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Procyclicality of fiscal policy in European Union countries

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ABSTRACT

Using real-time data, we examine whether fiscal policy has been counter- or procyclical in a panel of 27 European Union (EU) member states over the period 2000–2015. We also investigate whether fiscal rules and government efficiency improve the cyclical reaction of fiscal policy. Our results suggest that even though fiscal plans in EU countries have an acyclical stance, budgetary outcomes are procyclical. Government efficiency and fiscal rules seem to reduce fiscal procyclicality. Further analysis also reveals that fiscal policy seems to be more procyclical in non-euro area countries and in times of economic prosperity.

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1. Introduction

As central banks seem to run out of ammunition to stimulate the economy, fiscal policy has come to the fore. Early public finance theories already highlighted the importance of fiscal policy as an instrument for macroeconomic stabilization. For instance, according to Musgrave (1959), fiscal policy should be countercyclical. That is, it should be contractionary in good times and expansionary in bad times to dampen business cycle fluctuations. More recent theoretical work based on a New-Keynesian DSGE model with sticky prices by Christiano et al. (2011) also suggests that optimal fiscal policy should be countercyclical. These authors show that countercyclical fiscal policy is even more effective when the monetary policy interest rate is at the effective lower bound. Recent empirical research by Bonam et al. (2020) provides empirical support for this view.

Several arguments have been put forward against procyclical fiscal policy. For instance, it may increase output volatility and have a negative impact on long-term economic growth (Woo, 2009). Procyclical fiscal policy may also undermine the sustainability of public finances, particularly so in European Union (EU) member states. As their economies are heavily integrated, fiscal policy in one EU country may have large spillovers to other member states' economies; these spillovers are generally not internalised (Eyraud et al., 2017). Moreover, with the creation of the European Economic and Monetary Union (EMU), member states abandoned domestic monetary and exchange rate policies to respond to country-specific shocks, so that fiscal policy is the only tool available for macroeconomic stabilization at the national level in these countries (Wyplosz, 2005).

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In spite of all these arguments, fiscal policy is often procyclical. In the past, this was considered to be mainly a problem in developing countries. Eyraud et al. (2017), however, show that fiscal policies in European countries are also procyclical. Fiscal procyclicality may be caused by intensified borrowing constraints in times of economic slump, forcing governments to introduce fiscal adjustments while they should have introduced fiscal expansions. Another explanation is that during a boom it is hard to keep government spending under control due to political incentives (see Section 2 for more details).

To ensure the sustainability of public finances, many countries have introduced fiscal rules over the past couple of decades (Schaechter et al., 2012). Fiscal rules are widely accepted as an instrument to promote budgetary discipline (see, for instance, Bergman et al. (2016)), but relatively little is known about their impact on the stabilization function of fiscal policy. Some recent studies report that well-designed fiscal rules reduce procyclicality (Nerlich and Reuter, 2015; Combes et al., 2017; Guerguil et al., 2017), but Bergman and Hutchison (2015) suggest that this result only holds when these rules are supported by a sufficiently high level of government efficiency/quality. A drawback of these studies, however, is that they are based on ex post fiscal data, which has often been revised, and therefore almost certainly give a misleading inference about policy intentions (Croushore, 2011). As governments generally base their policy decisions on highly uncertain estimates about the state of the economy, actual budgetary policy may be significantly different from the ex-ante intentions of policymakers (Cimadomo, 2016).

In this paper, we analyse the cyclical stance of discretionary fiscal policy in EU countries across its various stages. It is important to consider these different stages as each stage of fiscal policymaking is potentially affected by different factors (Beetsma et al., 2009). We use real-time data, i.e., data available to policymakers at the time they made their budgetary decisions (the planning phase) and when they implemented their plans (the implementation phase) and compare these with ex post fiscal policy data (fiscal outcomes). Furthermore, we examine whether fiscal rules and government efficiency promote countercyclical fiscal policies. To the best of our knowledge, this is the first study examining the cyclical stance of fiscal policy in EU countries in its different stages using real-time data, while considering at the same time the conditional effect of fiscal rules and government efficiency.¹ Whereas most previous studies using real-time fiscal data employed Organisation for Economic Co-operation and Development (OECD) data, our analysis is based upon data provided in the Stability and Convergence Programs (SCP) that EU member countries have to submit as part of the fiscal surveillance rules in the EU (Gilbert and de Jong, 2017).

Previewing our results, we find that over the 2000–2015 period, fiscal plans have an acyclical stance on average in EU countries. However, the cyclical stance weakens during the implementation phase of fiscal policy, whilst fiscal outcomes end up being procyclical. Sufficiently stringent fiscal rules or efficient government institutions reduce procyclical fiscal policies and may even lead to acyclical policies. In contrast to Bergman and Hutchison (2015), we do not find that fiscal rules and government efficiency are complements in improving the cyclical reaction of fiscal policy; instead, they seem to be substitutes. We also find that fiscal policy appears to be more procyclical during economic booms, before the global financial crisis and in non-euro area countries.

The remainder of this paper is structured as follows: Section 2 discusses related literature and formulates our hypotheses. Section 3 describes the data used, while Section 4 offers the conceptual framework. Section 5 presents the results and Section 6 provides a robustness analysis. Section 7 concludes.

2. Related literature and hypotheses

2.1. Cyclicity of fiscal policy

Why is fiscal policy often procyclical? Two main explanations have been provided to account for the procyclicality bias of fiscal policy: *borrowing constraints* during economic slumps and *political-economy factors* that explain how political incentives cause the budget to deteriorate in times of economic prosperity.

Gavin and Perotti (1997) argue that borrowing constraints intensify in bad times, forcing countries to cut spending, which makes fiscal policy procyclical. Similarly, Kaminsky et al. (2004) find that for developing countries – and particularly for middle high-income countries – capital flows amplify the business cycle and tend to make fiscal policy procyclical.

Tornell and Lane (1998, 1999) pose that a windfall in government revenues in good times is considered to be a common pool by various interest-groups competing for it. As these groups have no incentive to reduce their claims (knowing that the economic windfall will otherwise accrue to other interest-groups), the windfall revenues will be spent making fiscal policy procyclical. Likewise, in the model of Talvi and Végh (2005), political pressures for additional spending intensify during revenue booms and weaken during economic slumps, such that the government finds it optimal to respond in a procyclical manner to fluctuations in the tax base. Alesina et al. (2008) argue that the procyclical bias of fiscal policy arises from voters'

¹ Some previous studies using real-time data to examine fiscal policy in EU countries are Golinelli and Momigliano (2009) and Beetsma and Giuliodori (2010). These and other related studies are discussed in more detail in section 2. The papers that come closest to our work are Bergman and Hutchison (2015) and Eyraud et al. (2017). The first paper also examines the role of fiscal rules and government efficiency in fostering countercyclical fiscal policies. However, these authors use a sample of 81 advanced, emerging and developing countries over the period 1985–2012 and do not use real-time data. The second paper also uses SCP data for euro area countries (instead of all EU member states as the present paper), but does not examine the role of fiscal rules and government efficiency in reducing fiscal procyclicality.

demands. As voters cannot directly observe government capital spending, they demand higher utilities during a flourishing economy, fearing that the government will otherwise appropriate part of the tax revenues for political rents.

Previous studies report that fiscal policy is often procyclical in emerging markets and developing economies (see, e.g., Gavin and Perotti, 1997). Ilzezki and Végh (2008), however, find evidence of procyclical fiscal policies in high-income countries as well. Gali and Perotti (2003) show that fiscal policy in EMU countries was procyclical before but not after the Maastricht Treaty. Other studies report that fiscal policy is often countercyclical (see, e.g., Wyplosz (2006) and Bénétrix and Lane (2013) for EMU member countries and Frankel et al. (2013) for developing economies), but some recent studies do not confirm this finding. For instance, Bova et al. (2018) and Eyraud et al. (2017) do not find that the procyclical bias in fiscal policy has declined over time in resource-rich and euro area countries, respectively.

2.2. Fiscal rules and government efficiency/quality

Over the past couple of decades, many countries have adopted fiscal rules to ensure fiscal sustainability. Fiscal rules impose long-lasting constraints on fiscal policy through numerical limits on budgetary aggregates (Schaechter et al., 2012). Four main types of fiscal rules can be distinguished: debt rules, balanced budget rules, expenditure rules, and revenue rules. Although each type of rule serves a different purpose, they are generally aimed at correcting budgetary distortions and maintaining sound fiscal policies. Recent research suggests that fiscal rules, amongst others, lower public debt (Azzimonti et al., 2016), reduce sovereign risk premia (Iara and Wolff, 2014), lower budget deficits (Bergman et al., 2016), constrain political budget cycles (Gootjes et al., 2020) and reduce the probability of experiencing a sovereign debt crisis (Asatryan et al., 2018).² However, the impact of fiscal rules on the cyclical stance of fiscal policy is not clear. Fiscal rules are oftentimes argued to trigger procyclical policies: in good times they allow to spend windfall revenues, whereas in bad times they force governments to cut spending. In spite of this, most research finds that fiscal rules reduce procyclicality, but the design of the rules seems to play a crucial role. For instance, flexible rules – e.g., rules that take macroeconomic developments into account – are associated with enhanced countercyclicality of fiscal policy (Guerguil et al., 2017).³ Furthermore, several studies conclude that a combination of multiple fiscal rules appears more effective in fostering countercyclical policies (Nerlich and Reuter, 2015; Combes et al., 2017).

Some studies, however, reach a different conclusion. For example, Bova et al. (2014) show that the adoption of fiscal rules did not help emerging markets and developing economies to escape the procyclicality trap. Similarly, Bova et al. (2018) find that the adoption of fiscal rules does not reduce the procyclical stance of fiscal policy in a significant way. Instead, these authors present results showing that the efficiency/quality of government institutions helps to limit procyclicality. Calderón et al. (2016) also conclude that the quality of the institutional framework plays an important role in countries' ability and willingness to implement countercyclical fiscal policies. Similar results are reported by Frankel et al. (2013), who argue that the political institutional framework is pivotal for a country's ability to graduate from procyclical to countercyclical policies.

A priori, it is not clear whether fiscal rules and government efficiency complement or substitute each other in improving the cyclical stance of fiscal policy. In the literature, both institutional factors have been found to reduce procyclicality and, as a consequence, they may supersede each other's effect. Bergman and Hutchison (2015), however, find that national fiscal rules are very effective in reducing procyclicality of fiscal policy, but only when government efficiency is sufficiently high. This suggests that fiscal rules and government efficiency are complements.

In view of the foregoing discussion, we test the following hypotheses:

Hypothesis 1. *Fiscal policy is procyclical in EU countries.*

Hypothesis 2. *Fiscal rules and government efficiency improve the cyclical stance of fiscal policy.*

Hypothesis 3. *Fiscal rules and government efficiency are complements in their effect on the cyclical stance of fiscal policy.*

2.3. Real-time data analysis

Most of the aforementioned literature focusses on outcomes of fiscal policy using the latest available fiscal data, whereas revisions in fiscal data tend to be large (Jong-A-Pin et al., 2012). Differences between the first release and the final outcome of

² Several studies discussed treat fiscal rules as exogenous. However, countries with non-sustainable public finances may be more likely to adopt fiscal rules. Heinemann et al. (2018) show in a meta-regression analysis of 30 empirical studies that fiscal rules cannot be treated as exogenous and that the budgetary impact of fiscal rules tends to lose statistical significance once endogeneity is properly accounted for. We therefore endogenize our fiscal rules index. In doing so, we find similar results as reported in section 5. However, we also find that the fiscal rules index can actually be treated as exogenous. We report these results in the online appendix.

³ Note that flexibility in fiscal rules comes at a price, as flexibility makes fiscal rules less transparent and more complicated. This can undermine compliance with fiscal rules and, ultimately, the political support for fiscal rules (see Debrun and Jonung (2019) for a discussion on finding the right balance between simplicity, flexibility and enforceability of fiscal rules).

fiscal variables are driven by several factors. It may be the consequence of methodological changes in calculating and collecting the data. Uncertainty about the state of the economy and overoptimistic forecasts may also play a role (Frankel and Schreger, 2013, 2016). Furthermore, policymakers may manipulate statistics for strategic reasons (Cimadomo, 2016). Analysing fiscal policy only using the latest available data almost certainly gives a misleading representation of the intentions of fiscal policymakers. Real-time data analysis therefore uses data that comes closest to the information set available to policymakers when setting up and implementing their fiscal plans (Croushore, 2011).

Some previous studies have assessed the cyclical stance of fiscal policy using real-time data (see Cimadomo (2016) for a survey of the literature). For instance, Golinelli and Momigliano (2009) find weak support for countercyclical policy intentions of EMU countries over the 1994–2008 period, but fiscal outcomes suggest a completely different result. Beetsma and Giuliodori (2010) report that planned fiscal policy is acyclical for EU countries and countercyclical for other OECD countries.⁴ Avellan and Vuletin (2015) show that in their sample of 101 countries fiscal policy responds procyclically to both predicted and unanticipated cyclical developments. As a consequence, fiscal policy ends up being procyclical.

So far, the literature using real-time data has paid only scant attention to the context-conditionality of fiscal procyclicality. An exception is the work of Eyraud et al. (2017). These authors examine whether political economy factors affect fiscal policies in the euro area during the planning, implementation and ex post phase. They show that policy distortions at both the national and supranational levels lead to excessive spending during good times in euro area countries. Eyraud et al. (2017), however, do not formally test for the impact of fiscal rules, nor do they consider the efficiency of governments.

3. Data

3.1. Macroeconomic and fiscal data

We investigate the cyclical reaction of discretionary fiscal policy in a sample of 27 EU countries over the 2000–2015 period.⁵ As mentioned in the previous section, only using the latest available (or ex post) data may provide misleading inferences about the actual intentions of fiscal policymakers. We therefore use several vintages of macroeconomic and fiscal data, so that we can compare the cyclical stance of fiscal plans and implemented fiscal policies with the budgetary outcomes.⁶ Fiscal plans are usually formed a year ahead, i.e., policymakers use information of economic and fiscal forecasts constructed in period $t - 1$ to make fiscal plans for period t ; the implementation phase of the budget and fiscal policy outcomes can be assessed using published data at $t + 1$ for fiscal year t and the latest data available for fiscal year t , respectively.

To assess the planning and implementation stage of fiscal policy, we use a real-time dataset constructed by Gilbert and de Jong (2017). This dataset consists of forecasts of macroeconomic and fiscal variables published by the European Commission (EC). Since 1998, the EC publishes economic forecasts of the current year and the year ahead for all EU members in the spring and autumn of each year, based on countries' Stability and Convergence Programs. We use the spring forecasts, as these come closest to the information available to policymakers when they make their budgetary plans (de Jong and Gilbert, 2020). To compare real-time data with the latest available data for the macroeconomic and fiscal variables, we employ the annual macro-economic (AMECO) database. Table A1 in Appendix A provides descriptive statistics.

3.2. Fiscal rules

As discussed in Section 2.2, fiscal rules may reduce the procyclicality bias of fiscal policy. To capture the effect of fiscal rules, we construct a fiscal rule stringency index ($FRI_{i,t}$) using information from the fiscal rules database of the IMF (Schaechter et al., 2012). The database provides information on the use and design of national and supranational fiscal rules and covers all types of rules (budget balance rules, debt rules, expenditure rules, and revenue rules). We use information on the legal basis, government coverage, supporting procedures, enforcement mechanisms, and flexibility for each type of fiscal rule (see Gootjes et al. (2020) for further details).⁷ The index ranges from 0 to 5.

Although the European fiscal rules are the same for all EU member states, each country has its own supporting procedures and institutions. Furthermore, each country has its own national fiscal rules. The fiscal rules index is therefore not the same for every country. Fig. 1 shows the average value of the fiscal rules index in our sample. In addition, it displays the spread of the minimum and maximum value of the index. The average score for the index gradually increases from 1.87 to 3.22 over the sample period as individual EU member states adopted new fiscal rules and strengthened their fiscal frameworks. The figure also shows two periods during which the index sharply increased, reflecting a strengthening of the European fiscal

⁴ Golinelli and Momigliano (2009) and Beetsma and Giuliodori (2010) use data from the OECD's Economic Outlook. Compared to the real-time data from the Stability and Convergence Programs (SCP) that we use, this database has the advantage that it goes back to 1994. The big advantage of the SCP data is that all data are gathered using the same method, whereas OECD data is based upon national definitions and methods. Furthermore, the SCP data allow us to examine the stance of fiscal policy in its different stages.

⁵ Croatia is excluded from the panel due to insufficient data.

⁶ To compare fiscal policy across its different phases, we only use year-observations which are available in every data vintage. Our findings are very similar though when we use the full dataset for each fiscal policy stage (results are available on request).

⁷ In contrast to Schaechter et al. (2012), we also include information about the flexibility of the fiscal rule into our index. Recent literature shows that flexible fiscal rules are desirable for macro-economic stabilization purposes (Guerguil et al. 2017). Results for the fiscal rules index which exclude the flexibility component, however, are similar (available on request).

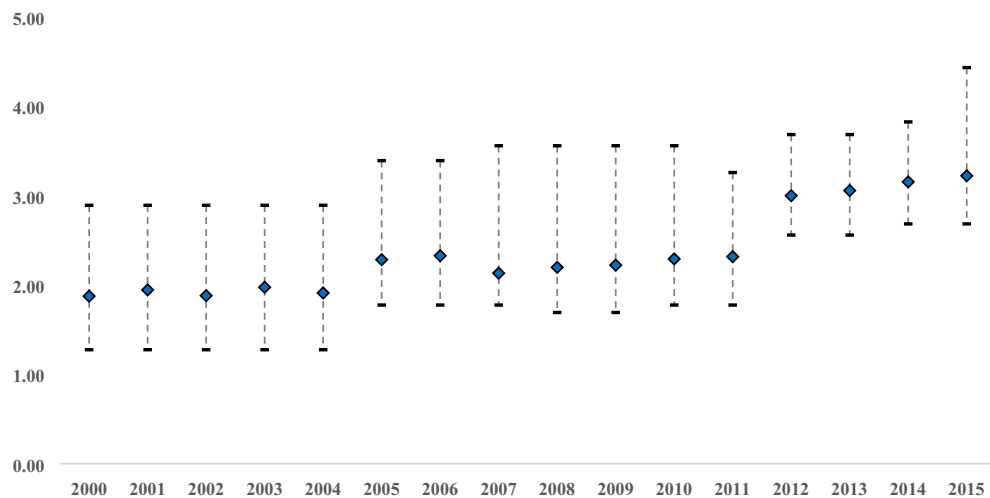


Fig. 1. Fiscal rules index (EU average). Note: The fiscal rules index ranges from 0 to 5. The average score for EU countries gradually increases from 1.87 to 3.22. Index constructed by the authors based on data of [Schaechter et al. \(2012\)](#).

rules. In 2005, the EC reinforced the preventive arm of the Stability and Growth Pact (SGP), such that every country had a specific medium-term objective (MTO) for the structural budget balance. Furthermore, as the global financial crisis revealed shortcomings of the European fiscal rules, the EU responded with several legislative measures (e.g., the “Six-Pack”, “European Fiscal Compact”, and “Two-Pack”) to enhance its economic governance.

3.3. Government efficiency

Another factor that we investigate is the efficiency of governmental institutions. To measure the efficiency of the government bureaucracy/quality of government (which we dub government efficiency following [Bergman and Hutchison \(2015\)](#) for lack of a better term), we use data from the Worldwide Governance Indicators 2018 project of the World Bank ([Kaufmann et al., 2011](#)). The government efficiency index (GQ_{it}) captures “the perceptions of the quality of public services, the quality of the civil service and the degree of its independence from political pressures, the quality of policy formulation and implementation, and the credibility of the government’s commitment to such policies”. The index takes on a value between -2.5 and 2.5 , where a higher value of the index reflects higher efficiency.

[Fig. 2](#) shows the average value and the min–max spread of the government efficiency index. It shows that the average score decreases from 1.67 to 1.15 over the sample period. This mainly reflects the accession of new member states into the EU. These new EU members consist predominantly of Eastern European countries, which in general have less efficient government institutions. As [Table A1](#) in [Appendix A](#) shows, there is also quite some variation within countries.⁸

3.4. A first look at the data

To investigate the discretionary reaction of fiscal policy to the business cycle, we follow [Golinelli and Momigliano \(2009\)](#) and examine the change of the cyclically-adjusted primary budget balance (in percentage of GDP) pertaining to the level of the output gap. When the change of the government budget and the output gap have opposite signs, the reaction of fiscal policy is considered to be procyclical. [Fig. 3](#) plots the EU averages for the years 2001–2015. It shows that the discretionary reaction of fiscal policy becomes increasingly procyclical moving from first-release to the latest available data: while the average fiscal plans in the EU seem to be procyclical in only five years, implemented fiscal policies and budgetary outcomes show a procyclical reaction in, respectively, nine and ten years.

To investigate this further, we now turn to a more formal econometric analysis of the cyclical reaction of fiscal policy in EU countries and the effect of fiscal rules and government institutions.

4. Empirical strategy

To analyse the cyclical stance of discretionary fiscal policy across its various stages in a formal econometric framework, we estimate a standard fiscal reaction function (cf., [Golinelli and Momigliano, 2009](#)).⁹ The baseline specification is a dynamic panel data model:

⁸ We are therefore confident that the effect of the government efficiency index will not be absorbed by the country or time fixed effects.

⁹ Hereafter, we refer to discretionary fiscal policy simply as ‘fiscal policy’ for reasons of parsimony.

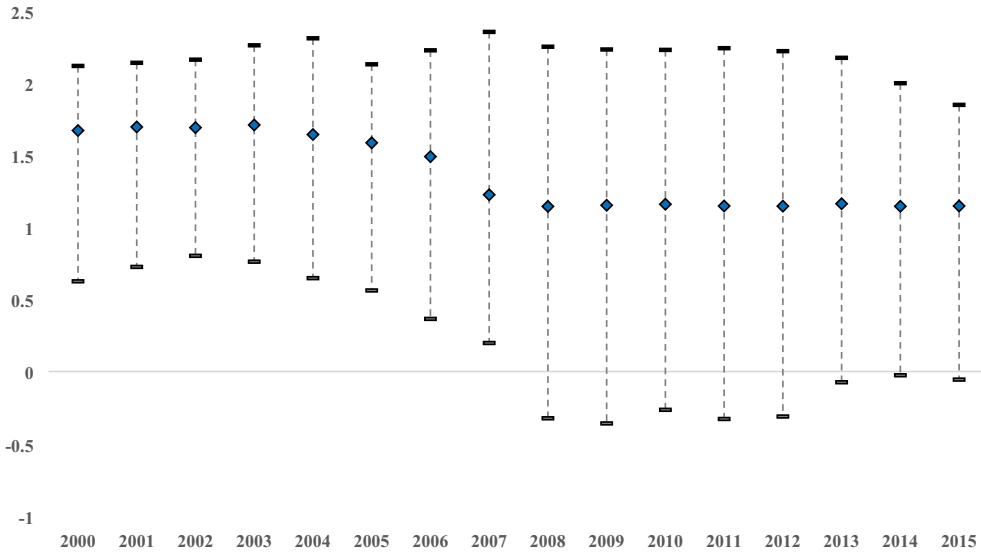


Fig. 2. Government efficiency index (EU average). Note: The government efficiency index ranges from -2.5 to 2.5 . The average score for EU countries decreases from 1.67 to 1.15 , mainly due to the enlargement of the EU. Index constructed by the authors based on data of Kaufmann et al. (2011).

$$\Delta CAPB_{i,t}^{t-1+s} = \alpha + \delta CAPB_{i,t-1}^{t-1+s} + \gamma GAP_{i,t}^{t-1+s} + \beta' X_{i,t} + \mu_i + \tau_t + \varepsilon_{i,t}, \text{ for } s = 0, 2 | \text{ex post}, \quad (1)$$

where the superscript $t - 1 + s$ indicates the year to which the fiscal and economic variables refer (where s is either 0 (planning stage), 2 (implementation stage) or ex post¹⁰ (fiscal policy outcomes)), while the subscript i refers to country i and subscript t refers to the fiscal year t .

The left-hand side variable is the change in the cyclically-adjusted primary budget balance ($\Delta CAPB_{i,t}^{t-1+s}$) and the level of the output gap ($GAP_{i,t}^{t-1+s}$) captures the cyclical reaction of fiscal policy; if γ is negative and significant this implies a procyclical reaction, whilst a positive value indicates countercyclicality. As we expect persistence in the government budget, we control for path dependence by including a lag of the dependent variable ($CAPB_{i,t-1}^{t-1+s}$).¹¹ Furthermore, we control for country-fixed (μ_i) and time effects (τ_t) to eliminate unobserved heterogeneity between countries and to capture common time effects.

$X_{i,t}$ is a vector of control variables. It includes $INFLATION_{i,t}^{t-1+s}$, which captures the influence of inflationary dynamics on the budget balance (Tujula and Wolswijk, 2004).¹² The lagged level of the government debt-to-GDP ratio is also included, as a high debt ratio makes contractionary fiscal policies more likely (Eyraud et al., 2017). $X_{i,t}$ also includes political-economy variables considered in the literature, namely an election variable capturing the impact of election years (de Haan and Klomp, 2013), a variable capturing the ideological orientation of the incumbent (Mulas-Granados, 2006), and the number of checks and balances in the political system (Tsebelis, 1995). See Table A2 in Appendix A for a description of the political variables and its data sources.

The baseline model incorporates economic and political covariates, but does not consider the institutional variables discussed in section 3. To assess whether institutional factors constrain fiscal policymaking, we consider the following equation:

$$\Delta CAPB_{i,t}^{t-1+s} = \alpha + \delta CAPB_{i,t-1}^{t-1+s} + \gamma GAP_{i,t}^{t-1+s} + \vartheta I_{i,t} + \theta (GAP_{i,t}^{t-1+s} * I_{i,t}) + \beta' X_{i,t} + \mu_i + \tau_t + \varepsilon_{i,t}, \text{ for } s = 0, 2 | \text{ex post}, \quad (2)$$

where $I_{i,t}$ is one of the institutional variables considered – i.e., fiscal rules or government efficiency – and $GAP_{i,t}^{t-1+s} * I_{i,t}$ captures the interaction between the output gap and the institutional variable. Finally, fiscal rules and government efficiency may be substitutes or complements. We therefore also consider the following three-way interaction model to examine how these institutional factors interact:

$$\Delta CAPB_{i,t}^{t-1+s} = \alpha + \delta CAPB_{i,t-1}^{t-1+s} + \gamma GAP_{i,t}^{t-1+s} + \vartheta FRI_{i,t} + \varphi GQ_{i,t} + \theta (GAP_{i,t}^{t-1+s} * FRI_{i,t}) + \omega (GAP_{i,t}^{t-1+s} * GQ_{i,t}) + \psi (FRI_{i,t} * GQ_{i,t}) + \zeta (GAP_{i,t}^{t-1+s} * FRI_{i,t} * GQ_{i,t}) + \beta' X_{i,t} + \mu_i + \tau_t + \varepsilon_{i,t}, \text{ for } s = 0, 2 | \text{ex post} \quad (3)$$

¹⁰ $t - 1$ drops from the superscript of the ex post fiscal and macroeconomic variables.

¹¹ With the inclusion of the lagged dependent variable the dynamic panel model may contain a bias (Nickell, 1981). To control for this, we estimate our model following the generalized method of moments (GMM) approach of Ahn and Schmidt (1995). Despite of some minor differences, the results do not vary much when the model is estimated using GMM. We therefore conclude that our results are not driven by this so-called “Nickell bias”. We report the results in the online appendix.

¹² As pointed out by Tujula and Wolswijk (2004), the overall effect of inflation on budget balances is not clear a priori. It may have an automatic effect through a nominal progression in tax receipts and governments may welcome inflation as it erodes the real value of outstanding nominal government debt. It might, however, also increase long-term interest rates and have a negative effect on investment and economic growth.

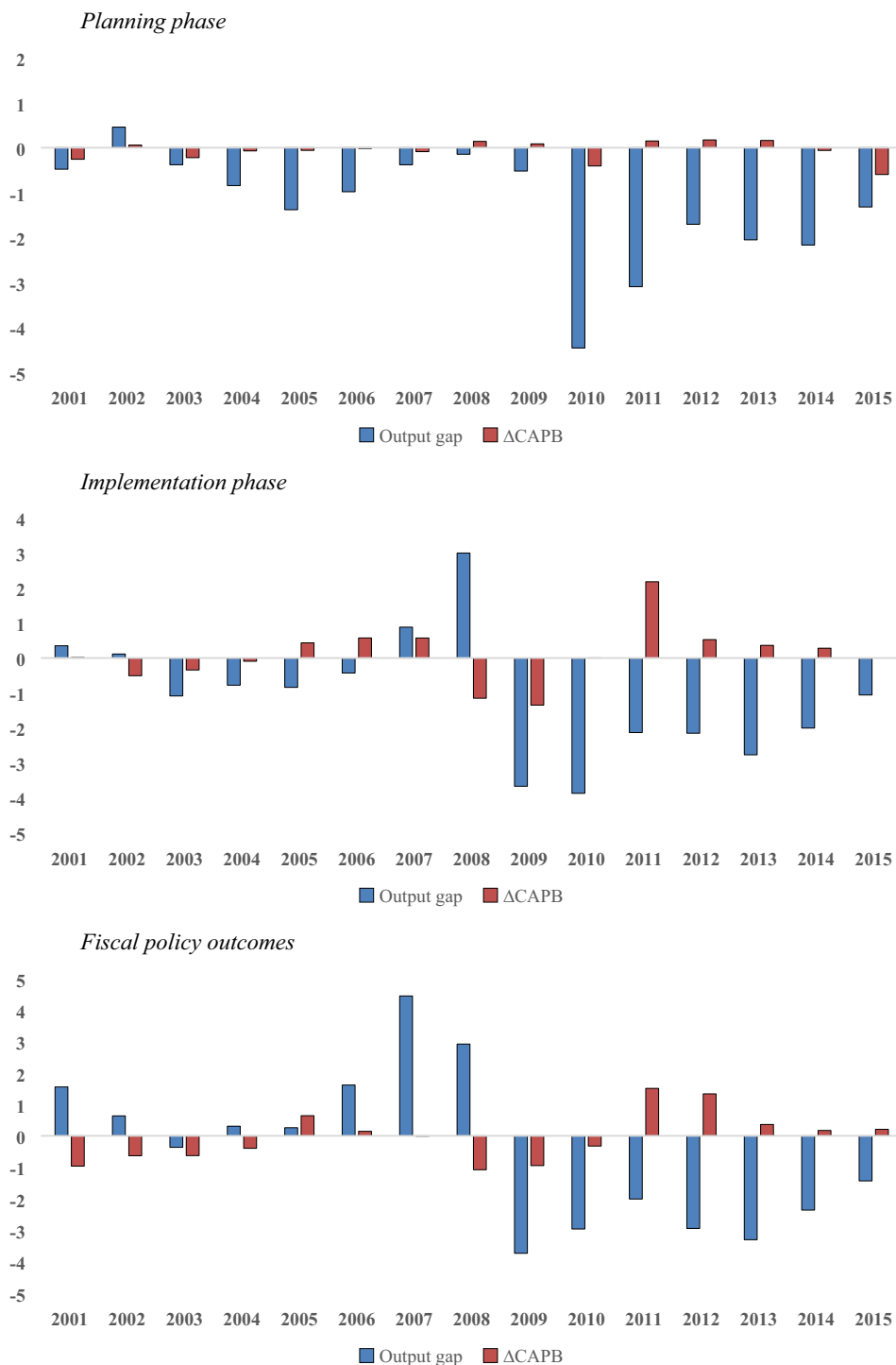


Fig. 3. Output gap vs. Δ cyclically adjusted primary balance (EU average). Note: The output gap and the change in the cyclically-adjusted primary budget balance (Δ CAPB) are measured in percentage of GDP. When the output gap and the Δ CAPB have opposite signs, fiscal policy is considered to be procyclical.

5. Results

5.1. Baseline model

Do fiscal policies in the EU contain a procyclicality bias? Table 1 shows the fixed effects (FE) estimation results for Eq. (1); country clustered standard errors are shown in parentheses. The estimates in column (1) refer to the planning stage of fiscal

Table 1

Fixed effects estimation results for Eq. (1).

Dependent variable: $\Delta CAPB_{i,t}^{t-1+s}$	(1) Planning; $t t - 1$	(2) Implementation; $t t + 1$	(3) Outcomes; $t ex\ post$
$CAPB_{i,t-1}^{t-1+s}$	-0.225*** (0.0809)	-0.509*** (0.0579)	-0.557*** (0.0543)
$GAP_{i,t}^{t-1+s}$	0.00483 (0.0396)	-0.135* (0.0705)	-0.188*** (0.0634)
$DEBT_{i,t-1}^{t-1+s}$	0.0133*** (0.00475)	0.0350*** (0.00688)	0.0413*** (0.00674)
$INFLATION_{i,t}^{t-1+s}$	0.144** (0.0663)	0.105 (0.136)	0.0377 (0.103)
$ELEC_{i,t}$	-0.217 (0.185)	0.101 (0.253)	-0.0955 (0.287)
$CHECKS_{i,t}$	0.158** (0.0759)	-0.0432 (0.185)	-0.0112 (0.186)
$IDEOLOGY_{i,t}$	0.00169 (0.000999)	-0.00132 (0.00305)	-0.00139 (0.00363)
Constant	-1.189*** (0.406)	-0.0322 (1.308)	-1.154 (1.116)
Observations	321	321	321
R-squared	0.290	0.404	0.421
Number of countries	27	27	27

Note: Fixed effects (FE) estimation of Eq. (1) with robust standard errors (clustered at the country level) shown in parentheses: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. Column (1) provides the results for the planning phase of fiscal policy; column (2) for the implementation phase; column (3) for the ex post fiscal outcomes. Results for the time dummies are not displayed but are available upon request.

policy; column (2) shows the results for the implementation stage and column (3) offers the findings for the fiscal policy outcomes. The lagged dependent variable has a negative and significant coefficient in all columns, indicating substantial path dependence of the government budget balance. The public debt ratio has a positive and significant coefficient in all columns, which suggests that a high level of public debt is associated with more contractionary fiscal policies. Inflation has a positive and significant coefficient in the first column, but the coefficient is insignificant in the subsequent columns. The political variables predominantly have a negative coefficient, but are insignificant. Only in the preparation of the fiscal plans the presence of checks and balances in the political system seems to significantly improve the government budget balance.

The coefficient on the output gap, γ , is positive but insignificant in column (1). This indicates that fiscal plans in EU countries have an acyclical stance on average. In column (2), however, γ is negative and significant at the ten percent level, suggesting procyclicality during the implementation of fiscal policy. This pattern is even stronger in the subsequent column, where γ is negative and significant at the one percent level. A positive (negative) output gap of one percentage point is associated with a deterioration (improvement) of the cyclically adjusted government balance of approximately 0.19% of GDP, which suggests that, on average, actual fiscal policies are procyclical in EU countries. This result is in line with the findings of Eyraud et al. (2017), but contrasts with the results of most other studies that consider the cyclical reaction of fiscal policy in EU countries (e.g., Galí and Perotti, 2003; Wyplosz, 2006; Bénétix and Lane, 2013).

5.2. Fiscal rules and the cyclicity of fiscal policy

Do fiscal rules mitigate the procyclicality bias of fiscal policy? Table 2 shows the FE estimation results for Eq. (2) when fiscal rules are considered. Columns (1), (3), and (5) present the results if we exclude the interaction term between fiscal rules and the output gap. The coefficient γ shows a similar pattern as in the results for the baseline model. The fiscal rules index has a positive coefficient in all columns, but is not significant.

To capture whether fiscal rules improve the cyclical stance of fiscal policy, columns (2), (4), and (6) include an interaction term between the output gap and the fiscal rules index. The interaction term has a positive coefficient in all columns and is significant (at the ten percent level) for the implementation and outcomes of fiscal policy. However, Brambor et al. (2006) show that the coefficients in interaction models should not be interpreted as average marginal effects. The coefficient on the output gap is not the unconditional effect anymore, but reflects the marginal effect on the government budget when fiscal rules are absent. Similarly, the coefficient on the fiscal rules index only captures the effect of fiscal rules on the government budget when the output gap is equal to zero.¹³

Fig. 4 therefore plots the marginal effect of the output gap on the change in the cyclically adjusted government budget balance conditional on fiscal rules (using a 95% confidence interval). Fig. 4a shows that budgetary plans in EU countries

¹³ Hainmueller et al. (2019) show that scholars who follow the guidelines of Brambor et al. (2006) often assume that the interaction effect is linear. Another problem that is often not addressed is the lack of common support in the data. To test whether the conditional marginal effects hold, we follow the instructions of Hainmueller et al. (2019). Our results remain remarkably similar to our findings presented in the present paper. We therefore conclude that our results do not suffer much from the linearity assumption applied or a potential lack of common support. We report the results in the online appendix.

Table 2

Fixed effects estimation results for Eq. (2) with fiscal rules.

Dependent variable:	(1) Planning; t t - 1	(2) Planning; t t - 1	(3) Implementation; t t + 1	(4) Implementation; t t + 1	(5) Outcomes; t ex post	(6) Outcomes; t ex post
$\Delta CAPB_{i,t}^{t-1+s}$						
$GAP_{i,t}^{t-1+s}$	0.00494 (0.0403)	-0.0982 (0.135)	-0.134* (0.0721)	-0.612** (0.271)	-0.185*** (0.0658)	-0.587** (0.251)
$FRI_{i,t}$	0.381 (0.226)	0.426* (0.228)	0.596 (0.610)	0.752 (0.569)	0.395 (0.519)	0.515 (0.480)
$GAP_{i,t}^{t-1+s} * FRI_{i,t}$		0.0408 (0.0474)		0.194* (0.110)		0.162* (0.0895)
Observations	321	321	321	321	321	321
R-squared	0.298	0.301	0.406	0.418	0.422	0.433
Number of countries	27	27	27	27	27	27

See notes to Table 1. Results for fixed effects and control variables are not displayed but are available upon request.

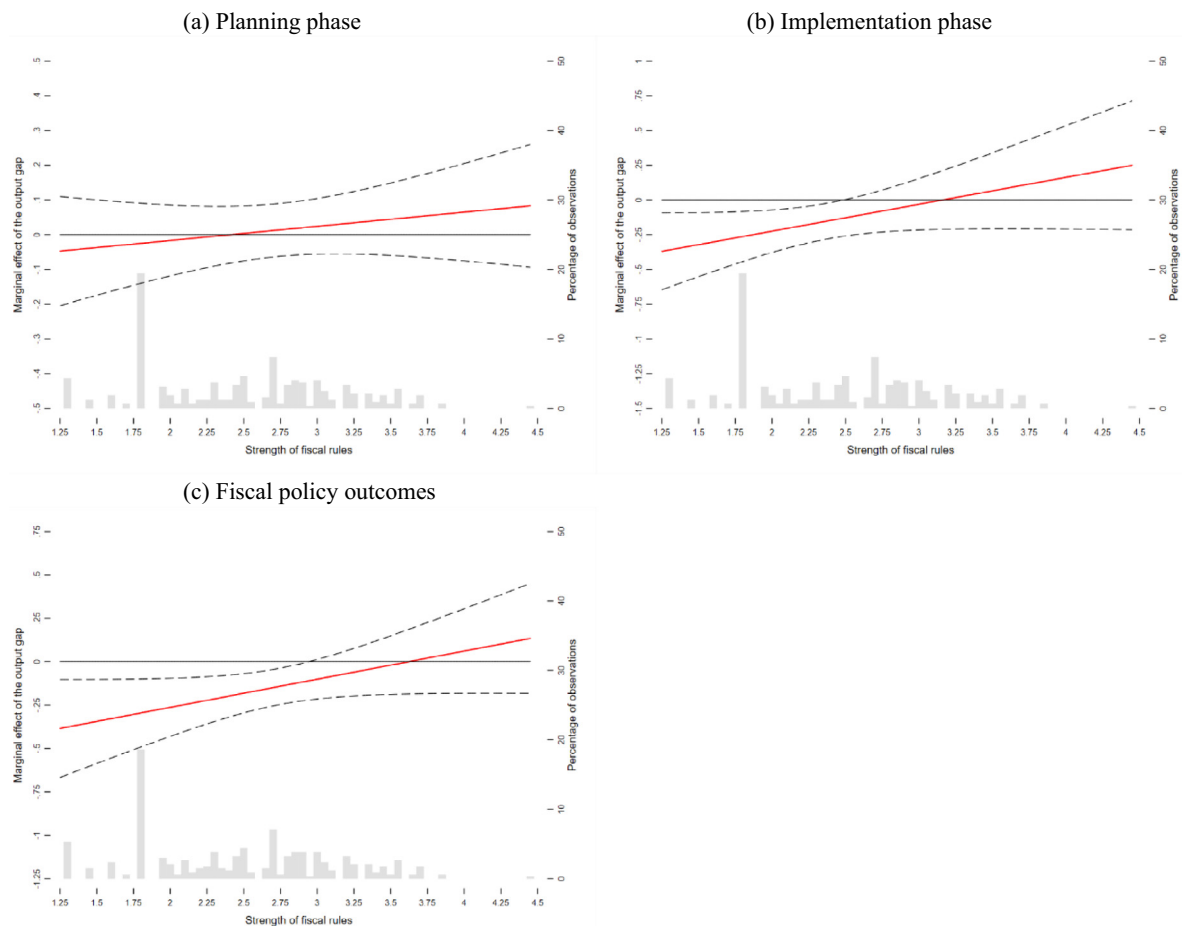


Fig. 4. Marginal effect of the output gap on $\Delta CAPB_{i,t}^{t-1+s}$ conditional on fiscal rules. Notes: Marginal effects are calculated with a 95% confidence interval, following Brambor et al. (2006). The graphs are based on the estimates shown in columns (2), (4), and (6) of Table 2, respectively. The red line shows the marginal effect of the output gap and the dashed lines display the 95% confidence interval for which the marginal effect is calculated. The grey bars show the percentage of observations for the fiscal rule index.

are acyclical irrespective of fiscal rules. In the implementation phase, the marginal effect of the output gap variable is negative and significant when fiscal rules are weak (see Fig. 4b). That is, if the economy is operating one percentage point above potential, the cyclically adjusted government balance will deteriorate with 0.37% of GDP. The marginal effect gradually diminishes as the fiscal rules index increases and, after passing a minimum threshold of approximately 2.5, the significance of the output gap disappears, indicating that fiscal policy becomes acyclical. Similar results are found for fiscal policy outcomes (see Fig. 4c).

Table 3

Fixed effects estimation results for Eq. (2) with government efficiency.

Dependent variable:	(1) Planning; t t – 1	(2) Planning; t t – 1	(3) Implementation; t t + 1	(4) Implementation; t t + 1	(5) Outcomes; t ex post	(6) Outcomes; t ex post
$\Delta CAPB_{it}^{t-1+s}$	–0.0113 (0.0410)	–0.246*** (0.0852)	–0.187** (0.0702)	–0.334** (0.142)	–0.240*** (0.0659)	–0.405*** (0.0931)
GQ_{it}	0.579 (0.351)	0.912** (0.336)	3.069*** (0.993)	3.188*** (1.011)	3.038*** (1.037)	2.782*** (0.996)
$GAP_{it}^{t-1+s} * GQ_{it}$		0.229*** (0.0603)		0.180 (0.124)		0.185** (0.0812)
Observations	321	321	321	321	321	321
R-squared	0.295	0.357	0.423	0.432	0.440	0.454
Number of countries	27	27	27	27	27	27

See notes to Table 1. Results for the fixed effects and control variables are not displayed but are available upon request.

5.3. Effect of government efficiency on the cyclicity of fiscal policy

Do efficient government institutions foster more countercyclical fiscal policies? Table 3 shows the estimation results for Eq. (2) for government efficiency. Similar to the previous table, columns (1), (3), and (5) present the estimation results without the interaction term, while columns (2), (4) and (6) show the results including the interaction between the output gap and government efficiency. The coefficient on the government efficiency index is positive and significant in all columns, except the first. This implies that countries with more efficient government institutions in general have lower budget deficits. The coefficient on the interaction with the output gap is positive and significant in the models for the planning phase and fiscal policy outcomes, but is insignificant in the model for the implementation phase of fiscal policy.

Fig. 5 shows the marginal effect of the output gap on the change in the cyclically adjusted government budget balance conditional on government efficiency. The graphs show that in all stages of the policymaking process, fiscal policy is procyclical for countries with less efficient government institutions; a positive output gap equal to one percentage point is associated with a deterioration of the government budget balance of between 0.36% and 0.50% of GDP when government efficiency is about –0.5. The cyclical stance of fiscal policy improves as government efficiency increases and becomes acyclical after passing a threshold. In the planning phase, fiscal policy even has a countercyclical stance when governments are considerably efficient. Although the diminishing effect remains present, it seems to weaken as the fiscal policy process proceeds, suggesting that especially in the preparation of the fiscal plans the efficiency of government institutions seems to matter for its cyclical reaction.

5.4. Simultaneous assessment of fiscal rules and government efficiency

Our results for fiscal rules and government efficiency portray a similar pattern (that is, fiscal rules and government efficiency mitigate the procyclicality bias of fiscal policy). As the next step, we consider fiscal rules and government efficiency simultaneously by estimating Eq. (3). However, as this model includes four interaction terms and three constitutive terms, estimation results are hard to interpret and cannot easily be displayed in a simple figure. Therefore, we have reconstructed the government efficiency index into a 0–1 dummy variable indicating whether government efficiency is low ($GQ_{it} = 0$) or high ($GQ_{it} = 1$).¹⁴

Table 4 presents the FE estimation results for Eq. (3) and Fig. 6 shows the marginal effect plots. The results for the planning phase (Fig. 6a) show that fiscal rules do not seem to matter for the cyclical reaction of fiscal policy when government efficiency is low. That is, planned fiscal policy is acyclical when government efficiency is low, irrespective of the stringency of fiscal rules. However, a high level of government efficiency and stringent fiscal rules seems to be a fruitful combination for countercyclical policy plans. In that case, a positive output gap of one percentage point leads to an improvement of the government budget balance between 0.10% and 0.15% of GDP.

The plots for the subsequent stages of the budgetary process show a different result. In the implementation phase, fiscal policy is procyclical when government efficiency is low and fiscal rules are weak. If the economy is operating one percentage point above (below) potential, this leads to a deterioration (improvement) of the cyclically adjusted budget balance of approximately 0.37% of GDP. More stringent fiscal rules seem to improve the cyclical stance and when the fiscal rules index surpasses the value of 2.5, fiscal policy becomes acyclical (see Fig. 6b). In contrast, the stringency of fiscal rules does not seem to matter for the cyclical stance when government efficiency is high: fiscal policy is acyclical in the implementation phase when government institutions are relatively efficient, irrespective of the stringency of fiscal rules. The results for the fiscal policy outcomes (Fig. 6c) suggest even more procyclicality – e.g., when government efficiency is low and fiscal rules are weak, a positive output gap results into a deterioration of the government of about 0.45% of GDP – while the conditional relationship between fiscal rules and the efficiency of government institutions is confirmed.

¹⁴ The split is based on whether the government efficiency index was below or above the median value (1.43).

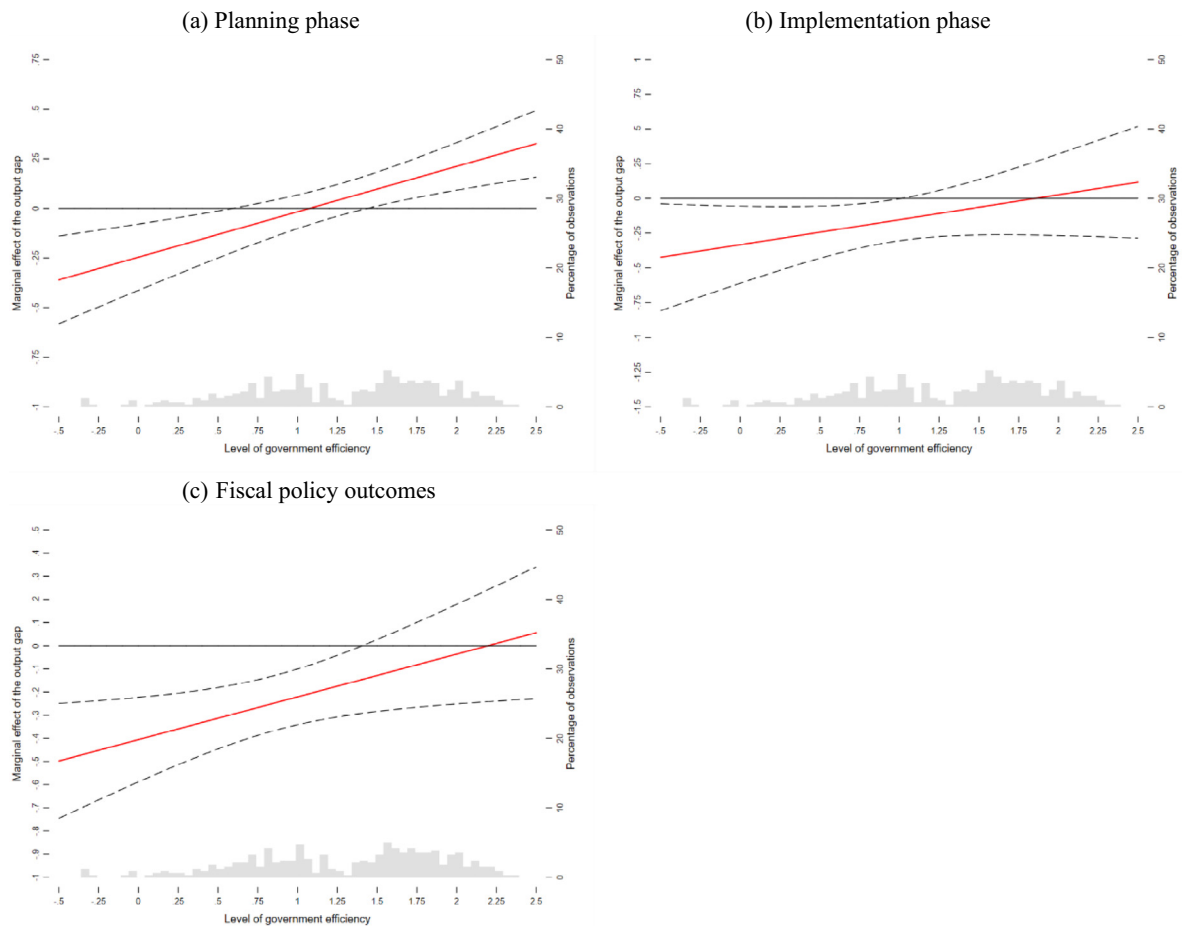


Fig. 5. Marginal effect of the output gap on $\Delta CAPB_{i,t}^{t-1+s}$ conditional on government efficiency. See notes to Fig. 4. The graphs are based on the estimates shown in columns (2), (4), and (6) of Table 3, respectively. The grey bars show the percentage of observations for the government efficiency measure.

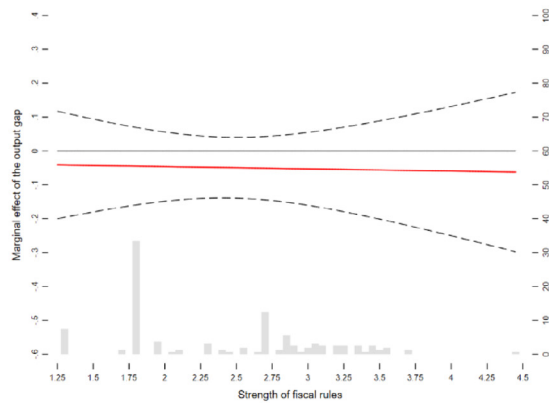
Table 4
Fixed effects estimation results for Eq. (3) with fiscal rules and government efficiency.

Dependent variable: $\Delta CAPB_{i,t}^{t-1+s}$	(1) Planning; $t t-1$	(2) Implementation; $t t+1$	(3) Outcomes; $t t+1$
$GAP_{i,t}^{t-1+s}$	-0.0332 (0.144)	-0.614** (0.295)	-0.709*** (0.236)
$FRI_{i,t}$	0.374 (0.239)	1.164* (0.664)	1.189* (0.652)
$GQ_{i,t}$	0.835 (0.581)	5.286* (2.950)	6.419* (3.362)
$GAP_{i,t}^{t-1+s} * FRI_{i,t}$	-0.00659 (0.0556)	0.193 (0.125)	0.206** (0.0863)
$GAP_{i,t}^{t-1+s} * GQ_{i,t}$	0.0323 (0.180)	0.0662 (0.594)	0.654* (0.355)
$FRI_{i,t} * GQ_{i,t}$	-0.0318 (0.240)	-1.041 (0.616)	-1.609** (0.691)
$GAP_{i,t}^{t-1+s} * FRI_{i,t} * GQ_{i,t}$	0.0604 (0.0796)	-0.0316 (0.218)	-0.251* (0.143)
Observations	321	321	321
R-squared	0.336	0.466	0.476
Number of countries	27	27	27

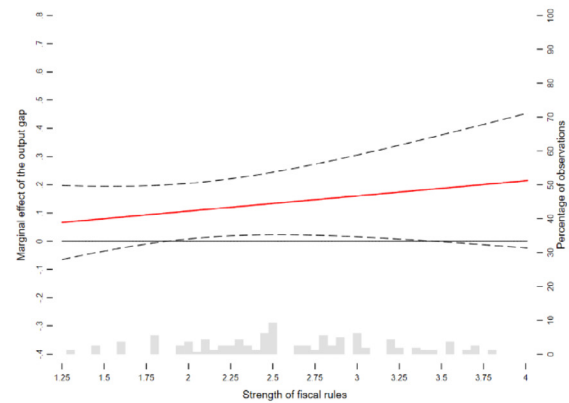
See notes to Table 1. Results for the fixed effects and control variables are not displayed but are available upon request.

(a) Planning phase

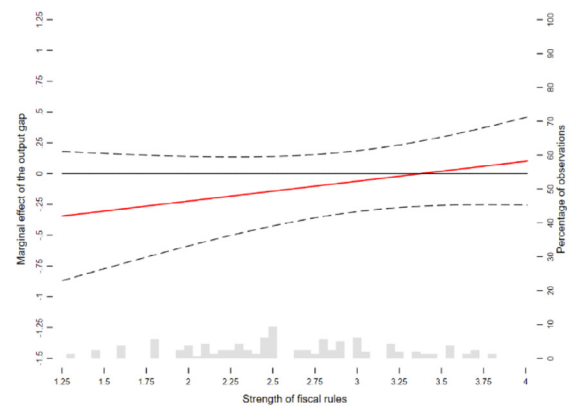
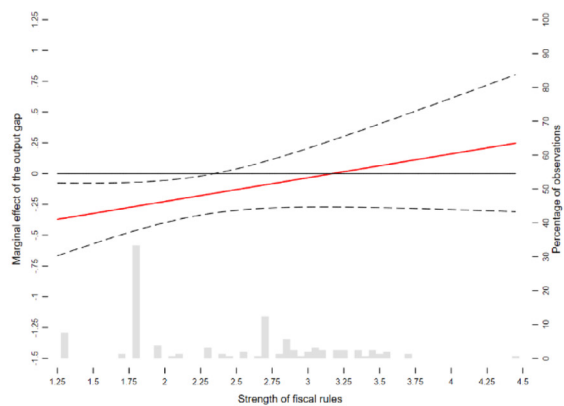
Low government efficiency



High government efficiency



(b) Implementation phase



(c) Fiscal policy outcomes

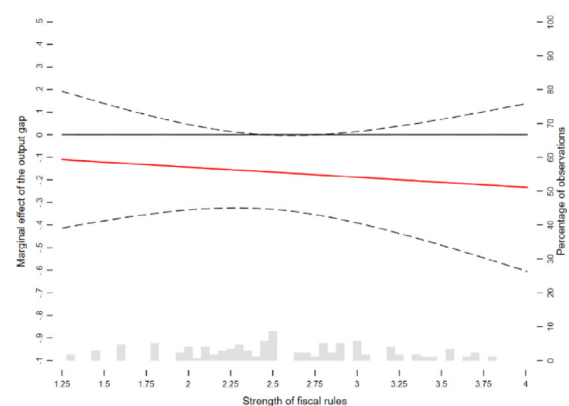
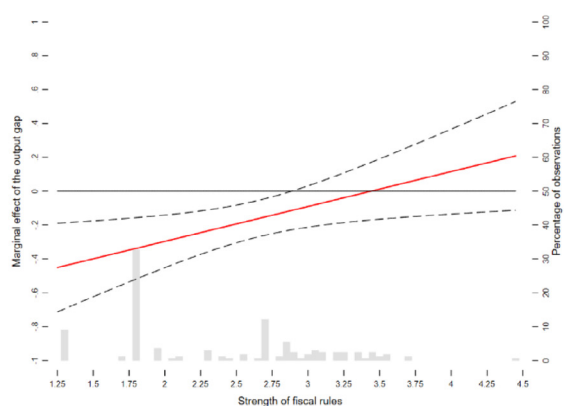


Fig. 6. Marginal effects of output gap on $\Delta CAPR_{it}^{t-1+s}$ conditional on fiscal rules and government efficiency, See notes to Fig. 4. The graphs are based on the estimates shown in columns (1), (2), and (3) of Table 4, respectively. The grey bars show the percentage of observations for the government efficiency measure.

Overall, the results suggest that both fiscal rules and government efficiency have a significant impact on the cyclical reaction of fiscal policy. The combination of a high level of government efficiency and stringent fiscal rules potentially leads to countercyclical fiscal plans. In contrast, in the latter stages of the fiscal policy process fiscal rules only foster more countercyclical policies when government efficiency is low. This suggests that fiscal rules and government efficiency are more likely to be substitutes when it comes to improving the cyclical reaction of fiscal policy. Therefore, our results provide no support for the hypothesis that these institutional factors are complements. This finding is in contrast with the results of [Bergman and Hutchison \(2015\)](#), which could reflect that both studies use very different samples.

6. Robustness

This section reports several robustness checks. In the [Online Appendix](#), we also report GMM and IV estimates to deal with the Nickel-bias and the potential endogeneity of our fiscal rules index. Also, we examine whether the interaction effect between the output gap and the fiscal rules and government efficiency indexes suffers from the assumption of linearity and a lack of common support. The findings reported in the [Online Appendix](#) confirm our main results.

6.1. Different types of fiscal rules

So far, we only considered the aggregated effect of the fiscal rules. Not all types of rules, however, may be equally apt for promoting fiscal sustainability or economic stabilization ([Schaechter et al., 2012](#)). To capture whether the different types of fiscal rules have a non-uniform effect on fiscal policy, we construct indexes for each type of fiscal rule – i.e., expenditure rules, revenue rules, balanced budget rules, and debt rules – similar to the aggregated fiscal rules index.

[Tables 5–7](#) present the estimation results for Eq. (2) using the disaggregated indexes for, respectively, the planning phase, implementation phase, and the fiscal policy outcomes. The corresponding marginal effects are displayed in [Figs. A1–A3](#) in [Appendix A](#). Similar to the results for the aggregated fiscal rules index, none of the different types of fiscal rules seem to influence the cyclical stance in the planning stage (i.e., fiscal plans are acyclical irrespective of fiscal rules). In the implementation phase, notably expenditure rules seem to improve cyclical behaviour. This finding seems to be in line with the results of some recent studies (e.g., [Nerlich and Reuter, 2015](#)). Considering the fiscal policy outcomes, however, balanced budget rules and debt rules appear equally efficient in reducing procyclical fiscal policies. Only the effect of revenue rules is less pronounced compared to the other types of fiscal rules. Results for revenue rules, however, most likely suffer from a lack of common support across the entire range of its index. Therefore, these results have to be interpreted with caution, as revenue rules might still be an effective tool to constrain the use of windfall revenues for (procyclical) fiscal policies.¹⁵

6.2. Good times versus bad times

Up to this point, we have assumed that the cyclical reaction of fiscal policy is symmetrical over the business cycle. However, the reaction of fiscal policy to positive and negative cyclical conditions may be different ([Golinelli and Momigliano, 2009](#); [Eyraud et al., 2017](#)).¹⁶

To capture the cyclical reaction of fiscal policy in good (bad) times, the output gap variable is interacted with a dummy variable, $D(GAP_{i,t}^{t-1+s} \leq 0)$, which equals 1 when the output gap is positive (negative) and 0 otherwise. [Table 8](#) presents the estimation results for Eq. (1) when we differentiate between good times and bad times. The results in column (1) show that planned fiscal policy is acyclical irrespective of cyclical situation (similar to the previous findings). Columns (2) and (3), however, reveal dissimilarities between the cyclical conditions. Implemented fiscal policies appear to be significantly procyclical in times of economic prosperity; a positive output gap of one percentage point results in a deterioration of the government budget equal to about 0.67% of GDP. In contrast, the results for times of economic slump show an acyclical stance of implemented fiscal policies. Furthermore, although the results for the budgetary outcomes indicate significant procyclical fiscal policies across both cyclical conditions, the discretionary response of fiscal policy to the business cycle is more than twice as large in good times as that during bad times. These results seem to be in line with the theoretical predictions of [Tornell and Lane \(1998, 1999\)](#), [Talvi and Végh \(2005\)](#) and [Alesina et al. \(2008\)](#).

The role of the institutional factors in mitigating procyclical fiscal policies might also be different during good and bad times. For instance, the SGP rules have often been criticized for their strong focus on prohibiting that the targeted variables do not over-shoot their numerical constraints, most notably the 3% deficit limit. As this particularly happened when the economy was in dire straits, fiscal rules may have induced procyclical policies in EU member states at those times. However, this is not apparent from our findings ([Tables A3 and A4](#) in [Appendix A](#) show the estimation results; [Figs. A4 and A5](#) plot the marginal effects). Although the role of fiscal rules seems more prominent in good times (since fiscal policy turns out to be more procyclical), fiscal rules also contain their mitigating effect on the procyclicality bias of fiscal policy in times of eco-

¹⁵ Results for the disaggregated indexes are remarkably robust using the kernel smoothing estimator suggested by [Hainmueller et al. \(2019\)](#); the results are available on request.

¹⁶ The results of [Eyraud et al. \(2017\)](#) suggest that in times of economic expansion, fiscal policy shows a significant procyclical reaction in the planning and implementation stage, which tends to fade out in the ex post outcomes. On the contrary, during economic contractions, fiscal policy plans and implementation seem to be acyclical, which becomes procyclical ex post.

Table 5

Fixed effects estimation results for Eq. (2) with different types of fiscal rules; planning phase.

Dependent variable: $\Delta CAPB_{i,t}^{t-1+s}$	(1) Expenditure rules	(2) Revenue rules	(3) Deficit rules	(4) Debt rules
$GAP_{i,t}^{t-1+s}$	−0.0261 (0.0624)	−0.00214 (0.0441)	−0.307 (0.300)	−0.107 (0.239)
$FRI_{i,t}$	0.0956 (0.0801)	0.0367 (0.137)	0.617* (0.322)	0.889** (0.354)
$GAP_{i,t}^{t-1+s} * FRI_{i,t}$	0.0143 (0.0225)	0.0152 (0.0193)	0.0864 (0.0808)	0.0321 (0.0715)
Observations	321	321	321	321
R-squared	0.294	0.291	0.301	0.310
Number of countries	27	27	27	27

See notes to Table 1. Results for the time dummies and control variables are not displayed but are available upon request.

Table 6

Fixed effects estimation results for Eq. (2) with different types of fiscal rules; implementation phase.

Dependent variable: $\Delta CAPB_{i,t}^{t-1+s}$	(1) Expenditure rules	(2) Revenue rules	(3) Deficit rules	(4) Debt rules
$GAP_{i,t}^{t-1+s}$	−0.334*** (0.0940)	−0.146* (0.0748)	−0.869 (0.533)	−1.210*** (0.407)
$FRI_{i,t}$	0.120 (0.188)	0.321* (0.173)	1.119 (0.804)	1.515** (0.676)
$GAP_{i,t}^{t-1+s} * FRI_{i,t}$	0.0975** (0.0420)	0.00607 (0.0324)	0.203 (0.143)	0.325** (0.126)
Observations	321	321	321	321
R-squared	0.422	0.406	0.409	0.422
Number of countries	27	27	27	27

See notes to Table 1. Results for the time dummies and control variables are not displayed but are available upon request.

Table 7

Fixed effects estimation results for Eq. (2) with different types of fiscal rules; final outcomes.

Dependent variable: $\Delta CAPB_{i,t}^{t-1+s}$	(1) Expenditure rules	(2) Revenue rules	(3) Deficit rules	(4) Debt rules
$GAP_{i,t}^{t-1+s}$	−0.328*** (0.100)	−0.193*** (0.0678)	−0.907 (0.591)	−1.135*** (0.366)
$FRI_{i,t}$	−0.0605 (0.172)	0.271 (0.165)	0.990 (0.738)	1.323** (0.580)
$GAP_{i,t}^{t-1+s} * FRI_{i,t}$	0.0654** (0.0284)	0.00716 (0.0280)	0.197 (0.158)	0.283** (0.104)
Observations	321	321	321	321
R-squared	0.433	0.423	0.427	0.438
Number of countries	27	27	27	27

See notes to Table 1. Results for the time dummies and control variables are not displayed but are available upon request.

Table 8

Fixed effects estimation results for eq. (1): good times vs. bad times.

Dependent variable: $\Delta CAPB_{i,t}^{t-1+s}$	(1) Planning; $t t - 1$	(2) Implementation; $t t + 1$	(3) Outcomes; $t ex\ post$
$GAP_{i,t}^{t-1+s} * D(GAP_{i,t}^{t-1+s} > 0)$	−0.0868 (0.0907)	−0.674*** (0.218)	−0.330*** (0.0982)
$GAP_{i,t}^{t-1+s} * D(GAP_{i,t}^{t-1+s} < 0)$	0.0219 (0.0520)	−0.0241 (0.0824)	−0.140** (0.0665)
Observations	321	321	321
R-squared	0.291	0.424	0.425
Number of countries	27	27	27

See notes to Table 1. Results for the time dummies and control variables are not displayed but are available upon request.

Table 9

Fixed effects estimation results for Eq. (2) with global financial crisis.

Dependent variable: $\Delta CAPB_{it}^{t-1+s}$	(1) Planning; $t t - 1$	(2) Implementation; $t t + 1$	(3) Outcomes; $t ex\ post$
GAP_{it}^{t-1+s}	-0.0648 (0.0554)	-0.497*** (0.158)	-0.279*** (0.0816)
$GAP_{it}^{t-1+s} * GFC_{it}$	0.0943 (0.0860)	0.444** (0.177)	0.120* (0.0682)
Observations	321	321	321
R-squared	0.293	0.416	0.423
Number of countries	27	27	27

See notes to Table 1. Results for the control variables and time dummies are not displayed but are available upon request. The direct effect of the GFC is fully captured by the annual time dummies. The constitutive term of the GFC is therefore omitted from the model.

nomie slump. Considering the conditional effect of government institutions, however, there seems to be one noticeable difference: for the results of the planning of fiscal policy in bad times, low levels of government efficiency point to procyclical fiscal plans and high levels indicate countercyclical plans (similar to previous results); in good times, the level of government efficiency does not seem to matter.

6.3. Global financial crisis

In the wake of the global financial crisis (GFC), several countries had severe fiscal imbalances. Arguably, the GFC triggered a structural break in the conduct of fiscal policy, which might not be (fully) captured by including annual time dummies (Janků and Libich, 2019). We therefore examine if there is a change in the cyclical reaction of fiscal policy between the pre-GFC and post-GFC periods.¹⁷ We do this by interacting the output gap variable with a dummy variable that equals 1 for the post-GFC period (i.e., from 2009 onwards).

Table 9 presents the results for the baseline model. Column (1) shows that there is no structural break in the conduct of fiscal policy after the GFC. In the subsequent columns, however, the coefficient of the interaction term becomes significant. Before the GFC, implemented fiscal policies were procyclical, but in the post-GFC era the implementation of fiscal policies in the EU became acyclical on average. Similarly, fiscal policy outcomes were procyclical before the GFC. In contrast to the aforementioned results, however, ex post fiscal policies also remained procyclical after the GFC (although the cyclical reaction significantly improved).¹⁸

Did the role of the institutional variables change between the pre-GFC and post-GFC periods? Tables A5 and A6 and Figs. A6 and A7 show the results when we employ a three-way interaction between the output gap, the GFC-dummy and either the fiscal rules index or the government efficiency variable. The results considering the fiscal rules index are almost identical to the results presented in Section 5.2. The only minor difference is that prior to the GFC, fiscal rules significantly improved the cyclical reaction in the implementation phase, whereas during the post-GFC period fiscal policy is acyclical irrespective of the strength of fiscal rules. This finding seems in line with the results presented in Table 9. Further, the conditional effect of fiscal rules on the budgetary outcomes is similar across pre-GFC and post-GFC periods.

The results for the government efficiency variable show that in the planning phase the conditional effect on the cyclicity of fiscal policy is only present in the post-GFC era. Assuming that the willingness of EU countries to improve their fiscal position (and thereby the cyclical reaction of fiscal policy) increased after the GFC, this could arguably reflect that government efficiency is pivotal in their ability of planning to do so. The findings for the subsequent phases of fiscal policy are similar to the results for the fiscal rules index and in line with Table 9. That means, the conditional effect of government efficiency on fiscal policy outcomes does not change between the pre-GFC and post-GFC periods. Since EU countries did not improve their government institutions after the GFC (see Fig. 2) and because the conditional effect of both institutional variables is more or less similar across both periods, this suggests that it is the improvement in the fiscal rules framework of EU countries (see Fig. 1) that significantly fostered a more countercyclical reaction of their fiscal policies after the GFC.

6.4. Euro area countries versus non-euro area countries

Finally, we consider whether results are different between euro area (EA) and non-EA countries.¹⁹ As member states of the EA abandoned their sovereignty over monetary and exchange rate policies, fiscal policy became the only stabilization tool available at the national level to deal with country-specific shocks. We might therefore expect more countercyclical fiscal policies in EA countries compared to non-EA countries.

¹⁷ We also find that during the GFC period (2007–2008), fiscal policies in the EU were more procyclical compared to the years outside the GFC. Results are available on request.

¹⁸ Fiscal policy outcomes are procyclical in the post-GFC era at the 5% significance level.

¹⁹ We have also examined the difference between periphery and core countries in the EA. The results suggest no significant difference in the cyclical stance (results available on request).

Table 10

Fixed effects estimation results for Eq. (2) with euro area.

Dependent variable: $\Delta CAPB_{i,t}^{f-1+s}$	(1) Planning; $t t - 1$	(2) Implementation; $t t + 1$	(3) Outcomes; $t ex\ post$
$GAP_{i,t}^{f-1+s}$	-0.0924 (0.0715)	-0.338** (0.124)	-0.337*** (0.113)
$EA_{i,t}$	0.439 (0.273)	0.0525 (0.598)	-0.239 (0.642)
$GAP_{i,t}^{f-1+s} * EA_{i,t}$	0.137* (0.0763)	0.384*** (0.124)	0.236* (0.125)
Observations	321	321	321
R-squared	0.310	0.438	0.441
Number of countries	27	27	27

See notes to Table 1. Results for the control variables and time dummies are not displayed but are available upon request.

Table 10 shows the estimation results for Eq. (2) when we interact the output gap variable with an EA dummy variable. Similar to our previous results, the coefficient on the output gap is insignificant for the planning phase and significant for the implementation and outcomes of fiscal policy. This points to procyclical fiscal policies in non-EA countries. The results also indicate that fiscal policies are more countercyclical in EA countries; the interaction between the output gap and EA variable is positive and significant in all columns. The results for the institutional factors also reflect these findings (see Table A7 and Fig. A8 in Appendix A for the results with fiscal rules; see Table A8 and Fig. A9 for the results with government efficiency). Fiscal rules and government efficiency seem to significantly reduce procyclical fiscal policies in non-EA countries. In addition, the EA-plots suggest that fiscal policies in EA countries are acyclical in general, but for the outcomes of fiscal policy this result seems to depend notably on the efficiency of government institutions.

7. Conclusions

We have studied the cyclical stance of discretionary fiscal policy in 27 EU member states using a real-time data approach. The results indicate that fiscal plans have an acyclical stance. However, when the fiscal plans are implemented the cyclical stance worsens, while budgetary outcomes end up procyclical. The results also suggest that institutional factors – i.e., fiscal rules and government efficiency – enhance the cyclical response of fiscal policy. When institutional factors are weak, fiscal policy is procyclical in all its various stages, but government efficiency and fiscal rules improve cyclical behaviour. In addition, strong institutional frameworks result in acyclical fiscal policies, although fiscal rules and government efficiency do not seem to complement each other.

We also find that notably expenditure rules appear to foster countercyclical policies when fiscal plans are implemented. When the course of fiscal policy proceeds, however, balanced budget rules and debt rules seem to be equally apt in improving cyclical behaviour. Further analysis also reveals that the results seem to be sensitive for the phase of the business cycle, as fiscal policy appears to be more procyclical during times of economic prosperity. Moreover, although government efficiency appears to play an important role in the planning phase of the budget, this only seems to be the case when the economy is in dire straits.

We find more procyclical fiscal policies before the global financial crisis. It seems that the improvement of EU countries' fiscal rules framework after the crisis significantly fostered more countercyclical policies. Also, we find that member states of the euro area have less procyclical policies than non-euro area countries. Foremost, our result that fiscal rules and government efficiency improve the cyclical response of fiscal policy appears robust against the consideration of the global financial crisis or membership of the euro area, nor does the effect seem to be driven by a specific type of fiscal rule or the stage of the business cycle.

Finally, one caveat is in order. To capture the effect of fiscal rules on the fiscal policy stance we use a stringency index derived from the IMF fiscal rules database. However, this index only considers the design of fiscal rules and does not capture the actual efficacy of fiscal rules (see also Caselli and Reynaud, 2020). Reuter (2015) shows that even though fiscal rules are not always complied with, they still force fiscal policy aggregates towards their numerical constraint in times of non-compliance. Moreover, de Jong and Gilbert (2020) show that when EU countries did not comply to the SGP rules and entered the Excessive Deficit Procedure, the recommendations of the EC led to substantial fiscal consolidations. These studies show that non-compliance to fiscal rules is not necessarily a sign of ineffectiveness, neither does compliance to the rules necessarily signal that they successfully constrain distorted political incentives, if present.

CRedit authorship contribution statement

Bram Gootjes: Conceptualization, Methodology, Formal analysis, Validation, Investigation, Writing – original draft. **Jakob de Haan:** Conceptualization, Methodology, Validation, Investigation, Writing – original draft, Supervision.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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Appendix A

See Figs. A1–A9.

See Tables A1–A8.

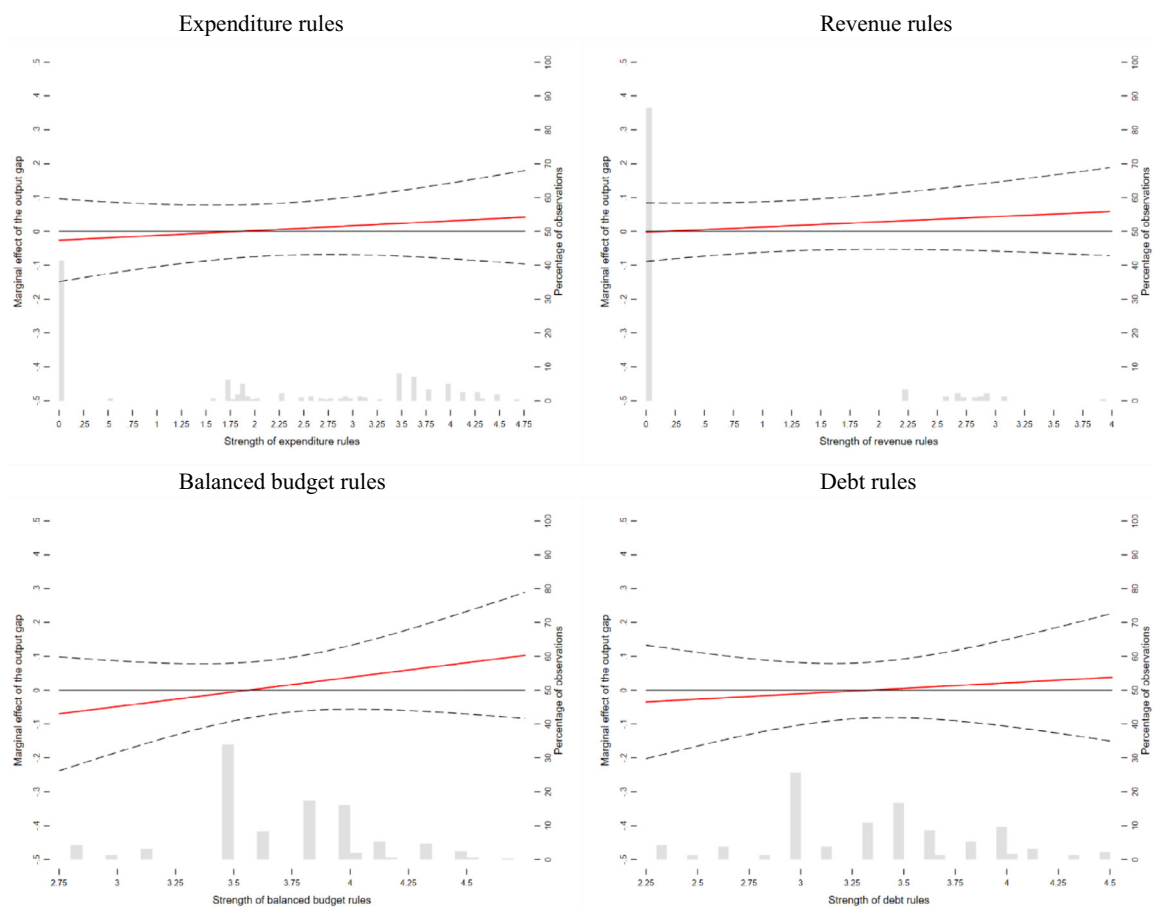


Fig. A1. Marginal effects of the output gap on $\Delta CAPB_{t,t}^{t-1+s}$ conditional on fiscal rules: planning phase, See notes to Fig. 4. The graphs are based on the estimates shown in column (1), (2), (3) and (4) of Table 5. The grey bars show the percentage of observations for the disaggregated fiscal rules indexes.

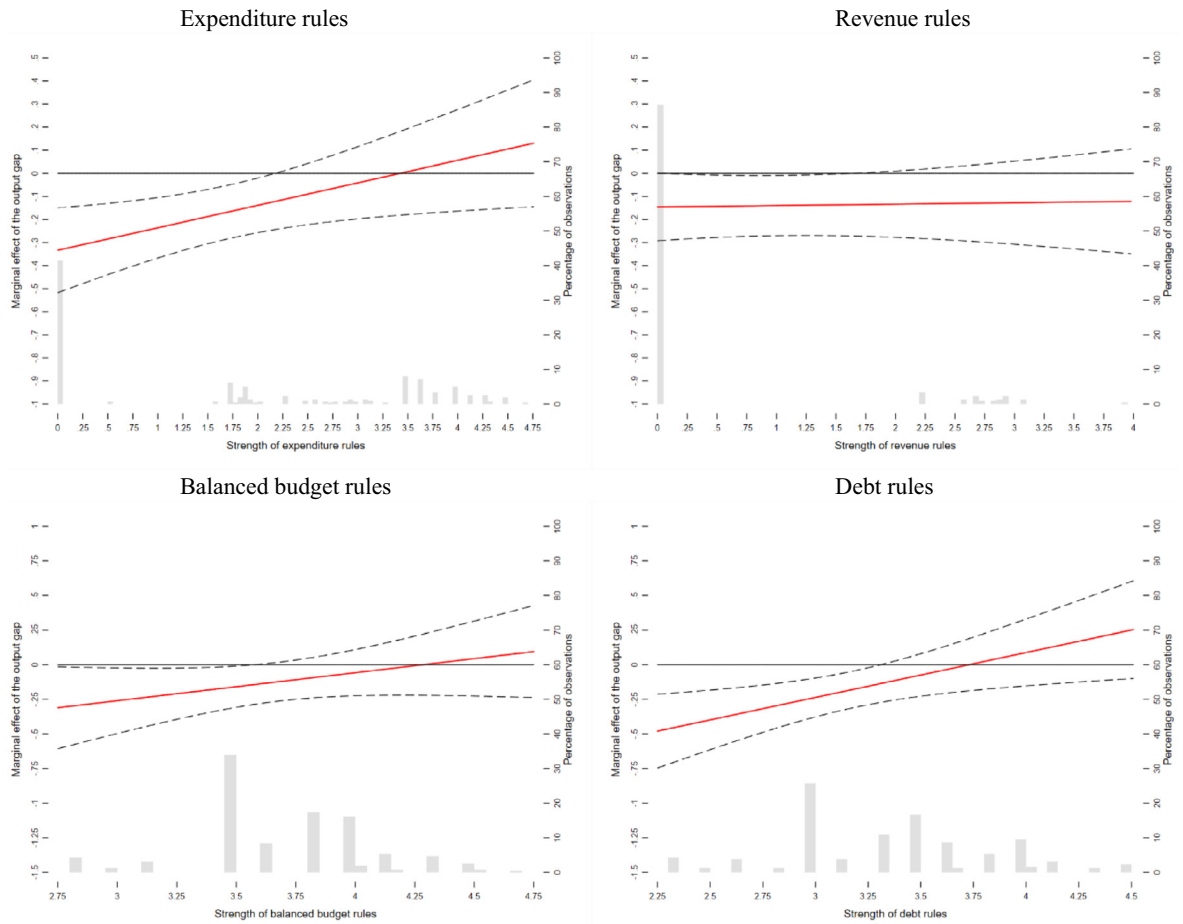


Fig. A2. Marginal effects of the output gap on $\Delta CAPP_{it}^{t-1+s}$ conditional on fiscal rules: implementation phase, See notes to Fig. 4. The graphs are based on the estimates shown in column (1), (2), (3) and (4) of Table 6. The grey bars show the percentage of observations for the disaggregated fiscal rules indexes.

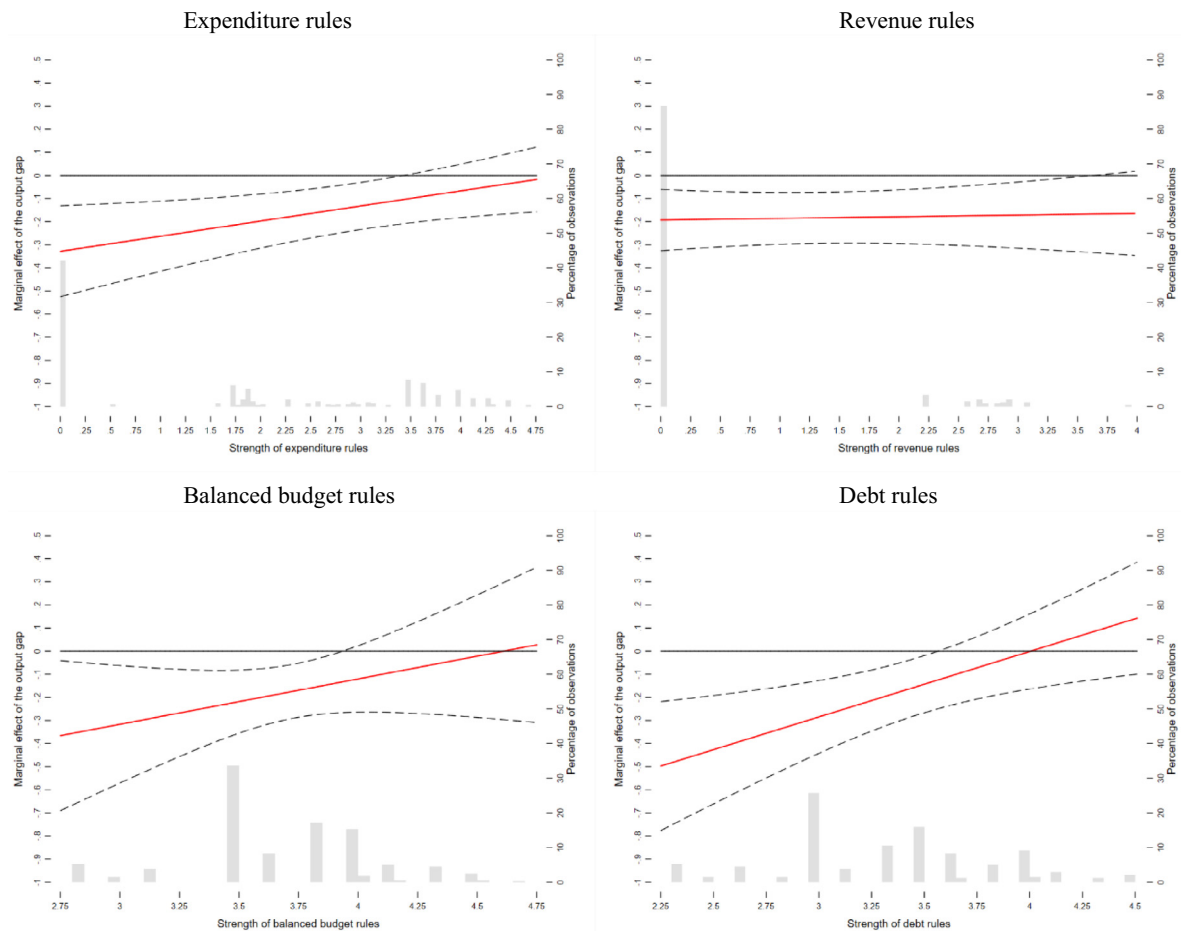
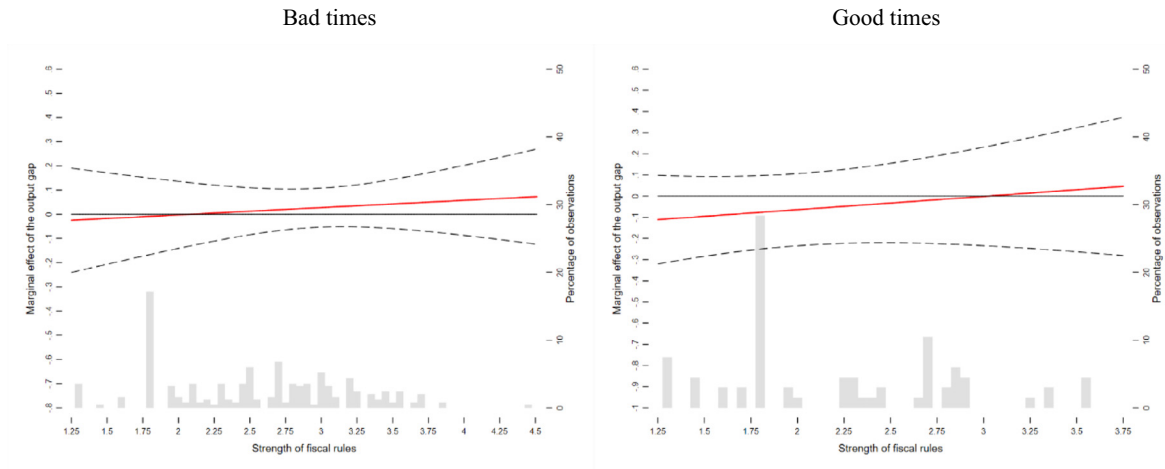
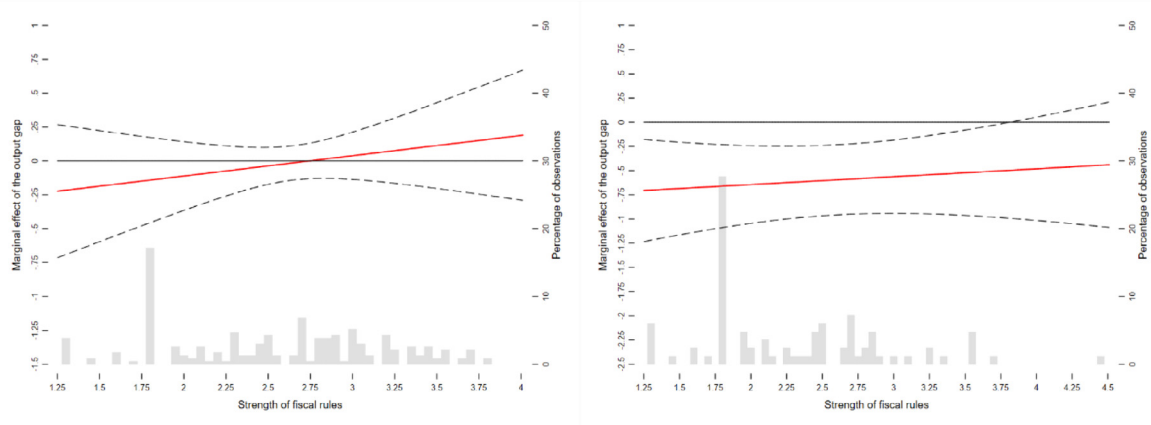


Fig. A3. Marginal effects of the output gap on $\Delta CAPB_{i,t}^{t-1+s}$ conditional on fiscal rules: fiscal policy outcomes, See notes to Fig. 4. The graphs are based on the estimates shown in column (1), (2), (3) and (4) of Table 7. The grey bars show the percentage of observations for the disaggregated fiscal rules indexes.

(a) Planning phase



(b) Implementation phase



(c) Fiscal policy outcomes

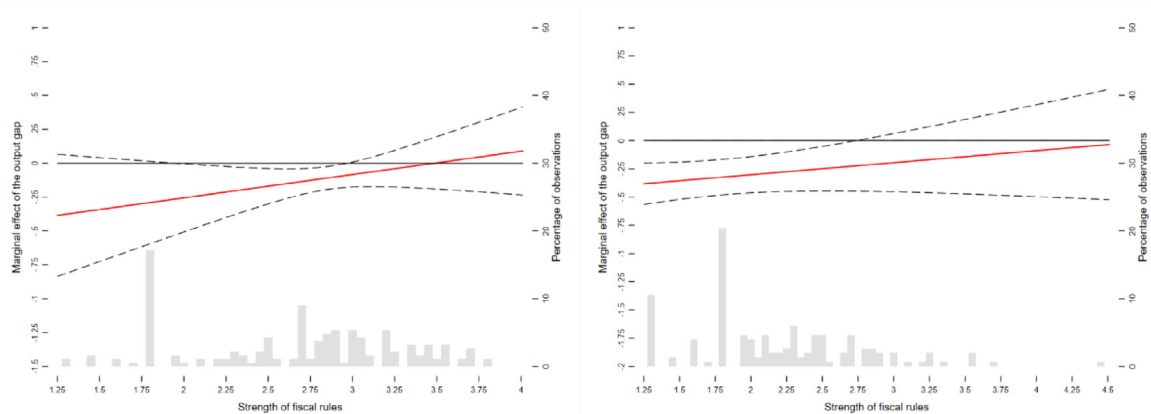
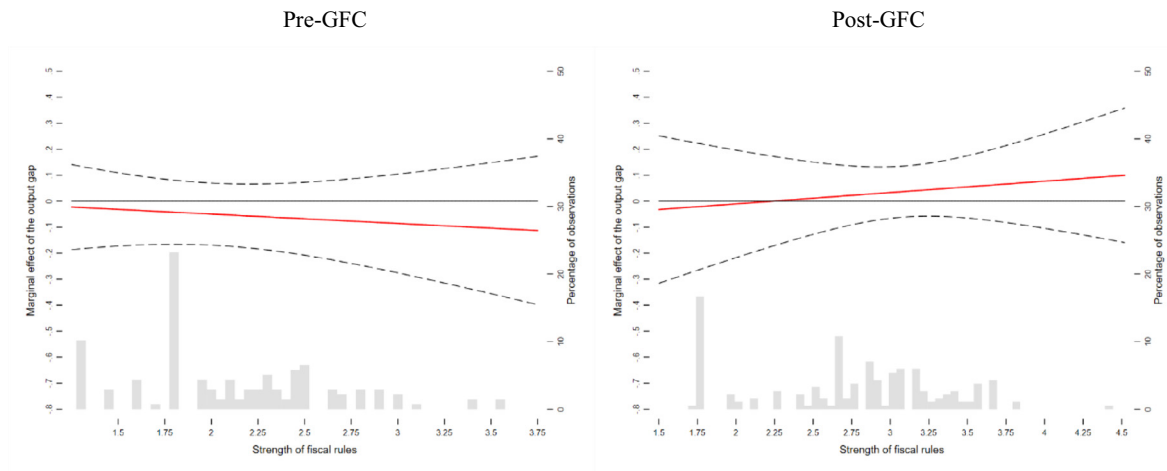
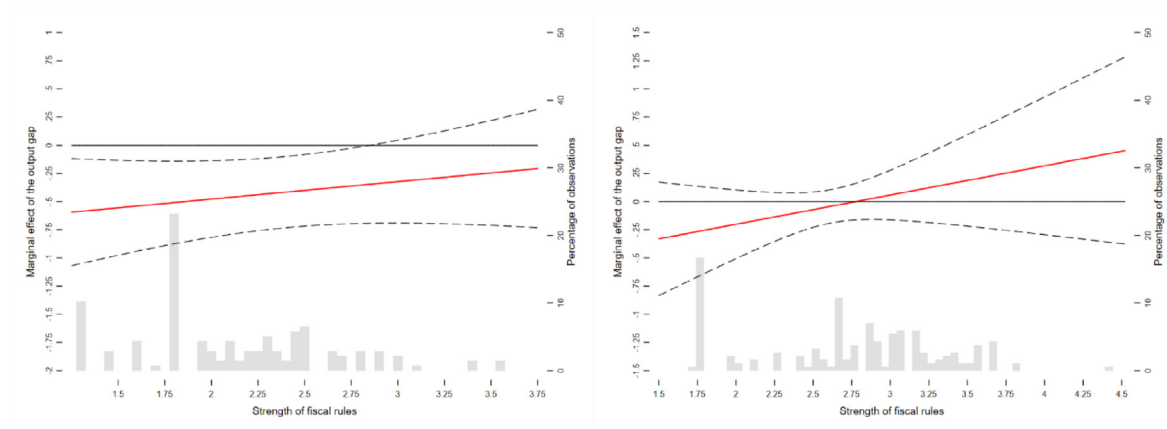


Fig. A4. Marginal effects of the output gap on $\Delta CAPB_{lit}^{t-1+s}$ conditional on fiscal rules: good times vs. bad times, See notes to Fig. 4. Marginal effects are calculated with a 90% confidence interval. The graphs are based on the estimates shown in columns (1), (2), and (3) of Table A3, respectively. The grey bars show the percentage of observations for fiscal rules index.

(a) Planning phase



(b) Implementation phase



(c) Fiscal policy outcomes

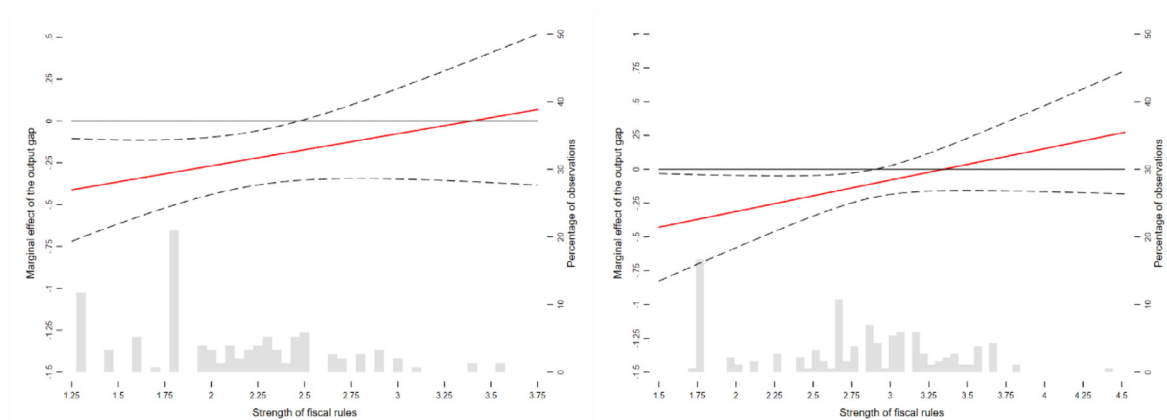
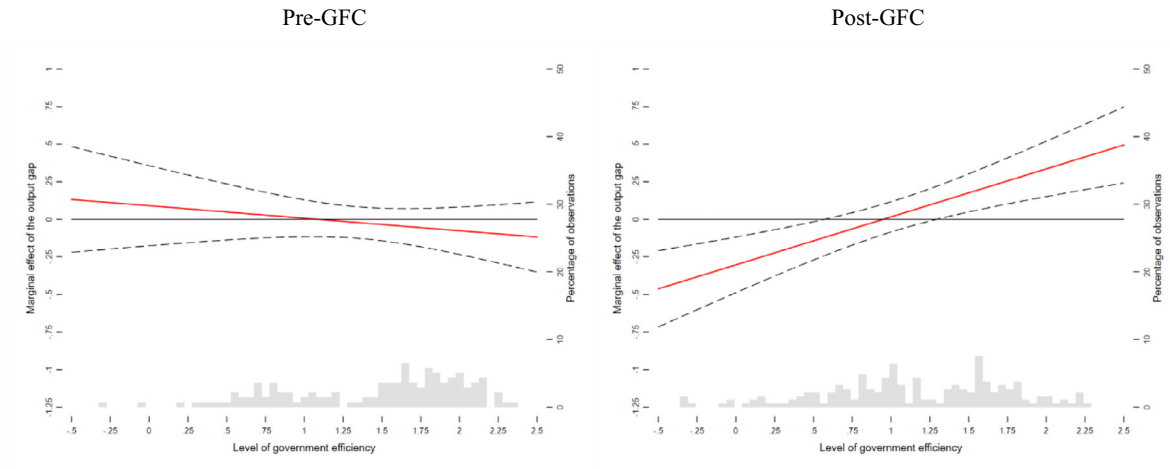
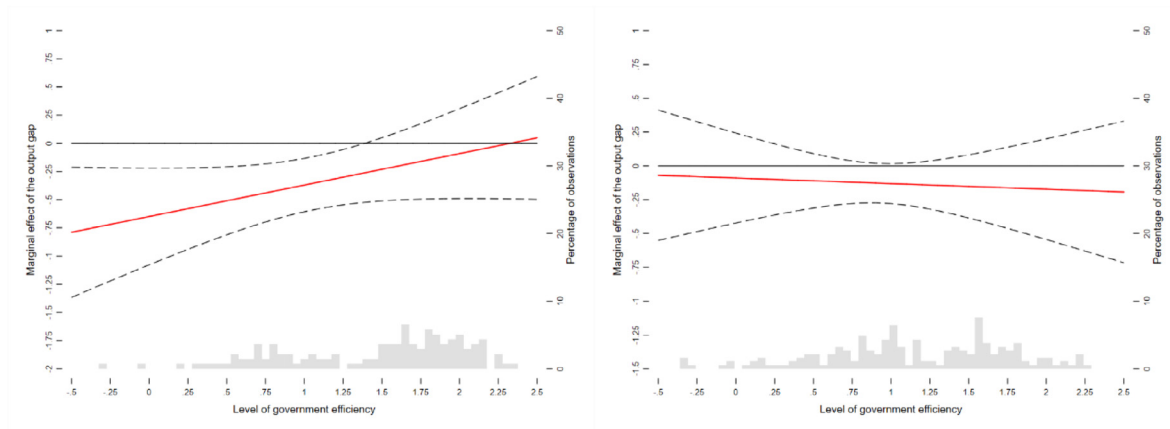


Fig. A5. Marginal effects of the output gap on $\Delta CAPB_{it}^{t-1+s}$ conditional on government efficiency: good times vs. bad times. See notes to Fig. 4. Marginal effects are calculated with a 90% confidence interval. The graphs are based on the estimates shown in columns (1), (2), and (3) of Table A4, respectively. The grey bars show the percentage of observations for the government efficiency measure.

(a) Planning phase



(b) Implementation phase



(c) Fiscal policy outcomes

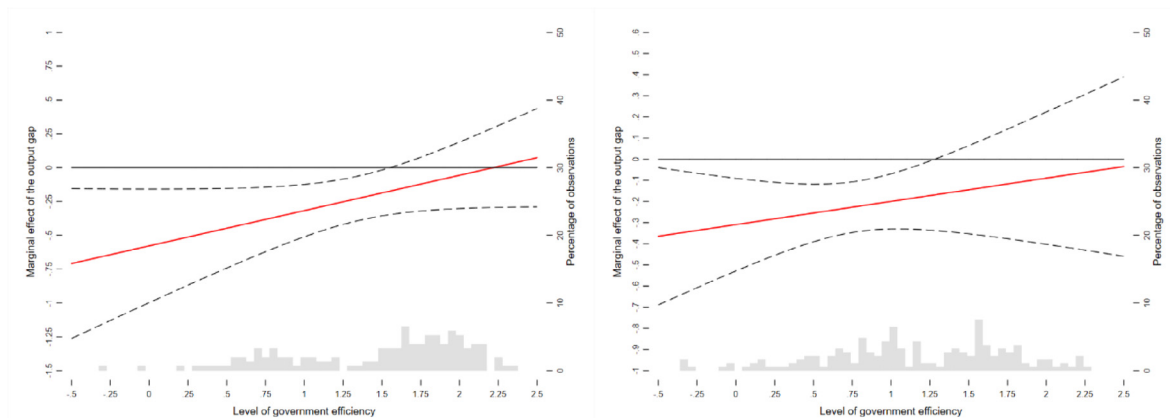
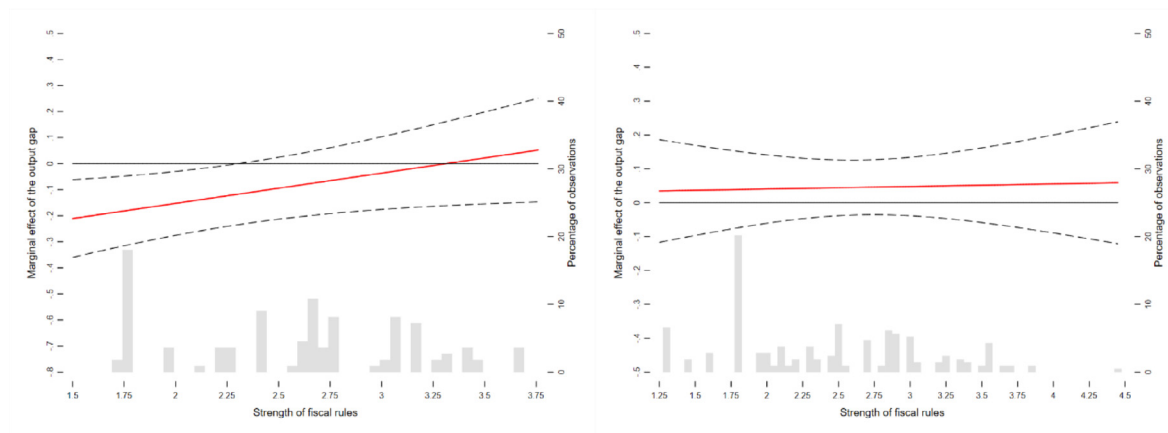


Fig. A6. Marginal effects of output gap on $\Delta CAPB_{it}^{t-1+s}$ conditional on fiscal rules and global financial crisis, See notes to Fig. 4. The graphs are based on the estimates shown in columns (1), (2), and (3) of Table A5, respectively. The grey bars show the percentage of observations for the fiscal rules index.

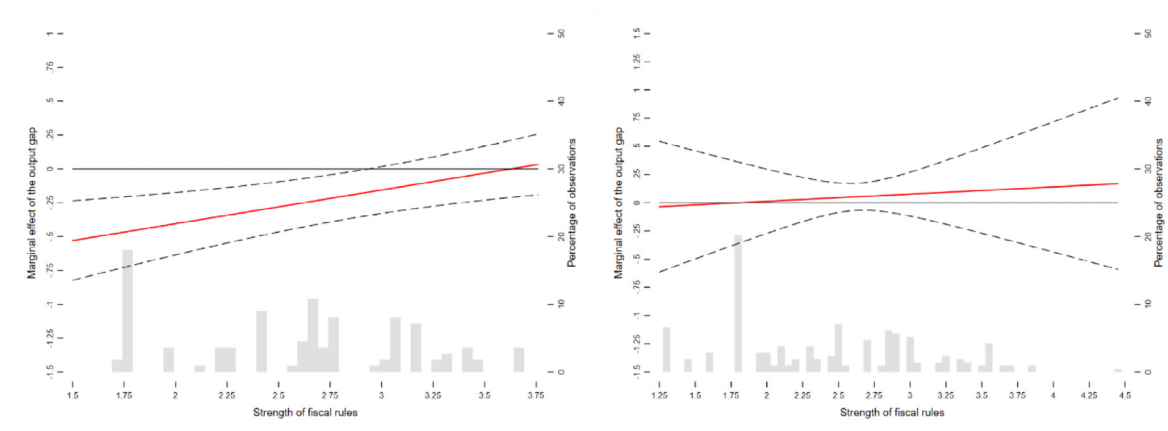
(a) Planning phase

Non-EA countries

EA countries



(b) Implementation phase



(c) Fiscal policy outcomes

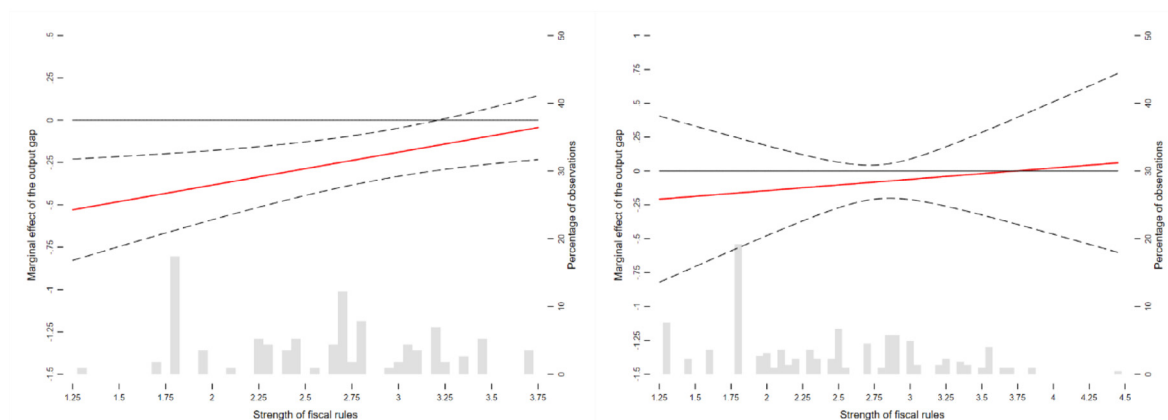
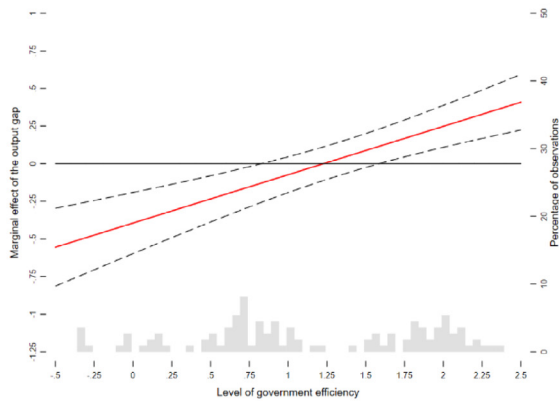


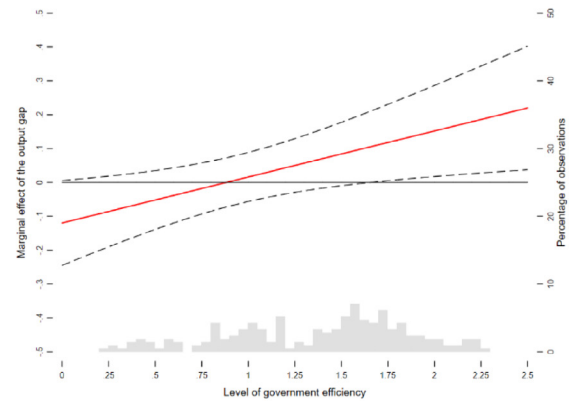
Fig. A7. Marginal effects of output gap on $\Delta CAPP_{it}^{t-1+s}$ conditional on government efficiency and global financial crisis, See notes to Fig. 4. The graphs are based on the estimates shown in columns (1), (2), and (3) of Table A6, respectively. The grey bars show the percentage of observations for the government efficiency measure.

(a) Planning phase

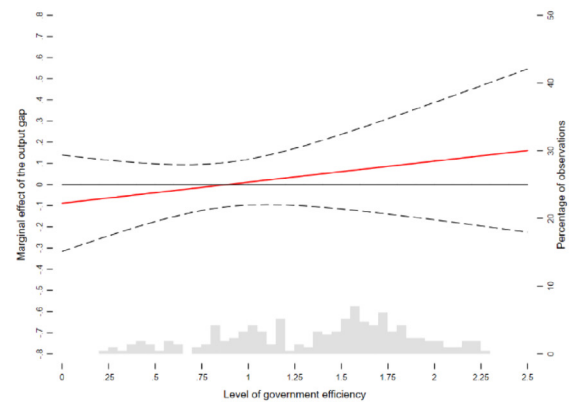
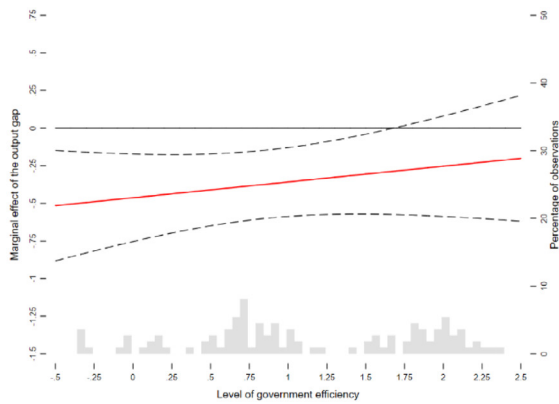
Non-EA countries



EA countries



(b) Implementation phase



(c) Fiscal policy outcomes

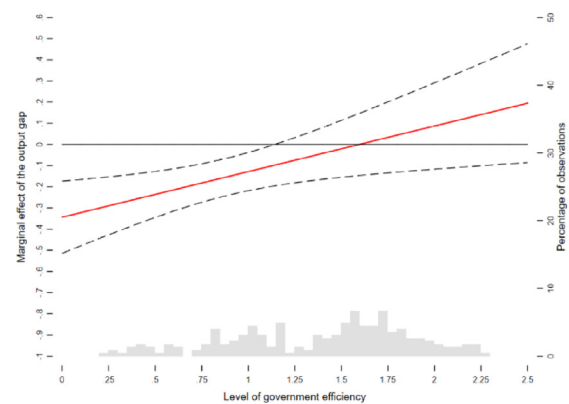
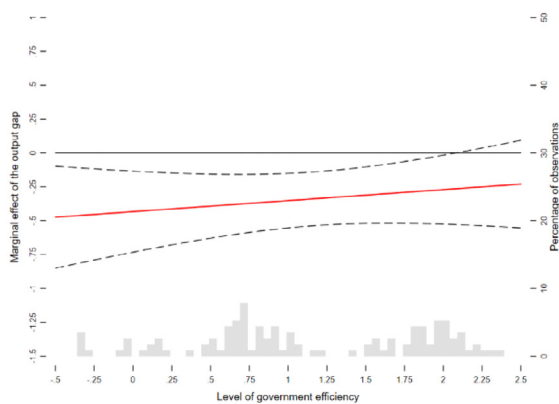
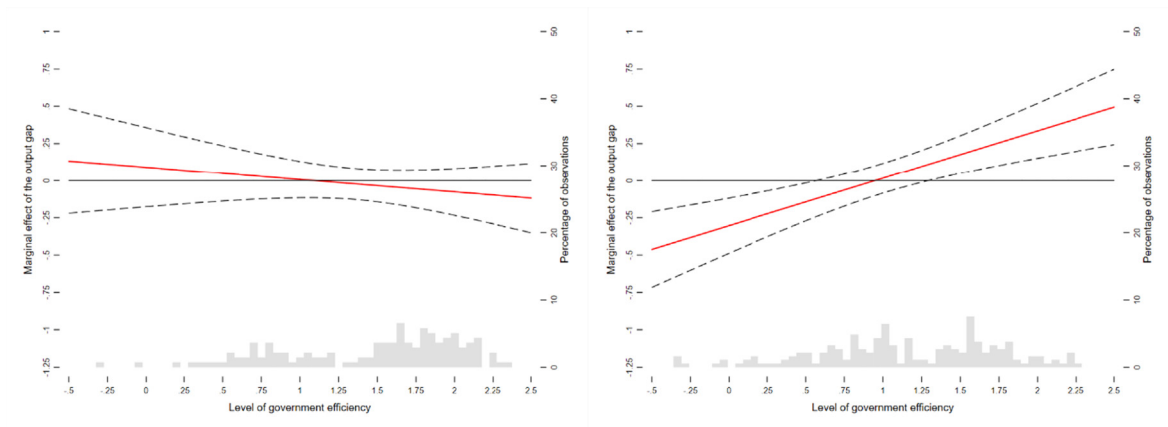


Fig. A8. Marginal effects of output gap on $\Delta CAPB_{it}^{t-1+s}$ conditional on fiscal rules and euro area, See notes to Fig. 4. The graphs are based on the estimates shown in columns (1), (2), and (3) of Table A7, respectively. The grey bars show the percentage of observations for the fiscal rules index.

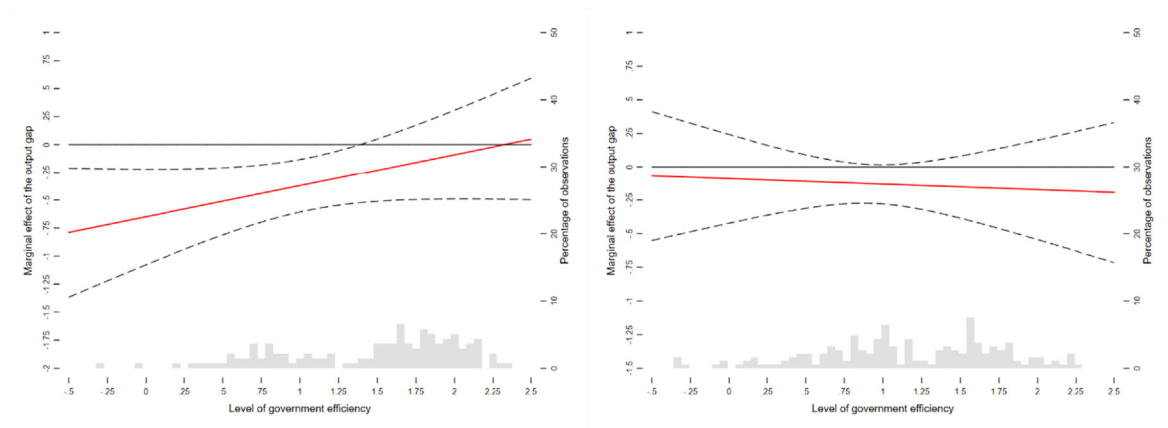
(a) Planning phase

Pre-GFC

Post-GFC



(b) Implementation phase



(c) Fiscal policy outcomes

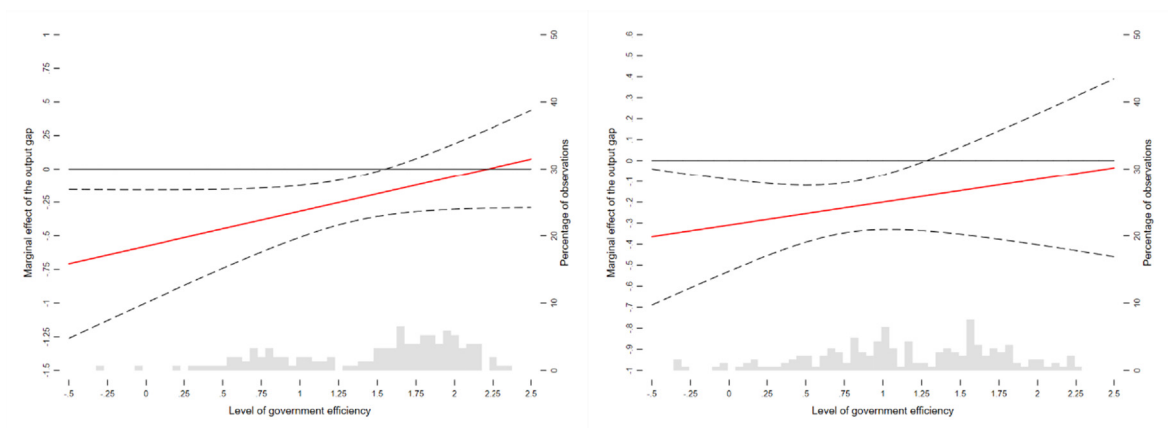


Fig. A9. Marginal effects of output gap on $\Delta CAPB_{it}^{t-1+s}$ conditional on government efficiency and euro area, See notes to Fig. 4. The graphs are based on the estimates shown in columns (1), (2), and (3) of Table A8, respectively. The grey bars show the percentage of observations for the government efficiency measure.

Table A1
Descriptive statistics.

Variable	Mean	Std. Dev.	Min	Max	Observations
$CAPB^{t-1}$	0.817	2.647	-9.2	7.3	324
$CAPB^{t+1}$	0.346	3.410	-27	9.4	324
$CAPB^{expost}$	0.000364	3.292	-27.348	8.232	339
$Output\ gap^{t-1}$	-1.463	2.079	-11.744	3.5	324
$Output\ gap^{t+1}$	-1.254	2.713	-12.6	8.470	324
$Output\ gap^{expost}$	-0.630	3.618	-15.910	13.810	339
$Public\ debt^{t-1}$	59.428	31.541	2.3	175	324
$Public\ debt^{t+1}$	61.230	32.220	3.2	177.1	324
$Public\ debt^{expost}$	60.648	32.295	3.664	178.908	339
$Inflation^{t-1}$	2.173	1.295	-3.609	9.306	324
$Inflation^{t+1}$	2.095	2.135	-3.179	15.179	324
$Inflation^{expost}$	2.098	2.319	-9.680	20.116	339
Government efficiency	1.301	0.599	-0.360	2.354	339
Between		0.605	-0.218	2.130	
Within		0.150	0.859	1.903	
Fiscal Rules Index	2.444	0.658	1.275	4.433	339
Between		0.401	1.665	3.354	
Within		0.518	1.051	3.709	
Expenditure Rules Index	1.736	1.655	0	4.667	339
Revenue Rules Index	0.356	0.921	0	3.933	339
Deficit Rules Index	3.677	0.379	2.8	4.667	339
Debt Rules Index	3.321	0.503	2.3	4.467	339
Elections	0.211	0.299	0	1	339
Checks and Balances	4.185	1.205	2	8	336
Ideology	35.823	35.635	0	100	339

Table A2
List of control variables.

Variable	Definition	Source
Elections	$M/12$ in an election year and $(12 - M)/12$ in a pre-election year, where M is the month of the election. In all other years the variable is set to zero.	Own calculations following Gootjes et al. (2020)
Ideology	Government composition: cabinet posts of social democratic and other left parties in percentage of total cabinet posts. Weighted by the number of days in office in a given year.	Comparative Political Data Set (CPDS), Armingeon et al. (2018).
Checks and Balances	Number of legislative veto players.	Database of Political Institutions (DPI) 2017, Inter-American Development Bank

Table A3
Fixed effects estimation results for Eq. (2) with fiscal rules: good times vs. bad times.

Dependent variable: $\Delta CAPB_{it}^{t-1+s}$	(1) Planning; $t t - 1$	(2) Implementation; $t t + 1$	(3) Outcomes; $t ex\ post$
$GAP_{it}^{t-1+s} * D(GAP_{it}^{t-1+s} > 0)$	-0.190 (0.221)	-0.807 (0.499)	-0.515** (0.211)
$GAP_{it}^{t-1+s} * D(GAP_{it}^{t-1+s} < 0)$	-0.0624 (0.216)	-0.411 (0.552)	-0.600 (0.480)
FRI_{it}	0.399 (0.245)	0.731 (0.650)	0.594 (0.473)
$GAP_{it}^{t-1+s} * D(GAP_{it}^{t-1+s} > 0) * FRI_{it}$	0.0628 (0.0973)	0.0815 (0.172)	0.107 (0.104)
$GAP_{it}^{t-1+s} * D(GAP_{it}^{t-1+s} < 0) * FRI_{it}$	0.0300 (0.0709)	0.150 (0.207)	0.172 (0.167)
Observations	321	321	321
R-squared	0.301	0.431	0.434
Number of countries	27	27	27

See notes to Table 1. Results for the time dummies and control variables are not displayed but are available upon request.

Table A4

Fixed effects estimation results for Eq. (2) with government efficiency: good times vs. bad times.

Dependent variable: $\Delta CAPB_{it}^{t-1+s}$	(1) Planning; $t t - 1$	(2) Implementation; $t t + 1$	(3) Outcomes; $t ex\ post$
$GAP_{it}^{t-1+s} * D(GAP_{it}^{t-1+s} > 0)$	-0.116 (0.265)	-0.816*** (0.214)	-0.622*** (0.170)
$GAP_{it}^{t-1+s} * D(GAP_{it}^{t-1+s} < 0)$	-0.259** (0.107)	-0.126 (0.152)	-0.309*** (0.0890)
GQ_{it}	0.954** (0.352)	2.389** (0.918)	2.287** (0.931)
$GAP_{it}^{t-1+s} * D(GAP_{it}^{t-1+s} > 0) * GQ_{it}$	0.0840 (0.218)	0.341*** (0.117)	0.289** (0.110)
$GAP_{it}^{t-1+s} * D(GAP_{it}^{t-1+s} < 0) * GQ_{it}$	0.245*** (0.0765)	0.0271 (0.143)	0.118 (0.105)
Observations	321	321	321
R-squared	0.358	0.444	0.457
Number of countries	27	27	27

See notes to Table 1. Results for the time dummies and control variables are not displayed but are available upon request.

Table A5

Fixed effects estimation results for Eq. (2) with global financial crisis and fiscal rules.

Dependent variable: $\Delta CAPB_{it}^{t-1+s}$	(1) Planning; $t t - 1$	(2) Implementation; $t t + 1$	(3) Outcomes; $t ex\ post$
GAP_{it}^{t-1+s}	0.0226 (0.163)	-0.787* (0.411)	-0.652* (0.317)
FRI_{it}	0.385 (0.295)	0.178 (0.641)	0.223 (0.560)
$GAP_{it}^{t-1+s} * FRI_{it}$	-0.0360 (0.0757)	0.155 (0.158)	0.192 (0.139)
$GAP_{it}^{t-1+s} * GFC_{it}$	-0.120 (0.382)	0.0673 (0.844)	-0.126 (0.496)
$FRI_{it} * GFC_{it}$	0.0169 (0.275)	1.003 (0.763)	0.678 (0.738)
$GAP_{it}^{t-1+s} * FRI_{it} * GFC_{it}$	0.0797 (0.135)	0.105 (0.298)	0.0408 (0.190)
Observations	321	321	321
R-squared	0.303	0.428	0.436
Number of countries	27	27	27

See notes to Table 1. Results for the fixed effects and control variables are not displayed but are available upon request. The direct effect of the GFC is fully captured by the annual time dummies. The constitutive term of the GFC is therefore omitted from the model.

Table A6

Fixed effects estimation results for Eq. (2) with global financial crisis and government efficiency.

Dependent variable: $\Delta CAPB_{it}^{t-1+s}$	(1) Planning; $t t - 1$	(2) Implementation; $t t + 1$	(3) Outcomes; $t ex\ post$
GAP_{it}^{t-1+s}	0.0903 (0.136)	-0.649*** (0.219)	-0.578** (0.214)
GQ_{it}	0.734** (0.334)	2.882*** (0.886)	2.495*** (0.751)
$GAP_{it}^{t-1+s} * GQ_{it}$	-0.0833 (0.0926)	0.279 (0.173)	0.261* (0.145)
$GAP_{it}^{t-1+s} * GFC_{it}$	-0.393** (0.152)	0.559** (0.202)	0.269* (0.149)
$GQ_{it} * GFC_{it}$	0.209 (0.187)	-0.687 (0.722)	-0.144 (0.683)
$GAP_{it}^{t-1+s} * GQ_{it} * GFC_{it}$	0.403*** (0.133)	-0.320* (0.156)	-0.151 (0.131)
Observations	321	321	321
R-squared	0.386	0.442	0.457
Number of countries	27	27	27

See notes to Table 1. Results for the fixed effects and control variables are not displayed but are available upon request. The direct effect of the GFC is fully captured by the annual time dummies. The constitutive term of the GFC is therefore omitted from the model.

Table A7

Fixed effects estimation results for Eq. (2) with euro area and fiscal rules.

Dependent variable: $\Delta CAPB_{i,t}^{f-1+s}$	(1) Planning; $t t - 1$	(2) Implementation; $t t + 1$	(3) Outcomes; $t ex\ post$
$GAP_{i,t}^{f-1+s}$	-0.385** (0.146)	-0.902*** (0.266)	-0.772*** (0.244)
$FRI_{i,t}$	0.419 (0.359)	0.883 (0.674)	0.630 (0.700)
$EA_{i,t}$	0.441 (0.699)	0.252 (1.331)	-0.431 (1.621)
$GAP_{i,t}^{f-1+s} * FRI_{i,t}$	0.116* (0.0572)	0.249*** (0.0863)	0.194** (0.0792)
$GAP_{i,t}^{f-1+s} * EA_{i,t}$	0.410* (0.207)	0.788 (0.672)	0.460 (0.669)
$FRI_{i,t} * EA_{i,t}$	-0.0244 (0.291)	-0.221 (0.444)	-0.106 (0.579)
$GAP_{i,t}^{f-1+s} * FRI_{i,t} * EA_{i,t}$	-0.109 (0.0756)	-0.185 (0.242)	-0.111 (0.235)
Observations	321	321	321
R-squared	0.326	0.450	0.450
Number of countries	27	27	27

See notes to Table 1. Results for the fixed effects and control variables are not displayed but are available upon request.

Table A8

Fixed effects estimation results for Eq. (2) with euro area and government efficiency.

Dependent variable: $\Delta CAPB_{i,t}^{f-1+s}$	(1) Planning; $t t - 1$	(2) Implementation; $t t + 1$	(3) Outcomes; $t ex\ post$
$GAP_{i,t}^{f-1+s}$	-0.395*** (0.104)	-0.463*** (0.148)	-0.434*** (0.153)
$GQ_{i,t}$	0.694 (0.556)	5.589*** (1.308)	4.902*** (1.101)
$EA_{i,t}$	0.319 (0.599)	3.983*** (1.399)	2.970** (1.301)
$GAP_{i,t}^{f-1+s} * GQ_{i,t}$	0.321*** (0.0651)	0.105 (0.109)	0.0814 (0.0978)
$GAP_{i,t}^{f-1+s} * EA_{i,t}$	0.275*** (0.0974)	0.375*** (0.114)	0.0898 (0.130)
$GQ_{i,t} * EA_{i,t}$	0.0266 (0.554)	-3.984*** (1.385)	-3.266** (1.201)
$GAP_{i,t}^{f-1+s} * GQ_{i,t} * EA_{i,t}$	-0.185** (0.0719)	-0.00531 (0.118)	0.134 (0.106)
Observations	321	321	321
R-squared	0.375	0.466	0.475
Number of countries	27	27	27

See notes to Table 1. Results for the fixed effects and control variables are not displayed but are available upon request.

Appendix B. Supplementary material

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.jimonfin.2020.102276>.

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