

The Design of National Fiscal Frameworks and their Budgetary Impact

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Abstract

This study analyses the link between well-designed 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 that numerical fiscal rules indeed 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

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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 that can arise in the euro area due to 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 assess 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 broaden the analysis by also including fiscal councils and medium-term budgetary frameworks as explanatory 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 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 also very reassuring with respect to the decision in early 2012 by most EU countries (except the Czech Republic and the UK) to sign the Fiscal Compact, which foresees the implementation of a national balanced budget rules preferably at constitutional level with an automatic correction mechanism in place.

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. All these new regulations are intended to soften inherent incentive and coordination problems that can arise in the euro area due to 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 governments¹. 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's 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)², 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 assess the budgetary impact we look at both, aggregated as well as disaggregated fiscal policy variables.

We have constructed our own time-varying dataset for national fiscal frameworks, which is largely based on four different datasets available from the European Commission (2010, 2012), 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 available³. 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 from 1990 to 2005 and find that stricter and broader national numerical fiscal rules lead to higher 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 and Hauptmeier

¹See Ayuso-i-Casals et al. (2007) or Debrun et al. (2008) for a review of the literature about the deficit bias.

²Kopits and Symanski (1998) define fiscal rules as "a permanent constraint on fiscal policy, expressed in terms of a summary indicator of fiscal performance".

³A 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).

(2009) focus on government decentralisation, while Wiertz (2008), 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 only 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 looking at disaggregated (expenditure and revenue) data to uncover hidden effects and the origin of the aggregated findings.

Apart from Debrun, Gerard and Harris (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 and Wren-Lewis (2011) or Debrun, Hauner and Kumar (2009). Debrun and 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, Gerard and Harris (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. In contrast to this latter study we look at fiscal councils and medium term budgeting frameworks only in combination with national numerical fiscal rules. 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.

Our main finding is that the introduction of numerical fiscal rules lowers public expenditures as well as revenues, but the latter to a smaller extent, such that indeed the primary balance is improved. 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 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 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 (2010, 2012), the OECD (2003, 2008), the IMF (2012) and an ESCB-internal dataset on national fiscal frameworks (2011, 2012)⁴. The dataset includes dummies (\mathcal{R}) for certain characteristics of fiscal rules, covering the 27 EU countries for the period 1990-2012. We look at national fiscal rules from 4 different dimensions, covering 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. Regarding the status, we differentiate whether a fiscal rule is just stipulated in a political or coalitional agreement or laid down in the law or constitution (LC). The coverage of a fiscal rule can apply to the central or general government ($CGGG$), to the regional or local government (RLG) or to social security. And finally regarding the enforcement, fiscal rules can contain (the possibility of or automatic) sanctions or an automatic correction mechanism (SCM).

A few interesting observations arise 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 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 security⁵. 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 the 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

⁴Although 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.

⁵The number of fiscal rules increased particularly strongly between 1996 and 1999 and between 2001 and 2004.

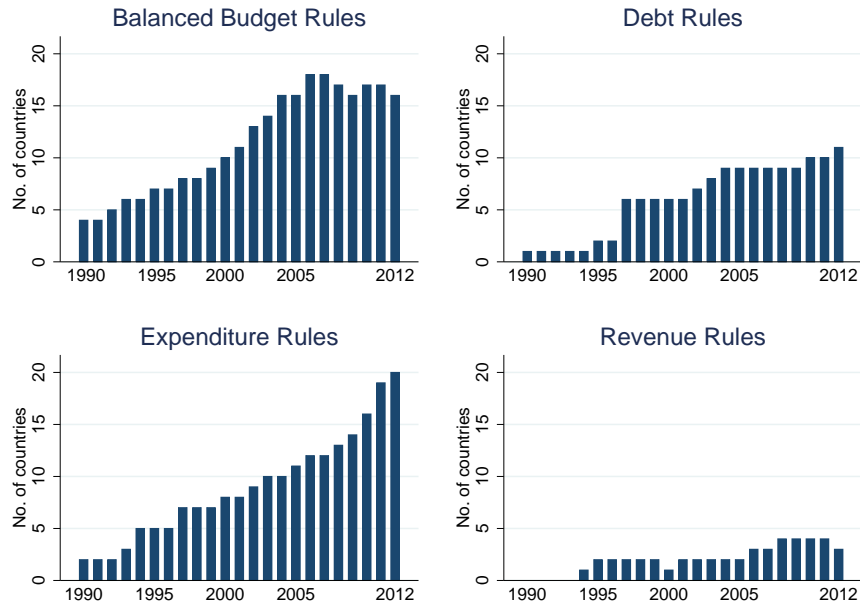


Figure 1: Number of countries for different types of NFRs (per year)

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 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 governments rather than to 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.⁶ We base our dataset on the information available from the EU Commission (2010b), Wren-Lewis and Calmfors (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

⁶We 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).

as for numerical fiscal rules. It distinguishes between some key characteristics of fiscal councils which were generally found to be important⁷: i) preparation of macroeconomic or fiscal forecasts (*FOREC*), ii) issuance of normative statements (*NORM*), iii) public assessment of government programs (*ASSES*), iv) obligation for a government to comply or react to assessments (*OBLIG*), v) legal status (*STAT*), vi) freedom from influence of the finance ministry (*FREE*), and vii) independent resources and nomination of staff (*INDEP*). 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.⁸

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.⁹

2.3 Medium-term budgetary frameworks (MTBFs)

Effective medium-term budgeting frameworks (MTBFs) should ensure the following elements¹⁰: 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 public annually. To our knowledge no time-varying database on medium term budgeting frameworks is available¹¹. 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

⁷See e.g. Debrun and Kumar (2007).

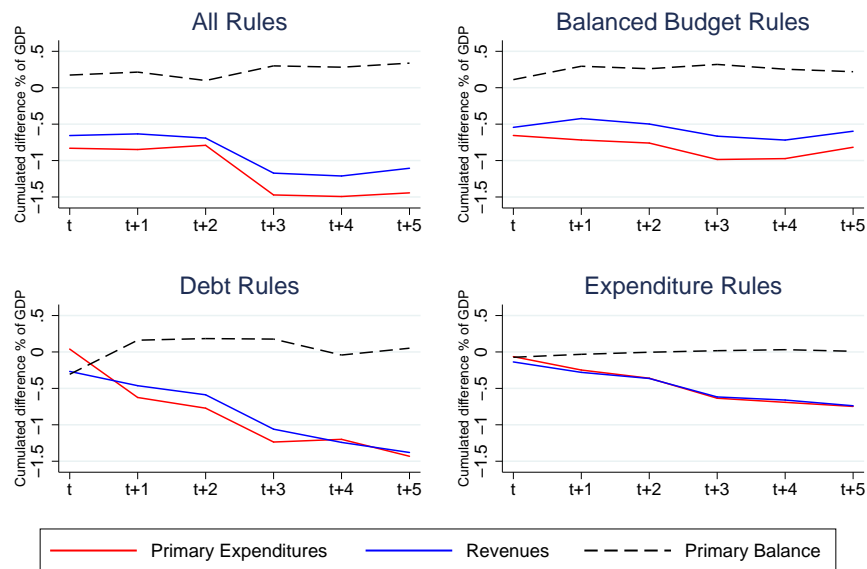
⁸We abstract from the case of Hungary as a notable exception.

⁹According to Debrun and Kumar (2007) independent resources and access of 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.

¹⁰See also the Council Directive 2011/85/EU on medium-term budgetary frameworks

¹¹The European Commission (2010c) published a non-time varying database covering medium-term budgeting frameworks for 2010.

the medium-term budgetary framework.¹² Our proxy constructed this way is broadly in line with the index constructed by the European Commission (2010c) for the year 2010. If we compare the two measures, we get a reassuringly high negative correlation of -0.68 ¹³. And as one would expect the correlation between earlier years of our measure and the 2010 index of the European Commission gradually declines.



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

2.4 Effects of national numerical fiscal rules: stylised facts

The impact of numerical fiscal rules can be already observed in the data directly. For different types of fiscal rules 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. At first glance we notice that expenditures as well as revenues are lower than the mean after the introduction

¹²Concretely 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 and the average is calculated over the first three years. 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.4.

¹³For the dummy index we still get a quite high correlation of 0.59.

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.

3 The baseline model

We use a standard empirical setup often used in the literature (see e.g. in Debrun et al., 2008, Hallerberg et al., 2009, or De Haan et al., 2012), which describes a basic fiscal reaction function. We estimate the following Equation 1, in which we regress various fiscal policy aggregates on numerical fiscal rules:

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

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 can represent 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 in line with the potential GDP method used by the European Commission (2012b), described in Appendix A.5. The fiscal policy variables are taken from Eurostat and the dummy variable is taken from our dataset¹⁴. As past fiscal policy outcomes can be expected to determine the current ones we include the lagged dependent variable.

In principle, this setting might raise the question of an endogeneity bias due to reverse causality, as countries might change their numerical fiscal rules over time and this change might depend on the government performance or fiscal outcomes¹⁵. However, as also in line with other studies, e.g. De Haan et al. (2012), we assume this bias to be negligible as fiscal frameworks are relatively costly to change and we only use annual data while there is a very significant implementation time lag between the decision to introduce a fiscal rule and the actual time the rule is in 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 variables¹⁶. The economic variables control for changes in fiscal policy that go

¹⁴A detailed list of variable sources is given in Appendix A.3.

¹⁵The reverse causality problem has been raised by Poterba (1994) and empirically shown for several European countries in De Haan et al. (1999). Both relying on cross-sectional models.

¹⁶All data sources are given in Appendix A.3.

beyond cyclical developments. They include the (lagged) debt level, as fiscal policy in countries with higher debt levels might be geared towards debt reduction, and, 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 as some parts of public expenditures or revenues might be indexed or relate on the number of people depending on the government. 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 different 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. As argued e.g. by Inman (1996), if these variables were not included, this would make cross-sectional (or panel) studies with several countries subject to endogeneity concerns due to omitted variables¹⁷. 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 η_i ¹⁸. Country fixed effects are included as Dafflon and Pujol (2001) and Krogstrup and Wälti (2008) show that voters fiscal preferences are largely time-invariant unless there are significant electorate changes. To account for those time variation in the electorate or voter 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 ideology distance of the parties in the government, iii) the size of the 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 the parliament).

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 variables which indicate if a country follows the delegation or contract approach in centralising budgetary decisions (i.e. 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). Furthermore we include a variable reflecting the quality of a country's institutions (apart from the 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 five years before joining the euro area and the

¹⁷In particular, Besley and 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.

¹⁸Including country fixed effects is also confirmed by Hausman test on systematic difference in coefficients of random and fixed effects models

3%-benchmark, to capture the countrys fiscal effort prior to joining the euro area¹⁹.

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 estimation²⁰. 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 checks we also estimate our model using fixed effects, pooled OLS or Arellano-Bond estimators and, as also shown in Debrun and Kumar (2007), find very similar or even higher coefficients and significance levels, especially for the coefficient of the fiscal framework variable we are most interested in²¹.

4 Baseline 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 numerical fiscal rules 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 0.62 percentage points of GDP higher than that of their peers. Moreover, primary expenditures are 1.43 percentage points and revenues 0.82 percentage points (expressed in GDP terms) lower. Thus, if numerical fiscal rules are in place the primary balance is significantly higher, because expenditures are decreased to a stronger extent than the decrease in revenues - a phenomenon we observe throughout the paper. If we account for the auto-correlation of the dependent variable we find the long-run impact²² of fiscal rules to be +1.68 pp of GDP for the primary balance, -7.53 pp of GDP for the primary expenditures and -4.56 pp of GDP for the revenues.

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 a significantly positive, although small reaction

¹⁹See also Hallerberg et al. (2009).

²⁰As 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.

²¹The 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.

²²We 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)	0.81*** (0.02)	0.82*** (0.03)
\mathcal{R}	0.62* (0.35)	-1.43*** (0.34)	-0.82** (0.34)
Debt level (-1)	0.02*** (0.01)	-0.01** (0.01)	0.01* (0.01)
Output Gap (-1)	-0.04 (0.03)	0.06*** (0.02)	0.03 (0.02)
Inflation rate	0.03 (0.02)	-0.05** (0.02)	-0.03 (0.02)
Dependency Ratio	0.02 (0.04)	-0.19*** (0.04)	-0.19*** (0.04)
Population	-0.14 (0.13)	0.35*** (0.12)	0.26** (0.12)
Openness	0.36 (0.74)	-2.85*** (0.72)	-2.32*** (0.73)
Ideology	0.07 (0.06)	-0.02 (0.06)	0.05 (0.06)
Ideology Range	-0.02 (0.13)	-0.31** (0.13)	-0.37*** (0.12)
Government Size	0.11 (0.13)	-0.28** (0.13)	-0.20 (0.13)
Government Fragmentation	-0.43 (1.41)	2.00 (1.41)	1.77 (1.40)
Majority Fragmentation	0.30 (1.43)	1.27 (1.42)	1.67 (1.41)
Parliamentary Election	-0.36*** (0.14)	-0.06 (0.14)	-0.42*** (0.14)
District Magnitude	-0.00 (0.02)	0.05** (0.02)	0.05** (0.02)
Delegation	-0.26 (0.53)	-0.45 (0.51)	-0.92* (0.52)
Contract	0.69 (0.61)	-1.78*** (0.58)	-1.19** (0.59)
Institutional Quality	0.47* (0.26)	-1.21*** (0.25)	-0.91*** (0.26)
SGP	-0.64** (0.25)	0.50** (0.25)	-0.22 (0.26)
RunUp to EMU	0.26** (0.12)	0.07 (0.12)	0.35*** (0.12)
R ² (within)	0.448	0.705	0.732
Obs	490	490	490

Notes: Results of estimation of Equation 1 using Kiviet's corrected LSDV estimator for unbalanced dynamic panels as in Bruno (2005); 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; Bootstrapped standard errors (using 100 repetitions) are in parentheses. R² is taken from fixed effects estimation. Significance at the 10%, 5% and 1% level is indicated by *, ** and *** respectively.

to past debt levels and a significant and high persistence of the primary balance. Furthermore we observe a significant negative effect of the electoral business cycle, the disciplinary device of the membership in the euro area (i.e. the SGP) and a positive effect of the deficits above 3% of GDP in the run-up to the EMU. Only weakly significant we also find a positive effect of the institutional quality. 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 aggregated 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 is made up by a negative effect on primary expenditures and a positive effect on revenues. While the output gap, inflation rate and government size was not significant in the primary balance regression, they are for primary expenditures. A higher output gap indeed leads to significant higher expenditures, but might not be detected in the primary balance as revenues also seem to go up (not significantly though). A similar effect can be observed for the dependency ratio, population, openness, ideology range of the government, district magnitude and contract approach of governing. In all those cases the respective control variables significantly influences expenditures and revenues in the same direction and in a similar magnitude. Finally, we see that the lower primary balance explained by the electoral cycle is due to lower revenues, while the higher 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 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, 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

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}	0.62*	-1.43***	-0.82**	\mathcal{R}_{LC}	0.65*	-1.49***	-0.85**
	(0.35)	(0.34)	(0.34)		(0.36)	(0.50)	(0.40)
\mathcal{R}^{BBR}	0.45	-1.20**	-0.66	\mathcal{R}_{LC}^{BBR}	0.68*	-1.46***	-0.96**
	(0.39)	(0.54)	(0.43)		(0.35)	(0.50)	(0.39)
\mathcal{R}^{DR}	0.44	-0.95*	-0.55	\mathcal{R}_{LC}^{DR}	0.60	-0.70	-0.19
	(0.40)	(0.56)	(0.44)		(0.44)	(0.62)	(0.49)
\mathcal{R}^{ER}	0.12	-0.29	-0.15	\mathcal{R}_{LC}^{ER}	0.05	-0.56	-0.43
	(0.26)	(0.35)	(0.28)		(0.30)	(0.41)	(0.33)
\mathcal{R}_{CGGG}	0.39	-0.97***	-0.60**	\mathcal{R}_{SCM}	0.11	-0.32	-0.09
	(0.25)	(0.35)	(0.28)		(0.33)	(0.46)	(0.37)
\mathcal{R}_{CGGG}^{BBR}	1.02***	-1.01**	-0.02	\mathcal{R}_{SCM}^{BBR}	-0.08	-0.31	-0.35
	(0.33)	(0.46)	(0.37)		(0.36)	(0.49)	(0.39)
\mathcal{R}_{CGGG}^{DR}	0.48	-0.78	-0.26				
	(0.43)	(0.59)	(0.47)				
\mathcal{R}_{CGGG}^{ER}	0.06	-0.23	-0.11	\mathcal{R}_{SCM}^{ER}	-0.70*	-0.46	-0.17
	(0.25)	(0.34)	(0.27)		(0.40)	(0.59)	(0.46)

Notes: Results using Kiviet's corrected LSDV estimator for unbalanced dynamic panels as in Bruno (2005); Dependent variables: \mathcal{F}^{PB} - cyclical adjusted primary balance, \mathcal{F}^{PE} - cyclical adjusted primary expenditures, \mathcal{F}^R - cyclical adjusted revenues; 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.

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. For fiscal rules enshrined in law or constitution the coefficient indicates that primary expenditures are lower by 1.49 pp of GDP and revenues by 0.85 pp of GDP (thus the impact is stronger than for all rules, as indicated in the baseline estimation).

When distinguishing between different types of rules (*BBR*, *DR*, *ER*) we find the strongest effects for balanced budget rules (in particular when they are enshrined in law or constitution). Some significant effects can also be found for the debt rule, while the findings for expenditure rules do not lead to conclusive results. 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 the results regarding the expenditure rule are surprising. One explanation 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. This would explain the limited impact on the primary budget balance²³. For example, Hansson-Brusewitz and Lindh (2005) and Boije (2002) show that tax expenditures, i.e. negative taxes,

²³This effect is especially visible in our results when looking at expenditure rules that are enforced by sanctions or automatic correction mechanisms.

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}	-0.05 (0.17)	-0.41*** (0.15)	-0.34*** (0.11)	-0.42*** (0.15)	-0.22** (0.10)	-0.10** (0.04)	-0.40*** (0.11)	-0.13 (0.09)
\mathcal{R}^{BBR}	-0.36** (0.18)	-0.25 (0.17)	-0.36*** (0.13)	-0.42** (0.17)	-0.29*** (0.11)	-0.07* (0.04)	-0.39*** (0.13)	-0.20** (0.10)
\mathcal{R}^{DR}	-0.27 (0.19)	-0.38** (0.17)	-0.25* (0.13)	-0.56*** (0.17)	-0.29*** (0.11)	-0.04 (0.04)	-0.30** (0.13)	-0.12 (0.11)
\mathcal{R}^{ER}	-0.03 (0.12)	-0.21* (0.11)	-0.21*** (0.08)	-0.08 (0.11)	-0.09 (0.07)	-0.05* (0.03)	-0.07 (0.08)	-0.02 (0.07)
\mathcal{R}_{LC}	-0.15 (0.17)	-0.39** (0.16)	-0.34*** (0.12)	-0.47*** (0.16)	-0.26*** (0.10)	-0.10** (0.04)	-0.43*** (0.11)	-0.16 (0.10)
\mathcal{R}_{LC}^{BBR}	-0.30* (0.17)	-0.40*** (0.15)	-0.31** (0.12)	-0.46*** (0.16)	-0.16 (0.10)	-0.07* (0.04)	-0.43*** (0.12)	-0.25** (0.10)
\mathcal{R}_{LC}^{DR}	-0.17 (0.21)	-0.35* (0.19)	-0.14 (0.15)	-0.49** (0.19)	-0.25** (0.12)	-0.02 (0.05)	-0.32** (0.14)	-0.07 (0.12)
\mathcal{R}_{LC}^{ER}	-0.09 (0.14)	-0.37*** (0.13)	-0.17* (0.10)	-0.08 (0.13)	-0.19** (0.08)	-0.03 (0.03)	-0.15 (0.10)	-0.05 (0.08)

Notes: Results using Kiviet's corrected LSDV estimator for unbalanced dynamic panels as in Bruno (2005); 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; 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}). In Table 3 we show the results for the disaggregated fiscal variables. 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 (-0.42 pp and -0.4 pp of GDP, respectively), while on the revenue side the strongest effect was found for direct taxes (-0.41 pp of GDP).

These results are even stronger when only looking at the impact of fiscal rules enshrined in law or constitution. 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 social benefits, intermediate consumption and compensation of employees. The impact on social benefits is, however, stronger with a debt rule, in particular when only looking at fiscal rules which are set at the central or general government. In contrast, for compensation of employees the impact of balanced budget rules is stronger than that of

debt rules; ii) only balanced budget rules significantly lower government investment and indirect taxes; iii) expenditure rules are only significant for revenue variables (in particular direct taxes).

Table 4: Coefficients of fiscal rules on expenditure areas

	\mathcal{F}^{DEF}	\mathcal{F}^{ECO}	\mathcal{F}^{EDU}	\mathcal{F}^{GPS}	\mathcal{F}^{HEA}	\mathcal{F}^{HOU}	\mathcal{F}^{POS}	\mathcal{F}^{REC}	\mathcal{F}^{SOC}
\mathcal{R}	-0.22*** (0.03)	-0.14 (0.19)	-0.13*** (0.05)	-0.25*** (0.08)	-0.17*** (0.06)	-0.09*** (0.03)	-0.08*** (0.02)	-0.02 (0.02)	-0.53*** (0.14)
\mathcal{R}^{BBR}	-0.19*** (0.04)	0.19 (0.25)	-0.14** (0.06)	-0.19* (0.10)	-0.12* (0.07)	-0.09** (0.04)	-0.06** (0.03)	-0.03 (0.02)	-0.39** (0.17)
\mathcal{R}^{DR}	-0.13*** (0.05)	-0.39 (0.27)	0.02 (0.07)	-0.31** (0.12)	-0.10 (0.08)	-0.04 (0.04)	-0.05* (0.03)	0.01 (0.02)	-0.64*** (0.19)
\mathcal{R}^{ER}	-0.06 (0.04)	0.16 (0.26)	0.03 (0.07)	-0.14 (0.11)	0.04 (0.08)	-0.02 (0.04)	-0.02 (0.03)	0.01 (0.02)	-0.01 (0.19)
\mathcal{R}_{LC}	-0.22*** (0.03)	-0.17 (0.20)	-0.17*** (0.05)	-0.27*** (0.09)	-0.18*** (0.06)	-0.12*** (0.03)	-0.08*** (0.02)	-0.04** (0.02)	-0.55*** (0.14)
\mathcal{R}_{LC}^{BBR}	-0.20*** (0.04)	-0.39 (0.26)	-0.18*** (0.06)	-0.23** (0.11)	-0.14* (0.08)	-0.21*** (0.04)	-0.08*** (0.03)	-0.05** (0.02)	-0.59*** (0.18)
\mathcal{R}_{LC}^{DR}	-0.17*** (0.06)	-0.02 (0.35)	0.06 (0.09)	-0.38** (0.15)	-0.17* (0.10)	-0.03 (0.06)	-0.07* (0.04)	0.03 (0.03)	-0.58** (0.25)
\mathcal{R}_{LC}^{ER}	-0.10** (0.05)	0.10 (0.27)	-0.02 (0.07)	-0.41*** (0.12)	-0.02 (0.08)	-0.02 (0.04)	-0.06** (0.03)	0.02 (0.02)	-0.20 (0.20)

Notes: Results using Kiviet's corrected LSDV estimator for unbalanced dynamic panels as in Bruno (2005); Dependent variables (cyclically adjusted): \mathcal{F}^{DEF} - Defence, \mathcal{F}^{ECO} - Economic affairs, \mathcal{F}^{EDU} - Education, \mathcal{F}^{ENV} - Environmental protection, \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}^{REC} - Recreation, culture and religion, \mathcal{F}^{SOC} - Social protection; 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}), economic affairs (\mathcal{F}^{ECO}), education (\mathcal{F}^{EDU}), environmental protection (\mathcal{F}^{ENV}), general public services (\mathcal{F}^{GPS}), health (\mathcal{F}^{HEA}) and housing (\mathcal{F}^{HOU}), 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 -0.53 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 -0.22 pp and -0.25 pp of GDP, respectively). In most cases is the impact of balanced budget rules on the areas of expenditures stronger than for debt rules (with the exception of 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 complemented 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

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

	\mathcal{F}^{PB}	\mathcal{F}^{PE}	\mathcal{F}^R
$\mathcal{FC} \times \mathcal{R}$	0.62*	-0.52	0.25
	(0.34)	(0.47)	(0.38)
$\mathcal{FC}_{\text{INDEP}} \times \mathcal{R}$	1.09**	-1.38**	0.10
	(0.46)	(0.63)	(0.50)
$\mathcal{FC}_{\text{INDEP}} \times \mathcal{R}^{BBR}$	1.21**	-1.62**	-0.10
	(0.55)	(0.75)	(0.60)
$\mathcal{FC}_{\text{INDEP}} \times \mathcal{R}^{DR}$	0.08	0.09	0.17
	(0.96)	(1.35)	(1.07)
$\mathcal{FC}_{\text{INDEP}} \times \mathcal{R}^{ER}$	0.57	-0.92	0.22
	(0.46)	(0.63)	(0.51)
$\mathcal{FC}_{\text{INDEP}} \times \mathcal{R}_{LC}$	1.13**	-1.46**	0.06
	(0.48)	(0.66)	(0.54)
$MTF \times \mathcal{FC} \times \mathcal{R}$	0.80**	-0.16	0.59
	(0.37)	(0.52)	(0.42)
$MTF \times \mathcal{FC}_{\text{INDEP}} \times \mathcal{R}_{LC}$	1.74***	-1.84***	-0.09
	(0.46)	(0.61)	(0.51)

Notes: Results using Kiviet's corrected LSDV estimator for unbalanced dynamic panels as in Bruno (2005); Dependent variables: \mathcal{F}^{PB} - cyclical adjusted primary balance, \mathcal{F}^{PE} - cyclical adjusted primary expenditures, \mathcal{F}^R - cyclical adjusted revenues; 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.

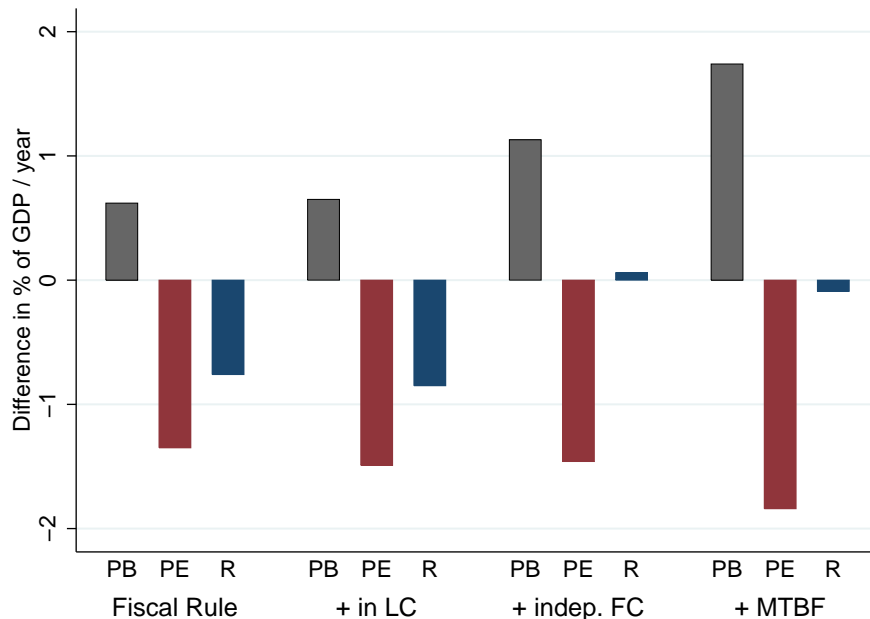
good fiscal framework. Therefore, by including fiscal councils and medium-term budgeting frameworks in the analysis, a more pronounced effect on the fiscal variables can be expected. Due to the relatively small number of countries having a fiscal council²⁴ in place and the relatively small time span (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. 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 when combined with a fiscal council that is considered independent. The effect on the primary balance is twice as strong as in the case without a fiscal council and even three times as strong than complemented with an independent fiscal council and an effective medium term budgeting framework. In this case the primary balance is 1.74pp of GDP higher, which is largely achieved through a likewise reduction in expenditures (by -1.84pp of GDP). As shown in Figure 3 which compares the coefficients for the various fiscal frameworks the main difference between countries with a fiscal council and countries which do not have a fiscal council, is that revenues are significantly lower. 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

²⁴All fiscal councils in our database have their status in law or constitution. Thus we omit this variable from our analysis. Furthermore the variables *NORM*, *ASSES* and *NOM* are the same for all countries except for very few countries. Therefore we also omit these variables.

tax expenditures or cuts in the tax burden. As a consequence fiscal council in combination with fiscal rules enshrined in law or constitution 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 grossly 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.²⁵ Thus, the results presented in our baseline specification can be seen as being at the lower end as regards significance and the quantitative effects.

²⁵In Appendix A.6 we show some of the additional robustness checks regarding the inclusion of the characteristics of the fiscal rules dummy as interacted variable by including the variables in an additive way, i.e. including \mathcal{R} and \mathcal{R}_{LC} simultaneously in one regression. We find that the joint significance test and the sum of the coefficients yield approximately the same result as if we include only the interacted variable. 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 show in the same direction.

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}	0.61** (0.28)	-1.48*** (0.39)	-0.95*** (0.32)	0.84** (0.35)	-1.70*** (0.41)	-0.95*** (0.32)
\mathcal{R}_{LC}	0.63** (0.26)	-1.53*** (0.37)	-0.95*** (0.30)	0.77* (0.41)	-1.86*** (0.47)	-1.12*** (0.36)
\mathcal{R}_{LC}^{BBR}	0.43 (0.28)	-1.08*** (0.40)	-0.83** (0.33)	0.70* (0.41)	-1.87*** (0.47)	-1.22*** (0.36)
\mathcal{R}_{LC}^{DR}	0.64 (0.44)	-1.81*** (0.67)	-1.11** (0.54)	0.81 (0.70)	-1.85** (0.86)	-1.26* (0.66)
\mathcal{R}_{LC}^{ER}	-0.32 (0.33)	-0.81* (0.46)	-1.34*** (0.36)	0.03 (0.46)	-0.91 (0.56)	-0.96** (0.42)

Notes: Results using Kiviet's corrected LSDV estimator for unbalanced dynamic panels as in Bruno (2005); Dependent variables: \mathcal{F}^{PB} - cyclical adjusted primary balance, \mathcal{F}^{PE} - cyclical adjusted primary expenditures, \mathcal{F}^R - cyclical adjusted revenues; 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 also very reassuring with respect to the decision in early 2012 by most EU countries (except the Czech Republic and the UK) to sign the Fiscal Compact, which foresees the implementation of a national balanced budget rules - 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 which would be worthwhile to analyse further. This relates in particular to

the role of independent forecasts and the importance of budget co-ordination between different governmental layers. The analysis of the budgetary impact of these additional elements could be an area of future research.

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A Appendix

A.1 Dataset of national numerical fiscal rules

Table 7: 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, PC, 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.2 Dataset of national fiscal councils

Table 8: 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.3 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
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.1, A.2 and A.3 respectively, as well as a group of control variables described below.

Data on Ideology, Ideology Range, Government Fragmentation, Majority Fragmentation, District Magnitude and Parliamentary Election 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 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 consumption spending, Transfers and subsidies as a percentage of GDP, Govern-

ment 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.4 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.5 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, or EU Commission, 2012b) 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 ϵ_{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 α 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.6 Robustness regarding additive effect

Table 10: Effects of NFRs on primary balance (Dep. Variable: \mathcal{F}^{PB})

	\mathcal{F}^{PB}	\mathcal{F}^{PB}	\mathcal{F}^{PE}	\mathcal{F}^{PE}	\mathcal{F}^R	\mathcal{F}^R
\mathcal{R}	0.29 (0.56)		-0.20 (0.77)		-0.13 (0.62)	
\mathcal{R}_{LC}	0.38 (0.58)	0.65* (0.36)	-1.31 (0.80)	-1.49*** (0.50)	-0.73 (0.64)	-0.85** (0.40)
\mathcal{R}	0.40 (0.59)		-0.29 (0.80)		-0.26 (0.64)	
\mathcal{R}^{BBR}	-0.39 (0.59)		0.08 (0.76)		0.35 (0.61)	
\mathcal{R}_{LC}	0.15 (0.71)		-0.95 (0.96)		-0.35 (0.77)	
\mathcal{R}_{LC}^{BBR}	0.62 (0.62)	0.68* (0.35)	-0.53 (0.78)	-1.46*** (0.50)	-0.81 (0.63)	-0.96** (0.39)

Notes: Results using Kiviet's corrected LSDV estimator for unbalanced panels as in Bruno (2005); Dependent variables: \mathcal{F}^{PB} - cyclical adjusted primary balance, \mathcal{F}^{PE} - cyclical adjusted primary expenditures, \mathcal{F}^R - cyclical adjusted revenues; 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.

A.7 Robustness regarding estimation method

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

	FE ¹	Pooled OLS ²	LSDVC ³	AB ⁴	BB ⁵
Lagged Dependent Var.	0.54*** (0.06)	0.65*** (0.04)	0.63*** (0.04)	0.39*** (0.08)	0.43*** (0.06)
\mathcal{R}	0.67** (0.27)	0.50*** (0.14)	0.62* (0.35)	1.26*** (0.49)	1.50*** (0.54)
Debt level (-1)	0.03*** (0.01)	0.02*** (0.00)	0.02*** (0.01)	0.05*** (0.01)	0.03*** (0.01)
Output Gap (-1)	-0.04 (0.03)	-0.06** (0.03)	-0.04 (0.03)	-0.03 (0.04)	-0.06 (0.04)
Inflation rate	0.04** (0.02)	0.02 (0.01)	0.03 (0.02)	0.08 (0.05)	0.08* (0.04)
Dependency Ratio	0.03 (0.04)	-0.01 (0.02)	0.02 (0.04)	-0.00 (0.07)	0.05 (0.06)
Population	-0.17** (0.08)	-0.00 (0.00)	-0.14 (0.13)	-0.12 (0.19)	-0.02 (0.03)
Openness	0.33 (0.66)	0.02 (0.28)	0.36 (0.74)	1.23 (1.13)	0.58 (0.98)
Ideology	0.08 (0.07)	0.09 (0.06)	0.07 (0.06)	0.14 (0.15)	0.13 (0.12)
Ideology Range	0.01 (0.15)	-0.13 (0.11)	-0.02 (0.13)	-0.12 (0.20)	0.02 (0.21)
Government Size	0.14 (0.17)	-0.02 (0.07)	0.11 (0.13)	0.55 (0.37)	0.30 (0.26)
Government Fragmentation	-0.53 (1.10)	0.40 (0.73)	-0.43 (1.41)	-0.62 (1.08)	-1.49 (1.06)
Majority Fragmentation	0.33 (1.14)	0.10 (0.47)	0.30 (1.43)	1.79 (1.15)	0.07 (1.09)
Parliamentary Election	-0.35** (0.15)	-0.36** (0.16)	-0.36*** (0.14)	-0.32** (0.13)	-0.39*** (0.13)
District Magnitude	-0.00 (0.02)	0.00 (0.00)	-0.00 (0.02)	-0.04 (0.03)	-0.00 (0.02)
Delegation	-0.30 (0.44)	-0.20 (0.18)	-0.26 (0.53)	-1.47 (0.98)	-1.18 (0.90)
Contract	0.72 (1.04)	0.23 (0.17)	0.69 (0.61)	0.54 (0.82)	0.17 (0.65)
Institutional Quality	0.53*** (0.19)	0.31*** (0.08)	0.47* (0.26)	0.88** (0.39)	0.97*** (0.22)
SGP	-0.66*** (0.23)	-0.44** (0.19)	-0.64** (0.25)	-1.53*** (0.59)	-1.72*** (0.52)
RunUp to EMU	0.25* (0.14)	0.20 (0.16)	0.26** (0.12)	0.28 (0.17)	0.28 (0.20)
R	0.389	0.635			
Obs	490	490	490	463	490

Notes: Results of estimation of Equation 1 using: ¹Fixed Effects, robust standard errors in parentheses. ²Pooled OLS, standard errors clustered by country, robust standard errors in parentheses. ³Kiviet's corrected LSDV estimator for unbalanced dynamic panels as in Bruno (2005), Bootstrapped standard errors (using 100 repetitions) in parentheses; ⁴Arellano Bond, robust standard errors in parentheses. ⁵Arellano-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.