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# The effects of fiscal institutions on fiscal adjustment

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ABSTRACT

Using a panel of 40 advanced economies over the period 1990–2020, this paper investigates the effect of various characteristics of fiscal institutions on the probability of starting a fiscal adjustment, as well as on the probability that this fiscal adjustment will be successful. We find that, an enriched and cleverly designed fiscal rule which incorporates both strict and flexible features increase both the probability to initiate and to successfully conclude a fiscal adjustment. The design features that are associated with stricter fiscal rules lead to a more pronounced increase in the probability of success vis-à-vis features that allow some flexibility e.g., by taking into account cyclical economic conditions. A fiscal council with enhanced powers which involve enhanced remit, independence and accountability and enhanced tasks & instruments increase the probability to initiate a fiscal adjustment. However, it is primarily fiscal councils with enhanced tasks & instruments that can lead to a successful fiscal adjustment. The results remain valid after conducting several robustness checks. Our findings contribute to the on-going debate on the revision of the EU fiscal framework and the importance it should be assigned to improved fiscal rules and national fiscal councils.



## 1. Introduction

The COVID-19 pandemic and its economic consequences necessitated a major fiscal expansion around the globe. As a result, public debt ratios in many countries soared, putting public finances in jeopardy. The Russian invasion in Ukraine in early 2022, interrupted the dynamic post-pandemic global economic recovery and led to a full-blown energy crisis. Due to the upward trend in inflation and its negative impact on business and households, many countries have had to take additional expansionary fiscal measures, resulting in a further increase in fiscal risks.

Due to public debt sustainability concerns, many countries will (sooner or later) must launch fiscal consolidation programs. In this context, the existence, and the specific design of fiscal institutions (fiscal rules and councils) is crucial as they could improve the chances that a fiscal adjustment will be successful. While fiscal rules have been in place for decades in many countries (see Schaechter et al., 2012), independent fiscal councils have begun to emerge on a large scale since the late 2000 s.

By setting numerical restrictions on budgetary aggregates, fiscal rules limit discretionary fiscal policy, in order to ensure prudent fiscal behavior and to safeguard debt sustainability. The relationship between fiscal performance and fiscal rules has

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been extensively studied in the literature. Fiscal rules are found to promote prudent fiscal policies and to facilitate the initiation and the success of a fiscal consolidation program (see e.g., Milesi-Ferretti, 2004; Bergman et al., 2016; Wiese et al., 2018; De Jong and Gilbert, 2020; Gootjes and de Haan, 2022a).

Fiscal councils can promote adherence to fiscal rules and the implementation of a fiscal adjustment programme by evaluating fiscal plans, assessing the budgetary and macroeconomic forecasts, and monitoring the budget implementation. However, there have been only a few studies assessing the effect of fiscal councils on fiscal performance and in particular on the probability of fiscal adjustments. Beetsma et al. (2019) find that fiscal councils promote adherence to budget-balance and spending rules, owing to their effect on the precision of budget plans, and improve fiscal transparency and accountability. Furthermore, independent fiscal councils have a significant positive impact on the government budget balance (see e.g., Capraru et al., 2022) and can mitigate fiscal policy procyclicality (Chrysanthakopoulos and Tagkalakis, 2022).

This paper, extends the existing literature (see e.g., Wiese et., 2018; Ziogas and Panagiotidis, 2021; Gootjes and de Haan, 2022a; Afonso et al., 2022) by investigating the role played by various characteristics of fiscal councils and fiscal rules on the probability of initiating a fiscal adjustment and on the probability that this adjustment will be successful on a group of 40 advanced economies from 1990 to 2020. The specific characteristics of fiscal institutions are obtained from Davoodi et al. (2022).

A fiscal adjustment is usually identified as a period when a large discretionary increase in the primary surplus takes place. In this paper, building on Alesina and Ardagna (2010) we define as fiscal adjustment an increase in the cyclically adjusted primary balance (CAPB) by at least 1.5% of potential GDP in a single year. The success of a fiscal adjustment programme is usually judged by either a decline in the public debt ratio or the achievement of high primary surpluses for several years after the initiation of fiscal adjustment. Building on Lambertini and Tavares (2005) and Tagkalakis (2011) we assume that a fiscal adjustment is successful if CAPB does not deteriorate 3 years after the initiation of the fiscal adjustment. However, we also consider alternative definitions. For example, building on Wiese et al. (2018) we apply the Bai & Perron (1998, 2003) (BP) method to endogenously identify fiscal adjustments and then we classify as successful those episodes that are associated with declining debt-to-GDP ratio.

We find that, an enriched and cleverly designed fiscal rule which incorporates both strict and flexible characteristics increase both the probability to initiate and to successfully conclude a fiscal adjustment. In more detail, the presence of a cyclically adjusted budget balance target, a well specified escape clause, strict enforcement, strong legal base, restriction that apply to the general government, and multi-annual spending limits are key features as they are associated positively with the successful conclusion of an adjustment programme. Interestingly, features that are associated with stricter fiscal rules lead to a more pronounced increase in the probability of success vis-à-vis features that allow some flexibility e.g., by taking into account cyclical economic conditions and by excluding public investment or other priority items from limits.

Moreover, a fiscal council with enhanced powers which involve a strong mandate (i.e., enhanced remit and independence and accountability) and enhanced tasks & instruments increase the probability to initiate a fiscal adjustment. However, it is primarily fiscal councils with enhanced tasks and instruments that can lead to a successful fiscal adjustment.

Overall, fiscal institutions and their specific design features are particularly relevant both for the initiation and the success of a fiscal consolidation programme. This conclusion is robust to alternative estimation techniques, to various definitions of fiscal adjustment and to several sub-samples. These findings are adding to the existing literature by highlighting the role of the specific design features of fiscal institutions as determinants of (successful) fiscal adjustments. Moreover, these findings and relevant as they contribute to the debate on the revision of the EU fiscal framework and the appropriate design of the fiscal rules and fiscal councils at the EU and at the national level (see e.g., Beetsma et al. 2019; 2022; Gootjes and de Haan, 2022a, 2022b).

The remainder of this paper is organized as follows. Section 2 reviews the empirical literature. Section 3 investigates whether the specific characteristics of fiscal rules and fiscal councils affect the probability of initiating a fiscal consolidation. Section 4 examines whether the characteristics of fiscal rules and fiscal councils affect the probability of success of a fiscal consolidation program. Section 5 presents some robustness checks, while Section 6 concludes.

## 2. Literature review

This paper is related to the empirical literature on the impact of fiscal rules and fiscal councils on fiscal policy. According to relevant literature time-inconsistency issues on fiscal policy can lead to deficit bias. As pointed out by Milesi-Ferretti (2004) numerical fiscal rules can address the deficit bias. Various studies have shown that fiscal rules improve government budget balances (Debrun et al., 2008; Bergman et al., 2016; Landon and Smith, 2017; Burret and Feld, 2018; Caselli and Reynaud, 2020) and mitigate public debt levels (Debrun et al., 2008; Luechinger and Schaltegger, 2013; Bergman et al., 2016; Azzimonti et al., 2016; Landon and Smith, 2017; Asatryan et al., 2018). In addition, Maltritz and Wüste (2015, 2020) find that the effectiveness of fiscal rules in improving the primary balance is significantly improved by the existence of fiscal councils, i.e., they reinforce each other. As regards political economy considerations, fiscal rules limit political budget cycles, i.e., purposeful fiscal policy manipulations to boost an incumbent's chances of re-election (Gupta et al., 2016; Bonfatti and Forni, 2019; Gootjes et al., 2021) and they induce more countercyclical fiscal policies (Bergman and Hutchison 2015; Nerlich and Reuter, 2015; Combes et al., 2017; Guerguil et al., 2017; Gootjes and de Haan, 2022b). More recently, Gootjes

and de Haan (2022a) showed that fiscal rules foster sound fiscal policies, increase the probability to initiate a fiscal adjustment and the chances that this fiscal adjustment will be successful.

Other papers investigate the effect of independent fiscal councils on fiscal policy outcomes (see Clark and Hallerberg, 2000; Hallerberg et al., 2009). According to (Žigman and Jergović, 2017), fiscal councils can influence fiscal policymakers and mitigate government spending before a fiscal consolidation episode. Furthermore, strong independent fiscal councils can improve fiscal transparency and accountability (Beetsma et al., 2019). Therefore, independent fiscal councils can increase the compliance and enforceability with fiscal rules and the fiscal performance (Jankovic and Sherwood, 2017; Capraru et al., 2022). In addition, Gilbert and De Jong (2017) examining the role of the 3% budget deficit limit of the Stability and Growth Pact (SGP) show that fiscal councils can promote more unbiased fiscal forecasts. Lledo et al. (2010) investigate the relationship between institutions and fiscal performance in low-income countries, emphasizing the importance of rules that lead to transparent budgets. Finally, Chrysanthakopoulos and Tagkalakis (2022) find that fiscal councils and in particular those with enhanced remit, strong independence and accountability and adequate resources can mitigate fiscal policy procyclicality.

There is a large body of literature on the factors that influence fiscal adjustments, which are deliberate attempts to reduce the government's budget deficit in order to reduce government debt and improve fiscal sustainability. Fiscal adjustments are more likely to occur when the domestic economy is performing well, monetary policy is expansionary, or the public debt level is high (von Hagen and Strauch, 2001). Fiscal adjustments are likewise predominantly driven by economic conditions, according to Mierau et al. (2007). When economic conditions are taken into account, political variables including decision-making fragmentation, political ideology, and election closeness are also linked to fiscal adjustment measures (Mulas-Granados, 2003). According to Potrafke (2018), government ideology is crucial at the state level, however, it has no bearing on economic policy at the local level. Lavigne (2011) shows that restrictive institutional frameworks limit governments' ability to make fiscal adjustments when they are in financial trouble. While Giesenow et al. (2020) demonstrate that the quality of political institutions is important not just for implementing a fiscal adjustment, but also for maintaining it. Finally, Tagkalakis (2009) shows that regulatory policies as regards labor and product markets can influence both the initiation and the success of a fiscal consolidation.

However, not all fiscal consolidation attempts result in a long-term improvement in a country's fiscal position. As a result, another body of research on fiscal adjustments has looked into what makes these consolidation efforts "successful". According to Alesina and Perotti (1995), fiscal adjustments that rely on spending cuts are more likely to succeed. Similar findings are reported by (Tavares, 2004) and Alesina and Ardagna (2010, 2013).

In a large panel of developing countries, Schaltegger and Weder (2015) analyze whether fiscal adjustments increase the chance of sovereign default. Adjustment attempts focused on spending cuts appear to have no effect, whereas modifications based on tax collections appear to dramatically reduce the likelihood of sovereign default. Wiese et al. (2018) examine the differences between successful and unsuccessful fiscal adjustments for a panel of 20 OECD countries and present a new method for identifying fiscal adjustments that takes into account the volatility of fiscal policy. They show that the composition of fiscal adjustments has no bearing on their success. Lambertini and Tavares (2005) and Jalles et al. (2016) investigate how exchange rate policies and regimes affect fiscal consolidations. The former paper finds a significant positive relationship between exchange rate depreciation prior to adjustment and successful adjustment, whereas the second examines how the exchange rate regime interacts with the political context and finds that flexible exchange rate regimes are preferable because fixed exchange rate regimes are associated with less fiscal discipline.

## 3. The probability of initiating a fiscal adjustment

### *3.1. Definitions and control variables*

Using annual data for a group of 40 advanced economies from 1990 to 2020, we investigate the effects of fiscal councils' and fiscal rules' characteristics on the probability of initiating a fiscal adjustment. The macroeconomic variables are taken from the IMF World Economic Outlook (vintage April 2022), while data for the government debt and the real effective exchange rate are taken from the World Bank. The political data were obtained from Döring's et al. (2022) website (ParlGov)[1].

Following Alesina and Ardagna (2010) and Tagkalakis (2011) a fiscal adjustment episode (FA_1) is defined as an increase in the cyclically adjusted primary balance (capb) of at least 1.5 percent of potential GDP in a single year. This definition generates 118 country-year adjustment episodes.[2]

Turning to the control variables, we incorporate in the analysis the lagged output gap which reflects initial macroeconomic conditions. According to von Hagen and Strauch (2001), a fiscal adjustment is more likely in better economic times. Initial fiscal conditions are expected to matter as well; we anticipate that a low primary balance surplus (Capb) at t-1 and a high debt-to-GDP ratio (Debt) at t-1, increase the chances of a fiscal consolidation episode at time t. In addition, we control for monetary and exchange rate conditions in the manner of Lambertini and Tavares (2005). To this end, we employ the first lag of the logarithm of the real effective exchange rate (Reer) and the first lag of the real long-term interest rate (Long inter-

[1] https://www.parlgov.org/.

[2] See supplementary material, Appendix A, Tables A1-A2.

est rates). Depreciation of the exchange rate and monetary easing can enhance economic activity, making it easier to start a fiscal consolidation program.

Turning to political variables, we control for elections (“Elections”) and the strength of government (i.e., “Power” is a binary variable that takes the value 1 if the political party has the majority in the parliament). In election years, fiscal policy is usually loosened, so we anticipate that this variable will be associated negatively with the probability of fiscal adjustment. Whereas, increased political power of the government in office implies that the government can take tough and unpopular decisions if needed, hence we anticipate that this variable would be associated positively with the probability of fiscal adjustment.

As regards the variables of interest, we rely on the most recent IMF dataset (Davoodi et al., 2022) on fiscal institutions (FIC). Based on the IMF dataset, Ardanaz et al. (2021) and Afonso et al. (2022) we construct indices for the specific design features (or characteristics) of fiscal rules and fiscal councils. In more detail, as regards fiscal councils' characteristics, in line with Beetsma et al. (2019) and Afonso et al. (2022), we consider the following four indices:

1. *Remit.* We compute this index by summing its twelve subcategories: positive and normative analysis, forecast preparation and assessment, recommendations, long-term sustainability, consistency with objectives, costing of measures, monitoring of fiscal rules, ex-post analysis, fiscal policy coordination, and mandate beyond fiscal policy. These subcategories are either binary or categorical variables. The index “Remit” is then normalized so that it ranges between 0 and 1. Overall, this indicator highlights the importance of independent analysis.
2. *Independence.* We compute this index by summing the following six subcategories: legal and operational independence, safeguards on budget, right to select staff, access to information and own staff commensurate to tasks. These subcategories are either binary or categorical variables. The new index is then normalized so that it ranges between 0 and 1. This index shows that the legal independence of a fiscal council is crucial in the provision of unbiased judgement and monitoring on the budgetary process.
3. *Tasks.* We compute this index by summing the following seven subcategories, which are either binary or categorical variables: public reports, high media impact, forecasts used in budget, binding forecasts, comply or explain, formal consultation or hearings and can stall the budget process. The new index is then normalized so that it ranges between 0 and 1. This index describes the tools that are available to fiscal councils in order to perform two crucial tasks, to manage public relations and to influence the budgetary process.
4. *Resources.* This variable takes the value 1 if the governing members of the fiscal council are appointed and removed by parliament and 0 otherwise.

Besides examining the individual effect of each fiscal council characteristics, we construct two more combined indices:

5. *FCC.* This is an overall index involving all fiscal councils' characteristics (i.e., remit, independence, tasks, and resources) and it is normalized so that it ranges between 0 and 1. This indicator captures the overall strength of the fiscal council and better reflects its ability to influence the budgetary process, especially in more advanced economies that typically have richer fiscal institutions, meaning that some or all of the above characteristics may coexist.
6. *Mandate.* This index is a combination of “Remit” and “Independence”, the two indices are summed, and the new indicator is then normalized so that it ranges between 0 and 1. We consider this new index, because a fiscal council that is considered to have enhanced remit is usually classified as highly independent in the IMF dataset. Hence, the higher is the value of this index the stronger is the mandate of the fiscal council.

Turning to fiscal rules' characteristics, we consider the following seven indices:

1. *Investment.* It examines whether the fiscal rule removes public investment or other priority items from the ceiling. The relevant categorical variable in the IMF dataset is normalized so that it ranges between 0 and 1.
2. *Stabilization.* This variable takes the value 1 if a fiscal rule includes a cyclically adjusted/structural budget balance target and 0 otherwise.
3. *Escape clause.* This variable takes the value 1 if a fiscal rule has a well-specified general escape clause and 0 otherwise.
4. *Enforcement.* We compute this index by summing the following two subcategories: monitoring of compliance outside government and formal enforcement procedure. This index which shows the strictness of the enforcement procedure, is then normalized so that it ranges between 0 and 1.
5. *Supportproc.* This variable takes the value 1 if the fiscal rule includes supporting procedures such as multi-year expenditure ceilings and 0 otherwise.
6. *Legal basis.* We compute this index by summing the following five binary or categorical variables: coalition agreement, political commitment, statutory commitment, international treaty and constitutional. The new index is normalized so that it ranges between 0 and 1. When the fiscal rule is based on constitutional, international treaty, and statutory commitment we assume that is stricter, rather than when it based on coalition agreement or political commitment.
7. *Coverage.* We compute this index by examining whether it applies in central government or in general government. The normalized index ranges between 0 and 1. When the fiscal rule applies to the general government, we assume that it has high coverage.

Besides examining the individual effect of each fiscal rule characteristics, we construct five combined indices:

8. *FRC.* This is an overall fiscal rule index which sums all the seven fiscal rules' characteristics. It is then normalized so that it ranges between 0 and 1. This composite index reflects a more "enriched" and cleverly designed fiscal rule because it incorporates both flexibility (investment, stabilization, escape clause) and strictness (enforcement, coverage, legal basis and mutli-annual spending limits) features.
1. Building on the above, we construct four more indices in order to distinguish the fiscal rules' characteristics into strict and flexible.
9. *Strict.* This index sums the strictest characteristics of the rules (i.e., enforcement, legal basis, coverage, and support procedures). It is then normalized so that it ranges between 0 and 1.
10. *Strict1.* This index is an alternative to "Strict" because it is the sum of enforcement, legal basis, and coverage which are closely related with each other i.e., it excludes the presence of supporting procedures such as multi-annual spending limits. It is then normalized so that it ranges between 0 and 1.
11. *Flexible.* Building on the work of Ardanaz et al. (2021), this index sums the most flexible characteristics of fiscal rules (i.e., stabilization, legal escape clause and investment). It is then normalized so that it ranges between 0 and 1.
12. *Flexible1.* As an alternative to "Flexible": we compute this index by summing stabilization and escape clause i.e., it includes the characteristics that are directly related to the cyclical economics conditions. It is then normalized so that it ranges between 0 and 1[3].

### 3.2. Econometric methodology

Following Wiese et al. (2018) and Gootjes and de Haan (2022a) we employ random effects panel probit model to examine the effects of fiscal institutions on the probability of initiating a fiscal adjustment. In line with Afonso et al. (2022), we examine the individual fiscal institutions' characteristics one at a time.

The baseline specification is of the form:

$$\begin{aligned} Pr(FA\_1 = 1) = {} & a_1\, Capb_{it-1} + a_2\, Outputgap_{it-1} + a_3\, Debt_{it-1} + a_4\, Reer_{it-1} + a_5\, Long\,interest\,rate_{it-1} \\ & + a_6\, (Fiscal\,council\,or\,Fiscal\,rule)_{it} + a_7\, Power_{it} + a_8\, Elections_{it} + a_9\, FIC_{it} + u_{it} \end{aligned} \quad (1)$$

### 3.3. Estimation results

Tables 1 and 2 report the empirical estimates for Eq. (1). The coefficient estimates of the control variables are as expected. In line with Tagkalakis (2009) and Gootjes and de Haan (2022a), an increase in the cyclically adjusted primary balance (CAPB) reduces the probability of a fiscal adjustment. An improvement in cyclical conditions (an increase in the outputgap), reduces the probability of fiscal adjustment but the coefficient estimate is insignificant in the most cases (except in column 5 of Table 2). The higher is the debt-to-GDP ratio at time t-1, the more likely is a fiscal adjustment at time t (see Table 1 columns 1, 3, 4, 5, 8–12). An increase in government borrowing costs (the long-term interest rate) prior to the fiscal consolidation, increases the probability of a fiscal adjustment, while the real effective exchange rate and the two political variables have no statistically significant effect. The presence of a fiscal council increases the chances of a fiscal consolidation (see Table 1), while a fiscal rule, although it is associated positively with the probability of fiscal adjustment, it has a statistically insignificant coefficient estimate (see Table 2).

Turning to the variables of interest, the overall fiscal rules' characteristics index (FRC) has a positive and statistically significant coefficient estimate (see Table 1, column 1), i.e., an "enriched" and cleverly designed fiscal rule increases the probability of initiating a fiscal adjustment. As regards the specific characteristics, a fiscal rule that includes a budget balance target in cyclically adjusted terms, has a well specified escape clause, involves strict enforcement, strong legal base, applies to the general government and expenditure multi-year spending ceilings increases the probability of initiating a fiscal consolidation (see Table 1 columns 3, 4, 5, 6, 7, 8). These results are in line with Gootjes and de Haan (2022a), who report that fiscal rules increase the probability of fiscal adjustment, without, however, examining each individual characteristic. Emphasizing on various groupings of fiscal rules characteristics, we find that strict fiscal rules increase the chances of fiscal adjustment (see column 9 in Table 1). This result still holds when we consider separately the multi-year expenditure ceilings from the strictness index (see column 10 in Table 1). Moreover, we also find that a flexible fiscal rule improves the chances of fiscal adjustment (see column 11 in Table 1). This finding still holds also for the second definition of flexibility, which does not take into account the the exclusion of public investment from a fiscal rule (see column 12 in Table 1). Interestingly, the positive effect of strict fiscal rules on the probability of fiscal adjustment is more sizeable relative to that of flexible rules.

As reported in Table 2, the coefficient estimate of the overall fiscal councils' characteristics index (FCC) is positive and statistically significant, which implies that a strong fiscal council increases the chances of fiscal adjustment. Turning to its

[3] In addition, when we examine the effects of fiscal rules' characteristics we add as a control variable a fiscal council dummy which reflects whether a fiscal council exists or not. Whereas,d when we examine the fiscal councils' characteristics we add as a control variable a fiscal rule dummy which reflects whether a fiscal rule exists or not. This way we control for the likely complementarity between fiscal rules and fiscal councils.

**Table 1**
Probability of starting a fiscal adjustment. Fiscal rules' characteristics and the distinction between strict and flexible fiscal rules.

| VARIABLES | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) | (11) | (12) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Capb (t-1) | −2.870*** | −2.915*** | −2.813*** | −2.636*** | −3.075*** | −2.990*** | −2.960*** | −2.947*** | −3.032*** | −3.031*** | −2.744*** | −2.688*** |
| | (0.350) | (0.540) | (0.474) | (0.388) | (0.322) | (0.542) | (0.435) | (0.448) | (0.376) | (0.370) | (0.468) | (0.434) |
| Outputgap (t-1) | −0.409 | −0.665 | −0.530 | −0.416 | −0.633 | −0.493 | −0.666 | −0.667 | −0.494 | −0.506 | −0.475 | −0.448 |
| | (0.478) | (0.477) | (0.506) | (0.420) | (0.464) | (0.550) | (0.451) | (0.453) | (0.500) | (0.511) | (0.478) | (0.466) |
| Debt (t-1) | 0.0757** | 0.0796 | 0.0886* | 0.0747** | 0.0792** | 0.0737 | 0.0569 | 0.0695* | 0.0708* | 0.0706* | 0.0771* | 0.0876** |
| | (0.0372) | (0.0514) | (0.0485) | (0.0340) | (0.0324) | (0.0562) | (0.0432) | (0.0420) | (0.0364) | (0.0363) | (0.0456) | (0.0403) |
| Reer (t-1) | −0.0924 | 0.104 | 0.0351 | 0.0196 | −0.0709 | 0.0502 | −0.0615 | −0.0374 | −0.0872 | −0.0887 | −0.0102 | 0.0361 |
| | (0.123) | (0.114) | (0.124) | (0.121) | (0.120) | (0.113) | (0.121) | (0.117) | (0.121) | (0.118) | (0.123) | (0.120) |
| Long interest rate (t-1) | 3.596*** | 2.730*** | 3.209*** | 3.403*** | 2.775*** | 3.266*** | 3.131*** | 2.991*** | 3.305*** | 3.277*** | 3.505*** | 3.297*** |
| | (0.507) | (0.482) | (0.591) | (0.460) | (0.486) | (0.559) | (0.489) | (0.503) | (0.469) | (0.539) | (0.567) | (0.507) |
| Fiscal council (t) | 0.0479* | 0.0500 | 0.0396 | 0.0404 | 0.0450* | 0.0638* | 0.0622** | 0.0515* | 0.0585** | 0.0579** | 0.0440 | 0.0350 |
| | (0.0258) | (0.0330) | (0.0300) | (0.0262) | (0.0249) | (0.0347) | (0.0286) | (0.0281) | (0.0263) | (0.0258) | (0.0296) | (0.0272) |
| Elections (t) | −0.0342 | −0.0288 | −0.0328 | −0.0346 | −0.0285 | −0.0321 | −0.0302 | −0.0296 | −0.0302 | −0.0301 | −0.0357 | −0.0332 |
| | (0.0248) | (0.0256) | (0.0256) | (0.0239) | (0.0255) | (0.0255) | (0.0257) | (0.0258) | (0.0255) | (0.0255) | (0.0247) | (0.0244) |
| Power(t) | 0.0213 | 0.00472 | 0.0167 | 0.0149 | 0.0128 | 0.00592 | 0.0217 | 0.0190 | 0.0183 | 0.0185 | 0.0177 | 0.0174 |
| | (0.0447) | (0.0416) | (0.0449) | (0.0425) | (0.0423) | (0.0400) | (0.0430) | (0.0432) | (0.0409) | (0.0410) | (0.0466) | (0.0440) |
| FRC (t) | 0.220*** | | | | | | | | | | | |
| | (0.0508) | | | | | | | | | | | |
| Investment (t) | | −0.0478 | | | | | | | | | | −0.0183 |
| | | (0.0459) | | | | | | | | | | (0.0446) |
| Stabilization (t) | | | 0.0677** | | | | | | | | | |
| | | | (0.0280) | | | | | | | | | |
| Escape clause (t) | | | | 0.106*** | | | | | | | | |
| | | | | (0.0268) | | | | | | | | |
| Enforcement (t) | | | | | 0.142*** | | | | | | | |
| | | | | | (0.0372) | | | | | | | |
| Supportproc (t) | | | | | | 0.0609* | | | | 0.0459 | | |
| | | | | | | (0.0328) | | | | (0.0298) | | |
| Legal basis(t) | | | | | | | 0.159*** | | | | | |
| | | | | | | | (0.0538) | | | | | |
| Coverage (t) | | | | | | | | 0.128*** | | | | |
| | | | | | | | | (0.0486) | | | | |
| Strict (t) | | | | | | | | | 0.192*** | | | |
| | | | | | | | | | (0.0551) | | | |
| Strict1 (t) | | | | | | | | | | 0.147*** | | |
| | | | | | | | | | | (0.0468) | | |
| Flexible (t) | | | | | | | | | | | 0.140*** | |
| | | | | | | | | | | | (0.0421) | |
| Flexible1 (t) | | | | | | | | | | | | 0.101*** |
| | | | | | | | | | | | | (0.0253) |
| Observations | 640 | 640 | 640 | 640 | 640 | 640 | 640 | 640 | 640 | 640 | 640 | 640 |
| Wald $x^2$ | 63.49*** | 62.17*** | 60.79*** | 61.82*** | 64.40*** | 64.46*** | 63.65*** | 62.37*** | 66.64*** | 66.47*** | 61.55*** | 60.69*** |
| Log pseudolikelihood | −190.019 | −197.247 | −195.004 | −190.156 | −189.963 | −196.194 | −193.235 | −193.989 | −190.853 | −190.841 | −193.367 | −191.997 |

Notes: Panel probit model with random effects. Dependent variable: Probability of starting a fiscal consolidation. For each independent variable we report dF/dX, i.e., the regressor's marginal effect of a one-unit change (evaluated at the means of all regressors). Robust standard errors in parentheses.

*** $p < 0.01$.
** $p < 0.05$.
* $p < 0.1$.

**Table 2**
Probability of starting a fiscal adjustment. Fiscal councils' characteristics.

| VARIABLES | (1) | (2) | (3) | (4) | (5) | (6) |
|---|---|---|---|---|---|---|
| Capb (t-1) | −3.226*** | −3.180*** | −3.167*** | −3.222*** | −3.007*** | −3.180*** |
| | (0.467) | (0.467) | (0.453) | (0.454) | (0.515) | (0.455) |
| Outputgap (t-1) | −0.729 | −0.683 | −0.729 | −0.820 | −1.053** | −0.688 |
| | (0.486) | (0.485) | (0.488) | (0.515) | (0.506) | (0.481) |
| Debt (t-1) | 0.0536 | 0.0472 | 0.0520 | 0.0552 | 0.0647 | 0.0490 |
| | (0.0541) | (0.0485) | (0.0517) | (0.0531) | (0.0646) | (0.0493) |
| Reer (t-1) | 0.000572 | −9.25e-05 | −0.00491 | −0.00424 | 0.0252 | −0.00437 |
| | (0.115) | (0.118) | (0.117) | (0.115) | (0.109) | (0.117) |
| Long interest rate (t-1) | 2.870*** | 2.887*** | 2.942*** | 2.918*** | 2.422*** | 2.947*** |
| | (0.554) | (0.524) | (0.565) | (0.571) | (0.569) | (0.529) |
| Fiscal Rule (t) | 0.0404 | 0.0401 | 0.0417 | 0.0406 | 0.0370 | 0.0412 |
| | (0.0344) | (0.0327) | (0.0340) | (0.0358) | (0.0378) | (0.0331) |
| Elections (t) | −0.0326 | −0.0324 | −0.0326 | −0.0337 | −0.0331 | −0.0324 |
| | (0.0256) | (0.0253) | (0.0255) | (0.0258) | (0.0258) | (0.0254) |
| Power (t) | 0.00541 | 0.00657 | 0.00251 | 0.00468 | −0.00532 | 0.00476 |
| | (0.0394) | (0.0378) | (0.0378) | (0.0399) | (0.0388) | (0.0378) |
| FCC (t) | 0.0992** | | | | | |
| | (0.0436) | | | | | |
| Remit (t) | | 0.107*** | | | | |
| | | (0.0298) | | | | |
| Independence (t) | | | 0.0867** | | | |
| | | | (0.0375) | | | |
| Tasks (t) | | | | 0.110** | | |
| | | | | (0.0439) | | |
| Resources (t) | | | | | −0.00437 | |
| | | | | | (0.0475) | |
| Mandate (t) | | | | | | 0.102*** |
| | | | | | | (0.0345) |
| Observations | 630 | 630 | 630 | 630 | 630 | 630 |
| Wald $x^2$ | 64.18*** | 66.83*** | 66.14*** | 65.48*** | 62.91*** | 66.87*** |
| Log pseudolikelihood | −193.054 | −191.472 | −192.869 | −192.833 | −195.518 | −192.053 |

Notes: Panel probit model with random effects. Dependent variable: Probability of starting a fiscal consolidation. For each independent variable we report dF/dX, i.e., the regressor's marginal effect of a one-unit change (evaluated at the means of all regressors). Robust standard errors in parentheses.
*p < 0.1.
*** p < 0.01.
** p < 0.05.

individual design features, we see that a fiscal council with enhanced remit and sufficient independence and accountability increases the probability of initiating a fiscal adjustment (see Table 2 columns 2, 3, 4). Moreover, we find that a fiscal council with strong mandate (as regards remit and independence) increases the probability of initiating a fiscal adjustment (Table 2 column 6).

### 3.4. Alternative definition of fiscal adjustment

As a robustness check, following Wiese et al. (2018), we apply the Bai and Perron (1998, 2003) (BP) method in order to endogenously identify fiscal adjustments episodes. As explained in Wiese et al. (2018) "*the BP method identifies the break date (fiscal adjustment initiation) as the first year after the structural break associated with a lower deficit*". Therefore, in order to identify the start of the fiscal adjustment we take a one-year lag. To identify the end-date, we assume that the fiscal adjustment continues for as long as the change in CAPB is positive (Wiese et al., 2018). This definition generates 202 country-year fiscal adjustment episodes relative to 118 identified with the baseline definition.[4] The difference in the adjustment episodes identified by the two definitions is related to the fact that the baseline definition captures only large fiscal adjustments (i.e., the change in the CAPB is higher than 1.5% of potential GDP), while with the BP method, we also take into account "smaller" fiscal adjustments. In more detail, the average size of the change in CAPB is 2.873% of potential GDP in case of the baseline definition and 1.473% in the definition based on the BP method. Moreover, the minimum value of the fiscal adjustment with the baseline definition is 1.514% of potential GDP, in contrast with 0.01% in the definition based on the BP method (see supplementary material Appendix A, Table A3).

The empirical estimates based on the BP definition of fiscal adjustment are qualitatively similar to those based on the baseline definition (see supplementary material Appendix B, Tables B1 and B2)[5].

[4] See supplementary material, Appendix F, Table F1.
[5] The only notable difference is that the coefficient estimate of a fiscal rule that includes a budget balance target in cyclically adjusted terms is statistically insignificant (see supplementary material Appendix B, Table B1, column 3).

## 4. The determinants of a successful fiscal adjustment

### 4.1. Definitions and control variables

In this section, we examine the effect that the different characteristics of fiscal institutions have on the probability of a successful fiscal adjustment. Following previous studies (such as Lambertini and Tavares, 2005; Tagkalakis, 2011), we define as a successful fiscal consolidation episode (succeess1) the country-year observations where the CAPB does not deteriorate three years after the initiation of the fiscal adjustment ($CAPB_{t+3} > CAPB_t$). This definition generates 69 country-year successful fiscal adjustments. [6]As in subsection 3.1 we control for initial fiscal and macroeconomic conditions. Moreover, we add the change in total government spending excluding interest payments (spending) and the change in total government revenues (revenues) to control for the "size effect" of fiscal consolidation as in Wiese et al. (2018), i.e., a sizeable fiscal consolidation is more likely to succeed.

Furthermore, we investigate the role of the specific characteristics of fiscal institutions (FIC) in inducing successful revenue-based and spending-based adjustments. To this end, we classify a fiscal adjustment episode as revenue-based when two conditions apply: (i) the CAPB increases by at least 1.5 percent of potential GDP in a single year, (ii) the increase in revenues is bigger than the spending (excluding interest payments) cuts in adjustment years. This definition generates 54 country-year revenue-based adjustment episodes (REFA). We classify a fiscal adjustment episode as expenditure-based when two conditions apply: (i) the CAPB increases by at least 1.5 percent of potential GDP in a single year (ii) the increase in revenues is smaller than the spending (excluding interest payments) cuts in adjustment years. This definition generates 57 country-year expenditure-based adjustment episodes (EXFA)[7].

These expenditure and revenue-based fiscal adjustment episodes are then differentiated into successful expenditure-based and revenue-based adjustments. In case of successful spending-based fiscal adjustments two conditions must apply: (i) the fiscal adjustment must be successful, i.e., $CAPB_{t+3} > CAPB_t$, (ii) spending cuts are bigger than revenue increases between t and t + 3. In case of revenue-based fiscal adjustments two conditions must apply: (i) the fiscal adjustment must be successful, i.e., $CAPB_{t+3} > CAPB_t$, (ii) spending cuts are smaller than revenue increases between t and t + 3. These definitions generate 50 country-year successful expenditure-based episodes and 14 country-year successful revenue-based episodes[8].

### 4.2. Econometric methodology

The dependent variables are "succeess1" (successful fiscal adjustment) for Eq. (2), and "expsuc" (successful fiscal adjustment based on expenditure cuts) or "revsuc" (successful fiscal adjustment based on revenue increases) for equations 3[9]. These dummy variables take the value 1 when a successful fiscal adjustment takes place and 0 otherwise. The empirical models are as follows:

$$Pr(succeess1 = 1) = a_1 Capb_{it-1} + a_2 Outputgap_{it-1} + a_3 Debt_{it-1} + a_4 Reer_{it-1} + a_5 Long\ interest\ rate_{it-1} + a_6 \Delta spending_{it} + a_7 \Delta revenue_{it} + a_8 (Fiscal\ council\ or\ Fiscal\ rule)_{it} + a_9 FIC_{it} + u_{it} \quad (2)$$

$$\Pr(expsuc\ or\ revsuc = 1) = a_1 Capb_{it-1} + a_2 Outputgap_{it-1} + a_3 Debt_{it-1} + a_4 Reer_{it-1} + a_5 Long\ interest\ rate_{it-1} + a_6 (\Delta spending\ or\ \Delta revenue)_{it} + a_7 (Fiscal\ council\ or\ Fiscal\ rule)_{it} + a_8 FIC_{it} + u_{it} \quad (3)$$

### 4.3. Estimation results

Table 3 reports the empirical estimates of Eq. (2). A fiscal rule that includes a budget balance target in cyclically adjusted terms, has a well specified escape clause, involves strict enforcement, has a strong legal base, and applies to the general government increases the probability of a successful fiscal adjustment. Moreover, the overall index of fiscal rules' characteristics (FRC) is statistically significant, indicating that an "enriched" and cleverly defined fiscal rule which includes both flexibility and strictness features increases the probability of a successful fiscal adjustment.

Examining various groupings of fiscal rules characteristics, we find that a strict fiscal rule increases the chances of a successful fiscal adjustment (see column 9 in Table 3). This result holds when we exclude the multi-year expenditure ceilings from the strictness index (see column 10 in Table 3). Moreover, we find that flexible fiscal rules improve the chances of suc-

[6] See supplementary material, Appendix A, Table A1.

[7] The small difference between the sum of the revenue and spending based fiscal adjustment episodes (54+57=111) and the fiscal adjustments episodes identified with the baseline definition (1 1 8) is due to missing values.

[8] The small difference between the sum of the successful fiscal adjustments based on spending cuts and revenue increases (64) and the successful fiscal adjustment episode identified with the baseline definition (69) is due to missing values.

[9] In equation (3) we use the change in total government spending as control variable when the dependent variable is the successful fiscal adjustment based on spending cuts. Moreover, we use the change in total government revenues as a control variable when the dependent variable is the successful fiscal adjustment based on revenue increases.

**Table 3**
Probability of successful fiscal adjustments - fiscal rules' characteristics and the distinction between strict and flexible fiscal rules.

| VARIABLES | (1) success | (2) success | (3) success | (4) success | (5) success | (6) success | (7) success | (8) success | (9) success | (10) Success | (11) success | (12) success |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Capb (t-1) | −2.525*** | −2.514*** | −2.478*** | −2.308*** | −2.510*** | −2.449*** | −2.636*** | −2.642*** | −2.532*** | −2.547*** | −2.370*** | −2.384*** |
| | (0.475) | (0.471) | (0.416) | (0.431) | (0.411) | (0.476) | (0.437) | (0.425) | (0.420) | (0.424) | (0.433) | (0.441) |
| Outputgap (t-1) | −1.026*** | −1.022*** | −1.001*** | −0.959*** | −0.862** | −0.880** | −0.969*** | −0.967*** | −0.780** | −0.796** | −0.977*** | −0.977*** |
| | (0.359) | (0.361) | (0.373) | (0.361) | (0.336) | (0.410) | (0.349) | (0.353) | (0.353) | (0.379) | (0.366) | (0.372) |
| Debt (t-1) | 0.0287 | 0.0254 | 0.0297 | 0.0199 | 0.0372 | 0.0163 | 0.0184 | 0.0308 | 0.0217 | 0.0232 | 0.0192 | 0.0244 |
| | (0.0456) | (0.0452) | (0.0399) | (0.0326) | (0.0337) | (0.0405) | (0.0386) | (0.0390) | (0.0326) | (0.0334) | (0.0358) | (0.0380) |
| Reer (t-1) | 0.0833 | 0.0767 | 0.0607 | 0.0707 | −0.0310 | 0.0659 | −0.0361 | −0.0307 | −0.0592 | −0.0617 | 0.0504 | 0.0621 |
| | (0.119) | (0.117) | (0.115) | (0.111) | (0.119) | (0.110) | (0.121) | (0.119) | (0.108) | (0.108) | (0.112) | (0.113) |
| Long interest rate (t-1) | 1.456*** | 1.486*** | 1.587*** | 1.546*** | 1.394*** | 1.680*** | 1.640*** | 1.588*** | 1.742*** | 1.714*** | 1.634*** | 1.589*** |
| | (0.327) | (0.326) | (0.318) | (0.328) | (0.387) | (0.352) | (0.382) | (0.395) | (0.372) | (0.418) | (0.316) | (0.334) |
| Δspending (t) | −1.574*** | −1.578*** | −1.554*** | −1.547*** | −1.565*** | −1.563*** | −1.618*** | −1.609*** | −1.579*** | −1.583*** | −1.558*** | −1.551*** |
| | (0.455) | (0.453) | (0.450) | (0.470) | (0.483) | (0.445) | (0.470) | (0.480) | (0.461) | (0.462) | (0.459) | (0.460) |
| Δrevenue (t) | 2.206** | 2.234** | 2.152** | 2.104** | 2.100** | 2.216** | 2.236** | 2.233** | 2.140** | 2.144** | 2.177** | 2.127** |
| | (0.950) | (0.961) | (0.959) | (0.918) | (0.979) | (0.966) | (1.011) | (1.016) | (1.005) | (1.009) | (0.946) | (0.934) |
| Fiscal council (t) | 0.0132 | 0.0138 | 0.00265 | 0.00355 | 0.000118 | 0.0185 | 0.0136 | 0.00659 | 0.00995 | 0.00906 | 0.00321 | 0.00170 |
| | (0.0235) | (0.0234) | (0.0210) | (0.0200) | (0.0202) | (0.0238) | (0.0224) | (0.0225) | (0.0199) | (0.0206) | (0.0210) | (0.0202) |
| FRC (t) | 0.152*** | | | | | | | | | | | |
| | (0.0431) | | | | | | | | | | | |
| Investment (t) | | −0.0119 | | | | | | | | | | 0.00258 |
| | | (0.0345) | | | | | | | | | | (0.0327) |
| Stabilization (t) | | | 0.0366** | | | | | | | | | |
| | | | (0.0172) | | | | | | | | | |
| Escape clause (t) | | | | 0.0462** | | | | | | | | |
| | | | | (0.0194) | | | | | | | | |
| Enforcement (t) | | | | | 0.117*** | | | | | | | |
| | | | | | (0.0430) | | | | | | | |
| Supportproc (t) | | | | | | 0.0451 | | | | 0.0396 | | |
| | | | | | | (0.0300) | | | | (0.0277) | | |
| Legal basis(t) | | | | | | | 0.147*** | | | | | |
| | | | | | | | (0.0556) | | | | | |
| Coverage (t) | | | | | | | | 0.124*** | | | | |
| | | | | | | | | (0.0388) | | | | |
| Strict (t) | | | | | | | | | 0.172*** | | | |
| | | | | | | | | | (0.0524) | | | |
| Strict1 (t) | | | | | | | | | | 0.136*** | | |
| | | | | | | | | | | (0.0500) | | |
| Flexible (t) | | | | | | | | | | | 0.0681*** | |
| | | | | | | | | | | | (0.0247) | |
| Flexible1 (t) | | | | | | | | | | | | 0.0480*** |
| | | | | | | | | | | | | (0.0173) |
| Observations | 642 | 642 | 642 | 642 | 642 | 642 | 642 | 642 | 642 | 642 | 642 | 642 |
| Wald $x^2$ | 47.00*** | 49.21*** | 47.58*** | 48.65*** | 44.65*** | 51.23*** | 46.35*** | 45.91*** | 46.33*** | 45.85*** | 48.08*** | 47.95*** |
| Log pseudolikelihood | −94.258 | −100.162 | −98.719 | −97.873 | −93.307 | −98.775 | −95.192 | −95.143 | −92.680 | −92.633 | −98.341 | −98.075 |

Notes: Panel probit model with random effects. Dependent variable: Probability of a successful fiscal adjustment. For each independent variable we report dF/dX, i.e., the regressor's marginal effect of a one-unit change (evaluated at the means of all regressors). Robust standard errors in parentheses.
*p < 0.1.
*** p < 0.01.
** p < 0.05.

cessful fiscal adjustment (see columns 11 and 12 in Table 3). This finding relates with the results reported in Ardanaz et al. (2021), i.e., that flexible fiscal rules provide a safeguard against public investment over-compression. This could contribute towards avoiding a sizeable decline in real GDP and, consequently, it would ensure that a fiscal consolidation in not self-defeating. Although both strict and flexible features are contributing to successful fiscal consolidation, the effect of the stricter fiscal rules is quite more sizeable vis-à-vis the one of flexible fiscal rules. These results are particularly relevant in the context of the upcoming revision of the European fiscal framework and the importance that needs to be assigned to cleverly designed fiscal rules.

Next, we examine the role of fiscal institutions in determining the probability of successful expenditure and revenue-based adjustments (see Eq. (3), and Table 4)[10]. We find that, the overall fiscal rules index (FRC) increases the probability of a successful expenditure-based fiscal adjustment. Furthermore, a fiscal rule that includes a budget balance target in cyclically adjusted terms, has a well specified escape clause, involves strict enforcement, has multi-year expenditure ceilings, strong legal base, and applies to the general government increases the probability of a successful fiscal adjustment based on spending cuts (see Table 4, column 1). A fiscal rule with strict enforcement and strong legal base increases the probability of a successful fiscal adjustment based on revenue increases (see Table 4, column 2).

Turning to the fiscal council characteristics, we find that, in the most cases, their coefficient estimates are insignificantly estimated. However, enhanced tasks and instruments can increase the probability of a successful fiscal consolidation and a successful expenditure-based fiscal consolidation (see Table 5)[11].

### 4.4. Robustness checks

In this section we examine two alternative definitions of a successful fiscal adjustment episode. According to the first definition, a country-year observation is a successful fiscal adjustment when the CAPB does not deteriorate three years after the fiscal adjustment ($CAPB_{t+3} > CAPB_t$) or the reduction of the debt to GDP ratio three years after the fiscal adjustment is at least 3%. This definition (“success2”, definition 1) generates 84 country-year observations (relative to 69 in the baseline definition).

Second, the fiscal adjustments episodes identified by means of the BP method discussed in subsection 3.4, are classified as successful fiscal adjustments if they are associated with a declining debt-to-GDP ratio. In more detail, building on Wiese et al. (2018), a fiscal adjustment is classified as successful, if fiscal adjustments are identified prior to, or simultaneously with the beginning of the periods of declining debt ratio, and the periods are not more than 3 years apart. This definition generates 177 country-year successful fiscal adjustment episodes (“success3”, definition 2). [12]Comparing the baseline with the two alternative successful adjustment definitions, we conclude that the baseline definition is much more demanding relative to the other two, and especially the one based on the BP method. In particular, the average change in CAPB is 3.052% of potential GDP in the baseline vis-à-vis 3.037% in the first alternative and 1.553% in the BP-based definition 2 (see supplementary material Appendix A, Table A3).

Table 6 reports the estimations for the alternative successful fiscal consolidation definitions. The coefficient estimates of all fiscal rules’ characteristics (except that ofa fiscal rule that excludes public investment) are positive and statistical significance (see Table 6, column 1). Hence, the baseline findings presented in subsection 4.3 are verified when considering the alternative slightly looser definition of a successful fiscal adjustment. Turning to the much looser definition based on the BP method, we find that a fiscal rule that has a well specified escape clause, involves strict enforcement, and has multi-year expenditure ceilings increases the probability of successful fiscal adjustments (see Table 6, column 2).[13] The coefficient estimates of the fiscal councils’ characteristics are not statistically significant for the two alternative looser definitions of successful fiscal adjustments (see supplementary material Appendix C, Tables C4, C5). This possibly implies that fiscal councils and their specific design features are particularly valuable in case of large or above average fiscal consolidations relative to smaller or typical fiscal adjustment episodes.

Next, we consider two alternative successful expenditure and revenue-based adjustment definitions. According to the first one, the successful adjustment episodes based on the definition “success2” (alternative definition 1) are classified as expenditure-based when spending cuts are bigger than the revenue increases between t and t + 3, while in the second case, it is the other way round. This definition generates 61 country-year observations for successful fiscal adjustments based on spending cuts “SSP” (relative to 50 in the baseline definition presented in subsection 4.3) and 16 country-year observations for successful fiscal adjustments based on revenue increases “SREV” (relative to 14 in the baseline definition).

As a further robustness check, following Alesina et al. (1998) and Ziogas and Panagiotidis (2021) we consider an alternative definition of expenditure and revenue-based adjustments which allows also for “neutral” adjustments. First, a fiscal adjustment is expenditure-based when (i) CAPB increases by at least 1.5% of potential GDP and (ii) the percentage point change in the ratio of total primary spending to GDP is less that its median across all years in which an adjustment occurs. Second, a fiscal adjustment is revenue-based when (i) CAPB increases by at least 1.5% of potential GDP and (ii) the percentage point change in the ratio of total revenue to GDP is more that its median across all years in which an adjustment occurs. This

[10] The full set of estimations is presented in the supplementary material Appendix D, Tables D1 and D2.
[11] The full set of results is reported in the supplementary material (see supplementary material Appendix C, Table C3 and Appendix D, Table D3).
[12] See supplementary material, Appendix F, Table F1.
[13] The full set of estimations is presented in the supplementary material (see Appendix C, Tables C1 and C2).

**Table 4**
Probability of successful fiscal adjustment based on spending cuts and revenue increases- fiscal rules' characteristics.

| VARIABLES | (1) successful spending-based adjustments | (2) successful revenue-based adjustments |
|---|---|---|
| FRC (t) | 0.127*** | 0.0455 |
| | (0.0394) | (0.0425) |
| Investment (t) | 0.0220 | −0.0187 |
| | (0.0290) | (0.0142) |
| Stabilization (t) | 0.0322* | 0.0146 |
| | (0.0186) | (0.0107) |
| Escapeclause (t) | 0.0353* | 0.0241 |
| | (0.0182) | (0.0185) |
| Enforcement (t) | 0.0643*** | 0.0380* |
| | (0.0215) | (0.0214) |
| Supportproc (t) | 0.0625** | −0.0104 |
| | (0.0274) | (0.0137) |
| legalbasis_high (t) | 0.0644*** | 0.0281*** |
| | (0.0180) | (0.00775) |
| coverage_high (t) | 0.0644*** | 0.0312 |
| | (0.0221) | (0.0221) |
| Strict (t) | 0.131*** | 0.0471** |
| | (0.0450) | (0.0211) |
| Strict1 (t) | 0.0821** | 0.0621*** |
| | (0.0385) | (0.0213) |
| Flexible (t) | 0.0674*** | 0.0276 |
| | (0.0260) | (0.140) |
| Flexible1 (t) | 0.0442** | 0.0193 |
| | (0.0183) | (0.0265) |
| Observations | 646 | 646 |

Notes: Panel probit model with random effects. Dependent variable: Probability of a successful fiscal consolidation based on spending cuts in column (1) and probability of a successful fiscal consolidation based on revenue increases in column (2). For each independent variable we report dF/dX, i.e., the regressor's marginal effect of a one-unit change (evaluated at the means of all regressors). Robust standard errors in parentheses. The full set of estimations is presented in the supplementary material Appendix D, Tables D1 and D2.
*** p < 0.01.
** p < 0.05.
* p < 0.1.

**Table 5**
Probability of successful fiscal adjustment - fiscal councils' characteristics.

| VARIABLES | (1) successful fiscal adjustments | (2) successful spending-based adjustments |
|---|---|---|
| FCC (t) | 0.0387 | 0.0287 |
| | (0.0288) | (0.0272) |
| Remit (t) | 0.0273 | 0.0197 |
| | (0.0263) | (0.0254) |
| Independence (t) | 0.0276 | 0.0219 |
| | (0.0263) | (0.0238) |
| Tasks (t) | 0.0694 | 0.0639** |
| | (0.0275) | (0.0274) |
| Resources (t) | 0.0129 | −0.00474 |
| | (0.0332) | (0.0254) |
| Mandate (t) | 0.0287 | 0.0217 |
| | (0.0269) | (0.0253) |
| Observations | 646 | 636 |

Notes: Panel probit model with random effects. Dependent variable: Probability of a successful fiscal consolidation in column (1) and probability of a successful fiscal consolidation based on spending cuts in column (2). For each independent variable we report dF/dX, i.e., the regressor's marginal effect of a one-unit change (evaluated at the means of all regressors). Robust standard errors in parentheses. The full set of estimations is presented in the supplementary material Appendix C and D, Tables C3 for column (1) and D3 for column (2).
***p < 0.01, *p < 0.1.
** p < 0.05.

alternative definition generates 46 spending-based adjustments, 50 revenue-based adjustments and 15 neutral fiscal adjustments. Based on these fiscal adjustment definitions we identify the successful fiscal adjustments ($CAPB_{t+3} > CAPB_t$) and we classify them as spending or revenue based.

**Table 6**
Probability of successful fiscal adjustments - fiscal rules' characteristics.

| VARIABLES | (1)<br>alternative definition (1) for successful fiscal adjustment | (2)<br>alternative definition (2) for successful fiscal adjustment |
|---|---|---|
| FRC (t) | 0.151*** | 0.135* |
| | (0.0484) | (0.0775) |
| Investment (t) | −0.0144 | −0.0861 |
| | (0.0394) | (0.0683) |
| Stabilization (t) | 0.0414** | 0.00646 |
| | (0.0202) | (0.0438) |
| Escape clause (t) | 0.0610*** | 0.0722* |
| | (0.0216) | (0.0381) |
| Enforcement (t) | 0.106*** | 0.132** |
| | (0.0392) | (0.0618) |
| Supportproc (t) | 0.0605** | 0.0948* |
| | (0.0304) | (0.0566) |
| Legal basis (t) | 0.0939* | 0.117 |
| | (0.0510) | (0.0718) |
| Coverage (t) | 0.0885** | 0.0772 |
| | (0.0392) | (0.0771) |
| Strict (t) | 0.143*** | 0.177** |
| | (0.0516) | (0.0821) |
| Strict1 (t) | 0.0969** | 0.0953 |
| | (0.0462) | (0.0751) |
| Flexible (t) | 0.0873*** | 0.0375 |
| | (0.0307) | (0.0582) |
| Flexible1 (t) | 0.0615*** | 0.0379 |
| | (0.0215) | (0.0366) |
| Observations | 646 | 646 |

Notes: Panel probit model with random effects. Dependent variable: Probability of a successful fiscal consolidation based on alternative definitions. Column (1) reports the results based on the definition 1 for successful fiscal adjustments (i.e., $CAPB_{t+3} > CAPB_t$ or the reduction of the debt to GDP ratio three years after the fiscal adjustment is at least 3%) and column (2) reports the results based on the definition 2 for successful fiscal adjustments (i.e., the fiscal adjustments episodes are identified by means of the BP method and are classified as successful fiscal adjustments if they are associated with a declining debt-to-GDP ratio as in Wiese et al. (2018)). For each independent variable we report dF/dX, i.e., the regressor's marginal effect of a one-unit change (evaluated at the means of all regressors). Robust standard errors in parentheses. The full set of estimations is presented in the supplementary material Appendix C, Tables C1 and C2.

*** $p < 0.01$.
** $p < 0.05$.
* $p < 0.1$.

Following Alesina et al. (1998) and Ziogas and Panagiotidis (2021), we identify a successful spending-based adjustment when (i) a successful fiscal adjustment (succeess1) occurs and (ii), the reduction of total primary spending must be higher than the median cut of total primary spending over the adjustment years. Finally, we identify a successful revenue-based adjustment when (i) a successful fiscal adjustment (succeess1) occurs, and (ii), the total revenue increases must be higher than the median increase in the total revenues. This alternative definition (definition 2) generates 28 successful spending-based fiscal adjustments (“spen_adjustSUC”), 28 successful revenue-based (“rev_adjustSUC”), and 8 neutral successful fiscal adjustments.

Contrary to the baseline and the first alternative definitions of successful expenditure-based fiscal adjustments, the second definition generates fewer expenditure-based fiscal adjustments (28 vis-à-vis 50 and 61, respectively, for the loose and looser definitions). This is due to the fact that it relies on the behavior of expenditure and revenue developments at the time of the adjustment episodes. However, taking into account the expenditure and revenue developments between t and t + 3 (as is done for CAPB) we can more accurately identify the successful expenditure and revenue based fiscal adjustment. Moreover, as shown in Table A4 (supplementary material Appendix A) the spending reduction between t-1 and t + 3 is bigger relative to the revenue increase. Furthermore, the size effect of the spending reduction between t-1 and t + 3 is bigger relative to the spending reduction between t-1 and t (which is used definition 2). While in the case of successful revenue-based adjustment the revenue increase between t-1 and t + 3 is marginally larger than the revenue increases between t-1 and t. Hence, if we use the second alternative definition instead of the baseline definition of successful expenditure-based fiscal adjustment we run the risk to identify fewer (than they actually are) successful expenditure-based adjustment episodes.

Table 7 presents the results for the alternative successful spending and revenue-based definitions (definition 1 and 2). A fiscal rule that includes a budget balance target in cyclically adjusted terms, has a well specified escape clause, strict enforcement and has multi-year expenditure ceiling raises the probability of a successful expenditure based fiscal adjustment, while a fiscal rule with strong legal basis increases the probability of a successful fiscal adjustment only when it is based on revenue increases (definition 1).. As regards the second looser definition (definition 2), a fiscal rule with multi-year expenditure ceilings increases the probability of a successful fiscal adjustment based on spending cuts, while a rule that has a well specified escape clause, strict enforcement, strong legal basis and applies to the general government increases the probability of a

**Table 7**
Probability of successful fiscal adjustments based on spending cuts or revenue increases - fiscal rules' characteristics.

| | Definition 1 | | Definition 2 | |
|---|---|---|---|---|
| | (1) | (2) | (3) | (4) |
| VARIABLES | successful spending-based fiscal adjustments | successful revenue-based fiscal adjustments | successful spending-based fiscal adjustments | successful revenue-based fiscal adjustments |
| FRC (t) | 0.119*** | 0.0502 | 0.0465** | 0.0587*** |
| | (0.0437) | (0.0395) | (0.0229) | (0.0216) |
| Investment (t) | 0.00868 | −0.0316 | 0.0113 | −0.0133 |
| | (0.0328) | (0.0260) | (0.0209) | (0.0151) |
| Stabilization (t) | 0.0306* | 0.0178 | 0.00713 | 0.0157 |
| | (0.0185) | (0.0109) | (0.0124) | (0.0112) |
| Escape clause (t) | 0.0438** | 0.0275 | 0.00833 | 0.0269** |
| | (0.0205) | (0.0301) | (0.0133) | (0.0106) |
| Enforcement (t) | 0.0654** | 0.0565 | 0.0232 | 0.0478*** |
| | (0.0309) | (6.191) | (0.0163) | (0.0138) |
| Supportproc (t) | 0.0737*** | −0.0124 | 0.0503* | 0.000153 |
| | (0.0267) | (0.0125) | (0.0286) | (0.0139) |
| Legal basis (t) | 0.0558 | 0.0705*** | 0.0201 | 0.0632*** |
| | (0.0413) | (0.0224) | (0.0197) | (0.0213) |
| Coverage (t) | 0.0566 | 0.0532 | 0.00449 | 0.0627*** |
| | (0.0355) | (2.010) | (0.0141) | (0.0189) |
| Strict (t) | 0.110** | 0.0477** | 0.0506 | 0.0620*** |
| | (0.0461) | (0.0204) | (0.0310) | (0.0238) |
| Strict1 (t) | 0.0536 | 0.0651*** | 0.0138 | 0.0619*** |
| | (0.0370) | (0.0203) | (0.0191) | (0.0172) |
| Flexible (t) | 0.0722** | 0.0334 | 0.0185 | 0.0374 |
| | (0.0287) | (0.0337) | (0.0169) | (0.0387) |
| Flexible (t) | 0.0483** | 0.0235 | 0.0109 | 0.0249 |
| | (0.0199) | (0.0198) | (0.0131) | (0.0340) |
| Observations | 646 | 659 | 642 | 654 |

Notes: Panel probit model with random effects. Dependent variable: Probability of a successful fiscal consolidation based on spending cuts in columns (1), (3) and probability of a successful fiscal consolidation based on revenue increases in columns (2), (4). Columns 1–2 refer to the definition 1, i.e., "SSP" and "SREV" respectively. Columns 3–4 refer to definition 2 i.e., "spen_adjustSUC" and "rev_adjustSUC" respectively. For each independent variable we report dF/dX, i.e., the regressor's marginal effect of a one-unit change (evaluated at the means of all regressors). Robust standard errors in parentheses. The full set of estimations is presented in the supplementary material Appendix D, Tables D5-C6, D9-D10.

*** p < 0.01.
** p < 0.05.
* p < 0.1.

successful fiscal adjustment based on revenue increases (definition 2). The overall fiscal rules' characteristics index (FRC) has a positive effect on the probability of successful fiscal adjustments, indicating that a well-designed fiscal rule increases the chances that both spending and revenue-based adjustments will succeed.

The coefficient estimates of fiscal councils' characteristics are statistically insignificant, except for the case of a fiscal council with enhanced tasks and instruments which is found to increase the probability of successful fiscal adjustments based on spending cuts (see supplementary material appendix D, Table D7).

## 5. Further robustness checks

In this section, we conduct various robustness checks in order to verify the validity our baseline findings. First, we re-estimate Eqs. (1) and (2) by means of a heteroskedasticity probit model, to account for heteroscedasticity, which can result in issues such as biased and inconsistent parameters and incorrect standard errors (see Ziogas and Panagiotidis, 2021). The findings for the baseline definitions of fiscal adjustment and successful fiscal adjustment are confirmed (see supplementary material appendix B and C, Tables B3, B4, C6 and C7).

Second, we exclude from the sample countries which implemented large fiscal adjustment programs (i.e., Greece, Cyprus, Ireland, and Portugal). The evidence presented in Tables B5, B6, C8 and C9 in Appendices B and C in the supplementary material verify that our main findings still hold and are not driven by these countries.

Third, in the so-called "new democracies" political budget cycles are found to affect the implementation of fiscal policy (see Brender and Drazen, 2005). Taking this into account, we exclude from the sample, the ex-Soviet Eastern and Central European countries (i.e., we exclude Bulgaria, Czech Republic, Estonia, Hungary, Lithuania, Poland, Romania, Slovenia, and Slovak Republic). The evidence presented in Tables B7, B8, C10 and C11 in Appendices B and C in the supplementary material verify the validity of our main findings.

Fourth, we focus only on European Union (EU) countries. Our main findings as regards the probability of initiating a fiscal adjustment are confirmed for the EU countries (see supplementary material appendix B, Tables B9 and B10). However, turning to the probability of a successful fiscal adjustment we find that it is only the coefficient estimates of a fiscal rule that includes a budget balance target in cyclically adjusted terms and a strict fiscal rule that are statistically significant (see supplementary material appendix and C, Table C12).

Fifth, we examine only Euro area (EA) countries. We find that, a fiscal rule that includes a budget balance target in cyclically adjusted terms, has strict enforcement and applies to general government and a fiscal council with enhanced remit, independence & accountability, tasks & instruments, and strong mandate increase the probability of initiating a fiscal adjustment (see supplementary material appendix B Tables B11 and B12). On the contrary, the specific design features of existing fiscal rules in the EA do not contribute to the success of a fiscal adjustment. However, a fiscal council with enhanced tasks & instruments increases the probability for successful fiscal adjustments in EA countries (see supplementary material appendix C, Table C15).

Finally, in order to take into account, the effect the Global Financial Crisis (GFC), we split the sample in the pre-GFC (1990–2007) and post-GFC (2008–2020) periods. This robustness check is particularly relevant because in the post-GFC period many countries improved their fiscal frameworks by establishing independent fiscal councils and by adopting more complex fiscal rules.

Prior to the GFC, the overall index of fiscal rules' characteristics (FRC), a flexible fiscal rule and a fiscal rule with a well specified escape clause increase the probability of fiscal adjustment (see supplementary material appendix B, Table B13). However, it is only rules with strong enforcement that increase the probability of success (see supplementary material, Appendix C, Table C16). After the GFC, a strict fiscal rule, a rule with a well specified escape clause and strict enforcement increases the probability of initiating a fiscal adjustment (see supplementary material appendix B, Table B14). Nevertheless, an enriched and cleverly design fiscal rule (FRC) with both strict and flexible features and, in particular, with a well-specified escape clause, strong enforcement, strong legal basis, which applies to the general government increases the probability of successful fiscal adjustment in the post-GFC periods (see supplementary material appendix C, Table C17). As regards fiscal councils' characteristics, the overall FCC index, mandate, remit, and independence improve the probability of fiscal adjustment in the period before the GFC. In the post-GFC period, it is an enhanced mandate, remit and task & instruments that increase the chances of initiating a fiscal adjustment (see supplementary material appendix B, Tables B15 and B16). The coefficient estimates of the fiscal councils' characteristics are insignificant in both the pre- and post-GFC periods, however, they are associated positively (except resources) with the probability of a successful fiscal adjustment (see supplementary material appendix C, Tables C18 and C19).[14]

## 6. Conclusion remarks

Using a panel of 40 advanced economies from 1990 to 2020 and the IMF dataset on fiscal rules and fiscal councils developed by Davoodi et al. (2022) and building on Afonso et al. (2022), this paper investigates the effect of the individual characteristics of fiscal rules and fiscal councils, on the probability to initiate a fiscal adjustment, as well as on the probability that this fiscal adjustment will be successful.

We find that, an enriched and cleverly designed fiscal rule, which incorporates both strict and flexible features, increases both the probability to initiate and to successfully conclude a fiscal adjustment. Turning to the specific design features of fiscal rules, we find that the presence of a cyclically adjusted budget balance target, a well specified escape clause, strict enforcement, strong legal base, limitation that apply to the general government, and multi-annual spending limits are key characteristics as they are associated positively with the successful conclusion of an adjustment programme. Interestingly, features that are associated with stricter fiscal rules lead to a more pronounced increase in the probability of success vis-à-vis features that allow some flexibility e.g., by taking into account cyclical economic conditions and by excluding public investment or other priority items.

Furthermore, a fiscal rule that includes a budget balance target in cyclically adjusted terms, has a well specified escape clause, involves strict enforcement, has multi-year expenditure ceilings, strong legal base, and applies to the general government increases the probability of a successful fiscal adjustment based on spending cuts. While it is only strict enforcement and strong legal base that increases the probability of a successful revenue-based fiscal adjustment.

Moreover, a fiscal council with increased powers which involve a strong mandate (i.e., enhanced remit and independence and accountability) and enhanced tasks & instruments increase the probability to initiate a fiscal adjustment. However, it is primarily fiscal councils with enhanced tasks and instruments that can lead to a successful fiscal adjustment as well as a successful fiscal adjustment based on spending cuts. However, when we account for the possibility of endogeneity between

[14] Building on a slightly modified setting where the fiscal institutions' characteristics are binary variables rather than indices, we investigate the effect of fiscal institutions on the probability of (successful) fiscal adjustments. Doing that, we also control for the possibility of endogeneity between fiscal adjustments and the specific design features of fiscal institutions. We do this by means of the augmented inverse propensity-score weighted regression adjustment method as in Jordà and Taylor, 2016. The results are presented in the supplementary material, Appendix E. We find that a fiscal rule that has a well-specified general escape clause, multi-year expenditure ceilings and excludes public investment, increases the probability of a successful fiscal adjustment. Furthermore, a fiscal council with enhanced remit, independence and accountability and extended tasks & instruments, increases the probability of successful fiscal adjustment.

fiscal adjustments and the specific design features of fiscal institutions, besides tasks and instruments, enhanced remit and independence and accountability emerge as significant factors that increase the probability of successful fiscal adjustment.

Overall, fiscal institutions and their specific design features are particularly relevant both for the initiation and the success of a fiscal consolidation programme. This conclusion is robust to alternative estimation techniques and to alternative definitions of fiscal adjustment (e.g., the Bai & Perron, 1998, 2003 method) that are looser relative to the baseline definition. However, in case of these looser definitions that involve smaller or typical fiscal adjustment episodes it is primarily fiscal rule characteristics that are improving the chances of a successful fiscal adjustment, whereas fiscal council characteristics are relevant only in above average or large fiscal adjustment episodes. The baseline results are also verified when we exclude countries that implemented large fiscal adjustments and the so-called "new-democracies" that are susceptible to political budget cycles. Moreover, the importance of the characteristics of fiscal rules and fiscal councils for fiscal adjustment is confirmed in different groups of countries (EU, euro area) and in different time periods (pre- and post-GFC), although different characteristics emerge as important in each different group of countries and time period.

Our findings are in line with Caselli and Reynaud (2020), who find that "well-designed" fiscal rules have a positive and significant impact on fiscal balance, as well as Gootjes and de Haan (2022a), who find that fiscal rules improve fiscal policy outcomes and the probability of successful fiscal adjustment. In addition, our analysis is closely related to Ardanaz et al. (2021) who find that flexible fiscal rules can safeguard public investment in the context of a fiscal consolidation programme. Moreover, our work is associated with Afonso et al (2022) who find that well-designed fiscal rules, fiscal councils and features that reinforce compliance with rules improve the current account balance. Our findings are also closely related to the work of Beetsma et al. (2019) who states that fiscal councils and in particular two of their tasks i.e., the preparation or assessment of forecasts, and the monitoring of compliance with fiscal rules lead to more accurate and possibly less optimistic fiscal forecasts and contribute to a greater compliance with fiscal rules. Finally, our work is also in line with the policy prescriptions emanating from the analysis of Beetsma et al. (2022) who claim that independent fiscal councils "*should be assigned with the tasks to perform long-term public debt sustainability analysis and monitoring of fiscal performance against numerical fiscal rules*". Overall, the evidence presented in the paper adds to the existing literature in two ways. First, by enriching the empirical analysis on the determinants of (successful) fiscal adjustments. Second, by contributing to the discussion on the optimal design of fiscal rules and fiscal councils in the context of the on-going debate on the review of the European fiscal framework.

## CRediT authorship contribution statement

**Christos Chrysanthakopoulos:** Conceptualization, Methodology, Software, Data curation, Writing – original draft, Visualization, Investigation, Supervision, Software, Validation, Writing – review & editing. **Athanasios Tagkalakis:** Conceptualization, Methodology, Software, Data curation, Writing – original draft, Visualization, Investigation, Supervision, Software, Validation, Writing – review & editing.

## Data availability

Data will be made available on request.

## 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. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.jimonfin.2023.102853.

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