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Abstract

Enforcement of European fiscal rules, to a large extent, hinges on the fiscal forecasts prepared by the European Commission (EC). The reliability of these forecasts has received little attention in the literature, despite the fact that i) the forecasts have potentially far-reaching consequences for national governments, especially in the euro area while ii) the EC depends on information supplied by national officials in preparing its forecasts. We hypothesise that the EC's forecasts are biased upwards when national governments expect European fiscal rules to bind. Reconstructing this expectation using real-time information, we show that for euro area countries the EC's fiscal forecasts are indeed biased upwards when the budget deficit threatens to exceed the critical value of 3% of GDP. For non-euro area countries, which do not face the risk of fines, this bias cannot be established. Our results are robust to various ways of controlling for crisis-induced budgetary problems and the exclusion of various country groups. We offer suggestive evidence that the presence of independent fiscal councils at the national level helps to attenuate the bias induced by the 3% threshold.

Keywords: Forecast errors, Stability and Growth Pact, fiscal policy, political economy.
JEL classification: C53, H3, H68, E62.

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1 Introduction

In response to the sovereign debt crisis in the euro area, European policy makers have taken important steps to improve fiscal governance. The Stability and Growth Pact (SGP) has been strengthened significantly. Sanctions have become more credible, in part because the European Commission (EC) now plays a more important role in enforcing the rules, at the expense of the more politically oriented European Council (De Haan et al., 2013).

With the tightening of fiscal rules and stricter European fiscal surveillance, the data used in monitoring adherence to SGP further gain in importance. This holds in particular for the European Economic Forecasts, prepared by the EC itself (EC, 2014a). The EC traditionally presents its forecasts in spring and autumn.[1] Of those, the so-called Spring Forecasts offer a first view of whether countries live up to the rules set out in the SGP. They serve as the benchmark against which the EC judges the budget balances reported by individual member states (Leal et al., 2008).

Fiscal forecasts must however be interpreted with care. It is well-established that national fiscal forecasts often suffer from politically motivated biases (Bohn, 2014). Although forecasts by supranational institutions tend to perform better, they are not completely insusceptible to such biases. This is probably caused by the fact that those institutions are dependent on information supplied by national governments (Merola and Pérez, 2013).

Indeed, in making its forecasts the EC depends to a large extent on the information conveyed to it by member states (Von Hagen, 2010). Forecasts are largely constructed by EC country desk officials (EC, 2014a), who often consult nationals to obtain information and opinions on forecast items. These nationals, for instance from the central government, may have specific interests in providing information. This raises questions regarding the unbiasedness of the forecasts, in particular when fiscal rules are binding, i.e. for expected deficits above the critical value of 3% of GDP as enshrined in the SGP.

Evidence that national governments try to circumvent European fiscal rules by resorting to creative accounting is present in the work of Von Hagen and Wolff (2006). They find that since the introduction of the SGP, stock-flow adjustments have been used to hide budget deficits, especially when the 3% threshold is binding. Frankel and Schreger (2013) show that in euro area countries year-ahead budget balance forecasts by national governments are overoptimistic when at the time of the forecast the current year budget deficit exceeds 3% of GDP. In the interpretation of the authors, this would suggest that governments "most at risk of breaching the rules", bias most.

Remarkably however, the effect of the 3% threshold on the reliability of the fiscal forecasts by the EC – those at the heart of the SGP - has received little to no attention. We intend to fill this gap. Given the EC's informational dependence on national governments, we hypothesise that whether the EC's forecasts are biased depends on whether

[1] Since 2007 these have been supplemented by interim forecasts presented in February/March and September. These were merely updates of the more elaborate, official forecasts. From 2013 onwards, an official Winter forecast is presented annually.

or not governments expect the SGP to bind. Moreover, we expect the potential bias to be particularly large for euro area member states. Although the SGP formally applies to all members of the European Union (EU), only members of the euro area face the threat of fines in case they do not comply with the rules.

We apply a novel identification strategy to identify whether the government expects the deficit to exceed the 3% threshold. We start from the idea that there exists an optimal forecast, based on all publicly and privately available information. The national government, having access to all relevant information, is able to construct this forecast. Our challenge is to recoup this optimal forecast. In order to do so, we purge the *realised* budget balance from any unexpected economic shocks that occurred after the original forecasting date by means of instrumental variable techniques, while exploiting the fact that having a deficit above or below 3% of GDP is in nature a binary variable.

We show that, all else equal, fiscal forecasts for members of the euro area are significantly more optimistic when the government expects the deficit to exceed 3% of GDP. For non-euro area countries, which under the SGP do not face the risk of fines, such an effect cannot be established. Qualitatively, our results are robust to various ways of controlling for crisis-induced budgetary problems and to the exclusion of various country groups. However, the size of the bias in the EC's forecasts does appear to be significantly smaller in those EMU countries where an independent fiscal council produces national macro-economic and/or budgetary forecasts.

Our findings point to the importance of further safeguarding the independence of the forecasts that underlie the SGP. Increased resources would help to reduce the EC's information dependence on member states. Additionally, as EC's DG ECFIN is currently responsible for both the enforcement of the SGP and the preparation of the forecasts that underlie it, moving the forecasting team to a more technocratic unit could help to reduce the risk of undue political influence on the forecasting process. Given that independent fiscal forecasts at the national level appear to reduce the biases in the EC's forecasts, a pragmatic, 'no-regret' alternative to these more fundamental reforms is to monitor and safeguard the independence of fiscal councils that are currently being set up throughout Europe.

2 Related literature and hypotheses

Why would the 3%-threshold enshrined in the SGP interact with the quality of fiscal forecasts by the European Commission?

2.1 The SGP

The European Economic and Monetary Union (EMU) is unique in its combination of centralised monetary policy and national fiscal policy. Already before the introduction of the euro, the EC (1990) argued that this combination required strict fiscal rules. "Excessive deficits" were deemed to be incompatible with EMU, as "the policy of price stability of the EuroFed might be jeopardized if individual member countries run up

excessive public debts or deficits."

The principle of "excessive deficits" was formalised in the treaty of Maastricht, signed in 1992. Budget deficits in EU member states were not to exceed 3% of GDP, whereas public debt levels would have to be below 60% of GDP or would have to be sufficiently diminishing and approaching the reference value at a satisfactory pace.

European fiscal rules got their definitive form with the introduction of the SGP in 1996. The SGP explicated the corrective process for countries in violation of the thresholds (this part of the Pact came to be known as the corrective arm), and it introduced the so-called preventive arm. The preventive arm seeks to ensure that fiscal policy is conducted in a sustainable manner over the cycle. Until the introduction of several reforms in 2011, no sanctions were possible under the preventive arm however.[2]

Within the SGP, the focus has therefore been on the corrective arm. More specifically, the focus has been on the by now well-known 3% limit for the budget deficit, as the debt criterion was actually not operationalized before the 2011 reforms of the SGP. Countries with an excessive deficit enter the Excessive Deficit Procedure (EDP), a step-by-step procedure in which they are required to correct their excessive deficits. Non-compliance can result in financial sanctions. Even though the rules in the SGP apply to all EU member states, potential sanctions are larger for members of the euro area. All countries in the corrective arm may face a temporary suspension in receipt of assistance from the Cohesion Fund, but only for euro area member states a fine of 0.2% of GDP may be imposed.

2.2 Fiscal forecasts and the SGP

While the rules of the SGP might seem straightforward, enforcement is by no means automatic.[3] All EU member states annually submit stability- or convergence programmes. In this, they present their fiscal forecast for the coming four years. The EC checks those against their own Spring Forecasts. If in the view of the EC a member state does not fulfil or risks not fulfilling the requirements with respect to deficit or debt developments, the EC prepares a report, taking into account other relevant factors such as the medium-term economic and budgetary position of the member state. If the EC considers that an excessive deficit in a member state exists or may occur, it informs the Council accordingly. The Council then decides whether an excessive deficit exists and may issue country specific recommendations to end the existence of an excessive deficit. If the member state continues to fail to live up to these recommendations, sanctions could follow.

Clearly, this procedure hinges on the quality of fiscal forecasts, in particular on the supposedly objective benchmark provided by the EC Spring Forecasts. However, the EC in practice does not have the resources to make forecasts for each member state fully on its own and must rely in part on the information conveyed to it by the member states (Von Hagen, 2010). Furthermore, it is likely that national authorities have access to

[2]Since 2011, mild sanctions are possible: Euro area countries face the possibility of having to make an interest-bearing deposit of 0.2% of GDP in case of non-compliance.

[3]The description of European fiscal rules in this section is based on the Treaty on the Functioning of the European union (see EC, 2012b).

more detailed information than outside forecasters, e.g. on short-term tax developments. This information asymmetry provides national representatives with an opportunity to bias the EC's forecasts, within certain limits, in a favourable direction.

It is likely that the opportunity to distort forecasts will be seized, as the SGP provides governments (in danger of) breaching the rules with an incentive to do so (see also Pina and Venes, 2011). In particular, countries which are not yet in an EDP but fear a deficit exceeding 3% of GDP, have an incentive to push their forecasted deficit below the 3%-threshold so as to stay out of an EDP. Countries already in an EDP have to show they are living up to the EC's recommendations, and thus also have a strong incentive to present an optimistic view of the fiscal state of affairs.

The EC, aware of this, faces a trade-off in constructing its forecasts. On the one hand, making use of the detailed information supplied by national agencies can improve forecast accuracy. On the other hand, this implies the EC will absorb more of the political-bias induced error (see e.g. Merola and Pérez, 2013). Since the EC is unlikely to completely ignore national information sources, it seems likely that at least some nationally-induced bias will be present in the fiscal projections by the EC.

In the empirical sections of this paper, our focus is therefore on the quality and unbiasedness of the fiscal forecasts at the heart of the European budgetary surveillance process – those by the European Commission itself. Based on the above, we formulate the following hypotheses:

Hypothesis 1: EC forecasts are biased upwards when the budget deficit is expected to exceed 3% of GDP.
Hypothesis 2: This bias is more pronounced for EMU member states than for other EU members.

2.3 Related literature

The fact that governments might have an incentive to bias fiscal forecasts is documented well. These incentives may arise from opportunistic or national motives, such as elections, or, especially within the European Union, from the institutional setting. Biases in forecasts by national agencies have been found on many occasions (e.g. Beetsma et al., 2009; Frankel, 2011). They have been found to be larger in countries subject to European fiscal rules (e.g. Frankel, 2011; Pina and Venes, 2011) and to be responsive to the electoral cycle (e.g. Brück and Stephán, 2006; Brogan, 2012; Merola and Pérez, 2013). Better national fiscal institutions, in the form of stricter national fiscal rules (e.g. Pina and Venes, 2011; Frankel and Schreger, 2013; Debrun and Kinda, 2014) or the presence of independent fiscal councils (Debrun and Kinda, 2014) are generally associated with smaller biases.

A solution to some of the issues associated with national fiscal forecasts would be to place the forecasting responsibility at a supranational level. One would expect supranational agencies to be less sensitive to political and economic developments in individual countries when constructing their forecast. Indeed, biases in forecasts by supranational

institutions are generally found to be smaller (Beetsma et al., 2009). For EC forecasts, this is confirmed in the forecast evaluation by Cabanillas and Terzi (2012). However, in line with our earlier argument, forecasts by international agencies such as the EC and OECD turn out not to be completely insusceptible to national political-economical developments (e.g. Brück and Stephán, 2006; Christodoulakis and Mamatzakis, 2009; Jong-A-Pin et al., 2012).

These studies do not explicitly account for the strategic effects induced by the 3%-thresholds - the focus of our research. Early evidence for the strategic effects induced by the 3%-thresholds is provided by Von Hagen and Wolff (2006). These authors scrutinize realisation data though, rather than forecast data. Following up on theoretical work by Milesi-Ferretti (2004), they hypothesise that the SGP's focus on the budget balance provides governments with an incentive for systematic strategic use of stock-flow adjustments. Indeed, Von Hagen and Wolff (2006) find that since the introduction of the SGP, recorded deficits have been lowered by increasing stock-flow adjustments. This effect is most pronounced when fiscal rules are binding.

Frankel and Schreger (2013) pay explicit attention to the effect of the 3%-threshold on fiscal forecasts by national governments (specifically: excessive deficit notifications). They test whether budget balance forecasts by EMU members which at the time of the forecast had a deficit exceeding 3% of GDP are more biased than those of countries that did not face a deficit exceeding 3% of GDP, finding an affirmative answer. EMU governments facing an excessive deficit thus forecast an overly quick reduction of their deficit. While Frankel and Schreger also hypothesise that EMU governments will be hesitant to forecast breaches of the 3% threshold, their identification strategy offers no direct proof of this, though they do offer some other descriptive evidence.

An alternative approach to testing the effects of European fiscal rules on forecasting errors is presented by Merola and Pérez (2013), though only as (minor) sidestep in a broader research. They test whether average forecast errors are larger for countries that have *ever* been under an EDP than for those that haven't, finding an affirmative answer.[4] This is a highly indirect way of identifying the effects of European fiscal rules. Moreover, results potentially suffer from an endogeneity problem: countries suffering from a truly unforeseeable macro shock will be more likely to both overestimate their budget balance and to end up in an EDP because their deficit exceeds 3% of GDP.

3 Data description

3.1 Sources and definitions

We analyse forecast errors in the Spring Forecasts by the European Commission. The following notation will be used throughout this paper:

[4]Merola and Perez focus on 1999-2007. Note that for our sample period, every euro area country except Estonia (which joined the euro area only in 2011) has been in an EDP at least once, rendering this identification strategy infeasible.

Subscript i = country
Subscript t = year to which the observation refers
Superscript t = vintage from which the observation is drawn

For forecast errors, the simple superscript t is replaced by:

Superscript $t : t + x$ = revision between period t and period $t + x$

We define the forecast error as the difference between the current year forecast of a variable and the first figure that is published in the National Accounts. This number is published in the $t + 2$ Spring Forecast. For the year t budget balance, the forecast error between the year t and year $t + 2$ forecast vintages is thus given by:

$$\Delta bbl_{i,t}^{t:t+2} = bbl_{i,t}^{t} - bbl_{i,t}^{t+2} \tag{1}$$

$$\textit{(forecast error)} = \textit{(forecast)} - \textit{(realisation)}$$

Defining the forecast error in this manner has the intuitive implication that a positive number amounts to too positive a forecast, such as an overestimate of the budget balance or GDP growth.

We focus on the $t = 0$ Spring Forecast. This forecast is an important input for the proposals for the Country Specific Recommendations presented by the EC in May and potentially triggers the EC to propose the opening of an EDP, or for countries already in an EDP, abrogation (see e.g. EC, 2014b). Therefore, the Spring Forecast has obvious relevance for national governments. Moreover, as it is a forecast for the running year, the $t = 0$ forecast has the advantage that it should, to a large extent, already incorporate planned policy measures as well as a relatively accurate assessment of the economic situation. This removes important sources of noise compared to longer-term forecasts.

Table 1 provides some summary statistics of the main variables used in the analysis. Short term forecast data on macro and fiscal variables such as GDP growth, the budget balance, the current account balance and the output gap, are taken from the EC's Spring Forecasts. Financial sector support data are taken from the October 2013 EDP notification tables. We use the composite Standard Fiscal Rules Index constructed by the European Commission (EC, 2014c), as a measure of the strength of fiscal rules. Planned elections are drawn from an updated version of the World Bank Database of Political Institutions (Beck et al., 2001). Data on the presence of fiscal councils is drawn from a new IMF database (Debrun and Kinda, 2014). Our sample comprises the EU27, over the period 2001-2012. For the EU15 our dataset covers the entire period.[5] For the ten 2004 EU-entrants, we have all required data for the period 2007-2012. Bulgaria and Romania are included in the baseline from 2008 onwards.

[5]We have two missing observations for Luxembourg.

Table 1: Summary statistics, EU27, 2001-2012

		Obs	*Mean*	*Std. Dev.*	*Min*	*Max*
Budget balance revision$_0^{0:2}$	(%-pt)	281	0.16	2.05	-4.8	19.5
GDP growth revision$_0^{0:2}$	(%-pt)	281	0.14	1.63	-4.5	8.4
Budget balance$_0^2$	(% GDP)	281	-2.63	4.01	-31.2	6.4
Budget balance$_0^0$	(% GDP)	281	-2.46	3.16	-12.0	5.3
Fiscal rules index	(relative index)	281	0.55	0.99	-1.0	3.3
Planned elections	(dummy variable)	281	0.17	0.37	0	1
Fiscal council	(dummy variable)	281	0.24	0.43	0	1
Financial sector support	(% GDP)	281	-0.15	1.26	-19.9	1.0
Output gap$_0^{-1}$	(% potential GDP)	259	-1.28	2.05	-11.7	3.5
Current account$_0^{-1}$	(% GDP)	271	-1.70	6.03	-21.0	20.1
Current account$_1^0$	(% GDP)	281	-1.95	6.47	-22.9	20.1
Budget balance, 4-yr average$_{-1}^{-1}$	(% GDP)	271	-1.72	3.03	-16.1	5.0

For interpretation of sub- and superscripts, see main text. As an example, current account$_0^{-1}$ is the current year ($t = 0$) level of the current account as forecasted last year ($t - 1$). Budget balance revision$_0^{0:2}$ is the revision to the current year ($t = 0$) budget balance between the current year ($t = 0$) forecast and the realisation number published two years later (in the $t + 2$ forecast vintage). NB: The $t - 1$ average budget balance is calculated over the period $t - 4$ to $t - 1$, as reported in vintage $t - 1$.

3.2 Statistical properties

We focus on the average forecast error of the budget balance – i.e. the bias. Revisions to well-behaved forecasts should on average be mean zero. Over the period 2001-2012, the average forecast error for our entire (EU) sample is 0.2% of GDP (see table 1). For EMU countries, the average error is somewhat larger: 0.4% of GDP. For non-EMU countries, the average error over the same period is –0.2% of GDP.[6]

Average forecast errors however differ strongly across countries (see figure 1). Within EMU, current year forecasts are on average notably too optimistic for Greece, Ireland and, to a lesser extent, Cyprus, Slovakia and Spain. Forecasts were on average most cautious in Luxembourg and Estonia. Outside EMU, forecasts for in particular Bulgaria and Romania were overoptimistic, while Cyprus stands out as being too pessimistic in its pre-euro years.

As is visible in the left hand chart of figure 2, forecast errors are skewed to the right, i.e. highly overoptimistic forecasts are overrepresented. This is at least to some extent due to the fact that our sample includes the financial crisis. In this period, budget deficits in a number of countries have been heavily affected by measures necessary to keep their financial sectors afloat. As rescue operations and support packages for banks were generally announced last-minute, and the Spring Forecasts are published early in the year, most of the financial sector support measures will not have been included in the forecasts, thereby leading to a severe underestimation of the budget deficit. Clearly, when assessing forecast accuracy it is important to correct for this.

[6]Throughout the paper, countries are assigned to either group on a year by year basis. For example, in 2004-2007 Cyprus is part of the non-EMU sample, while from 2008 onwards Cyprus is counted as a euro area member state.

Figure 1: Average forecast errors, 2001-2012

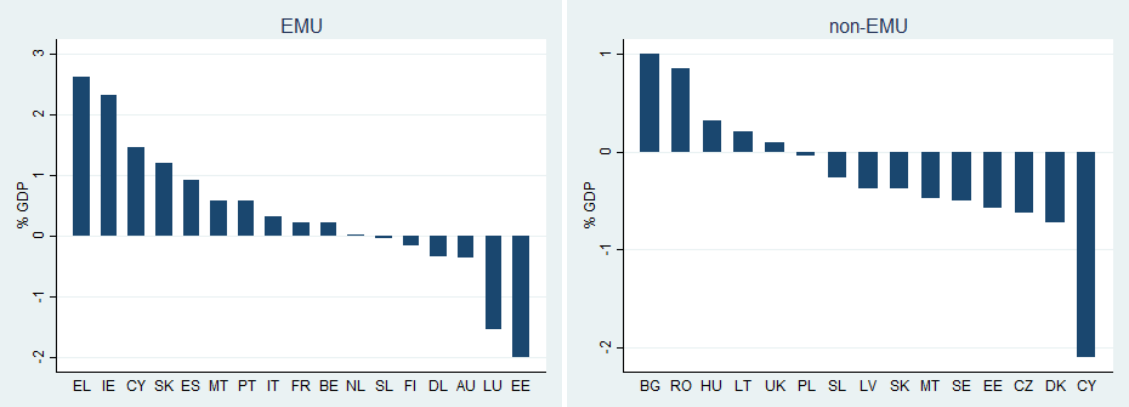
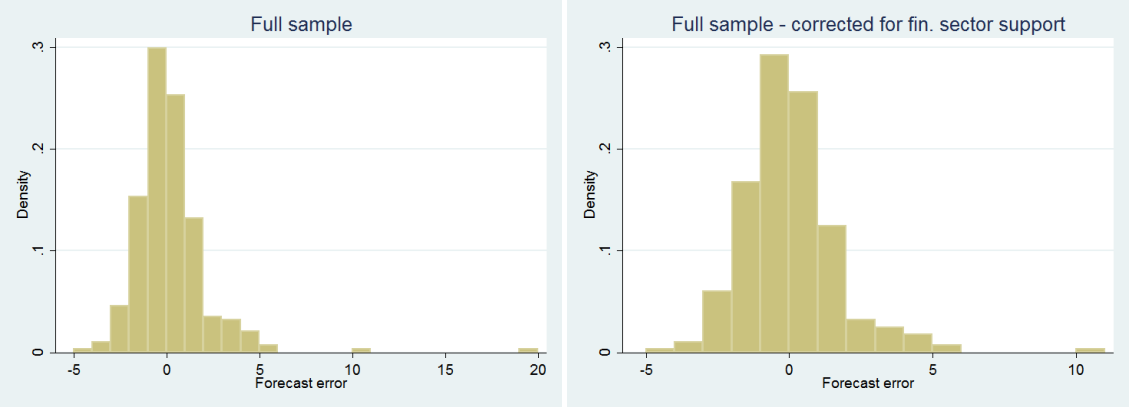


Figure 2: Distribution of forecast errors, 2001-2012



The right-hand side figure shows budget balances after subtraction of financial sector support. This simple approach is warranted as the regression coefficient on financial sector support ≈ 1 in table 2.

Eurostat has published a comprehensive overview of the financial sector support measures in EU countries (Eurostat, 2013). Based on this, we construct the variable "financial sector support" measuring the effect of support to the financial sector on the budget balance as a percentage of GDP. If financial sector support measures were indeed unanticipated, a regression of the forecast error on the financial sector support variable should return a coefficient of minus one. We indeed find an estimate close to minus one, suggesting that by and large financial sector support measures were not included in the forecast (table 2, column 1). We will therefore control for financial sector support in our regressions. However, as financial sector support explains most, but not all extreme revisions (see right hand side chart in figure 2), we will in our robustness checks take the more rigorous approach of directly dropping the observations with the 1% or 5% most extreme forecast errors on one or both tails.

If forecasts make full and efficient use of all available information, data revisions

Table 2: Forecast properties

$\Delta bbl_{i,t}^{t:t+2}$	**FE**	
	(1)	(2)
Financial sector support$_{i,t}$	-0.91***	-0.97***
	(0.05)	(0.04)
$bbl_{i,t}^{t}$		0.10***
		(0.03)
Observations	281	281
Countries	27	27
R-squared	0.34	0.36

Clustered robust standard errors in parentheses. ***p<0.01; **p<0.05; *p<0.10.

should be unpredictable given the information set available at the time of the forecast (Nordhaus, 1987; Gentry, 1989). We follow De Castro et al. (2013) by running a basic regression of the average forecast error on the level of the forecast. To avoid our results being distorted by financial sector support, we include the financial sector measure introduced above in the regression. We find a statistically significant positive relation between the level of the forecasted budget balance and the forecast error (table 2, column 2). As such, the direction of the error can be predicted based on the level of the forecasted budget balance, suggesting that the information set available at the time of the forecast has not been put to full, efficient use.

4 Estimation methodology

4.1 Identification

By hypothesis I, we expect that the prevalence of a bias in the EC's forecast depends on whether the SGP is expected to be binding. This requires us to separate the countries which expect to be in violation of the 3% ceiling from those which deem themselves safe. We cannot do this on the basis of the EC's official forecasts, as under our hypothesis these will be biased in case the 3% threshold is expected to be binding.

To identify governments expecting a deficit larger than 3% of GDP, we therefore resort to realisation data. We start from the idea that there exists an optimal forecast, which incorporates all publicly and privately available information. We dub this the *clean* forecast. Only the national government or representative has access to all relevant information and is therefore the only party able to construct this forecast. Let us denote the government's clean budget balance forecast by $bbl_{i,t}^{exp}$. With $sgp_{i,t}^{exp}$ indicating whether the expected deficit is above 3% of GDP or not, we have that:

$$sgp_{i,t}^{exp} = 1 \text{ if } bbl_{i,t}^{exp} \leq -3 \tag{2}$$

$$= 0 \text{ if } bbl_{i,t}^{exp} > -3 \tag{3}$$

Since $bbl_{i,t}^{exp}$ is unobserved, so is $sgp_{i,t}^{exp}$. We do however observe the realised budget balance. By definition, this is equal to the clean forecast plus or minus any unexpected shocks occurring in the course of the year. As these shocks take place after the period t forecast has been made, but before the $t = 2$ realisation is published, we label them $\epsilon_{i,t+1}$:

$$bbl_{i,t}^{t+2} \equiv bbl_{i,t}^{exp} + \epsilon_{i,t+1} \tag{4}$$

Based on the realised budget balance, we construct a dummy variable indicating whether a country's realised budget deficit violates the 3% ceiling – an imperfect proxy of whether the government's expected deficit was larger than 3% of GDP:

$$sgp_{i,t}^{t+2} = sgp_{i,t}^{exp} + \epsilon_{i,t+1}^{dum} \tag{5}$$

Or, rewriting and using the fact that obviously $\epsilon_{i,t+1}^{dum}$ is a function of $\epsilon_{i,t+1}$:

$$sgp_{i,t}^{exp} = sgp_{i,t}^{t+2} - f(\epsilon_{i,t+1}) \tag{6}$$

As we expect that the presence of a bias in the EC's forecast depends on whether or not governments expect the 3% threshold to bind[7], we have that:

$$\Delta bbl_{i,t}^{t:t+2} = \alpha * sgp_{i,t}^{exp} + \epsilon_{i,t+1} \tag{7}$$

Equivalently, substituting in (6) for the unobservable $sgp_{i,t}^{exp}$:

$$\Delta bbl_{i,t}^{t:t+2} = \alpha * (sgp_{i,t}^{t+2} - f(\epsilon_{i,t+1})) + \epsilon_{i,t+1} \tag{8}$$

We thus end up with a classic endogeneity problem, as third factors captured by $\epsilon_{i,t+1}$ may be driving both the realised budget balance and our proxy for $sgp_{i,t}^{exp}$. To identify the effect of $sgp_{i,t}^{exp}$ on $\Delta bbl_{i,t}^{t:t+2}$ we will therefore make use of instrumental variable techniques. We instrument $sgp_{i,t}^{t+2}$ using information available at time t; that is, information that should in principle be uncorrelated with unexpected shock $\epsilon_{i,t+1}$. Since under the Stability and Growth Pact only EMU members face the possibility of sanctions, we allow the effect of an expected violation of the 3% ceiling to differ between EMU- and non-EMU member states within the EU.

[7] Effectively, we test whether forecasts are *on average* more optimistic in case the rules of the SGP are binding. This is the most general way to test for an SGP-induced bias, as it does not require us to specify an exact functional form for the expected bias. Averages can, however, be disproportionally affected by extreme values. We will show in section 5 that, qualitatively, this does not drive our results.

4.2 Estimation procedure

We estimate the following equation:

$$\Delta bbl_{i,t}^{t:t+2} = \beta_1 sgp_{i,t}^{t+2} + \beta_2 (sgp_{i,t}^{t+2} * EMU_{i,t}) + \beta_3 EMU_{i,t} + \boldsymbol{\mu C_{i,t}} + \rho_i + \gamma_t \qquad (9)$$

Here, $sgp_{i,t}^{t+2}$ is a dummy equal to one if the realised budget deficit of country i at time t exceeds 3% of GDP and $EMU_{i,t}$ a dummy equal to one if country i is at time t a member of the euro area. $\boldsymbol{C_{i,t}}$ denotes a vector of control variables containing the controls from our efficiency test, namely the year t forecast for the country i, year t level of the budget balance and the measure for financial sector support measures. The vector furthermore always includes the revision to GDP, to control for the effect of unexpected shocks to GDP growth on the budget balance forecast error.[8] ρ_i is a country i fixed effect and γ_t a year t time dummy.

Depending on the specification, a dummy for planned elections, the fiscal rule index and a dummy for the presence of a fiscal council providing independent macro and/or budgetary forecasts are included as well.[9] The electoral cycle has often been shown to impact the quality of fiscal forecasts (see e.g. Brück and Stephán, 2006; Brogan, 2012; Merola and Pérez, 2013). However, we do not have clear expectations on the sign of the effect on theoretical grounds. On the one hand, a government could have an incentive to be overoptimistic, so as to create fiscal room for manoeuvre prior to an election. On the other hand, the government may prefer to be pessimistic in order to show its competence by being able to do unexpected expansionary fiscal policies (Bohn, 2014). A stricter institutional setting, as measured by the fiscal rule index, might be expected to lead to more prudent forecasts (e.g. Frankel and Schreger, 2013; Pina and Venes, 2011; Debrun and Kinda, 2014). Likewise, we would expect the presence of an independent fiscal council to coincide with a smaller upward bias in fiscal forecasts. Indeed, Debrun and Kinda (2014) show that countries with independent fiscal councils producing macroeconomic and/or budgetary forecasts, official forecasts of the budget balance are less biased and more accurate, while also confirming the finding by Jonung and Larch (2006) that independent fiscal councils produce less biased GDP forecasts. Frankel and Schreger (2013) do not find a bias reducing effect of fiscal councils in general. Interestingly however, for EMU member states with high deficits fiscal councils are found to reduce the forecast bias.

As outlined above, the major challenge lies in reliably estimating the coefficients on $sgp_{i,t}^{t+2}$ and $sgp_{i,t}^{t+2} * EMU_{i,t}$. We will instrument these variables to circumvent the endogeneity problem that results from the correlation between $sgp_{i,t}^{t+2}$ and the error

[8] Growth surprises are potentially endogenous to the extent that unforeseen changes in the fiscal stance lead to a budget balance forecast error while simultaneously affecting GDP growth. This effect is likely to be small, as we focus on current year forecasts published in spring. By then, most policy measures will be known. Nevertheless, caution is required in interpreting the effect of the GDP forecast error on the budget balance forecast error as causal. Under the assumption of conditional mean independence, potential endogeneity of GDP growth does not prevent a causal interpretation of other coefficients.

[9] Our data do not allow us to distinguish between fiscal councils in charge of macro-economic forecasts, budgetary forecasts or both.

term. Due to the binary nature of the instrumented variable we resort to probit-2SLS (cf. Wooldridge (2002), procedure 18.1) as applied using panel data by amongst others Adams et al. (2009). Even though the consistency of 2SLS does not hinge on choosing the right functional form in the first stage, 2SLS is known to be biased in small samples. Weak instruments amplify this bias. Exploiting the binary nature of our endogenous variable increases the power of our instruments, giving us better small sample properties. Compared to other ways of taking the binary nature of our endogeneous variable into account[10], probit-2SLS has the advantages that it does not require the binary response model to be correctly specified and that it preserves the (asymptotic) validity of the standard IV standard errors.

Probit-2SLS is a three-stage procedure. Before applying the 2SLS-procedure, we estimate a probit model in which our endogeneous variable is regressed on our exogenous instruments and control variables from the second stage regression:

$$sgp_{i,t}^{t+2} = \alpha + \boldsymbol{\theta Z_{i,t}} + \delta_1 EMU_{i,t} + \boldsymbol{\xi C_{i,t}} \tag{10}$$

where $\boldsymbol{Z_{i,t}}$ is a vector of instruments.

Equation (9) is used to predict fitted values for $sgp_{i,t}^{t+2}$. Then, the fitted values, $s\tilde{g}p_{i,t}^{t+2}$, and their interaction with the EMU dummy, $s\tilde{g}p_{i,t}^{t+2} * EMU_{i,t}$, are used as instruments for $sgp_{i,t}^{t+2}$ and $sgp_{i,t}^{t+2} * EMU_{i,t}$ in our main (2SLS) regression. In all stages of the analysis we use standard errors clustered by country, which are robust to both heteroskedasticity and arbitrary intra-country autocorrelation.

4.3 Instrument selection

Instruments should be relevant and exogenous, that is, predictive of whether or not a deficit exceeds the 3% threshold and uncorrelated with unexpected shocks to the budget balance.

Evidently exogenous macro-economic instruments are hard to find. We therefore proceed as follows. First, we select a number of variables that - while potentially predictive of large deficits - in our setting have no obvious relationship with the average revision to the budget balance. Those variables include a country's current account balance (as indicator of macroeconomic imbalances), its debt level, the level of the output gap (indicator of the stance of the business cycle) and the country's budgetary track record (defined as its average budget balance over the past four years), as well as lags, squares and cubes of those variables.[11]

To guarantee exogeneity to the largest possible extent, we then employ three additional safeguards. First, we only include as instruments variables that are available at

[10] Such as directly plugging in fitted values from a probit model into the main regression, which is only consistent if the probit model is correctly specified.

[11] The output gap has in fact been used as an explanatory variable for budget balance forecast errors in for example Frankel and Schreger (2013). They show the level of the output gap to be predictive of the GDP forecast error, and thereby of the budget balance forecast error. We control for the GDP forecast error directly however, so as to close off this channel.

the time of forecast t. In the absence of autocorrelation, they should therefore be uncorrelated with unexpected shock $\epsilon_{i,t+1}$. Second, we refrain from using variables from the current vintage of the forecast. After all, if a country seeks to bias its forecast for the year t budget deficit, it might also do this via distorting other figures in the forecast. Third, we include the the current year forecast for the level of the budget balance (explicitly controlling for the information set available at the time of the forecast) and the revision of GDP-growth in every specification of the second stage regression (to already filter out some events of which we know that they should have affected the budget balance forecast error). This implies that for instruments to be invalidated, they should influence the average fiscal forecast error through something else than either the GDP forecast error or the level of the forecasted budget balance.

As a robustness check, we will also report results where one further lag of all instruments is used. Those instruments are derived from the $t-2$ or earlier vintage of the forecasts and are valid even in the presence of AR(1) forecast errors.

Instrument selection is then done through an a-theoretic general-to-specific approach. Our final instrument set contains variants of the current account balance, the level of the output gap and the budgetary track record (all derived from the $t-1$ forecast vintage). The F-test shows that, in a probit setting, this is quite a powerful set of instruments (table A1 in annex).

5 Results

5.1 Main results

Table 3 presents the main results of this paper. The dependent variable in all columns is the forecast error of the budget balance in the current year, with a positive number pointing at too favourable a forecast.

As shown in column 1, the expectation of exceeding the 3% threshold - as identified by our instrumented *sgp*-dummy - induces a positive bias in budget balance forecasts for EMU member states. This effect is economically large and significant: all else equal, fiscal forecasts for EMU member states with a 'truly expected deficit' above 3% of GDP are on average 1.3 percentage points too optimistic. For non-EMU countries, a positive bias cannot be established. The coefficient on the interaction term $sgp * EMU$, which estimates to what extent the effect of *sgp* on the forecast errors is stronger for EMU than non-EMU countries, is large and statistically significant at the 10% level.

The signs on the control variables are as expected. The effects of the level of the current year budget balance forecast and the measure for financial sector support are similar to those in the efficiency tests presented earlier. Shocks to GDP growth are positively correlated with the fiscal forecast error.

Next, we successively add our political-economy and institutional controls to the model. In a year with planned elections, budget forecasts tend to be overoptimistic. This provides evidence in support of the 'room for manoeuvre' hypothesis, in line with the results of Boylan (2008), Heinemann (2006) and Jong-A-Pin et al. (2012), amongst

Table 3: Main results

$\Delta bbl_{i,t}^{t:t+2}$	Probit-2SLS				Probit-2SLS, lagged instruments			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
$sgp_{i,t}^{t+2}$	0.33	-0.07	-0.07	-0.03	0.66	0.24	0.39	0.48
	(0.63)	(0.64)	(0.61)	(0.60)	(0.74)	(0.80)	(0.75)	(0.78)
$sgp_{i,t}^{t+2} * EMU_{i,t}$	0.99*	1.34**	1.45**	1.46**	1.02	1.33*	1.35*	1.27
	(0.58)	(0.61)	(0.61)	(0.60)	(0.70)	(0.76)	(0.77)	(0.78)
$EMU_{i,t}$	0.17	-0.03	-0.10	-0.15	0.62	0.41	0.36	0.39
	(0.67)	(0.68)	(0.68)	(0.66)	(0.87)	(0.90)	(0.91)	(0.91)
$bbl_{i,t}^{t}$	0.18**	0.17**	0.18**	0.19**	0.25***	0.23***	0.24***	0.24***
	(0.08)	(0.08)	(0.08)	(0.08)	(0.08)	(0.08)	(0.08)	(0.08)
Fin. sector support$_{i,t}$	-0.99***	-0.99***	-1.01***	-1.01***	-1.00***	-1.01***	-1.02***	-1.02***
	(0.04)	(0.04)	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)
ΔGDP growth$_{i,t}^{t:t+2}$	0.23***	0.26***	0.26***	0.26***	0.24***	0.26***	0.26***	0.26***
	(0.08)	(0.08)	(0.08)	(0.08)	(0.09)	(0.09)	(0.08)	(0.09)
Planned elections$_{i,t}$		0.77***	0.78***	0.76***		0.66***	0.66***	0.66***
		(0.20)	(0.19)	(0.19)		(0.20)	(0.19)	(0.19)
Fiscal rule index$_{i,t}$			-0.45*	-0.45*			-0.42	-0.40
			(0.27)	(0.27)			(0.29)	(0.29)
Fiscal council$_{i,t}$				-0.35				0.30
				(0.46)				(0.37)
$sgp_{i,t}^{t+2} \mid EMU_{i,t} = 1$	1.32**	1.27**	1.38**	1.43**	1.68**	1.58**	1.74***	1.75***
	(0.62)	(0.61)	(0.60)	(0.58)	(0.68)	(0.65)	(0.64)	(0.65)
Observations	258	258	258	258	231	231	231	231
Countries	27	27	27	27	27	27	27	27
Period	2001-12	2001-12	2001-12	2001-12	2002-12	2002-12	2002-12	2002-12
R-squared	0.65	0.66	0.67	0.67	0.69	0.70	0.71	0.71
F-test excl. instruments	24.60	21.93	21.53	21.68	14.19	12.98	12.26	11.99

All regressions include country FE and year dummies; cluster-robust standard errors in parentheses. $sgp_{i,t}^{t+2}$ and $sgp_{i,t}^{t+2} * EMU_{i,t}$ are instrumented using the predicted values from a probit regression, see section 4. In columns 1-4, Current account$_{i,t}^{t-1}$, Current account$_{i,t-1}^{t-1}$, Output gap$_{i,t}^{t-1}$, and squares and cubes of the lagged 4-year average of the budget balance serve as exogenous instruments. See table A1. In columns 5-8, excluded instruments are the same, but lagged one period. See table A2. ***p<0.01; **p<0.05; *p<0.10.

others. Both institutional variables have the expected sign, with only the fiscal rule index having a significant effect. Strong fiscal rules can therefore be said to reduce the optimism present in fiscal forecasts, confirming findings by Frankel and Schreger (2013).

The inclusion of the controls drives the estimated effect of *sgp* on the average forecast error for non-EMU members closer to zero. For EMU-members, on the contrary, the point estimate increases slightly and is now estimated at 1.4 percentage points. This implies an even larger divergence between the two country groups of the effect of the 3% threshold on the quality of fiscal forecasts. The interaction term gains significance at the 5%-level.

In columns 5-8 we proceed using lagged instruments so as to further safeguard their exogeneity.[12] The results closely resemble those in columns 1-4. For EMU member states the threat of exceeding the 3% threshold still induces a sizeable positive bias in budget balance forecasts. Point estimates are even somewhat larger now, though the same holds for the standard errors. For non-EMU member states an SGP-induced bias can still not be established.

5.2 The role of fiscal councils

In response to the crisis, European policy makers implemented measures to improve fiscal governance in the EU. The Treaty on Stability, Coordination and Governance in the EMU paved the way for an explicit role for independent fiscal councils. These in many countries newly installed independent bodies should provide public assessments over whether budgetary plans are in line with national and European fiscal rules. Independence would be guaranteed by i) a statutory regime grounded in law; ii) freedom from interference, and having the ability to communicate publicly in a timely manner; iii) nomination procedures based on experience and competence and iv) adequacy of resources and appropriate access to information to carry out the given mandate (EC, 2012a).

Frankel and Schreger (2013) find that for EMU members with high deficits, fiscal councils reduce the bias in national forecasts. In constructing its forecasts, EC depends to a large extent on information obtained from national governments (Von Hagen, 2010). This issue becomes particularly pressing when countries face binding fiscal rules. Therefore, we test whether in countries with an independent fiscal council in charge of making macro-economic and/or budgetary forecasts, the bias associated with the 3% threshold is smaller. We augment our baseline model by allowing the effect the coefficients on *sgp* and $sgp * EMU$ to vary between countries (and years) where national macro and/or budgetary forecasts are prepared by an independent agency and countries (and years) where this is not the case. Now we find that, for EMU members, having an independent fiscal council seems to mitigate the overoptimism present in forecasts when the 3% threshold is expected to be exceeded (see table A3). Some caution is however warranted in interpreting these results causally. The existence of a fiscal council is probably not fully exogenous: countries with a preference for fiscal discipline might be more likely to

[12] In columns 1-4 all instruments are already lagged once; in columns 5-8 they are lagged twice so as to make them exogenous even in case of autocorrelated forecasting errors.

install a fiscal council in the first place.

5.3 Robustness

Since the eruption of the financial crisis, budget deficits exceeding 3% of GDP are more prevalent than before. During the years 2001-2007, 43% of EU budget balances exceeded the 3% threshold, while for the years 2008-2012 the equivalent number is 65%. Moreover, during 2008-2012 budget balances often surprised on the downside: the average budget balance forecast in the EU was 0.5 percentage point too optimistic, compared to an average forecast error of close to zero during 2001-07.

In order to test whether the crisis period drives our results, we allow the coefficients on *sgp* and $sgp * EMU$ to differ pre- and post financial crisis. Both before and after 2008, fiscal forecasts are significantly biased upwards for EMU countries in violation of the 3% threshold. There is no evidence for a structural break and coefficients are more or less comparable to previous results. For non-EMU countries, no significant bias can be found, although the point estimate in pre-crisis years becomes similar in magnitude to the one found for EMU-members (table A4).

Next, we want to make sure our results are not driven by a few extreme observations. As figure 2 made clear, if anything, extreme forecast errors are skewed to the right, i.e. much worse than expected budget balances occur more often than large favourable surprises. Therefore we alternately drop 1 and 5% of the observations with the largest *positive* forecast errors, and 1 and 5% of the most extreme observations on *both* tails (so in the latter case, 10% of the total observations is dropped).

We qualitatively obtain the same results as before (see table A5). For EMU member states, expecting a high deficit is found to cause an upward bias in budget balance forecasts by the EC. The point estimate of the effect declines somewhat if more observations are dropped, but remains significant. For non-EMU members, we generally find no evidence of a significant bias related to the 3% threshold, except in the case where 5% of the observations on both tails is dropped. Remarkably, the coefficient on *sgp* then becomes significantly negative. This could imply that non-EMU countries at risk of a high deficit, take consolidation measures not included in the forecast. However, this result is not robust to using twice lagged instruments.

In table A6 we explore the dependence of our results on the inclusion of specific countries or country groups. As a first test, we drop Greece from the sample, which is known to have been misreporting data on several occasions (EC, 2010).[13] This leaves results by and large unchanged. Secondly, we drop observations for countries in the years that they received support from EFSF or ESM. Most countries in EFSF/ ESM programmes repeatedly missed their fiscal targets: for countries in an EFSF/ ESM programme, fiscal forecasts in our sample are on average 1.3 percentage points to optimistic. This does however not drive our results, as column 2 shows that their exclusion again leaves our results virtually unchanged. Next, we exclude the GIIPS countries from the sample altogether. This imposes a rather strong test on our results, since not only does

[13] Greece is the individual country with the largest effect on estimation results.

it cost us many observations, these observations are also overrepresented in the category 'overoptimistic'. Nevertheless, our earlier findings are confirmed qualitatively. The point estimate of the bias for EMU member states drops to 0.7, but it remains significant at the 10%-level. The declining coefficient indicates that on average the forecasts for the GIIPS have been among the more overoptimistic. For non-EMU member states, still no bias can be established. The difference between the effect of the SGP on EMU and non-EMU countries is smaller than before and is no longer statistically significant.

In columns 4-6 we check the sensitivity of our results to respectively the inclusion of small countries, large countries and "late entrants" into our panel (the Eastern European countries, for which we only have data starting in 2006). Empirical results resemble the baseline findings to a large extent, although the bias found for EMU members seems to increase when we leave out the four largest countries (Germany, France, Italy and UK), suggesting that in forecasts for larger countries, biases tend to be smaller. This could be the result of a smaller information asymmetry between governments and EC. An alternative explanation is that larger countries have a smaller need to bias, as they have more leverage over the EC and are therefore better able to 'bend the rules'.[14]

Finally, results are not sensitive to the data vintage that is used as 'realisation'. Using the most recent historical realisation data for the whole period, rather than the first national account vintage as available in real time, our earlier results are confirmed (table A7).

6 Concluding remarks

With numerical rules at the heart of European fiscal surveillance, it is of the utmost importance that the data on which surveillance is based are accurate and unbiased. Our results show that, all else equal, for members of EMU the EC's fiscal forecasts are more optimistic when the 3% threshold is expected to bind. For EU member states that are not part of the EMU, such an effect cannot be established. Qualitatively, this result does not seem driven by crisis countries, financial sector support, small or large countries or extreme forecast errors.

To improve the quality of the EC's fiscal forecasts, one needs to know what is driving our findings. Is it the informational dependence of the EC on national governments, which are trying to bias forecasts in a favourable direction? Or does the EC itself have some sort of incentive to present too optimistic forecasts in case of binding fiscal rules? Our results suggest that the first channel is, at least to some extent, relevant. First of all, the EC's forecasts are ceteris paribus more optimistic in years with planned elections, in line with the findings by Merola and Pérez (2013) and Brück and Stephán (2006). One would a priori not expect supranational institutions to respond to such national events. Secondly, we find tentative evidence that for countries where an independent fiscal council prepares macro-economic and/or budgetary forecasts, the overoptimism induced by the 3% threshold is smaller. This again hints at the importance of the quality of nationally

[14] Chang (2006) argues that under the SGP large countries have had an easier time than small ones, with the most obvious beneficiaries of favoritism being France and Germany.

provided data. However, on the basis of our findings we cannot exclude the second possibility, namely that the EC itself is a source of overoptimism. A direct comparison between forecasts constructed by national member states in their EDP notifications and the EC's forecasts could shed light on the relative importance of both channels. This is work for future research.

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7 Annex

Table A1: Predicting excessive deficits - probit

	dependent variable: sgp_t^{t+2}			
	(1)	(2)	(3)	(4)
Current account$_{i,t}^{t-1}$	-0.61***	-0.61***	-0.61***	-0.64***
	(0.20)	(0.20)	(0.20)	(0.21)
Current account$_{i,t-1}^{t-1}$	0.51***	0.52***	0.51***	0.52***
	(0.17)	(0.18)	(0.17)	(0.18)
Output gap$_{i,t}^{t-1}$	0.21***	0.21***	0.21***	0.22***
	(0.06)	(0.06)	(0.06)	(0.06)
bbl mean, square$_{i,t-1}$	-0.13***	-0.13***	-0.12***	-0.12***
	(0.04)	(0.04)	(0.04)	(0.05)
bbl mean, cube$_{i,t-1}$	-0.02***	-0.02***	-0.02***	-0.02**
	(0.01)	(0.01)	(0.01)	(0.01)
$EMU_{i,t}$	0.52	0.52	0.57	0.58
	(0.33)	(0.35)	(0.45)	(0.45)
$bbl_{i,t}^{t}$	-1.01***	-1.01***	-1.02***	-1.01***
	(0.16)	(0.17)	(0.17)	(0.17)
Fin. sector support$_{i,t}$	-0.64	-0.66	-0.65	-0.69
	(0.53)	(0.52)	(0.51)	(0.52)
ΔGDP growth$_{i,t}^{t:t+2}$	0.38***	0.39***	0.38***	0.36***
	(0.10)	(0.10)	(0.10)	(0.10)
Planned elections$_{i,t}$		0.41	0.41	0.38
		(0.40)	(0.40)	(0.40)
Fiscal rule index$_{i,t}$			0.04	0.04
			(0.16)	(0.16)
Fiscal council$_{i,t}$				0.40
				(0.33)
Observations	258	258	258	258
Countries	27	27	27	27
Period	2001-12	2001-12	2001-12	2001-12
Pseudo R-squared	0.65	0.65	0.65	0.66
F-test excl. instruments	24.60	21.93	21.53	21.68

Cluster-robust standard errors in parentheses. Probit-regressions are used to construct the instruments used in the 2SLS regressions in table 3, columns 1-4. Exogenous regressors as well as control variables from the second stage of the 2SLS-procedure are included in the probit-regression. Therefore, interpretation of coefficients of exogenous regressors in the probit-regression is conditional on second stage endogenous regressors (most notably, the forecasted level of the budget balance). *** p<0.01, ** p<0.05, * p<0.1.

Table A2: Predicting excessive deficits - probit, lagged instruments

	dependent variable: sgp_t^{t+2}			
	(1)	(2)	(3)	(4)
Current account$_{t-1}^{t-2}$	-0.40*	-0.36*	-0.35*	-0.36*
	(0.21)	(0.20)	(0.20)	(0.20)
Current account$_{t-2}^{t-2}$	0.34*	0.31*	0.31*	0.31*
	(0.19)	(0.18)	(0.17)	(0.18)
Output gap$_{i,t-1}^{t-2}$	0.05	0.04	0.04	0.04
	(0.06)	(0.06)	(0.06)	(0.07)
bbl mean, square$_{i,t-2}$	-0.12***	-0.12**	-0.12***	-0.12***
	(0.04)	(0.05)	(0.05)	(0.05)
bbl mean, cube$_{i,t-2}$	-0.02***	-0.02**	-0.02**	-0.02**
	(0.01)	(0.01)	(0.01)	(0.01)
$EMU_{i,t}$	0.30	0.24	0.01	0.01
	(0.35)	(0.35)	(0.37)	(0.38)
$bbl_{i,t}^{t}$	-0.86***	-0.88***	-0.88***	-0.87***
	(0.12)	(0.12)	(0.13)	(0.12)
Fin. sector support$_{i,t}$	-0.69	-0.69	-0.67	-0.68
	(0.57)	(0.57)	(0.55)	(0.55)
ΔGDP growth$_{i,t}^{t:t+2}$	0.36***	0.37***	0.37***	0.37***
	(0.09)	(0.10)	(0.10)	(0.10)
Planned elections$_{i,t}$		0.52*	0.57*	0.54*
		(0.31)	(0.31)	(0.31)
Fiscal rule index$_{i,t}$			-0.17	-0.17
			(0.14)	(0.15)
Fiscal council$_{i,t}$				0.22
				(0.27)
Observations	231	231	231	231
Countries	27	27	27	27
Period	2002-12	2002-12	2002-12	2002-12
Pseudo R-squared	0.63	0.63	0.64	0.64
F-test excl. instruments	14.19	12.98	12.26	11.99

Cluster-robust standard errors in parentheses. Probit-regressions are used to construct the instruments used in the 2SLS regressions in table 3, columns 5-8. Exogenous regressors as well as control variables from the second stage of the 2SLS-procedure are included in the probit-regression. Therefore, interpretation of coefficients of exogenous regressors in the probit-regression is conditional on second stage endogenous regressors (most notably, the forecasted level of the budget balance). *** p<0.01, ** p<0.05, * p<0.1.

Table A3: Role of independent fiscal councils

$\Delta bbl_{i,t}^{t:t+2}$	probit-2sls
Effect $sgp_{i,t}^{t+2} \mid EMU_{i,t} = 0$	
No fiscal council	0.03
	(0.56)
Fiscal council	0.44
	(1.24)
Difference	*0.41*
	(1.18)
Effect $sgp_{i,t}^{t+2} \mid EMU_{i,t} = 1$	
No fiscal council	2.01**
	(0.85)
Fiscal council	0.79***
	(0.29)
Difference	*-1.22**
	(0.70)
$EMU_{i,t}$	-0.71
	(0.78)
$bbl_{i,t}^{t}$	0.22***
	(0.09)
Fin. sector support$_{i,t}$	-1.00***
	(0.03)
ΔGDP growth$_{i,t}^{t:t+2}$	0.25***
	(0.07)
Planned elections$_{i,t}$	0.76***
	(0.19)
Fiscal rule index$_{i,t}$	-0.50*
	(0.26)
Fiscal council$_{i,t}$	-1.10
	(1.18)
Fiscal council$_{i,t}$ * $EMU_{i,t}$	2.00
	(1.43)
Observations	258
Countries	27
Period	2001-12
R-squared	0.68
F-test excluded instruments	20.69

Regression includes country FE and year dummies; cluster-robust standard errors in parentheses. $sgp_{i,t}^{t+2}$ and $sgp_{i,t}^{t+2} * EMU_{i,t}$ are instrumented using the predicted values from a probit regression, see section 4. Current account$_{i,t}^{t-1}$, Current account$_{i,t-1}^{t-1}$, Output gap$_{i,t}^{t-1}$, and second and third powers of the lagged 4-year average of the budget balance serve as exogenous instruments. ***p<0.01; **p<0.05; *p<0.10.

Table A4: Pre- vs. post-crisis effects SGP

$\Delta bbl_{i,t}^{t:t+2}$	probit-2sls
Effect $sgp_{i,t}^{t+2} \mid EMU_{i,t} = 0$	
2001-2007	1.01
	(1.24)
2008-2012	0.16
	(0.65)
Difference	*-0.85*
	(0.75)
Effect $sgp_{i,t}^{t+2} \mid EMU_{i,t} = 1$	
2001-2007	0.99*
	(0.57)
2008-2012	1.40**
	(0.64)
Difference	*0.41*
	(0.45)
$EMU_{i,t}$	-0.17
	(0.73)
$bbl_{i,t}^{t}$	0.19**
	(0.08)
Fin. sector support$_{i,t}$	-1.01***
	(0.03)
ΔGDP growth$_{i,t}^{t:t+2}$	0.25***
	(0.08)
Planned elections$_{i,t}$	0.76***
	(0.18)
Fiscal rule index$_{i,t}$	-0.50*
	(0.28)
Fiscal council$_{i,t}$	-0.14
	(0.47)
Crisis$_{i,t}$	0.60
	(0.47)
Crisis$_{i,t}$ * $EMU_{i,t}$	0.24
	(0.41)
Observations	258
Countries	27
Period	2001-12
R-squared	0.68
F-test excluded instruments	31.46

Regression includes country FE and year dummies; cluster-robust standard errors in parentheses. $sgp_{i,t}^{t+2}$ and $sgp_{i,t}^{t+2} * EMU_{i,t}$ are instrumented using the predicted values from a probit regression, see section 4. Current account$_{i,t}^{t-1}$, Current account$_{i,t-1}^{t-1}$, Output gap$_{i,t}^{t-1}$, and second and third powers of the lagged 4-year average of the budget balance serve as exogenous instruments. ***p$\leq$0.01; **p$<$0.05; *p$<$0.10.

Table A5: Main results, sensitivity to outliers

$\Delta bbl_{i,t}^{t:t+2}$	Probit-2SLS				Probit-2SLS, lagged instruments			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	p0-p99	*p0-p95*	*p1-p99*	*p5-p95*	*p0-p99*	*p0-p95*	*p1-p99*	*p5-p95*
$sgp_{i,t}^{t+2}$	-0.07	-0.63	-0.18	-1.14**	0.38	-1.11	0.37	-0.12
	(0.60)	(0.64)	(0.61)	(0.57)	(0.76)	(0.69)	(0.72)	(0.83)
$sgp_{i,t}^{t+2} * EMU_{i,t}$	1.41**	1.59***	1.51**	1.94***	1.22	2.06***	1.20	1.32*
	(0.62)	(0.60)	(0.60)	(0.51)	(0.79)	(0.64)	(0.74)	(0.78)
$EMU_{i,t}$	-0.07	-0.02	-0.55	-0.52	0.45	-0.37	-0.39	0.56
	(0.65)	(0.58)	(0.41)	(0.34)	(0.91)	(0.64)	(0.54)	(0.86)
bbl_t^t	0.15**	0.09	0.13**	0.10*	0.20***	0.13**	0.18***	0.13**
	(0.06)	(0.06)	(0.06)	(0.06)	(0.06)	(0.06)	(0.06)	(0.06)
Fin. sector support$_{i,t}$	-0.79***	-0.74***	-0.78***	-0.73***	-0.80***	-0.72***	-0.78***	-0.74***
	(0.12)	(0.17)	(0.12)	(0.17)	(0.13)	(0.17)	(0.13)	(0.18)
ΔGDP growth$_{i,t}^{t:t+2}$	0.26***	0.23***	0.24***	0.22***	0.26***	0.23***	0.24***	0.24***
	(0.08)	(0.07)	(0.07)	(0.06)	(0.08)	(0.07)	(0.08)	(0.08)
Planned elections$_{i,t}$	0.80***	0.57***	0.79***	0.55***	0.71***	0.48***	0.70***	0.46**
	(0.19)	(0.20)	(0.19)	(0.18)	(0.19)	(0.18)	(0.19)	(0.21)
Fiscal rule index$_{i,t}$	-0.36	-0.41*	-0.34	-0.42*	-0.30	-0.33	-0.26	-0.32
	(0.24)	(0.23)	(0.23)	(0.25)	(0.25)	(0.21)	(0.24)	(0.24)
Fiscal council$_{i,t}$	-0.26	-0.15	-0.24	0.00	0.40	0.99***	0.44	0.87***
	(0.46)	(0.50)	(0.44)	(0.49)	(0.40)	(0.26)	(0.40)	(0.27)
$sgp_{i,t}^{t+2} \mid EMU_{i,t} = 1$	1.34**	0.95**	1.33**	0.80*	1.59***	0.95**	1.58***	1.20**
	(0.53)	(0.44)	(0.53)	(0.41)	(0.57)	(0.41)	(0.54)	(0.47)
Observations	256	245	254	234	229	207	227	218
Countries	27	27	27	27	27	27	27	27
Period	2001-12	2001-12	2001-12	2001-12	2002-12	2002-12	2002-12	2002-12
R-squared	0.53	0.42	0.53	0.38	0.57	0.43	0.57	0.48
F-test excl. instruments	21.68	18.20	25.64	17.45	11.98	10.52	11.09	11.07

All regressions include a full set of year dummies; cluster-robust standard errors in parentheses. *sgp* and $sgp*EMU$ are instrumented using the predicted values from a probit regression, see section 4. In columns 1-3, Current account$_{i,t}^{t-1}$, Current account$_{i,t-1}^{t-1}$, Output gap$_{i,t}^{t-1}$ and squares and cubes of the lagged 4-year average of the budget balance serve as exogenous instruments. In columns 5-8, excluded instruments are the same, but lagged one period. ***p<0.01; **p<0.05; *p<0.10.

Table A6: Geographical sensitivity

$\Delta bbl_{i,t}^{t:t+2}$	*Probit-2SLS*					
	(1) *Excl. Greece*	(2) *Excl. EFSF/ ESM prog.*	(3) *Excl. GIIPS*	(4) *Excl. four smallest*	(5) *Excl. four largest*	(6) *EU15 only*
$sgp_{i,t}^{t+2}$	-0.42	-0.52	0.34	0.08	0.54	-0.64
	(0.65)	(0.62)	(0.64)	(0.56)	(0.65)	(0.97)
$sgp_{i,t}^{t+2} * EMU_{i,t}$	1.52**	1.72***	0.32	1.38**	1.49**	1.83**
	(0.65)	(0.66)	(0.43)	(0.57)	(0.74)	(0.74)
$EMU_{i,t}$	-0.01	-0.29	0.42	-0.47	-0.47	
	(0.66)	(0.68)	(0.59)	(0.53)	(0.69)	
bbl_t^t	0.13**	0.17**	0.26***	0.20**	0.22***	0.18
	(0.06)	(0.07)	(0.07)	(0.08)	(0.08)	(0.12)
Fin. sector support$_{i,t}$	-1.01***	-0.60**	-0.40**	-1.01***	-1.01***	-1.01***
	(0.02)	(0.25)	(0.16)	(0.03)	(0.03)	(0.04)
ΔGDP growth$_{i,t}^{t:t+2}$	0.31***	0.30***	0.30***	0.23***	0.21***	0.31***
	(0.07)	(0.07)	(0.08)	(0.08)	(0.08)	(0.11)
Planned elections$_{i,t}$	0.82***	0.79***	0.51***	0.80***	0.84***	0.56**
	(0.20)	(0.20)	(0.20)	(0.21)	(0.21)	(0.23)
Fiscal rule index$_{i,t}$	-0.30	-0.33	-0.46**	-0.38	-0.72**	-0.36
	(0.22)	(0.22)	(0.19)	(0.28)	(0.34)	(0.37)
Fiscal council$_{i,t}$	-0.44	-1.52***	-1.77***	-0.28	-0.33	0.59
	(0.43)	(0.38)	(0.44)	(0.48)	(0.38)	(0.56)
$sgp_{i,t}^{t+2} \mid EMU_{i,t} = 1$	1.11**	1.20**	0.67*	1.46**	2.03***	1.19**
	(0.53)	(0.50)	(0.39)	(0.60)	(0.76)	(0.55)
Observations	246	249	198	227	210	178
Countries	26	27	22	23	23	15
Period	2001-12	2001-12	2001-12	2001-12	2001-12	2001-12
R-squared	0.71	0.50	0.56	0.69	0.71	0.72
F-test excluded instruments	18.35	21.80	22.31	18.04	18.68	14.80

All regressions include a full set of year dummies; cluster-robust standard errors in parentheses. *sgp* and $sgp * EMU$ are instrumented using the predicted values from a probit regression, see section 4. Current account$_{i,t}^{t-1}$, Current account$_{i,t-1}^{t-1}$, Output gap$_{i,t}^{t-1}$ and squares and cubes of the lagged 4-year average of the budget balance serve as exogenous instruments. ***p<0.01; **p<0.05; *p<0.10.

Table A7: Final realisations

$\Delta bbl_{i,t}^{t:final}$	Probit-2SLS				Probit-2SLS, lagged instruments			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
$sgp_{i,t}^{final}$	0.81	0.52	0.43	0.48	1.03	0.77	0.79	0.83
	(0.67)	(0.69)	(0.66)	(0.66)	(0.92)	(0.97)	(0.98)	(1.00)
$sgp_{i,t}^{final} * EMU_{i,t}$	0.93	1.21*	1.37*	1.35*	0.78	0.93	1.07	1.00
	(0.68)	(0.72)	(0.75)	(0.77)	(0.90)	(0.97)	(1.04)	(1.05)
$EMU_{i,t}$	0.23	0.06	-0.01	-0.04	0.70**	0.53	0.43	0.47
	(0.69)	(0.70)	(0.71)	(0.70)	(0.35)	(0.40)	(0.44)	(0.45)
bbl_t^t	0.22**	0.20**	0.22**	0.22**	0.23**	0.21**	0.23**	0.23**
	(0.09)	(0.09)	(0.09)	(0.09)	(0.10)	(0.10)	(0.10)	(0.10)
Fin. sector support$_{i,t}$	-0.97***	-0.97***	-0.99***	-0.99***	-0.97***	-0.98***	-0.99***	-1.00***
	(0.04)	(0.04)	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)
ΔGDP growth$_{i,t}^{t:final}$	0.24***	0.25***	0.26***	0.26***	0.25***	0.26***	0.26***	0.26***
	(0.06)	(0.06)	(0.06)	(0.06)	(0.07)	(0.07)	(0.06)	(0.06)
Planned elections$_{i,t}$		0.59***	0.61***	0.60***		0.54**	0.55**	0.56**
		(0.22)	(0.21)	(0.21)		(0.23)	(0.23)	(0.23)
Fiscal rule index$_{i,t}$			-0.50*	-0.51*			-0.38	-0.37
			(0.29)	(0.29)			(0.35)	(0.34)
Fiscal council$_{i,t}$				-0.23				0.46
				(0.56)				(0.53)
$sgp_{i,t}^{final} \mid EMU_{i,t} = 1$	1.73**	1.73**	1.80**	1.83**	1.81**	1.70**	1.86**	1.83**
	(0.73)	(0.73)	(0.74)	(0.73)	(0.72)	(0.72)	(0.75)	(0.74)
Observations	258	258	258	258	221	221	221	221
Countries	27	27	27	27	27	27	27	27
Period	2001-12	2001-12	2001-12	2001-12	2002-12	2002-12	2002-12	2002-12
R-squared	0.65	0.66	0.66	0.66	0.68	0.69	0.69	0.69
F-test excluded instruments	43.34	43.00	40.60	37.20	29.85	34.70	31.40	29.11

All regressions include a full set of year dummies; cluster-robust standard errors in parentheses. *sgp* and $sgp * EMU$ are instrumented using the predicted values from a probit regression, see section 4. In columns 1-3, Current account$_{i,t}^{t-1}$, Current account$_{i,t-1}^{t-1}$, Output gap$_{i,t}^{t-1}$ and second and third powers of the lagged 4-year average of the budget balance serve as exogenous instruments. In columns 5-8, excluded instruments are the same, but lagged one period. ***p<0.01; **p<0.05; *p<0.10.

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