{LC}$	numerical fiscal rule enshrined in law or constitution
$\mathcal{R}_{CGGG}$	numerical fiscal rule covering the central or general government
$\mathcal{R}_{SCM}$	numerical fiscal rule enforced by sanctions or an automatic correction mechanism
$\mathcal{R}_{LC}^{BBR/DR/ER}$	numerical balanced budget / debt / expenditure rule enshrined in law or constitution
$\mathcal{R}_{CGGG}^{BBR/DR/ER}$	numerical balanced budget / debt / expenditure rule covering the central or general government
$\mathcal{R}_{SCM}^{BBR/DR/ER}$	numerical balanced budget / debt / expenditure rule enforced by sanctions or an automatic correction mechanism
$\mathcal{FC}$	fiscal council of any type
$\mathcal{FC}_{INDEP}$	fiscal council with independent resources and nomination of staff

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## A.2 Dataset of national numerical fiscal rules

Table 8: National numerical fiscal rules

Ctry	Numerical Fiscal Rule	Ctry	Numerical Fiscal Rule
AT	BBR, GG, LC, NSCM (08-10)	IE	BBR, RLG, PC, SCM (04-12)
	BBR, GG, LC, SCM (11-12)		ER, CG, LC, NSCM (00-09)
	BBR, CG, LC, NSCM (99-04)		ER, CG, LC, SCM (10-12)
	BBR, CG, LC, SCM (05-12)	IT	BBR, RLG, LC, SCM (01-12)
	BBR, RLG, LC, SCM (05-12)		ER, CG, LC, SCM (01-07)
	BBR, RLG, LC, NSCM (99-04)		ER, RLG, LC, SCM (99-12)
	ER, GG, LC, NSCM (09-12)	LT	BBR, RLG, LC, SCM (90-12)
BE	BBR, RLG, LC, NSCM (82-12)		RR, CG, LC, SCM (08-12)
	RR, CG, PC, NSCM (95-99)		DR, CG, LC, NSCM (97-12)
	ER, CG, PC, NSCM (93-98)		ER, CG, LC, NSCM (08-12)
BG	BBR, GG, LC, NSCM (12)	LU	DR, GG, PC, NSCM (04-12)
	BBR, GG, LC, NSCM (06-11)		ER, CG, PC, NSCM (90-12)
	DR, GG, LC, SCM (03-12)	LV	BBR, GG, LC, NSCM (12)
	ER, GG, LC, NSCM (12)		DR, GG, LC, NSCM (12)
	ER, GG, PC, NSCM (06-11)		ER, GG, LC, NSCM (12)
CZ	ER, CG, LC, NSCM (05-12)	NL	RR, GG, PC, SCM (94-12)
DE	BBR, CG, LC, SCM (11-12)		ER, GG, PC, SCM (94-12)
	BBR, CG, LC, NSCM (69-10)	PL	BBR, CG, PC, SCM (06-07)
	BBR, RLG, LC, SCM (90-12)		DR, GG, LC, SCM (97-12)
	BBR, SS, LC, SCM (09-12)		ER, CG, LC, SCM (11-12)
	ER, CG, PC, NSCM (82-12)	PT	BBR, GG, LC, NSCM (12)
	ER, RLG, PC, NSCM (82-12)		BBR, CG, LC, NSCM (02-11)
DK	BBR, GG, PC, NSCM (92-12)		BBR, RLG, LC, NSCM (03-06)
	RR, GG, PC, NSCM (01-11)		BBR, RLG, LC, SCM (07-11)
	ER, GG, PC, NSCM (94-12)		ER, CG, LC, NSCM (12)
EE	BBR, GG, PC, NSCM (93-12)	RO	ER, GG, LC, SCM (10-12)
	DR, RLG, LC, NSCM (97-12)	SE	BBR, GG, LC, NSCM (07-12)
ES	BBR, GG, LC, SCM (03-05, 10-12)		BBR, RLG, LC, NSCM (00-12)
	BBR, GG, LC, NSCM (06-09)		BBR, GG, PC, NSCM (00-06)
	ER, CG, LC, NSCM (11-12)		ER, CG, LC, SCM (10-12)
	ER, RLG, LC, NSCM (11-12)		ER, CG, PC, SCM (97-09)
FI	BBR, RLG, LC, NSCM (95-12)		ER, SS, LC, SCM (10-12)
	BBR, CG, PC, NSCM (99-12)		ER, SS, PC, SCM (97-09)
	DR, CG, PC, NSCM (95-07)	SI	DR, RLG, LC, NSCM (-90-12)
	ER, CG, PC, NSCM (03-12)		DR, GG, PC, NSCM (00-04)
FR	BBR, RLG, LC, NSCM (83-12)		ER, GG, LC, NSCM (11-12)
	RR, CG, LC, NSCM (06-12)	SK	BBR, RLG, LC, SCM (02-08)
	DR, SS, LC, NSCM (08-12)		BBR, RLG, LC, NSCM (09-12)
	ER, CG, PC, NSCM (98-12)		DR, GG, LC, NSCM (12)
	ER, SS, LC, NSCM (06-12)		DR, RLG, LC, SCM (02-12)
	ER, SS, PC, NSCM (97-05)		ER, CG, LC, SCM (02-12)
HU	BBR, GG, LC, NSCM (04-09)	UK	BBR, GG, LC, SCM (97-08)
	BBR, CG, LC, NSCM (10-11)		BBR, GG, LC, NSCM (10-12)
	BBR, SS, LC, NSCM (10-11)		DR, GG, LC, SCM (97-08)
	ER, CG, LC, NSCM (10-11)		DR, GG, LC, NSCM (10-12)
	ER, SS, LC, NSCM (10-11)	CY	None
	DR, GG, LC, NSCM (10-12)	GR	None
	DR, CG, LC, NSCM (09-11)	MT	None
	DR, SS, LC, NSCM (09-11)		

Notes: BBR: Balanced Budget Rule, DR: Debt Rule, ER: Expenditure Rule, RR: Revenue Rule; GG: General Government, CG: Central Government, RLG: Regional or Local Government, SS: Social Security; LC: Law or Constitution, PC: Political or Coalitional Agreement; [N]SCM: [no] (possibility of) sanctions and/or automatic correction mechanism. Years the rule has been in place are stated in brackets.

### A.3 Dataset of national fiscal councils

Table 9: Fiscal Councils

Country	Est.	FOREC	NORM	ASSES	OBLIG	STAT	FREE	NOM	INDEP
AT	1970	1	1	1	1	1	0	1	1
BE	1989	0	1	1	0	1	0	0	0
BG	None								
CY	None								
CZ	None								
DE	1963	1	0	0	1	1	1	1	1
DK	1962	1	1	0	0	1	1	1	1
EE	None								
ES	None								
FI	None								
FR	None								
GR	None								
HU	2008-2010	1	1	1	0	1	1	1	1
	2012	0	1	1	0	1	0	0	0
IE	2011	0	1	1	0	1	0	1	1
IT	None								
LT	None								
LU	None								
LV	None								
MT	None								
NL	1945	1	1	1	1	1	1	1	0
PL	None								
PT	2012	0	1	1	1	1	1	1	1
RO	2010	0	1	1	1	1	1	1	1
SE	2007	0	1	1	0	1	0	1	1
SI	2009	0	1	1	0	1	0	1	0
SK	2012	0	1	1	0	1	0	1	1
UK	2010	1	1	1	0	1	1	1	1

Notes: Est.: Year of establishment of fiscal council; FOREC: provision of independent macroeconomic and/or budgetary forecasts; NORM: normative statements; ASSES: public assessments over if development is proceeding in accordance with national rules and plans; OBLIG: Government is obliged to comply with, or alternatively explain publicly why they are not following the assessments of the fiscal council; STAT: Status, i.e. Law or Constitution; FREE: Freedom from interference, i.e. No politicians in Council, council members not appointed by Government; NOM: nomination procedures, staff is selected by experience and competence; INDEP: independent resources from MF and appropriate access to information

## A.4 Data Sources

Variable	Source
Fiscal Policy Variables	AMECO, European Commission (vintage spring 2012)
Debt level	AMECO, European Commission (vintage spring 2012)
Output Gap	AMECO, European Commission (vintage spring 2012)
Inflation rate	AMECO, European Commission (vintage spring 2012)
Dependency Ratio	Population structure and ageing, EC (spring 2012)
Population	Population structure and ageing, EC (spring 2012)
Openness	(Imports + Exports) / GDP AMECO, European Commission (vintage spring 2012)
Ideology	World Bank Political Database
Ideology Range	World Bank Political Database
Government Size	Gwartney, J., J. Hall, and R. Lawson (2011)
Government Fragmentation	World Bank Political Database
Majority Fragmentation	World Bank Political Database
Parliamentary Election	World Bank Political Database
District Magnitude	World Bank Political Database
Open/Closed List	World Bank Political Database & authors input
Delegation	Hallerberg et al. (2009), Ylaoutinen (2004)
Contract	Hallerberg et al. (2009), Ylaoutinen (2004)
Institutional Quality	Gwartney, J., J. Hall, and R. Lawson (2011)
SGP	Authors input
RunUp to EMU	% of GDP government deficit above 3% target in five years before joining Euro, AMECO, European Commission (vintage spring 2012)
Potential GDP	AMECO, European Commission (vintage spring 2012)
Nominal GDP	AMECO, European Commission (vintage spring 2012)

Most of the variables i.e. all fiscal policy and economic variables are from the AMECO database of the EU Commission using the ESA 95 variants where applicable. Exceptions are data on the fiscal rules, fiscal councils and medium term budgeting framework described in Appendix A.2, A.3 and A.5 respectively, as well as a group of control variables described below.

Data on Ideology, Ideology Range, Government Fragmentation, Majority Fragmentation, District Magnitude, open and closed list election systems and Parliamentary Elections are all taken from the World Bank Political Database and updated for the year 2011-2013 by using the European Election and Referendum Database until 2012 and [www.electionguide.org](http://www.electionguide.org) for 2013 election dates. The classification of parties (left right center) was taken from previous years. The district magnitude variable significantly changed only for 6 countries from 2000-2010. Five of them changed the variable shortly before or after joining the European Union: Poland (2001), Czech Republic (2003), Hungary (2006), Lithuania (2007), Romania (2007). Thus we just prolonged the time series and assumed the same district magnitude for 2011-2012 as in 2010.

The Government Size variable is an indicator of General government con-

sumption spending, Transfers and subsidies as a percentage of GDP, Government enterprises and investment and the top marginal tax rate which is published by the Economic Freedom Network (Gwartney *et al.*, 2011). The institutional quality variable is also taken from the same database and covers Judicial independence, Protection of property rights, Military interference in rule of law and the political process, Integrity of the legal system and Legal enforcement of contracts.

## A.5 Medium Term Budgeting Variable

We obtain the following variables from the "stability and convergence programmes" (SCP), which are available from 1998 (for the old EU Member States; 2004 for the new EU Member States) to 2012: i) expected primary expenditures as share of expected nominal GDP for the following three to five years (varying over the SCPs); ii) expected nominal GDP (growth) for the next three to five years. We denote  $\mathcal{F}_{i,f,t}^{PE}$  as the expected primary expenditure for year  $t$  as share of expected nominal GDP as stated in the SCP of year  $f$  for country  $i$ , i.e.  $\mathcal{F}_{AT,2006,2008}^{PE}$  is the expected primary expenditure as share of expected nominal GDP of the year 2008 which is stated in the SCP of Austria in year 2006. A similar notation is used for the expected nominal GDP:  $Y_{i,f,t}$ . The actual values for primary expenditures and nominal GDP for country  $i$  and year  $t$  are denoted as  $\mathcal{F}_{i,t}^{PE}$  and  $Y_{i,t}$  respectively. As a first step we calculate the difference between the expected and actual primary expenditures as share of actual GDP:

$$d\hat{\mathcal{F}}_{i,f,t}^{PE} = \frac{\left(\hat{\mathcal{F}}_{i,f,t}^{PE} \cdot \hat{Y}_{i,f,t} - \mathcal{F}_{i,t}^{PE} \cdot Y_{i,t}\right)}{Y_{i,t}} \quad (2)$$

This way we already adjusted for the denominator effect of an error in the expected nominal GDP. But as parts of the level of primary expenditures also depend on the business cycle (e.g. unemployment benefits), we also adjust for the error in the forecasts of nominal GDP of the governments by running the following OLS regressions for every country  $i$  and every year  $f$ :

$$d\hat{\mathcal{F}}_{i,f,t}^{PE} = \beta \left(\hat{Y}_{i,f,t} - Y_{i,t}\right) + \epsilon_{i,f} \quad (3)$$

Our measure of the quality of the medium term budgeting framework of a country is now the five-year average of the residual  $\epsilon_{i,f}$ , i.e.

$$MTF_{i,t} = 0.2\epsilon_{i,t-2} + 0.2\epsilon_{i,t-1} + 0.2\epsilon_{i,t} + 0.2\epsilon_{i,t+1} + 0.2\epsilon_{i,t+2} \quad (4)$$

The dummy variable, which represents our proxy for the MTBF, is 1 if  $|MTF_{i,t}| \leq 1$  and 0 otherwise, i.e. if the absolute five-year average is below 1% of GDP.

## A.6 Cyclical Adjustment

For the cyclical adjustment of the various components of the fiscal policy aggregates we rely on the same production function method used (see e.g. Denis

*et al.*, 2002; European Commission, 2012a) by the EU Commission to cyclically adjust the total expenditures, total revenues and overall balance. Together with the other variables used in this paper the AMECO database also publishes the potential GDP estimates  $Y^{Pot}$  for the EU Member States, which can be used to calculate the cyclically adjusted fiscal policy variables  $F_{CA}^*$  as follows:

$$\mathcal{F}_{CA}^* = \mathcal{F}^* \left( \frac{Y^{Pot}}{Y} \right)^{\epsilon_{F^*}} \quad (5)$$

where  $\mathcal{F}^*$  is the not cyclically adjusted fiscal policy variable,  $Y$  is the actual output and  $\epsilon_{F^*}$  is the elasticity of the fiscal policy variable with respect to the output gap. This elasticity is estimated for every country separately relying on OLS according to the following equation:

$$\log \mathcal{F}^* = \alpha + \epsilon_{F^*} \log \left( \frac{Y}{Y^{Pot}} \right) + u \quad (6)$$

where  $\alpha$  is a constant and  $u$  the error term. The cyclically adjusted primary balance, primary expenditures and revenues aggregates calculated using this method have a correlation of 0.999 with their counterparts published by the EU Commission in the AMECO database.

## A.7 Robustness regarding estimation method

Table 11: Effects of NFRs on primary balance (Dep. Variable:  $\mathcal{F}^{PB}$ )

	FE <sup>1</sup>	Pooled OLS <sup>2</sup>	LSDVC <sup>3</sup>	AB <sup>4</sup>	BB <sup>5</sup>
Lagged Dependent Var.	0.55*** (0.06)	0.66*** (0.04)	0.63*** (0.04)	0.39*** (0.07)	0.43*** (0.06)
$\mathcal{R}$	0.62** (0.27)	0.51*** (0.15)	0.55* (0.33)	1.07** (0.45)	1.46*** (0.53)
Debt level (-1)	0.03*** (0.01)	0.02*** (0.00)	0.02*** (0.01)	0.05*** (0.01)	0.04*** (0.01)
Output Gap (-1)	-0.05* (0.03)	-0.07** (0.03)	-0.05* (0.03)	-0.03 (0.04)	-0.06* (0.04)
Inflation rate	0.04** (0.02)	0.02 (0.02)	0.03 (0.02)	0.09* (0.05)	0.08* (0.05)
Dependency Ratio	-0.01 (0.04)	-0.03** (0.02)	-0.02 (0.04)	-0.09 (0.08)	-0.12*** (0.04)
Population	-0.17* (0.09)	0.00 (0.00)	-0.14 (0.13)	-0.12 (0.17)	-0.02 (0.03)
Openness	0.34 (0.67)	0.04 (0.30)	0.30 (0.77)	1.36 (1.14)	0.82 (0.94)
Ideology	0.10 (0.07)	0.09 (0.06)	0.09 (0.06)	0.18 (0.14)	0.12 (0.11)
Ideology Range	0.04 (0.15)	-0.09 (0.12)	0.01 (0.15)	-0.07 (0.22)	0.11 (0.28)
Government Size	0.12 (0.17)	-0.06 (0.07)	0.06 (0.14)	0.49 (0.38)	0.03 (0.24)
Government Fragmentation	-2.08 (1.82)	-2.01*** (0.86)	-2.02 (1.86)	-2.89 (2.78)	-5.55*** (1.68)
Majority Fragmentation	0.48 (1.31)	-1.18 (0.83)	0.37 (1.54)	2.02 (1.28)	-1.86 (1.85)
Parliamentary Election	-0.32** (0.15)	-0.37*** (0.16)	-0.33** (0.17)	-0.29** (0.14)	-0.43*** (0.14)
District Magnitude	-0.03 (0.03)	0.00 (0.00)	-0.02 (0.02)	-0.08*** (0.02)	-0.02 (0.02)
Dist. Magn. x Open/Closed List	0.07* (0.04)	0.01 (0.03)	0.06 (0.05)	0.11* (0.07)	0.01 (0.08)
Delegation	-0.95 (0.61)	-0.59 (0.37)	-0.94 (0.70)	-2.31* (1.26)	-1.51 (0.97)
Delegation x Government Frag.	2.27 (1.65)	0.93 (0.85)	2.25 (1.49)	4.14** (1.97)	4.43** (1.82)
Contract	-0.33 (1.01)	-0.70* (0.36)	-0.32 (0.90)	-1.17 (1.74)	-1.32 (1.21)
Contract x Government Frag.	2.35** (1.20)	2.04** (0.67)	2.40** (1.17)	3.35 (2.45)	3.48* (2.04)
Institutional Quality	0.56*** (0.20)	0.30*** (0.07)	0.47* (0.26)	0.84** (0.40)	0.72*** (0.24)
SGP	-0.70*** (0.22)	-0.52** (0.19)	-0.63** (0.26)	-1.58** (0.58)	-1.71*** (0.58)
RunUp to EMU	0.29** (0.14)	0.26 (0.16)	0.30** (0.12)	0.31* (0.17)	0.33* (0.20)
R <sup>2</sup>	0.457	0.657			
Obs	490	490	490	463	490

Notes: Results of estimation of Equation 1 using: <sup>1</sup>Fixed Effects, robust standard errors in parentheses. <sup>2</sup>Pooled OLS, standard errors clustered by country, robust standard errors in parentheses. <sup>3</sup>Kiviet's corrected LSDV estimator for unbalanced dynamic panels as in Bruno (2005a), Bootstrapped standard errors (using 100 repetitions) in parentheses; <sup>4</sup>Arellano Bond, robust standard errors in parentheses. <sup>5</sup>Arellano-Bover/Blundell-Bond, robust standard errors in parentheses. Constants included in every regression but not shown. Dependent variable:  $\mathcal{F}^{PB}$  - cyclical adjusted primary balance; Significance at the 10%, 5% and 1% level is indicated by \*, \*\* and \*\*\* respectively.