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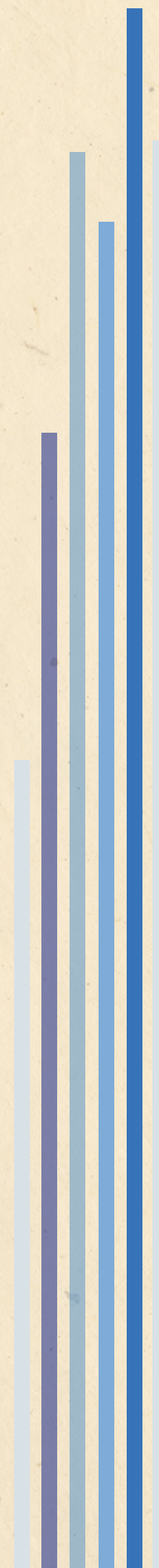
Working Paper

Dynamic panel analysis of the
EU's fiscal reaction function with
threshold effects

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Dynamic panel analysis of the EU's fiscal reaction function with threshold effects.

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Abstract

This study contributes to the ongoing reform of the EU's economic governance, particularly about fiscal performance. We opt for a fiscal reaction function of the cyclically adjusted primary balance. Given concerns over underlying endogeneity and heterogeneity across countries we employ a threshold dynamic analysis. The findings confirm that the fiscal policy in the EU has been procyclical overall. However, we identify two regimes of output gap. Fiscal policy has been countercyclical for EU member states in the higher output gap regime while EU member states follow a procyclical fiscal policy in the lower regime. We reveal also that the endogenous debt-to-GDP ratio threshold is at 75.6% for the EU and 78.7% for the Euro area, which notably exceeds the EU Treaty's reference value of 60%. Fiscal rules and fiscal councils mitigate procyclical fiscal policies, being more effective for low debt countries. In terms of policy implications, the identified fiscal thresholds and variability across countries warrant a higher degree of fiscal coordination in the EU, particularly in the Euro area.

Keywords: Debt, output gap, fiscal rules, fiscal councils, cyclically adjusted primary balance, EU, dynamic panel threshold analysis.

JEL classification: H3, H6, E6, E62, C5.

1 | Introduction

Over the years, there have been multiple revisions to EU economic governance, aiming to enhance fiscal sustainability and stability. However, the debt-to-GDP ratios of member states have not converged towards the EU Treaty's reference value of 60%, established back in 1992 in Maastricht. The EU Commission has recently proposed several changes to economic governance, emphasising the need for multi-year government expenditure targets spanning four to seven years (EU Commission 2023; 2022a; 2022b). Some EU Member states, such as Germany and the Netherlands, have expressed concerns about the perceived lack of ambition in these changes. They put forth their own suggestions for legislating fiscal rules for high-debt countries, advocating for an annual debt reduction of 1% (0.5% for low-debt countries) until the Treaty's 60% target, which provides the threshold of high versus low debt, is achieved.

These proposals by EU Commission and EU Member states emphasise the importance of reducing debt in a sustainable manner, recognising the existing heterogeneity in fiscal performance across EU Member states. In this context, our study contributes to the ongoing reform of the EU's economic governance. Through an empirical modelling approach that considers controls for fiscal heterogeneity across EU Member states, the study aims to provide valuable insights into the underlying debt thresholds in the EU.

Recently, the EU Council approved the reform of the EU fiscal rules in December 2023 (EU Council 2023) proposed by the EU Commission (EU Commission 2023; 2022a). A notable feature of the EU fiscal reform is the adoption of a differentiated fiscal assessment tailored to each member state. This feature acknowledges the heterogeneity in fiscal positions, in public debt levels, and in economic challenges across the EU. The new EU economic governance reforms give added importance to reducing debt-to-GDP ratios towards the EU Treaty's reference level of 60% within a medium-term period, possibly extending to seven years. The EU Commission is tasked with developing technical trajectories and technical information to guide the formulation of multi-year government expenditure targets, aiming to bring debt-to-GDP ratios and deficits in line with the reference values (see Figure A2 deficit ratios in the EU). It is worth noting that EU Member states, in collaboration with the EU Commission, could submit their own multi-year government expenditure targets. This collaborative process allows for a country specific approach to address country specific economic conditions and fiscal considerations within individual member states. In the context of the new EU economic governance, national fiscal councils are accredited to have a role in formulating and discussing technical information related to multi-year government expenditure targets. The significance of fiscal councils is emphasised in the EU Commission's proposals. This study contributes also to the understanding of the role of fiscal councils by employing an empirical modelling approach to examine their impact, along with the impact of fiscal rules, on fiscal sustainability and stability.

In some detail, we employ a dynamic panel analysis to address potential endogeneity issues in the fiscal reaction function, akin to functions used by Bohn (1998), Aldama and Creel (2022) and Jalles (2018), while we also control for heterogeneity across EU Member states. The dynamic panel analysis accounts for the observed variability in fiscal policies across the EU. As part of our investigation, we first assess whether the fiscal policy in the EU has been procyclical and thereby contributing to high debt levels, aligning with findings from prior studies (Gootjes and de Haan 2022; Beetsma et al. 2019; Salvi et al. 2020; Jennes 2021; Larch et al. 2021; Bergman and Hutchinson 2015;). We include control variables in our empirical model to address balance sheet vulnerability, external and private sector debt related risks, and market access. These are critical variables that could influence fiscal performance. A comprehensive panel database of fiscal space provided by Kose et al. (2022) assists in controlling for debt sustainability, balance sheet vulnerability, and various risks associated with external and private sector debt, as well as considerations of market access.

Given the heterogeneity in debt to GDP ratios in the EU, we expand our empirical analysis by employing a dynamic panel threshold model, building upon the framework developed by Seo and Shin (2016). In this dynamic panel threshold analysis, we designate lagged debt as the threshold variable. To strengthen the robustness of our findings, we also introduce the output gap, fiscal rules, and fiscal councils as additional threshold variables.

We contribute to the literature in several aspects. First, we examine the association between cyclically adjusted primary balance and output gap, past debt, fiscal rules, and fiscal councils in the EU. We opt for the fiscal reaction function of Bohn (1998) and Aldama and Creel (2022) (see also Fournier and Liebknecht 2020; Fincke and Wolski 2016; Reuter et al. 2022; Tkacevs and Vilerts 2019) while we control for a discretionary fiscal policy without the additional complication to count for automatic stabilisers. Given the endogeneity and dynamics of fiscal variables, we employ dynamic panel data analysis (Blundell and Bond 1998; Kremer et al. 2013; Bergman and Hutchinson 2015). Second, we employ a threshold panel model of Seo and Shin (2016) that endogenously identifies the underlying thresholds for debt, output gap, fiscal rules, and fiscal councils. The application of dynamic threshold analysis is of importance because of the underlying heterogeneity of countries. In a recent paper, Jennes (2021) shows that even within a country there is heterogeneity, showing that in Belgium the Francophone region was persistently running larger fiscal deficits than the Flanders region, which led to debt-related transfers from Flanders to the Francophone region of over 7% of Flemish GDP (see also Salvi, et al. 2020). Third, we examine with interaction whether fiscal rules and fiscal councils could mitigate procyclical fiscal policy. Lastly, we examine whether our results hold for the Euro area given the single currency that also warrants coordination of fiscal policy. Our results highlight some interesting policy implications that are of relevance to the ongoing discussion of reforming EU economic governance.

The remainder of the paper is organised as follows. The second section discusses related literature on fiscal reaction function and the EU economic governance. Section three reports the data and presents the methodology while section 4 discusses our findings. The last section offers some concluding remarks.

2 | Literature and the EU economic governance

In the past decade, there has been a significant increase in both the number and intricacy of fiscal governance mechanisms, particularly fiscal rules, within the EU (European Economic Forecast 2022; 2020 and 2021; Regling, 2023). Previous studies show that there is a link between fiscal rules and fiscal performance in terms of compliance with the Treaty's reference values of government deficit of 3% of GDP and debt of 60% of GDP (see Schick, 2009; Caselli and Reynaud, 2019; Eyraud et al., 2018; Beetsma et al., 2019; Debrun and Kinda, 2017; and Fincke and Wolski, 2016;). Based on the research by IMF, (2019), Davoodi et al. (2022), Badinger and Reuter, (2017), fiscal rules would improve public finances in the EU. However, the effectiveness of fiscal rules can vary depending on the specific design of the rules and the broader economic and political context in which they are implemented. For example, some studies have found that fiscal rules are less effective in countries with weak institutions or high levels of corruption (see Debrun and Kinda, 2017; Montes and Luna 2021). Debrun and Jonung (2019) have raised concerns about the complexity of fiscal rules, which could potentially undermine compliance. This complexity could potentially lead to the emergence of loopholes and instances of non-compliance. The argument made by Milesi-Ferretti (2004) suggests that fiscal rules may lead to optimistic bias in fiscal and/or output growth forecasts, which could indirectly result in procyclical fiscal policy. This is because governments may overestimate their ability to achieve fiscal targets or underestimate the negative impact of a downturn on public finances. As a result, fiscal policy may become more expansionary during economic upturns, which could exacerbate the business cycle and lead to economic instability.

Bergman and Hutchinson (2015) raise an important point by arguing that fiscal governance and institutions reflect national preferences. Bergman and Hutchinson (2015) in an international study of 81 countries employ a fiscal rule composite index derived from the database of the Fiscal Affairs Department of the International Monetary Fund and an index of government efficiency of the World Bank. Their findings show that the effectiveness of fiscal rules in mitigating the procyclicality as measured by government expenditure is conditional to government efficiency.

Given the evidence from previous studies, there is not a clear consensus on the effectiveness of fiscal governance and fiscal rules (see Schick 2009; Caselli and Reynaud 2019; Eyraud et al. 2018; Beetsma et al. 2019; Salvi et al. 2020; and Jennes 2021;). However, unequivocally and on factual observation fiscal performance in the EU has significant room for improvement given the persistence of high debt in some countries (EU Commission 2022a). To this date, the EU's economic governance aims to build a robust and efficient framework for coordinating and overseeing the fiscal policies of member states. This objective is rooted in the Maastricht Treaty of 1992, which established the euro as the common currency of the EU and set fiscal targets for member states. These targets included a 3% limit on government deficits as a percentage of GDP and a 60% limit on public debt as a percentage of GDP. In 2021, the EU's debt-to-GDP ratio was 87.9%, down from 89.8% in 2020, while the Euro area's debt to GDP ratio was 95.4%, down from 97.0% in 2020. Several Euro area member states, including Greece, Italy, Portugal, Spain, France, Belgium, and Cyprus, recorded debt-to-GDP ratios well above 100% in 2021 (see Figure A1 for debt to GDP ratios in the EU). These high debt to GDP ratios, which come almost thirty years after the signing of the Maastricht Treaty in 1992 intending to coordinate economic policies and enhance fiscal stability in the EU, indicate that the fiscal governance has not been effective, particularly regarding the debt criterion.¹

In November 2022, the EU Commission published an economic governance review communication that highlighted the uneven effectiveness of the fiscal surveillance mechanism and the growing heterogeneity of fiscal performance among member states (EU Commission, 2022b). This communication identified several key areas where improvements could be made, including greater enforcement of the fiscal rules and improved coordination between national fiscal policies and EU-level economic policies. The Commission also called for increased flexibility in the application of the fiscal rules, considering the varying economic conditions and circumstances of member states. Overall, the review emphasised the need for a more effective and coordinated approach to economic governance within the EU, which would require greater cooperation and collaboration among member states and a willingness to address the underlying fiscal imbalances. The EU Commission has proposed a redesigned framework, with national medium-term fiscal-structural plans that integrate each member state's fiscal, reform, and investment commitments within a single EU framework. As part of the common framework, the Commission would propose a reference multi-annual adjustment path based on debt sustainability, encompassing at least four years for member states with a significant or moderate public debt burden. The adjustment path to the reference value of debt is of paramount importance.

In April 2023, the EU Commission unveiled its proposals for new economic governance rules (EU Commission, 2023). If EU member states fail to comply with fiscal rules concerning government debt and deficit—set at 60% and 3% of GDP, respectively—the Commission will formulate and issue a country-specific “technical trajectory”. This trajectory is designed to guide the member state

1. There have been also deviations from the deficit fiscal rule of 3% of GDP. In 2020, the average general government deficit in the EU and the euro area was 6.7% of GDP and 7.0% respectively, which is more than double the fiscal rule set out in the EU Treaty (see Figure A2 in Appendix). This deviation was largely due to higher government expenditures because of the pandemic, coupled with a contraction in economic activity. In response to the pandemic, the EU Council activated the general escape clause in 2020, allowing Member states to deviate from the fiscal rules. While some improvement has been observed in 2021, with the EU and euro-area deficit to GDP ratios reduced to 4.6% and 5.1% respectively, fifteen Member states still had deficits higher than the 3% of GDP threshold value of the EU Treaty. This type of deviation from the 3% threshold was also observed during the sovereign debt crisis of the EU between 2009 and 2012. See Figure A2.

in achieving a plausible downward trend in debt and maintaining prudent debt levels. Recently, the EU Council reached a consensus among its member states on key aspects of the new economic governance (EU Council Press Release 2023).

In parallel with the reforms in economic governance that aim to strengthen fiscal rules, the EU Commission proposes to enhance the role of fiscal councils. Independent fiscal councils would be crucial in evaluating the assumptions behind the plans, determining their suitability in terms of debt sustainability and country-specific medium-term goals, and ensuring plan compliance in each member state. The setup and effectiveness of independent fiscal councils would need to be improved.

The present study provides an empirical modelling approach to endogenously reveal threshold values for debt, but also for output gap, fiscal rules, and fiscal councils. This information is relevant to the ongoing reform of EU economic governance.

3 | Data and methodology

3.1 | Data presentation

Our sample is a panel data set of EU-27 countries for the period 2001 to 2021. We obtained data from various sources, including EU AMECO (2022), the EU Commission (2022b), and Kose et al. (2022). For consistency in data measurement, we cross check with the IMF World Economic Outlook. We control for procyclical fiscal policies using the cyclically adjusted primary balance as well as the output gap. To account for fiscal rules, we use an effectiveness index per country based on data from the EU Commission (2022b). Additionally, we consider the scope index of fiscal institutions (SIFI) to control for fiscal councils EU Commission (2022b). We also employ dummy variables for fiscal council that take the value of one if there is a fiscal council in the country in a particular year, and zero otherwise.

Table 1 reports descriptive statistics for the sample of EU-27 member states.² Our main variables include the cyclically adjusted primary balance as a percentage of potential output (CAPB) to capture procyclical fiscal policy. We also include general government gross debt, % of GDP (Debt) as well as the output gap (y-gap) (Bohn 1998; Aldama and Creel 2022;). According to Table 1, the cyclically adjusted primary balance (CAPB) of the EU has been negative on average during the sample period, indicating that even after accounting for the cyclical effects, there are fiscal deficits across the EU. Interestingly the debt to GDP ratio is at 72%, which is well above the EU Treaty's level of 60%. Also note that during the pandemic in 2020, the average EU debt to GDP ratio was 90% up from 78% in 2019, though it dropped to 88% in 2021. Clearly, these descriptive debt figures highlight the fiscal sustainability challenges that the EU is facing. Table 1 also reports the output gap, as measured by the difference between the actual GDP and the potential GDP. The output gap is negative across countries and over time. A negative output gap implies that the economy is not operating at full capacity. In the case of Greece, the output gap records the lowest value at -19.4 in 2012, which was the year of the sovereign debt crisis. Greece has recorded very high negative output gaps ever since with -14.5 in 2020. The negative output gap in Greece has been very high and prolonged, reflecting a severe and prolonged economic downturn. This has led to high unemployment, low economic growth, and a deteriorating fiscal situation, as the government has had to implement austerity measures to address the debt crisis. The high negative output gap in Greece has also had significant social and economic consequences, with a large increase in poverty

2. The EU-27 includes: Belgium (BE), Bulgaria (BG), Czechia (CZ), Denmark (DK), Germany (DE), Estonia (EE), Ireland (IR), Greece (GR), Spain (ES), France (FR), Croatia (HR), Italy (IT), Cyprus (CY), Latvia (LV), Lithuania (LT), Luxembourg (LU), Hungary (HU), Malta (MT), Netherlands (NL), Austria(AT), Poland (PL), Portugal (PT), Romania (RM), Slovenia (SL), Slovakia (SK), Finland (FI), and Sweden (SE).

and inequality, as well as a brain drain of young, skilled workers leaving the country.

Table 1. Descriptive statistics of the fiscal reaction function.

	Obs	Mean	Std.Dev.	Min	Max
CAPB	540	-0.237	1.222	-27.60	10.90
y-gap	540	-0.919	2.959	-19.402	11.829
Debt	540	71.840	35.737	7.439	212.44
ExternalDebt	540	46.852	16.726	13.128	89.136
Rating	540	19.057	3.2184	2.8424	21
AveMaturity	540	8.1428	2.2609	1.1177	15.252
NonRes	540	5.4128	3.7231	0.0831	23.804

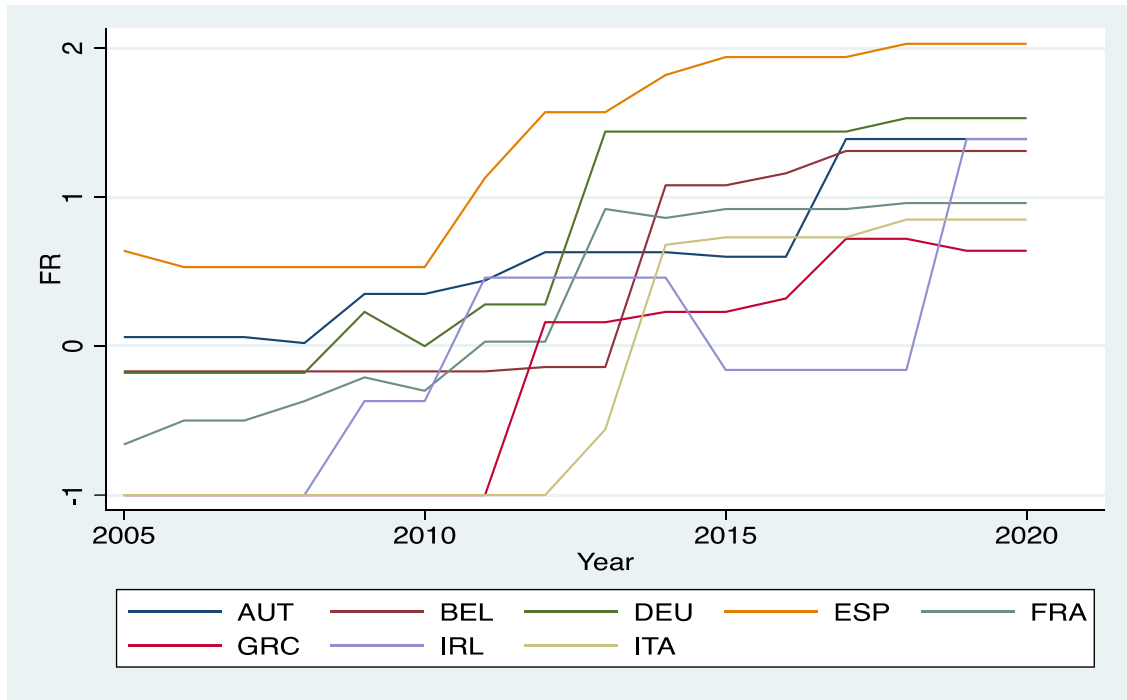
Source: EU Commission AMECO, World Bank (see Kose et al. 2022) and Eurostat. CAPB is cyclically adjusted primary balance in percent of potential GDP, debt is debt to GDP ratio; y-gap is the output gap in percent of potential GDP; AveMaturity is sovereign debt average maturity, years; ExternalDebt total external debt stocks, % of GDP; Rating foreign currency long-term debt ratings by major international rating agencies. NonRes debt securities held by non-residents, % of total.

Regarding fiscal rules, we use the fiscal rule index of the European Commission, DG ECFIN (see EU Commission, 2022a and Table A1). The EU Commission fiscal rule index is a composite index and is calculated based on five criteria: 1) legal base, 2) binding character, 3) bodies monitoring compliance and the correction mechanism, 4) correction mechanisms, and 5) resilience to shocks. It follows the methodology of Deroose et al. (2005). The fiscal rule index is named as fiscal rule strength index (FRSI), and it is calculated by aggregating scores of the five criteria. It is worth noting that all individual fiscal rule strength indices of the five criteria are aggregated into one index per country and year. The aggregate fiscal rule index is estimated by applying equal weights for all disaggregate fiscal rule indices. The aggregate index is standardized to follow the standard normal distribution with 0 mean and standard deviation equal to 1. As a result, the aggregate index could take negative values. Note that the fiscal rule index with a positive value indicates an overachievement of the target or reference value implied by fiscal rules while a negative value reflects a shortfall.³

Figure 1 shows the fiscal rules index over time for selected member states: Austria, Belgium, Germany, Spain, France, Greece, Ireland, and Italy. Clearly, the index remained negative for most parts of the nineties and 2000s despite the nominal macroeconomic convergence of EU countries that entered the Economic and Monetary Union (EMU) and the adoption of the euro in 2002. Negative values for fiscal rules imply significant fiscal underachievement. Spain and Austria are the exceptions as they reported a positive index early in the 2000s and in the late nineties respectively. Since, 2012 there has been an upward trend, reflecting a period of compliance with fiscal rules given draconian fiscal adjustment in some member states of the periphery of the Euro area due to the sovereign debt crisis.

3. In a recent study Larch, et al. (2023) introduces a novel database that systematically tracks numerical adherence to the four primary rules outlined in the Stability and Growth Pact (SGP), commencing in 1998. Larch, et al. (2023) examine the compliance with the SGP rules, finding compliance in slightly over half of the EU member states. This is an interesting data set that employs dummy variables to observe compliance with SGP rules (Larch et al. 2021). This data set is compiled by the Secretariat of the European Fiscal Board (the web link to access the data set is inactive).

Figure 1: Fiscal Rules Index of DG ECFIN, EU Commission.



Source: EU Commission, AUT is Austria, BEL is Belgium, DEU is Germany, ESP is Spain, FRA is France, GRC is Greece, IRL is Ireland, ITA is Italy.

Regarding fiscal councils, we follow the definition of the EU Commission which considers independent fiscal institutions as one of the pillars of the fiscal economic governance of the EU. Fiscal councils are independent and nonpartisan public authorities that have a well-specified mandate mainly focusing on monitoring compliance with national and EU fiscal rules, evaluating macroeconomic forecasts, and assessing governmental budgetary proposals and forecasting.⁴

We control for the impact of fiscal councils using the index SIFI (Scope Index of Fiscal Institutions) of the EU Commission, DG ECFIN (EU Commission, 2022a). The index covers 6 dimensions of the IFIs' mandate: monitoring compliance with fiscal rules; macroeconomic/budgetary forecast; evaluation of fiscal policy (financial impact - policy costing); analysis of the long-term sustainability of public finances; promoting fiscal transparency and fiscal policy recommendations.⁵ There is quite some variability across countries, with the highest score reported for Austria at 83.5 and the lowest for Slovakia at 17.5, while the average SIFI score is at 57.6 and there is a limited improvement

4. Fiscal councils also have the mandate to evaluate fiscal sustainability and medium-term budget proposals as well as to provide an ex-post review of government budget execution. Another important role that most EU fiscal councils have is the economic and statistical assessment of governmental economic forecasts. This is an important role in monitoring the prudence of governmental macroeconomic and revenue forecasting. For example, in some Member states, i.e., the Netherlands, the macroeconomic forecasts of the fiscal institutions are adopted by the government (similarly in the UK the Office of Budget Responsibility has the mandate to approve governmental budgetary forecasts). Given the importance of fiscal councils in monitoring fiscal governance in the EU, the European Fiscal Board was established in 2015. The importance of fiscal councils becomes all more relevant in the current time conjecture considering the ongoing reform of EU economic governance. Moreover, the EU Commission proposed that fiscal councils should play a more active role in the new framework of economic governance.

5. In some detail, the fiscal institutions index is a composite index and is calculated based on: $SIFI_{i,t} = \sum_{\alpha=1}^6 TK_{\alpha,i,t} C_{TK,t} W_{\alpha,h}$, where i is index for institution i at t , $TK_{\alpha,i,t}$ is task of α completed by institution i at t , $C_{TK,t}$ is legal force coefficient for task TK at t , and $W_{\alpha,h}$ is weight associated to task TK with h being the type of weighting scheme. For details of the calculations and tasks α see a discussion paper of EU: https://economy-finance.ec.europa.eu/system/files/2023-06/dp186_en_reviewing%20national%20frameworks.pdf

over time as the average value is 58.2 in 2021.⁶ Some countries, like Austria and the Netherlands, have stronger fiscal institutions that are better able to enforce fiscal discipline and promote counter-cyclical policies, while others may face greater challenges in this regard. It is important to understand these variations to design effective fiscal institutions that can promote sustainable fiscal performance across the EU. It is worth noting that SIFI data are available from 2015 onwards. To address this limitation and to cover a longer period, we have included a dummy variable taking the value of one if there is a fiscal council. By using this measure of fiscal council, we have data for all countries in all years over the sample period. In the empirical section, we employ both the SIFI and the dummy variable for fiscal institutions.

3.2 | Economic model: the fiscal reaction function.

Our economic model follows from the analysis by Bohn (1998) which provides a fiscal reaction function that depends on lagged debt, capturing sustainability, and counter-cyclical fiscal policy (see also, Aldama and Creel 2022; Fournier and Liebknecht 2020; Reuter et al. 2022; Tkacevs and Vilerts 2019). As in Aldama and Creel (2022), and Jalles (2018), this paper employs cyclically adjusted primary balance as the dependent variable:

$$\Delta CAPB_{it} = \alpha_1 \Delta CAPB_{it-1} + \beta_1 X_{it} + \beta_2 Z_{it} + a_i + v_{it} \quad (1)$$

$i = 1, \dots, n; t = 1, \dots, T$

where $\Delta CAPB_{it}$ is the change of cyclically adjusted primary balance as percentage of potential output, X_{it} includes endogenous variables like the lagged debt-to-GDP ratio ($Debt_{it-1}$), output gap ($y-gap_{it}$), and fiscal rules and fiscal councils (FR_{it} and FC_{it}), and Z_{it} is a vector of control variables, like $AveMaturity_{t-1}$ sovereign debt average maturity, years; $ExternalDebt_{t-1}$ total external debt stocks, % of GDP; $Rating_{t-1}$ foreign currency long-term debt ratings by major international rating agencies. $NonRes-1$ debt securities held by non-residents, % of total. is the country-specific error component (that counts for heterogeneity), and is the idiosyncratic error component.

Note that we control for the impact of variables related to external conditions and include balance sheet composition data to capture risks associated with financial market conditions in line with a recent study by Kose et al. (2022). Such variables are all too relevant in the context of the EU that experienced a sovereign debt crisis in the previous decade when government bond spreads widened, and capital inflows were reduced, negatively affecting liquidity and solvency as access to financial markets was interrupted. To this end, we include total external debt stocks, % of GDP ($ExternalDebt$) that includes also private sector debt. We also use debt securities held by non-residents, % of the total ($NonRes$). And sovereign debt average maturity to account for liquidity constraints ($AveMaturity$).⁷ Lastly, we include variables to capture market perception. This information is critical because it reflects the country's ability to roll over debt or to issue new debt, and its market cost of borrowing. Market perception indicators can serve as high-frequency proxies for fiscal sustainability. The variable included is the foreign currency long-term debt ratings by major international rating agencies ($Rating$). The rating variable captures the annual average of foreign currency long-term sovereign debt ratings by Moody's, Standard & Poor's, and Fitch Ratings, which are available in

6. The SIFI index for each country takes the following values: AT=83.57; BE=60.00; BG=54.643; CY=65.714; CZ=51.250; DE=51.964; DK=46.250; EE=51.429; EL=62.143; ES=68.929; FI=49.133; FR=46.429; HR=32.500; HU=45.000; IE=68.214; IT=74.286; LT=56.786; LU=68.087; LV=49.286; MT=72.143; NL=70.536; PL=17.500; PT=68.571; RO=64.286; SE=43.061; SI=48.546; SK=45.357.

7. The average maturity is measured by the annual average life (average time of principal repayment) of the national sub-indices of the J.P. Morgan EMBI Global index and maturity profile of government debt is obtained from the FTSE via Bloomberg.

Bloomberg daily. The rating takes values from 1 to the worst rating and 21 to the best one and then takes a simple average of three ratings.

3.3 | The dynamic panel threshold analysis.

In April 2023 the EU Commission press release explicitly stated that central to the economic governance is that member states comply with the fiscal rules of government debt and deficit not exceeding 60% and 3% of GDP respectively (EU Commission, 2023). In case, for example, that the debt fiscal rule is violated the Commission will formulate and issue a country-specific ‘technical trajectory’ to guide the member state towards a plausible downward trend in debt or the maintenance of prudent debt levels.⁸ In a recent decision, on 21st December 2023, the EU Council agreed on reforms of fiscal rules and reached a consensus among its member states on key aspects of the new EU economic governance.

Given the recent events, it is crucial to examine using economic modelling underlying endogenous country-specific debt levels. To achieve this, we opt for the dynamic panel with thresholds model proposed by Seo and Shin (2016). This model enables the endogenous identification of the threshold value for the debt-to-GDP ratio. Additionally, it helps uncover threshold values for the output gap, and the indexes of fiscal rules, and fiscal councils. The dynamic panel with threshold allows the estimation of different regression coefficients for different subgroups of the data, based on a specified threshold value. The model is particularly useful for analysing panel data, where the same set of countries are observed over time. The dynamic panel threshold model builds on the standard dynamic panel model by introducing threshold effects that can vary across countries or time. The model is estimated using GMM estimation, so it controls also for endogeneity, with the threshold value estimated alongside the other model parameters. The estimation involves testing the null hypothesis of no threshold effect against the alternative hypothesis of the presence of one or more threshold effects. This model by allowing for different regression coefficients for different subgroups of the data provides a more flexible approach to modelling nonlinear relationships than simple dynamic or static panel models that have been applied in the (Aldama and Creel 2022; Fournier and Liebknecht 2020; and Jalles 2018).

In detail, we estimate the following dynamic panel threshold model (see Seo and Shin 2016):

$$\Delta CAPB_{it} = (\alpha_1 \Delta CAPB_{it-1} + \beta_{11} X_{it} + \beta_{12} Z_{it}) I_{\{q_{it} \leq \gamma\}} + (\alpha_2 \Delta CAPB_{it-1} + \beta_{21} X_{it} + \beta_{22} Z_{it}) I_{\{q_{it} > \gamma\}} + \alpha_i + v_{it} \quad (2)$$

where $I_{\{q_{it} \leq \gamma\}}$ and $I_{\{q_{it} > \gamma\}}$ are indicator functions, q_{it} is the threshold variable and γ is the threshold parameter which categorizes the observations above (upper regime) and below the threshold value (lower regime).

For simplifying the notation, we drop in result Tables the sub-index i in variables, noting EU member state.

The first difference GMM estimator of Seo and Shin (2016) is used that nests a grid search approach, where different possible threshold values are tried and the one that produces the best fit is selected. Once the threshold is estimated, the data is split into two groups: one group below the threshold and one group above the threshold. In the next sections, we report the results of Equation 2.

8. Member states will use the provided EU Commission’s technical trajectories and technical information as guiding principles in formulating multi-year government expenditure targets to be incorporated into their fiscal planning.

4 | Empirical Findings

4.1 | Dynamic Panel Analysis of the fiscal reaction function

The examination of descriptive statistics in the data sections reveals that EU member states should have used periods of robust economic growth to build fiscal buffers to utilise during economic downturns. However, according to the EU Commission (2022a), there is an inclination among EU member states towards adopting procyclical fiscal policies. In this section, we shift our focus to offer empirical evidence on whether fiscal policy has indeed been procyclical in the EU.

Table 2 presents the results for the dynamic panel regressions. We employ the two-step system GMM estimator of Arellano and Bover (1995) and Blundell and Bond (1998) with Windmeijer (2005) corrected (robust) standard errors that control for endogeneity.⁹ It is worth noting this GMM estimator controls for endogeneity and unobserved individual heterogeneity.⁹ One lag is selected based on AIC, BIC information criteria, but also due to the annual frequency of the sample as we should preserve as much information as possible in the underlying data. As instruments and in line with the literature (Aldama and Creel, 2022; Fournier and Liebknecht, 2020; and Jalles 2018), we select lagged values of endogenous variables. Such variables can serve as instruments, as they capture the persistence of fiscal decisions over time and provide information about the past fiscal stance.¹⁰ In addition, we compute heteroscedasticity and autocorrelation-robust standard errors based on Windmeijer (2005) to correct potential issues related to heteroscedasticity and serial correlation in the error term.

Our findings show that the output gap (y -gap) asserts a negative impact on the cyclically adjusted primary balance, suggesting an overall procyclical fiscal policy in the EU. The negative and statistically significant coefficient of the output gap confirms previous findings in the literature (Aldama and Creel 2022; and Jalles 2018). The observed procyclicality of fiscal policy is raising concerns about fiscal sustainability and stability. Moreover, procyclical fiscal policy implies that government expenditure increases during periods of economic growth and decreases during periods of economic contraction. This pattern is rather problematic because it exacerbates business cycles, leading to greater volatility in output and employment. This is particularly true for the high debt countries in the EU which faced difficulties in meeting their financing needs in the early 2010s, which led to further economic contraction and raised debt sustainability risks, see for example the cases of Greece, Ireland, Spain, Portugal, and Italy.

Note that our results show that higher lagged debt-to-GDP ratios assert a positive impact on ΔCAPB in a statistically significant manner across all specifications. Thus, past debt as a percentage of GDP would reduce discretionary fiscal policy at 1% significance level across all models. The coefficient on debt securities held by non-residents as a percentage of the total (NonRes_{t-1}) asserts a statistically significant positive impact on ΔCAPB , see column 3. If there is a high percentage of government debt held by non-residents, as in the case of Cyprus with 74%, can indicate the potential for liquidity and currency risks should foreign investor confidence wane. This is because debt denominated in foreign currencies can heighten concerns related to refinancing and exchange rate fluctuations, respectively. Moreover, the composition of a balance sheet can influence exposure to sudden changes in financial market conditions. The debt securities held by non-residents as a percentage of the total is a balance sheet indicator and assesses the risk that abrupt fluctuations in interest rates or

9. We employ as endogenous explanatory variables their lags. The J-tests indicate that the null of valid instruments is not rejected for all cases of threshold variables

10. To control for over-identification, we employ up to lags 2 and 3 of the instrumented variables. For example, we use two lags for the output gap and check the robustness of findings while reducing the number of instruments. We also include 5-year sovereign CDS spreads, IMF fiscal rules, and fiscal council data, lagged debt maturity, long-term debt in foreign currency, long-term interest rates, output (per capita growth) volatility, volatility of real growth of government expenditures (see Kose et al., 2022).

exchange rates, or a sudden cessation of capital inflows, could jeopardise liquidity or solvency. For instance, a concentration of foreign currency-denominated debt can render a government's balance sheet susceptible to rollover and exchange rate risks. Additionally, a significant share of non-resident government debt holdings would suggest liquidity risk in case foreign investor confidence erodes. Such a scenario could give rise to financial stability concerns and hinder economic growth.

The impact of total external debt as a percentage of GDP also asserts a significant positive impact on ΔCAPB , capturing the structure of a country's overall external debt which also includes the private sector debt. Therefore, it asserts pressure to increase fiscal buffers through CAPB. Private sector debt, whether it is domestic or external, has the potential to impact a country's fiscal stability when explicit or implicit bailout guarantees create contingent liabilities. In such cases, governments become obligated to assume the private sector's financial responsibilities in the event of borrower failures. The costs associated with these interventions tend to rise with the overall magnitude of private sector obligations and the presence of maturity or currency mismatches. For example, one significant avenue through which private obligations can impose fiscal burdens is in the resolution of troubled banks as noted in the case of the Greek sovereign debt crisis. This process may entail explicit forms of support, such as deposit insurance, nationalisations (the cases of many countries in the EU due to the subprime crisis), recapitalisations (the Greek case), or the establishment of asset management companies. Additionally, external, and domestic vulnerabilities within the private sector are closely intertwined. When private businesses encounter severe depreciation shocks or sharp declines in asset prices, the existence of currency mismatches and excessive borrowing can further worsen their financial stability concerns (Kose et al. 2022).

Table 2. Dynamic Panel Data Analysis.

	Model (1)	Model (2)	Model (3)	Model (4)	Model (5)
ΔCAPB_{t-1}	-0.188*** (0.0485)	-0.125*** (0.0746)	-0.133*** (0.0786)	-0.212*** (0.0603)	-0.141*** (0.042)
y-gapt	-0.102*** (0.032)	-0.116*** (0.027)	-0.119*** (0.012)	-0.235*** (0.021)	-0.161*** (0.011)
FC	0.145** (0.016)	0.124 (0.220)	0.105*** (0.018)	0.106*** (0.011)	0.130*** (0.021)
Debt_{t-1}	0.171*** (0.0240)	0.277*** (0.0346)	0.300*** (0.0380)	0.0350 (0.0340)	0.287*** (0.040)
$\text{ExternalDebt}_{t-1}$	0.0185 (0.0151)	0.0106 (0.0237)	0.00670*** (0.00241)	0.0420* (0.0235)	0.135*** (0.011)
Rating_{t-1}		0.0624 (0.0625)	0.0782 (0.0629)	0.0714 (0.0515)	0.0542*** (0.010)
NonRes_{t-1}			0.0576*** (0.0113)	0.154 (0.126)	0.0429 (0.038)
AveMaturity_{t-1}				0.0374 (0.0925)	0.0314*** (0.0051)
FR			0.183*** (0.0123)	0.161*** (0.0106)	0.152*** (0.037)
Constant	1.716*** (0.310)	2.164*** (0.335)	2.065*** (0.667)	1.403 (2.863)	2.531*** (0.133)
Observations	520	520	520	520	135
Number of countries	27	27	27	27	27
Time Dummy	YES	YES	YES	YES	YES

Number of Instru.	14	14	14	14	14
AR (1) p-val	0.091	0.078	0.010	0.111	0.111
AR (2) p-val	0.312	0.301	0.419	0.232	0.232
Sargan p-val	0.149	0.264	0.235	0.184	0.221

Note: Δ CAPB is the change in cyclically adjusted primary balance as percent of potential output; FR fiscal rules. FC captures the presence of fiscal councils using dummy variable in models 1 to 4, while model 5 in the last column reports results using FC measured by the SIFI index; $y\text{-gap}_t$ is output gap; Debt_{t-1} debt general government debt as % of GDP; AveMaturity_{t-1} sovereign debt average maturity, years; $\text{ExternalDebt}_{t-1}$ total external debt stocks, % of GDP; Rating_{t-1} foreign currency long-term debt ratings by major international rating agencies. NonRes_{t-1} debt securities held by non-residents, % of total. Standard errors in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

In line with previous findings (Gootjes and de Haan, 2022; Beetsma, et al. 2019;) Table 2 shows that fiscal rules (FR) can play a statistically significant role in enhancing fiscal discipline and increasing the cyclically adjusted primary balance (Δ CAPB) of the EU. By providing strong fiscal guidance, fiscal rules can enhance fiscal discipline and improve the quality of fiscal decision-making, in line with Debrun and Kinda (2017). Salvi et al. (2021) showed that a new federal rule in 2003 reduced government debt to GDP in Switzerland by 2.5 percentage points on average until 2010. However, it is crucial to acknowledge that the effectiveness of fiscal rules may vary depending on underlying thresholds such as the level of debt to GDP which we shall examine in the next section. Similarly, fiscal councils (FC) improve Δ CAPB in statistically significant terms in all models but model 2. Models 1 to 4 employ FC as measured by the presence of fiscal councils using a dummy variable, while model 5 in the last column of Table 2 reports results using FC measured by the SIFI index of the EU Commission as FC. Fiscal councils (FC) by providing independent assessments and recommendations on fiscal policies can enhance peer pressure towards fiscal discipline and provide an additional monitoring mechanism other than that of the EU Commission.

4.2 | Dynamic Panel Analysis with Thresholds

Having identified that fiscal policy in the EU has been procyclical, we turn our attention to the estimation of dynamic panel analysis with thresholds, treating as endogenous variables the debt-to-GDP ratio, the output gap, FR, and FC. We test the validity of our model by examining the null hypothesis of no threshold effects and the validity of the overidentifying moment conditions. J-tests indicate that the null of valid instruments is not rejected for all cases of threshold variables (see Table 3). These results are satisfactory since the number of instruments rises quadratically with the number of observations.¹¹ The bootstrap p-values of the supW test are zero, which provides strong evidence in favour of threshold effects.

Table 3 presents the results of Equation (2) with four endogenous threshold variables: output gap, past debt, fiscal rules, and fiscal councils. The first column of Table 3 shows that the threshold value of the output gap is 0.253, implying that 75.2% of the sample is at the lower regime. The threshold is derived from our economic model in Equation (2) that nests dynamics and controls for economic and financial conditions using exogenous variables. Interestingly, for countries in the lower regime, our evidence shows that fiscal policy has been procyclical, whilst for countries in the upper regime fiscal policy has been countercyclical. The difference between the coefficient of output gap between the regimes is negative and statistically significant, implying an overall procyclical fiscal policy. We observe, therefore, a marked heterogeneity of fiscal policies across countries in the EU. The

11. As instruments, we opt for up to three lags of endogenous variables. We also include 5-year sovereign CDS spreads, IMF fiscal rules and fiscal council data, lagged debt maturity, long-term debt in foreign currency, long-term interest rates, output (per capita growth) volatility, volatility of real growth of government expenditures (see Kose et al., 2022).

new EU economic governance recognises such heterogeneity and proposes to formulate country-specific fiscal adjustment paths. The present findings emphasise the importance of adopting country-specific expenditure targets and staying vigilant against procyclical fiscal policies, especially for countries with low output gaps. Adopting country-specific expenditure targets can help ensure that fiscal policies are appropriately adjusted to the economic condition of each country, contributing to overall fiscal stability.

Moreover, automatic fiscal stabilisers are essential to support economic recovery. However, in cases of countries with persistent high debt, an overall counter cyclical fiscal policy should be applied to bring debt to a downwards trend in the medium term, ensuring fiscal sustainability (Burriel et al. 2020). It is worth noting that while countercyclical fiscal policy is beneficial, implementing it too aggressively in strong economic downturns should be approached cautiously. Excessive fiscal measures during downturns could potentially exacerbate economic challenges. Therefore, a balanced and careful approach is essential to ensure the effectiveness of countercyclical fiscal policies without causing adverse economic effects, posing additional risks to fiscal sustainability and stabilisation.

The models in Table 3 include also exogenous variables that are associated with financial market conditions (Kose et al. 2022) such as external debt (ExternalDebt), as % of GDP. External debt has a positive sign, as expected, due to the contingent liabilities associated with bailout-type guarantees. The debt securities held by non-residents (NonRes), as % of total debt, and sovereign debt average maturity (AveMaturity) to account for liquidity constraints assert a counter-cyclical effect, though only the latter is significant. The debt average maturity is of importance because it provides information about forthcoming debt financial needs that could be severely bounded during the euro-area periphery sovereign crisis in 2012-2013. Lastly, the annual average of foreign currency long-term sovereign debt ratings (Rating) captures market perception and carries a positive sign, but it is not significant.

When the debt-to-GDP ratio is employed as the threshold variable (see second column in Table 3), the threshold is endogenously estimated as 75.58% of GDP. This implies that 81.6% of observations fall into the lower debt-to-GDP regime over the sample period. In contrast, if we use the EU Treaty's debt target of 60%, only 45% of observations fall into the lower regime. Defining the debt threshold is pivotal as it could influence the required fiscal adjustment and could be additional technical information to applied economic policy. It is worth noting that the endogenously derived threshold, though higher than the Treaty's reference value, is much lower than the average EU debt, which stood at 90% in 2020. This divergence of actual debt level from the endogenous debt threshold suggests that fiscal policy at the EU level should intensify efforts towards fiscal sustainability and move away from pro-cyclical fiscal policies. Given the observed diversity in fiscal policies across EU countries, justifying a new EU economic governance becomes evident. The new EU economic governance by acknowledging the heterogeneity in fiscal positions of different EU member states would formulate a country-specific 'technical trajectory' for multi-year government expenditure targets to guide the member state towards a downward trend in debt. This process is expected to assist in the harmonisation of fiscal policy across member states.

Regarding the impact of past debt on ΔCAPB , it is negative and higher for high debt countries, indicating discretionary fiscal loosening for those countries in line with Aldama et al. (2022). Interestingly, the coefficient of FR is significantly higher for low debt countries, suggesting that FR is more effective in those countries. FC also has a higher and statistically significant impact on low debt countries. Thus, both FR and FC assert a positive impact on fiscal performance, but a low debt is necessary for this impact to be more effective.

The findings in Table 3, 2nd column, indicate that fiscal policy tends to be procyclical for countries in the high regime of debt, as suggested by the negative sign of parameter estimate of $y\text{-gap}_{t, \text{upper}}$.

The presence of procyclical fiscal policies in high-debt countries raises concerns about a potential vicious fiscal cycle, particularly during recessions. This cycle could be intensified by exacerbating the recession, leading to increased fiscal deficits and debt levels. It is important to note that the fiscal behaviour of the EU member states, especially those with chronic high debt levels, may reflect underlying country-specific preferences regarding deviations of government debt from the Treaty's value over the long term. Recognising this distinction is crucial for deriving meaningful policy implications. Harmonising fiscal preferences across EU member states, particularly within the Euro-area, is deemed significant. The new EU economic governance by recognising the heterogeneity of fiscal positions of EU member states, implicitly acknowledging that underlying preferences for some member states lean towards high debt, proposes to formulate country specific multi-year expenditure targets. Initiatives, such as the EU's proposed medium-term fiscal-structural plans, aimed at steering debt on a negative trajectory should be complemented by country specific efforts to correct fiscal preferences towards a sustainable fiscal path. This alignment is vital for promoting fiscal stability and sustainability across the EU.

Moreover, the convergence of fiscal preferences across EU member states is crucial for fostering fiscal cohesion and stability. High-debt countries have encountered challenges in reversing the upward trajectory of their debts. In navigating these challenges, fiscal policy should, overall, maintain a countercyclical stance. This approach would help address the specific challenges faced by high-debt countries and would contribute to overall economic stability and sustainability.

Table 3: Threshold dynamic analysis fiscal performance,

	Threshold Var. $y\text{-gap}_t$	Threshold Var. $Debt_{t-1}$	Threshold Var. FR	Threshold Var. FC_{SIFI}
Lower Regime				
$\Delta CAPB_{t-1, lower}$	-0.075 (0.043)	-0.119 (0.025)	-0.138 (0.052)	-0.137 (0.031)
FR_{lower}	0.012 (0.039)	0.095 (0.023)	0.064 (0.012)	0.075 (0.087)
FC_{lower}	0.064 (0.007)	0.016 (0.001)	0.08 (0.010)	0.061 (0.028)
$Debt_{t-1, lower}$	0.211 (0.079)	0.281 (0.195)	0.296 (0.290)	0.274 (0.171)
$y\text{-gap}_{t, lower}$	-0.201 (0.018)	0.119 (0.021)	-0.151 (0.017)	-0.164 (0.045)
Upper Regime				
$\Delta CAPB_{t-1, upper}$	-0.118 (0.019)	-0.215 (0.028)	-0.014 (0.012)	-0.024 (0.017)
FR_{upper}	0.068 (0.047)	0.113 (0.225)	0.119 (0.025)	0.158 (0.015)
FC_{upper}	0.053 (0.051)	0.055 (0.077)	0.123 (0.069)	0.117 (0.032)
$Debt_{t-1, upper}$	0.313 (0.108)	0.344 (0.110)	0.242 (0.031)	0.283 (0.084)
$y\text{-gap}_{t, upper}$	0.118 (0.055)	-0.185 (0.039)	0.053 (0.055)	0.066 (0.131)
Threshold	0.253 (0.073)	75.58 (34.08)	0.64 (0.311)	62.02 (24.09)

Differences				
ΔCAPB_{t-1}	-0.043 (0.019)	-0.096 (0.028)	0.124 (0.012)	0.113 (0.017)
FR	0.056 (0.047)	0.018 (0.225)	0.055 (0.025)	0.083 (0.015)
FC	-0.011 (0.051)	0.039 (0.077)	0.043 (0.069)	0.056 (0.032)
Debt_{t-1}	0.102 (0.108)	0.063 (0.110)	-0.054 (0.031)	0.009 (0.084)
y-gap_t	-0.319 (0.055)	-0.304 (0.039)	0.204 (0.055)	0.230 (0.131)
Exogenous Variables				
ExternalDebt_{t-1}	0.027 (0.009)	0.061 (0.023)	0.012 (0.0024)	0.031 (0.012)
Rating_{t-1}	0.061 (0.021)	0.038 (0.062)	0.031 (0.051)	0.058 (0.102)
NonRes_{t-1}	0.033 (0.074)	0.061 (0.011)	0.044 (0.026)	0.035 (0.012)
AveMaturity_{t-1}	0.023 (0.002)	0.022 (0.003)	0.071 (0.021)	0.087 (0.081)
Lower regime%	75.2	81.6	64.7	66.8
Bootstrap	0.0	0.0	0.0	0.0
J-test	75.23 (0.001)	77.8 (0.001)	75.5 (0.001)	76.43 (0.001)
No of IVs	32	32	32	32
Observations	520	520	520	135

Source: Author's estimations. If subindex shows lower it implies below the threshold value, if upper it implies above the threshold value. $\Delta\text{CAPB}_{t-1, \text{lower}}$ cyclically adjusted primary balance below the threshold value. FC is measured by a dummy variable (columns 1 to 3), while FC_{SIFI} (column 4), is measured by the SIFI index; FR fiscal rules; y-gap_t is output gap; Debt_{t-1} debt general government debt as % of GDP; AveMaturity_{t-1} sovereign debt average maturity, years; ExternalDebt_{t-1} total external debt stocks, % of GDP; Rating_{t-1} foreign currency long-term debt ratings by major international rating agencies. NonRest-1 debt securities held by non-residents, % of total. Standard errors in parentheses.

When using the FR as the threshold variable (see Table 3, column 3), our analysis reveals that the estimated threshold is 0.64, significantly higher than the mean FR value of 0.12 in our sample. This indicates that 75.5% of observations fall into the low FR regime. The impact of past debt on the change in the cyclically adjusted primary balance (ΔCAPB) is more pronounced for high FR countries, suggesting that countries with high FR are more responsive to fiscal tightening due to past debt. The counter-cyclical impact of FR is evident for countries in the high FR regime, in contrast to procyclical fiscal policies observed for countries in the low FR regime. When using the FC as the threshold variable (measured by the SIFI index of the EU Commission, see the last column in Table 3), the estimated FC threshold is 62.02 (compared to the sample mean of 57.68), with 76.43% of observations falling into the low regime. Both FR and FC contribute more positively to fiscal performance in countries with a high FC regime. Additionally, when FC is selected as the threshold variable, fiscal policy is found to be procyclical for countries in the low regime, while counter-cyclical fiscal policies are observed in the high regime.

Table 4 reports results with interactions between the $y\text{-gap}_t$, Debt_{t-1} , FR, and FC. The purpose of this model is to capture possible non-linearities between variables while enhancing control over the observed heterogeneity of our sample (Burriel et al. 2020; Gootjes and de Haan 2022; Larch et al. 2021;). In addition, interactions would be useful to reveal any type of moderation effects. If such effect is present it would identify, for example, whether the impact of $y\text{-gap}_t$ is conditional on the level of Debt_{t-1} .

Table 4: Threshold dynamic analysis with interactions.

	Threshold Var. $y\text{-gap}_t$	Threshold Var. Debt_{t-1}	Threshold Var. FR	Threshold Var. FC_{SIFI}
Lower Regime				
$\Delta\text{CAPB}_{t-1,\text{lower}}$	-0.165 (0.026)	-0.132 (0.084)	-0.141 (0.035)	-0.129 (0.094)
$\text{FR}_{t,\text{lower}}$	0.014 (0.013)	0.025 (0.08)	0.092 (0.015)	0.062 (0.016)
$\text{FC}_{t,\text{lower}}$	0.004 (0.094)	0.013 (0.009)	0.015 (0.054)	0.032 (0.006)
$\text{Debt}_{t-1,\text{lower}}$	0.242 (0.022)	0.318 (0.042)	0.271 (0.104)	0.254 (0.091)
$y\text{-gap}_t$	-0.191 (0.012)	0.166 (0.084)	-0.194 (0.031)	-0.185 (0.096)
Upper Regime				
$\Delta\text{CAPB}_{t-1,\text{upper}}$	-0.231 (0.084)	-0.202 (0.060)	-0.128 (0.123)	-0.132 (0.116)
$\text{FR}_{t,\text{upper}}$	0.056 (0.050)	0.085 (0.084)	0.125 (0.057)	0.118 (0.022)
$\text{FC}_{t,\text{upper}}$	0.079 (0.060)	0.115 (0.095)	0.035 (0.075)	0.149 (0.099)
$\text{Debt}_{t-1,\text{upper}}$	0.307 (0.114)	0.223 (0.172)	0.227 (0.138)	0.294 (0.174)
$y\text{-gap}_t$	0.281 (0.115)	-0.297 (0.116)	0.051 (0.184)	0.094 (0.115)
Threshold	0.235 (0.120)	78.52 (19.10)	0.561 (0.135)	61.51 (27.01)
Differences				
ΔCAPB_{t-1}	-0.066 (0.011)	-0.070 (0.010)	0.013 (0.012)	-0.003 (0.016)
FR_t	0.042 (0.013)	0.060 (0.030)	0.033 (0.011)	0.056 (0.009)
FC_t	0.075 (0.022)	0.102 (0.007)	0.020 (0.021)	0.117 (0.211)
Debt_{t-1}	0.065 (0.011)	0.005 (0.024)	-0.044 (0.013)	0.040 (0.003)
$y\text{-gap}_t$	0.472 (0.126)	-0.463 (0.121)	-0.245 (0.127)	0.279 (0.105)

Interactions				
y-gap_t×Debt_{t-1}	0.095 (0.011)	0.037 (0.014)	0.031 (0.007)	0.047 (0.009)
y-gap_t×FR_t	0.101 (0.015)	0.022 (0.001)	0.061 (0.013)	0.056 (0.001)
y-gap_t×FC_t	0.065 (0.011)	0.035 (0.005)	0.051 (0.011)	0.025 (0.011)
Exogenous variables				
ExternalDebt_{t-1}	0.108 (0.021)	0.033 (0.021)	0.023 (0.022)	0.065 (0.210)
Rating_{t-1}	0.050 (0.112)	0.064 (0.011)	0.031 (0.012)	0.021 (0.008)
NonRes_{t-1}	0.026 (0.011)	0.019 (0.015)	0.077 (0.232)	0.012 (0.025)
AveMaturity_{t-1}	0.087 (0.109)	0.058 (0.011)	0.043 (0.009)	0.076 (0.016)
Lower regime%	65.7	81.5	64.4	66.5
Bootstrap	0.0	0.0	0.0	0.0
J-test	33.92 (0.192)	35.97 (0.171)	30.01 (0.230)	28.24 (0.54)
No of Ivs	32	32	32	32
Observations	520	520	520	135

Source: Author's estimations. If subindex shows lower it implies below the threshold value, if upper it implies above the threshold value. $\Delta\text{CAPB}_{t-1, \text{lower}}$ cyclically adjusted primary balance below the threshold value. FC is measured by a dummy variable (columns 1 to 3), while FC_{SIFI} (column 4), is measured by the SIFI index; FR fiscal rules; y-gap_t is output gap; Debt_{t-1} debt general government debt as % of GDP; AveMaturity_{t-1} sovereign debt average maturity, years; ExternalDebt_{t-1} total external debt stocks, % of GDP; Rating_{t-1} foreign currency long-term debt ratings by major international rating agencies. NonRes_{t-1} debt securities held by non-residents, % of total. Standard errors in parentheses.

These findings indicate a consistent negative sign for the output gap in all lower regime cases, but for the low debt countries, suggesting a procyclical fiscal policy. Interestingly, for countries in the low regime of debt, the positive sign of the output gap indicates a countercyclical fiscal policy, which is in line with findings in the Table 3. Conversely, for countries in the high regime of debt, the fiscal policy appears to be procyclical. These results highlight the variability in fiscal policies among EU countries, emphasising the need for improvements in EU economic governance to enhance the coordination of fiscal policies across member states. The goal should be to guide policies toward a more consistent fiscal approach, especially during economic downturns and for EU member states with high debt.

Concerning the interactions of the output gap with FR and FC display positive signs. These suggest that strengthening fiscal rules and fiscal councils would enhance the countercyclical fiscal policy. Both FR and FC play a role in improving the monitoring of fiscal policies. In instances where fiscal policy becomes procyclical, FR and FC could facilitate the implementation of fiscal consolidation measures and contribute to imposing fiscal discipline. Similar findings are reported by Gootjes and de Haan (2022) in their study, where they employ interaction terms between fiscal rules and the output gap.

For the sake of completeness in our analysis, we also have an interaction between past debt and

the output gap.¹² This interaction term aims to identify the stance of fiscal policy over the business cycle in the presence of past debt. Burriel et al. (2020), in a DSGE study, use government debt to capture the sustainability objective of fiscal policy and the output gap to capture the stabilisation objective. The authors explore various scenarios and find that during recessions, indicated by a low output gap, heavy reliance on automatic fiscal stabilizers in a high-debt country could increase risks to fiscal sustainability imposed by financial markets through higher interest payments. Burriel et al. (2020) argue that fiscal policy should prioritise the reduction of government debt by mitigating the role of automatic fiscal stabilisers. Additionally, in an empirical EU study, Larch et al. (2021) emphasise that high-debt countries do not have sufficient fiscal space to apply countercyclical fiscal policy during recessions. Chronic procyclical fiscal policies contribute to high debt, and fiscal consolidation is warranted regardless of the phase of the business cycle, as measured by the output gap (Burriel et al. 2020; Larch et al. 2021). Such a fiscal stance would restore fiscal sustainability and enhance economic recovery. The positive sign of the interaction between the output gap and past debt highlights the importance of past debt, irrespective of the current stage of the business cycle, in shaping the fiscal reaction function towards fiscal sustainability and away from procyclical policies. The dynamic threshold analysis contributes to the findings in the literature (Burriel et al. 2020; Larch et al. 2021), emphasising the need to moderate the role of automatic fiscal stabilisers to prioritise the reduction of high debt. It is noteworthy that the new EU economic governance places emphasis on the importance of reducing high debt as a priority, particularly for those member states with debt well above the Treaty's value of 60% of GDP (in some cases more than twice the Treaty's value).

When we employ the fiscal rules index as the threshold variable, the results show that the threshold estimate is 0.56 such that about 64.4% of member states fall into the lower regime of fiscal rules though there is improvement over time (25% of member states fall into the lower regime of fiscal rules in 2021 compared to 78% in 2010). In terms of the strength of fiscal institutions, the endogenously estimated threshold value is at 61.5%, suggesting that only 66.5% of member states fall into the lower regime while there has been a limited improvement since 2015.

Our findings indicate that fiscal councils have a great deal of room for development in terms of policy consequences. The recent proposals of the EU Commission (see EU Commission 2022b; EU Commission, 2023), which aim to improve the monitoring and enforcement of the Stability and Growth Pact, argue to enhance the role of national independent fiscal institutions. In detail, the Council of EU on 21 December 2023 endorsed the EU Commission proposals for economic governance (EU Commission, 2023) regarding the function of national independent fiscal institutions (IFIs). The IFIs should generate or endorse macroeconomic projections of member states to align with medium-term fiscal-structural plans, potentially exploring the establishment of minimum standards. It is recommended that IFIs refrain from involvement in the design phase of member states fiscal plans. The EU Council also argued that the role of the European Fiscal Board within the economic governance framework warrants further analysis. To live up to aspirations, however, national fiscal institutions should first improve in terms of their technical analysis and fiscal assessments. As things are, most of the member states have IFIs in the lower regime, and there is significant space for improvement.

4.3 | Dynamic Threshold Panel Analysis in the Euro-Area

The single currency poses unique challenges that warrant streamlining fiscal policy even more to tackle fiscal imbalances that could destabilise the Euro-area. Indeed, the coordination of fiscal policy in the Euro-area is more salient compared to the remaining countries of the EU-27. To this end, in

12. Note Table 4, second column, with the past debt as threshold variable, the parameter estimates of the output gap report its marginal effects on ΔCAPB_{it} .

this section, we investigate dynamic threshold effects in the Euro-area. Table 5 presents results, treating $y\text{-gap}_t$, Debt_{t-1} , FR, and FC as threshold variables. Our choice of transition variables is more comprehensive in scope compared to prior studies by Aldama and Creel (2022), Fournier and Liebeknecht (2020), Reuter et al. (2022), and Tkacevs and Vilerts (2019).

The results are reported for the lower and upper regimes in Table 5. In the case where the $y\text{-gap}_t$ is employed as the transition variable, the results indicate that the estimated threshold stands at 0.233. This implies that approximately 61.71% of the observations fall within the lower output gap regime. The coefficient on output gap is positive for the countries in the high regime suggesting that fiscal policy is counter-cyclical in ‘good times’, switching sign to negative in the case of the low regime. Note the difference between the coefficients on the output gap in the lower and upper regimes is positive at 0.284 and significant, implying that a shift away from procyclical fiscal policy overall in the Euro-area. Aldama and Creel (2022) for OECD countries find a negative and statistically significant coefficient of output gap and argue that the procyclical fiscal policy is sustainable nevertheless while Jalles (2018) reports counter-cyclical fiscal policies for advanced economies. Our findings complement previous findings by testing for underlying thresholds in $y\text{-gap}_t$. Steering away from procyclical fiscal policies would necessitate a coordinated fiscal effort which seems to be warranted in the case of Euro-area countries. Regarding the coefficient on lagged ΔCAPB , it is somewhat higher for countries in the higher output gap regime. The difference of the coefficients of ΔCAPB is negative but low in magnitude. The difference in coefficients on FR and FC between the two regimes is also low, but positive for FR. The difference in the coefficients of lagged debt to GDP ratio between the lower and the upper regime is positive at 0.164, and it is statistically significant. This is not surprising because countries in the higher output gap regime are asserting a countercyclical fiscal policy.

The second column of Table 5 reports results when the lagged debt ratio is the transition variable. The threshold parameter is estimated to be 78.73%, which is lower than the mean debt ratio of 95.5 % in 2021. More than 75.4% of observations fall into the low-debt regime. We observe a statistically significant negative impact of past on current for countries in both regimes, though their difference exhibits a low magnitude. For countries in the lower debt regime, a positive coefficient of output gap is reported, in line with counter-cyclical fiscal policy. The opposite is reported for the high debt countries. The difference in the coefficient of $y\text{-gap}_t$ when the Debt_{t-1} is the threshold variable is in line with the estimations in Table 3. Similarly, results show that both FR and FC assert a positive impact on . The impact of FR (FC) is more amplified for countries in the higher regime of the output gap (Debt_{t-1}). Although FR and FC could enhance and contribute therefore to fiscal sustainability their economic significance is low given their low magnitude.

Table 5: Threshold dynamic analysis fiscal performance in the Euro-area,

	Threshold Var. $y\text{-gap}_t$	Threshold Var. Debt_{t-1}	Threshold Var. FR	Threshold Var. FC_{SIFI}
Lower Regime				
$\Delta\text{CAPB}_{t-1,\text{lower}}$	-0.135 (0.012)	-0.147 (0.091)	-0.167 (0.012)	-0.187 (0.037)
FR_{lower}	0.047 (0.076)	0.015 (0.011)	0.005 (0.041)	0.011 (0.077)
FC_{lower}	0.015 (0.005)	0.045 (0.011)	0.0812 (0.006)	0.069 (0.016)
$\text{Debt}_{t-1,\text{lower}}$	0.325 (0.129)	0.201 (0.119)	0.292 (0.118)	0.295 (0.244)
$y\text{-gap}_t$	-0.178 (0.065)	0.221 (0.117)	-0.192 (0.082)	-0.161 (0.045)

Upper Regime				
$\Delta\text{CAPB}_{t-1, \text{upper}}$	-0.158 (0.181)	-0.139 (0.167)	-0.097 (0.114)	-0.079 (0.188)
FR_{upper}	0.068 (0.011)	0.058 (0.015)	0.087 (0.011)	0.066 (0.014)
FC_{upper}	0.014 (0.011)	0.087 (0.007)	0.036 (0.069)	0.05 (0.017)
$\text{Debt}_{t-1, \text{upper}}$	0.489 (0.156)	0.246 (0.146)	0.315 (0.125)	0.362 (0.162)
$y\text{-gap}_t$	0.106 (0.127)	-0.112 (0.179)	0.071 (0.218)	0.085 (0.245)
Threshold	0.233 (0.048)	78.731 (31.17)	0.421 (0.014)	66.431 (12.44)
Differences				
ΔCAPB_{t-1}	-0.023 (0.011)	0.008 (0.011)	0.070 (0.016)	0.108 (0.011)
FR	0.021 (0.015)	0.043 (0.023)	0.082 (0.0024)	0.055 (0.014)
FC	-0.001 (0.021)	0.042 (0.062)	-0.045 (0.051)	-0.019 (0.102)
Debt_{t-1}	0.164 (0.074)	0.045 (0.0113)	0.023 (0.026)	0.067 (0.012)
$y\text{-gap}_t$	0.284 (0.0025)	-0.333 (0.003)	0.263 (0.001)	0.246 (0.381)
Exogenous Variables				
$\text{ExternalDebt}_{t-1}$	0.011 (0.102)	0.046 (0.061)	0.041 (0.022)	0.078 (0.014)
Rating_{t-1}	0.153 (0.011)	0.011 (0.042)	0.058 (0.101)	0.040 (0.012)
NonRes_{t-1}	0.093 (0.014)	0.105 (0.011)	0.081 (0.012)	0.053 (0.012)
AveMaturity_{t-1}	0.13 (0.071)	0.075 (0.011)	0.012 (0.011)	0.065 (0.019)
Lower regime%	61.71	75.41	66.67	61.70
Bootstrap	0.0	0.0	0.0	0.0
J-test	36.39 (0.180)	33.77 (0.165)	31.68 (0.153)	26.53 (0.62)
No of IVs	32	32	32	32
Observations	278	278	278	95

Source: Author's estimations. If subindex shows lower it implies below the threshold value, if upper it implies above the threshold value. $\Delta\text{CAPB}_{t-1, \text{lower}}$ cyclically adjusted primary balance below the threshold value. FC is measured by a dummy variable (columns 1 to 3), while FC_{SIFI} (column 4), is measured by the SIFI index; FR fiscal rules; $y\text{-gap}_t$ is output gap; Debt_{t-1} debt general government debt as % of GDP; AveMaturity_{t-1} sovereign debt average maturity, years; $\text{ExternalDebt}_{t-1}$ total external debt stocks, % of GDP; Rating_{t-1} foreign currency long-term debt ratings by major international rating agencies. NonRes_{t-1} debt securities held by non-residents, % of total. Standard errors in parentheses.

When FR and FC are the transition variables, the estimated threshold stands at 0.421 and 66.43, representing 66.67% and 61.70% of observations in the lower regime respectively. Interestingly,

the coefficient on output gap is positive for the countries in the high regime suggesting that fiscal policy is counter cyclical in the presence of strong fiscal institutions and for countries with high scores in the fiscal rules index. For countries in low regimes of FR and FC output gap coefficients are negative providing evidence of procyclicality. The impact of debt is positive in both regimes though the differences show that there is an improvement in countries in the higher regime in both FR and FC. The coefficients of the exogenous variables are in line with the results in the previous section.

Table 6 presents results with interactions between the output gap and FR and FC, as well as with past debt. The results are consistent with those reported in Table 5, reporting positive signs across all models. Countries with high levels of debt should have a greater incentive to adopt countercyclical fiscal policies, while the presence of robust fiscal rules and high-quality fiscal councils can help alleviate procyclical fiscal policies and reinforce fiscal discipline. The findings in Table 6 also highlight the fiscal heterogeneity across countries in the Euro area, as demonstrated by the thresholds. Clearly, a higher degree of coordination in fiscal policies within the Euro area is necessary to address fiscal imbalances and safeguard economic stability.

Table 6: Threshold dynamic analysis with interactions in the Euro-area

	Threshold Var. $y\text{-gap}_t$	Threshold Var. $Debt_{t-1}$	Threshold Var. FR	Threshold Var. FC_{SIFI}
Lower Regime				
$\Delta CAPB_{t-1,lower}$	-0.143 (0.096)	-0.199 (0.09)	-0.145 (0.076)	-0.183 (0.062)
FR_{lower}	0.051 (0.094)	0.086 (0.012)	0.028 (0.009)	0.019 (0.013)
FC_{lower}	0.018 (0.006)	0.014 (0.001)	0.091 (0.011)	0.098 (0.020)
$Debt_{t-1,lower}$	0.352 (0.186)	0.228 (0.165)	0.165 (0.241)	0.231 (0.233)
$y\text{-gap}_t$	-0.289 (0.117)	0.243 (0.090)	0.267 (0.115)	0.234 (0.012)
Upper Regime				
$\Delta CAPB_{t-1,upper}$	-0.247 (0.110)	-0.361 (0.119)	-0.113 (0.287)	-0.118 (0.138)
FR_{upper}	0.078 (0.012)	0.066 (0.018)	0.119 (0.001)	0.128 (0.020)
FC_{upper}	0.093 (0.015)	0.073 (0.083)	0.112 (0.013)	0.109 (0.009)
$Debt_{t-1,upper}$	0.403 (0.147)	0.239 (0.197)	0.252 (0.135)	0.315 (0.120)
$y\text{-gap}_t$	0.153 (0.171)	-0.154 (0.169)	0.338 (0.178)	0.392 (0.179)
Threshold	0.211 (0.171)	77.08 (30.37)	0.461 (0.079)	65.16 (24.89)
Differences				
$\Delta CAPB_{t-1}$	-0.104 (0.016)	-0.162 (0.101)	0.032 (0.001)	0.065 (0.001)
FR	0.027 (0.031)	-0.020 (0.001)	0.091 (0.012)	0.109 (0.011)

FC	0.075 (0.005)	0.059 (0.006)	0.021 (0.011)	0.011 (0.004)
Debt_{t-1}	0.051 (0.011)	0.011 (0.003)	0.087 (0.014)	0.084 (0.046)
y-gap_t	0.442 (0.109)	-0.397 (0.131)	0.071 (0.067)	0.158 (0.001)
Interactions				
y-gap_t × Debt_{t-1}	0.106 (0.024)	0.158 (0.006)	0.068 (0.014)	0.048 (0.020)
y-gap_t × FR_t	0.087 (0.011)	0.095 (0.014)	0.058 (0.024)	0.081 (0.030)
y-gap_t × FC_t	0.002 (0.021)	0.039 (0.027)	0.091 (0.017)	0.047 (0.001)
Exogenous variables				
ExternalDebt_{t-1}	0.036 (0.011)	0.084 (0.031)	0.043 (0.021)	0.026 (0.011)
Rating_{t-1}	0.051 (0.010)	0.021 (0.011)	0.101 (0.011)	0.008 (0.013)
NonRes_{t-1}	0.063 (0.017)	0.006 (0.025)	0.071 (0.003)	0.001 (0.011)
AveMaturity_{t-1}	0.070 (0.009)	0.012 (0.101)	0.016 (0.021)	0.021 (0.003)
Lower regime%	63.2	75	67.8	62.54
Bootstrap	0.0	0.0	0.0	0.0
J-test	37.57 (0.201)	36.12 (0.185)	32.96 (0.173)	36.53 (0.18)
No of Ivs	32	32	32	32
Observations	278	278	278	95

Source: Author's estimations. If subindex shows lower it implies below the threshold value, if upper it implies above the threshold value. $\Delta\text{CAPB}_{t-1, \text{lower}}$ cyclically adjusted primary balance below the threshold value. FC is measured by a dummy variable (columns 1 to 3), while FC_{SIFI} (column 4), is measured by the SIFI index; FR fiscal rules; y-gap_t is output gap; Debt_{t-1} debt general government debt as % of GDP; AveMaturity_{t-1} sovereign debt average maturity, years; ExternalDebt_{t-1} total external debt stocks, % of GDP; Rating_{t-1} foreign currency long-term debt ratings by major international rating agencies. NonRes_{t-1} debt securities held by non-residents, % of total. Standard errors in parentheses.

5 | Conclusions

Persistent deviation from the EU Treaty's reference values for deficit and debt has undermined the efficacy of economic governance and surveillance. While past EU economic governance provided a monitoring platform that recognised the heterogeneity of fiscal policies across member states, there is room for improvement in fiscal coordination. The EU Commission has proposed a new economic governance, aiming to enhance compliance with fiscal rules and fiscal coordination across EU countries. Our study contributes on the ongoing discussion of the new EU economic governance by revealing underlying thresholds of key variables like the debt to GDP ratio, and the output gap.

Our findings provide an endogenously derived debt threshold value at 75.6% for the EU, 78.7% for the Euro area, which could be used as additional information in the new EU economic governance of technical trajectories to bring debt in a downward trend. Our dynamic threshold estimation of debt could act as an intermediate debt target, for the high debt countries that report debt well in excess of 100%. Dynamic panel analysis reveals that fiscal policy in the EU has been procyclical. However, when we test for thresholds in the output gap, we reveal that countries in the higher regime have applied countercyclical fiscal policies. To this end, there is variability of fiscal policies across EU member states.

Our findings further show that while fiscal rules and fiscal councils have the potential to enhance EU economic governance, their impact on cyclically adjusted balance (CAPB) depends on their effectiveness and the level of debt to GDP ratios. Therefore, policymakers should not see fiscal rules and fiscal councils as a panacea for addressing fiscal challenges. Instead, they should consider other factors, such as country specific fiscal preferences, the design and implementation of fiscal rules, the level of political commitment to fiscal discipline, and the broader economic and institutional context in which fiscal rules apply. Moreover, the study highlights that there is significant room for improvement regarding fiscal councils. Around 62% of EU member states are classified in the low regime of fiscal council index, indicating that many fiscal councils may not be providing effective assessments and recommendations on fiscal policies.

Given these findings, policymakers may consider implementing measures to enhance the effectiveness of fiscal councils. This could involve providing them with additional resources and independence, ensuring that their recommendations are integral to fiscal decision-making processes, and enhancing their accountability. While fiscal rules (and fiscal councils) demonstrate the potential to mitigate procyclical fiscal policies, our study emphasises that achieving high effectiveness in fiscal rules and fiscal councils is crucial for overall fiscal performance. Therefore, the key to success lies in improving the EU's fiscal coordination to ensure that all member countries achieve optimal efficiency in implementing fiscal rules and maintaining effective fiscal councils.

To address variations across EU member states as highlighted by our findings of various thresholds, the new EU economic governance should enhance fiscal coordination. The new economic governance should aim to create a more cohesive and effective framework for fiscal policies across member states. The present findings highlight the need for country specific fiscal objectives that consider the diverse economic conditions and fiscal preferences across EU member states, while the evolving nature of fiscal challenges, for example, related to the digital and green transition, and to demographic changes, necessitate a continued effort to refine and adapt economic governance policies. Achieving a homogenous and effective fiscal framework remains a central goal for the EU economic governance.

Declarations

No funds, grants, or other support was received.

Data Availability Statement

The data that support the findings of this study are available from the corresponding author upon request.

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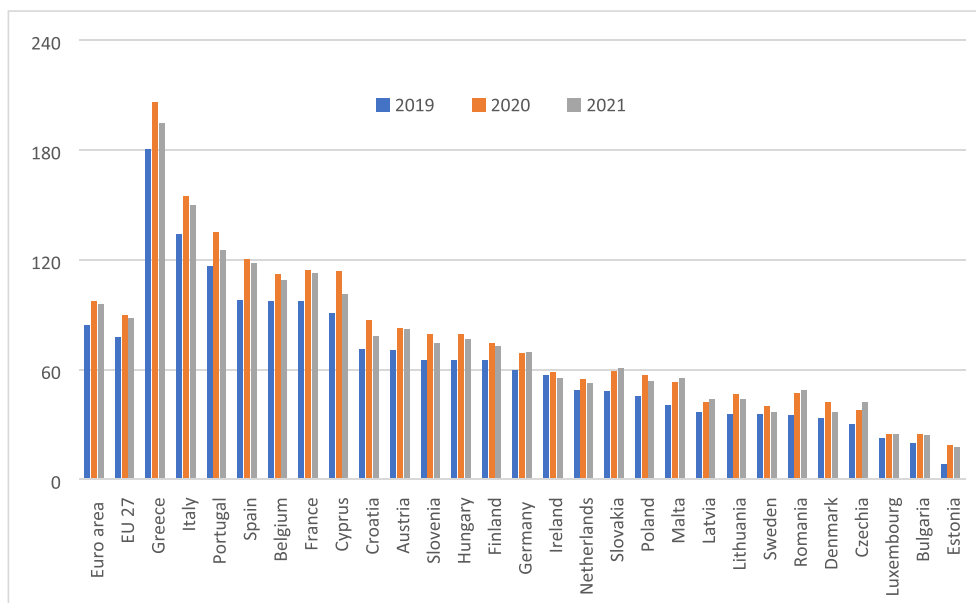
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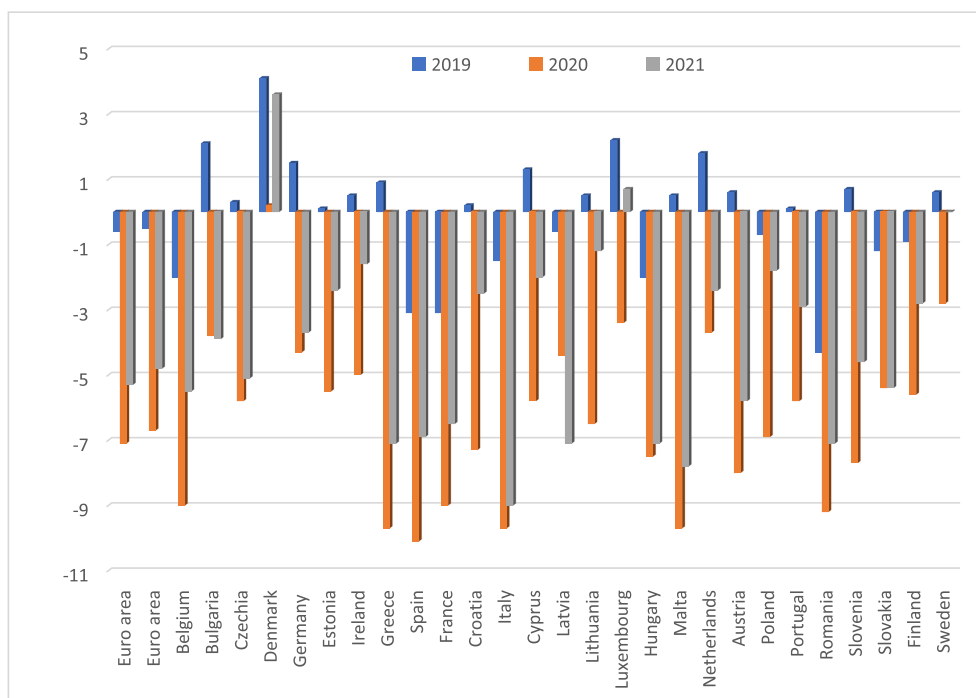
Appendix A

Figure A1: Government debt as % of GDP.



Source: Eurostat, EU.

Figure A2: Government deficit, % of GDP.



Source: EU DG ECFIN, Economic Forecasts, Autumn.

Table A1: Fiscal Rules Index of DG ECFIN, EU Commission.

	Mean	SD	min	max
AT	0.579	0.509	-0.029	1.309
BE	0.397	0.698	-0.212	1.227
BG	1.520	1.060	0.183	2.824
CY	0.069	1.045	-0.944	1.119
CZ	-0.426	0.982	-1.018	1.114
DE	0.668	0.762	-0.222	1.455
DK	0.635	0.458	-0.718	1.041
EE	1.026	0.303	0.435	1.338
EL	-0.180	0.814	-1.018	0.920
ES	1.250	0.651	0.473	1.963
FI	0.636	0.567	-0.200	1.310
FR	0.237	0.664	-0.687	0.886
HR	-0.067	0.818	-1.018	1.305
HU	-0.225	0.870	-1.018	0.775
IE	-0.012	0.932	-0.909	1.069
IT	0.962	1.265	-0.241	2.355
LT	0.929	1.290	-0.362	2.705
LU	0.486	0.306	0.030	0.865
LV	0.220	0.946	-0.692	1.196
MT	0.025	1.200	-1.018	1.329
NL	1.312	1.091	0.356	2.758
PL	0.792	0.400	0.202	1.298
PT	0.704	1.124	-0.393	1.985
RO	0.500	1.349	-0.664	2.258
SE	1.212	0.241	0.956	1.706
SI	-0.450	0.733	-1.018	0.444
SK	0.575	0.868	-0.364	1.417

Source: EU Commission. AT is Austria, BE is Belgium, BG is Bulgaria, DE is Germany, ES is Spain, FR is France, GR is Greece, IR is Ireland, IT is Italy, CY Cyprus, CZ is Check-Republic, DK Denmark, ES Estonia, FI Finland, HR is Croatia, HU is Hungary, LT Lithuania, LU Luxemburg, LV Latvia, NL Netherland, PT Portugal, SK Slovakia, SI Slovenia, SE Sweden.

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