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Do Commitment and Enforcement of Fiscal Rules Enhance Fiscal Stability? Evidence from European Union Countries

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Abstract

This study investigates the impact of fiscal rules on EU countries' fiscal stability, particularly within the Stability and Growth Pact (SGP) framework. By rigorously addressing endogeneity concerns, we show that, from all the rules imposed by the SGP, compliance with budget balance rules (BBR) is the only one that contributes to fiscal stability. However, countries that comply with the other targets, individually or simultaneously, or that established a constitutional BBR do not perform better than countries that comply exclusively with the budget balance rule. Finally, our results indicate that strong fiscal rules are not necessary to achieve better fiscal discipline.

Keywords: Fiscal rules; Compliance; European Union; Instrumental Variables; Treatment Effect Models

JEL Classification: C21, C26, E62, 052

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1. Introduction

Fiscal policy rules, which are numerical limits on government deficits or debt levels, are widely considered the most effective means to strengthen budgetary discipline and enhance the credibility of public finances. By instilling predictability and transparency into fiscal policy, these rules-based frameworks have emerged as the predominant mechanism for fiscal governance around the world: in 2021, there were 105 countries with some sort of fiscal rule (FR) in force, compared to only 23 countries in 1995, of which 15 countries belonged to the European Union (EU).

Fiscal rules among EU countries are laid out in the Stability and Growth Pact (SGP). Approved in 1997 and reformed in 2005 and 2011-13, the SGP clarifies the budgetary criteria set up in the 1992 Maastricht Treaty. Adherence to the Maastricht fiscal criterion demanded maintaining deficits and debts below 3% and 60% of GDP, respectively. EU countries also committed to reaching fiscal balance over the medium term. However, after the 2008 global financial crisis and subsequent euro area crisis, both fiscal and monetary policies began to diverge from the Maastricht criteria, highlighting that governments may fail to comply with these rules. Later, following the Covid crisis in 2020, EU nations activated escape clauses to either deviate from or suspend the fiscal rules.¹ This led to a harmonization of monetary and fiscal policies at the regional level, marked by extensive fiscal support both nationally and across Europe.

By improving government budget balances and reducing public debt levels, fiscal policy rules are a widely-accepted policy to promote fiscal discipline (see [Alesina and Perotti, 1995](#); [Debrun, 2000](#); [Lledo et al., 2010](#); [Piguillem and Riboni, 2021](#); [Caselli and Wingender, 2021](#)); etc.). Yet, in spite of the growing adherence of countries to FRs, some theoretical and empirical contributions point out to a more skeptical perspective regarding their potential benefits. This lack of consensus underlines, first, a methodological challenge and, second, issues related to the adherence and the implementation of the rules.

Indeed, when assessing the effectiveness of fiscal rules in stabilizing fiscal outcomes, there is a well-known methodological challenge related to the potentially endogenous decision of whether to adopt a fiscal rule in the first place (see [Grembi et al., 2016](#)). For instance, [Heinemann et al. \(2018\)](#) and [Caselli and Wingender \(2021\)](#) both document a constraining impact of rules that is considerably weakened if refined identification strategies are employed. To overcome this limit, the recent literature usually adopts a treatment effect strategy to estimate the causal effect of fiscal rules on different fiscal outcomes (see [Vinturis, 2023](#)). However, the widespread adoption of fiscal rules complicates this task. In particular, without a clear counterfactual or control group, isolating the true effect of fiscal rules becomes increasingly challenging.

Moreover, the effectiveness of fiscal rules can be hampered by commitment and enforcement problems. It could be argued that merely adopting a fiscal rule does not guarantee its effectiveness.

¹The SGP contains a preventive and a corrective arm, where the former seeks to monitor and prescribe actions to avoid the buildup of fiscal imbalances, and the latter – also referred to as Excessive Deficit Procedure (EDP) – seeks to monitor and prescribe actions to redress excessive fiscal imbalances.

Rather, the robustness of the rule and the degree of adherence might be key factors hindering the effectiveness of fiscal rules. For instance, [Grembi et al. \(2016\)](#) shows that relaxing fiscal rules triggers a substantial deficit bias. Similarly, [Milesi-Ferretti \(2004\)](#) finds that rules usually target only some parts of the budget and offer policymakers opportunities to sidestep the rules by complying with them without changing the overall fiscal discipline.

Our paper contributes to the debate on the relationship between fiscal rules and fiscal outcomes. We extend previous studies by looking at the effects of the commitment and enforcement of the FRs introduced by the SGP in the EU-27 countries. We start our analysis by quantify how large are primary fiscal balance adjustments in the presence of strong and conforming fiscal rules. We then study the composition of the fiscal adjustment by analyzing the general government's expenditure and public investment, as reliable indicators of discretionary fiscal policy ([Fatas and Mihov, 2006](#)). Finally, we investigate the sustainability of fiscal consolidation, studying whether the effects of complying with the rules endure over time or experience swift reversals post-compliance. This last point is crucial since political economy arguments point to possible switches due to the strong application of rules and after complying.²

Focusing on the EU-27 countries is important for several reasons. First, fiscal policies, including taxation, government spending and fiscal objectives, can differ among EU member states. Second, even if all the countries in the region have fiscal rules in place, they have alternated between compliance and non compliance of the rules for many year.³ Third, with the suspension of the general escape clause in 2024, attention has turned towards the future of fiscal governance in Europe and the imperative to reshape FRs to better suit the economic circumstances and without delaying economic recovery. In particular, it is recognized that fiscal rules need to adapt to the landscape of high debts and low real interest rates. They also need to enable or even provide incentives for counter-cyclical policies both in economic downturns and upturns. Finally, they need to be simpler, better enforced and less dependent on unobserved variables such as the output gap, while at the same time leaving room for judgement taking into account country-specific situations.

Instead of relying on *de jure* rules as the vast majority of the existing literature, we capture the bindingness of the rules using the Compliance Tracker provided by [Larch et al. \(2023\)](#) and the European Commission. This data allows us to focus on numerical as opposed to legal compliance. We further define full compliance as the event of complying with all existing supra-national rules set at the SGP simultaneously. In addition, we use data provided by [Asatryan et al. \(2018\)](#) to study the fiscal effect of balance budget rules (BBR) that are enshrined in national constitutions. This allow us to test the hypothesis that constitutional BBRs are more binding than non-constitutional,

²For instance, it is argued that due to the political costs of fiscal consolidation, politicians may face incentives not to comply with a rule in the future. Political economy considerations may also lead governments with large budgetary surpluses to relax their fiscal efforts in the presence of widespread non-compliance with the rule by other countries in the union (e.g. [Alesina, 2000](#)). In such cases, lobbying pressures by various interest groups over the apportionment of the surplus may lead to a less stringent fiscal position ([Caselli and Wingender, 2021](#)).

³For instance, in 2008, just before the crisis, only 11 of the 27 EU countries were in compliance with the fiscal criterion (see [Caselli and Wingender, 2021](#)).

or statutory laws. We finally rely on fiscal rule strength data as a final measure of the adherence and implementation of fiscal rules. The strength of the fiscal rule is also important since there are arguments to believe that neither strict rules nor full discretion are optimal to ensure fiscal discipline (e.g. [Blanchard et al., 2021](#)). As long as we know, we are the first to use this data to estimate the impact and effectiveness of fiscal rules.

We use two empirical strategies to estimate causality. The first relies on diffusion and regulation contagion arguments to instrument compliance and strength of fiscal rules. More precisely, as geographical proximity is known to be a powerful channel of diffusion of policy reforms (e.g. [Brueckner, 2003](#); [Pitlik, 2007](#)), the probability that a country complies with the criteria in place is likely to increase with the number of neighboring countries that have implemented similar policies (see [Caselli and Reynaud, 2020a](#)). We follow [Eklou and Joanis \(2019\)](#) and [Caselli and Reynaud \(2020a\)](#) and use the number of similar countries in the region that have complied with the rule as an instrument for compliance. The strength of the rule, in turn, is instrumented by the average strength in similar countries in the region.

Second, we adopt a heterogeneous difference-in-difference (DID) design as proposed in [de Chaisemartin and D’Haultfoeuille \(2020\)](#) and [de Chaisemartin and D’Haultfoeuille \(2024\)](#). DID requires that trends in fiscal variables of treated and control units are comparable. In a static set-up, the methodology allows us to control for the presence of other episodes of compliance. In its dynamic specification, we allow the effect to differ in each time period. This recent progress on staggered treatment designs and heterogeneous treatment effects makes these methods suitable for application that involves a staggered treatment, i.e., countries with the same FRs that complied with it for the first time at different dates. To the best of our knowledge, we are the first to estimate compliance impacts of fiscal rules using DID estimators robust to heterogeneity and contamination issues.

Our results show a significant impact of budget balance rule compliance on the primary balance, public expenditure, and public investment. On the contrary, even if expenditure rules are recognized as one of the most effective tools to manage budgetary aggregates, complying with this rule or maintaining a debt below 60% of GDP are not requirements to achieve consolidation. As a result, countries that accomplish all the targets imposed by the SGP simultaneously do not perform better than countries that comply exclusively with the budget balance rule. Our results also indicate that strong fiscal rules, defined as those rules with wide coverage, a strong legal base, independent monitoring, or those having well-specified consequences for non-compliance, are not necessary to achieve better fiscal performance.

The paper proceeds as follows. Section 2 provides a brief review of the literature. Section 3 describes the data and their properties. Section 4 introduces the empirical strategy. Section 5 presents the estimation results. Section 6 concludes.

2. Related literature

There is a large theoretical and empirical literature that suggests that governments persistently spend and borrow at levels that may deviate from the prescriptions of optimal fiscal policies (see [Rogoff, 1987](#) or [Persson and Tabellini, 2000](#), for instance). Moreover, overspending during economic growth may stem from a "voracity effect" ([Tornell and Lane, 1999](#)), which can undermine countercyclical fiscal policies.

Under this scenario, fiscal rules are a widely-accepted policy to promote fiscal discipline. The vast literature on fiscal policy and fiscal rules usually finds that FRs are associated with less discretion in conducting fiscal policy (e.g. [Alesina and Perotti, 1995](#); [Alesina et al., 1999](#); [Debrun, 2000](#); [Lledo et al., 2010](#); [Piguillem and Riboni, 2021](#); etc.), improve government budget balances ([Debrun et al., 2008](#); [Luechinger and Schaltegger, 2013](#); [Bergman et al., 2016](#); [Burret and Feld, 2018](#); [Caselli and Reynaud, 2020a](#)) and reduce public debt levels ([Hallerberg et al., 2007](#); [Azzimonti et al., 2016](#); [Asatryan et al., 2018](#)). Moreover, [Grembi et al. \(2016\)](#) show that relaxing fiscal rules increases deficit and lowers taxes. Fiscal rules are also shown to curb political budget cycles, which involve deliberate manipulations of fiscal policy to bolster the incumbent's reelection prospects ([Gupta et al., 2016](#); [Bonfatti and Forni, 2019](#); [Gootjes et al., 2021](#)). Moreover, FRs prompt the adoption of more countercyclical fiscal measures ([Combes et al., 2018](#); [Gootjes and de Haan, 2022](#)).

An important channel through which FRs can lead to fiscal stability is credibility. For instance, the literature suggests that, by constraining politicians' discretion, FRs signal a commitment to fiscal responsibility and foster political consensus across parties ([Eyraud et al., 2018](#)). Successful implementation of these rules can reassure economic agents, lower borrowing costs, and provide resources to cushion the economy against shocks or fund policies that promote long-term growth.

In spite of the well recognized positive effects on fiscal discipline, strict adherence to fiscal rules may prove counterproductive when economic policies, particularly public investment and structural reforms, can improve long-term fiscal health despite short-term fiscal burdens ([Fiori et al., 2012](#)). Moreover, fiscal rules may constrain governments seeking structural reforms with upfront costs, necessitating flexibility in rule enforcement ([Beetsma and Debrun, 2004](#); [Sajedi and Steinbach, 2019](#)). As such, countries do not always comply with rules.

A recent literature on fiscal rules compliance seeks to find its main determinants and their impact on fiscal outcomes. For instance, focusing on the EU members, [Reuter \(2019\)](#) uses a logistic model and highlights that determinants of fiscal rules' compliance particularly concern fiscal rules' characteristics such as the registration in the law, the level of rigor or the degree of public finance coverage. Furthermore, [Reuter \(2015\)](#) shows that, even if fiscal rules are not complied with, governments implement efforts to move close to the limit. Including both national and supranational rules and a large sample of emerging and developing countries, similar conclusion are reached by [Caselli et al. \(2018\)](#). Likewise, [Eyraud et al. \(2018\)](#) highlight a "magnet-effect" to describe the trend of government to move close to the limit of fiscal rules, pointing out the benchmark status that the fiscal rules seem to have, suggesting that compliance seems to be a goal

for governments. [Caselli and Reynaud \(2020b\)](#) also find evidence for 96 countries from 1985 to 2015 that there is a positive and significant relation between the index of rule strength and fiscal balance. However, their results lose significance when they exclude European countries from the sample. The authors justify this lack of evidence since European countries generally exhibit the strongest rules and removing them from the sample significantly reduces the sample variation.

The literature that aim to analyse the economic effects of compliance is even more scarce are relatively recent. An interesting contribution is [Larch et al. \(2023\)](#) who focuses on the compliance with the supranational fiscal rules included in the SGP and its effect on various macroeconomic variables such as market volatility, the output gap, nominal GDP growth or the quality of governance. More specifically on compliance and fiscal stability, [Reuter \(2015\)](#) finds that if countries do not comply with their fiscal rule in the year or forecast before, there is a strong downward tendency of the constrained variable towards the numerical limit. Finally, using basic panel regressions without attempt to control for endogeneity issues [Larch et al. \(2021\)](#) show that EU supranational fiscal rules compliance reduce public debt and promote counter-cyclical fiscal policies.

3. Data and descriptive statistics

3.1. Data

We employ data from 27 countries in the European Union between 1995 to 2022. We are interested on capturing the effects of the bindingness of the fiscal rules. To this purpose, our data for fiscal rules comes from three sources.

The first one is the fiscal rule strength index (FRSI) from the Fiscal Rules Database by the Directorate-General for Economic and Financial Affairs of the European Union. The criteria for the construction of the FRSI is that a fiscal rule is well designed when it is binding, thereby acting as an effective constraint on policy making. In the case of the FRSI, the bindingness of a rule relates to the stringency of the legal basis. Additional desirable features of fiscal rules include monitoring bodies and correction mechanisms in case of deviations from the rule targets. A final important property is the resilience to shocks through some form of flexibility, usually embedded in the rule design, such as escape clauses.

More in detail, to obtain a time series FRSI, a unique country Fiscal Rule Index (cFRI) is calculated as an average of four rules: budget balance rule (BBR), debt rule (DR), revenue rule (RR), and expenditure rules (ER) over the 1995-2022 period. For each of these rules, an FRSI is calculated as the average across five dimensions (the legal basis, the binding nature of the rule, the nature of the enforcement and monitoring body, the correction mechanism and media visibility), summed over all rules in force weighted by the sector coverage and a penalty in case of a second or third rule covering the same sector. It has a theoretical lower bound of 0 in case there are no rules in force and no theoretical upper bound.

The second source we use is the Compliance Tracker provided by [Larch et al. \(2023\)](#) and the European Commission. This data provides numerical compliance with the four main rules of the SGP since 1998. The indicators take the value of one (zero) if the relevant fiscal aggregates -the budget balance, the debt-to-GDP ratio, or government expenditure -evolved within (outside) the perimeters defined by the fiscal rules. Then, a country is considered: (i) deficit rule (DeficitR) compliant in case the -3% of the deficit to GDP threshold is breached, the deviation remains small (maximum 0.5% of GDP); ii) debt rule (DebtR) compliant if the debt-to-GDP ratio is below 60% of GDP or if the excess above 60% of GDP has been declining by 1/20 on average over the past three years; iii) balance budget rule (BBR) compliant if the budget balance of the general government is equal or above -3% of GDP; and iv) Structural balance rule (ER) compliance if the structural budget balance of the general government is at or above the medium-term objective. It is important to note that for countries that joined the EU after the inception of the SGP and for rules introduced after 1997, part of the compliance scores are hypothetical: They tell us how fiscal performance compared to the requirements of the SGP, and more importantly, whether compliance changed significantly once a country joined the EU or a rule was introduced.⁴ Based on this information, we construct a variable that takes the value of one when there is compliance and the fiscal rule set at the SGP is active. This implies that years before 1998 take the value of zero. We further create a full compliance indicator, which is a binary variable that equals one for country/periods where there was compliance for the four rules simultaneously.⁵

A final measure of the bindingness of a fiscal rule is based on data provided by [Asatryan et al. \(2018\)](#). The authors argue that a recent trend in advanced economies has been to strengthen the credibility of fiscal rules by enshrining them at the highest level of law: national constitutions. Indeed, during our time period, four countries in our sample: Austria in 2008, Denmark and Italy in 2014, and Spain in 2011 have passed legislations.⁶ In these cases, the treatment variable takes the value of one for the country/period after the change in the constitution.

The main dependent variable is the primary fiscal balances of the general government (percent of GDP). The primary balance refers to the financial situation of the government, considering revenues and expenditures but excluding interest payments on outstanding debt from both revenues and expenditures. It reflects whether the government is running a surplus (revenues exceed expenditures), a deficit (expenditures exceed revenues), or is balanced (revenues equal expenditures) over a certain period. As the primary balance focuses solely on the government's fiscal position and excludes the cost of servicing its existing debt – the government does not control the interest payments – it provides a clear picture of the government's ability to finance its ongoing operations without relying on borrowed funds. It is also a key indicator as regards public debt sustainability (see [Combes et al. \(2018\)](#)). In addition, we study two further measures of a country's fiscal performance: the general government final consumption expenditure, which consists of to-

⁴See [Larch et al. \(2023\)](#) for further details on the data construction.

⁵It is important to note that whereas compliance relies on supranational rules the FRSI relies on national rules.

⁶Switzerland and Germany are the two exceptions among advanced countries that already had such constitutional rules.

tal expense and the net acquisition of non-financial assets and the general government investment (gross fixed capital formation), both as percentage of GDP (source WEO and OECD respectively).⁷

Regarding the control variables and to address the influence of the fiscal stance and the fact that elevated public debt levels may prompt higher fiscal surpluses, we incorporate the lag of public debt (see [Bohn, 1998](#)). Real GDP growth rate is included to reflect domestic economic conditions, which significantly influence fiscal policy behavior. We also include trade openness to capture external conditions affecting government fiscal behavior ([Barbier-Gauchard et al., 2021](#)). Finally, including private investment helps control for potential crowding-in or crowding-out effects between public and private spending ([Vinturis, 2023](#)).

The detailed descriptions and sources of all variables are provided in the table [Appendix C.1](#).

3.2. Descriptive statistics

A notable feature of fiscal behavior across EU countries is its substantial divergence not only to fiscal behavior but also regarding the strength and compliance of the fiscal rules in place.

Indeed, as seen in the first plot in [Figure 1](#) there are important differences in the primary balance across EU countries. Notably, countries like Belgium, Bulgaria, Denmark, Finland, Germany, Ireland, and the Netherlands display a cluster of values above the median, indicating a generally positive primary balance. In contrast, countries such as Croatia, Czech Republic, Greece, Romania or Slovak Republic show more variability, often dipping into negative territories, reflecting fiscal deficits. Concerning differences in public expenditure, we observe that countries cluster around 40-50% of GDP with no extreme outliers. This suggests a relative uniformity in public spending, although the span of the boxes and whiskers indicates that the range of expenditures as a percentage of GDP can vary significantly from one country to another. Public investment, in turn, is relatively higher in Croatia, Cyprus and Czechia compared to the rest of the countries, probably linked to specific national policies or periods of economic stimulus.

The second series of figures provides insights into compliance with fiscal rules over time. The plots in [Figure 2](#) show in gray areas the dates and countries that complied with each fiscal rule after the SGP entered into force in the late 1990s. The last figure shows compliance with all four rules, i.e. full compliance.⁸ As seen, compliance with EU Fiscal Rules has been mixed. Whereas the accomplishment of debt and deficit rules is more generalized, budgetary and expenditure rules are

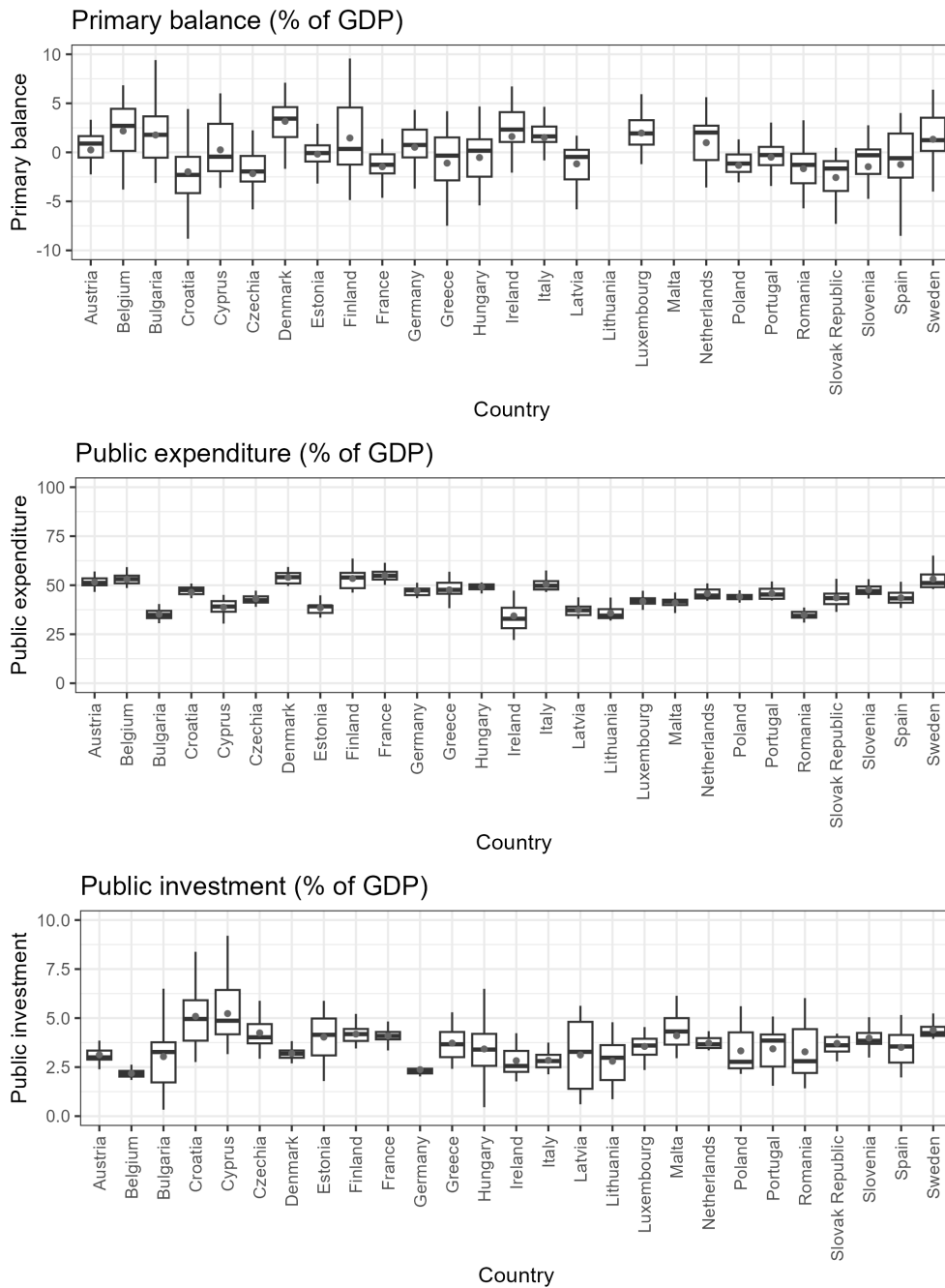
⁷Government total expenditure comprises several categories such as capital investments (gross capital formation), which made up 6.7% of general government total expenditure in the EU in 2022. Other categories included are: intermediate consumption; compensation of employees; social payments; social transfers in kind; other taxes on production; property income, etc.

⁸That is, compliance takes the value of 1 if the rule was implemented according to the SGP and there was compliance, zero otherwise. Therefore, for the debt, deficit and BB rules, the first year of compliance is 1998. As it was until the 2011 reform that the expenditure rule was introduced, all the years before this date are counted as zero. Full compliance considers three rules up to 2011 and four rules afterwards.

much less frequent, reflecting the challenges countries face in adjusting their fiscal policies to economic cycles. At the same time, during some periods there has been considerably less compliance of the rules. For instance, just before the crisis in 2008, only 16 of the 27 EU countries complied with the deficit rule, 6 with the budgetary (structural) rule, and only 3 with the expenditure rule. By 2020, when the Commission concluded that the conditions to activate the general escape clause were met in the EU, Denmark, Luxembourg, and Sweden were the only countries where the budget balance of the general government was below 3% of GDP. These are the only 4 countries that have achieved high compliance for several years. Otherwise, countries have either alternated between full compliance and non compliance during the whole period or have never complied with all the four rules simultaneously.⁹

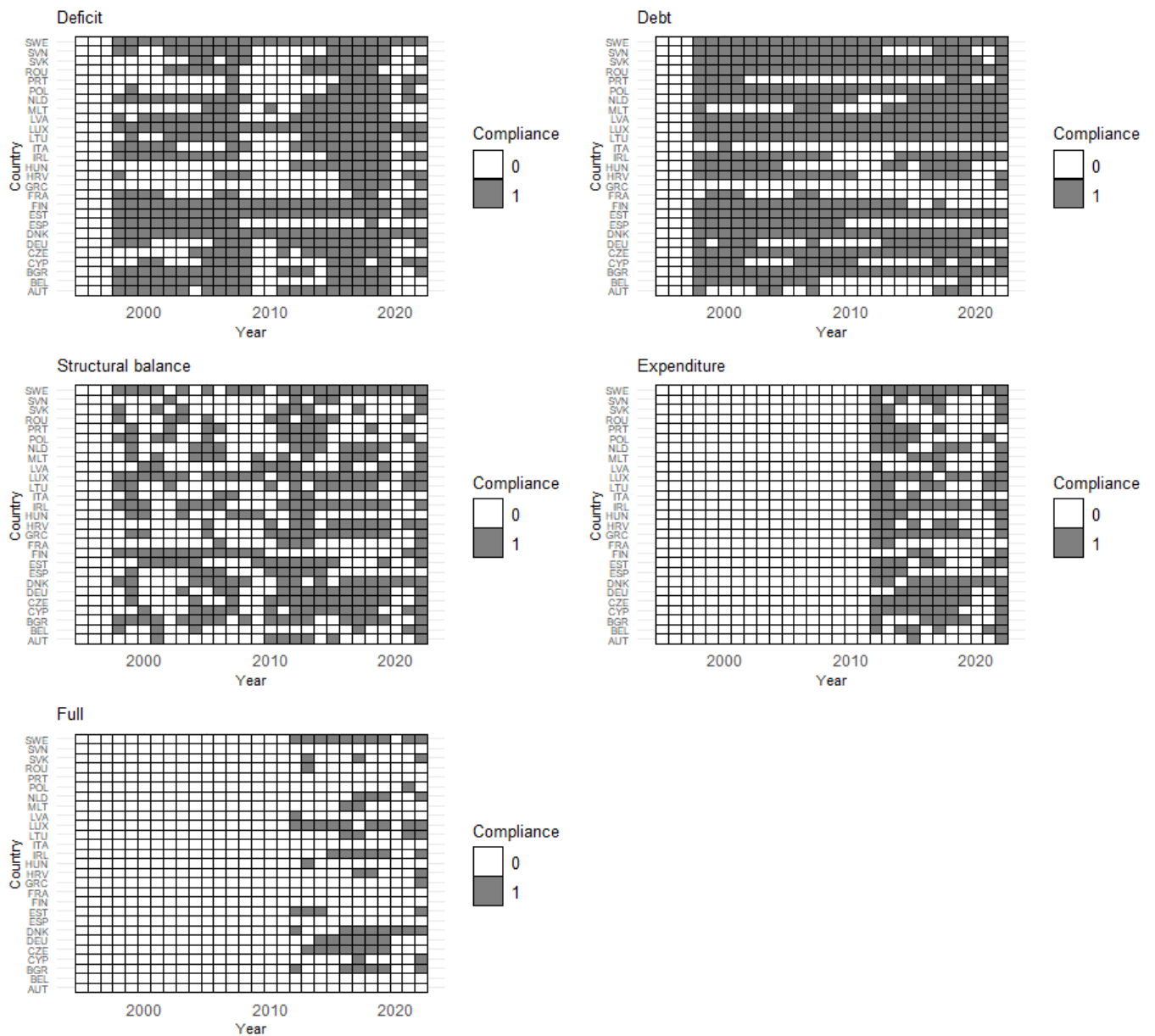
⁹The general escape clause does not suspend the procedures of the SGP, but it allows the Commission and the Council to depart from the budgetary requirements that would normally apply.

Figure 1: Box-Whisker plot for fiscal behavior in EU-27 countries. 1995-2022



Notes: The boxes in the plot represent the interquartile range of the data distribution for each country. The line inside the box represents the median. The whiskers extend up to 1.5 times the IQR from the edges of the box. The dots represent the mean of the variable for each country.

Figure 2: Fiscal rule compliance by year and country. 1995-2022

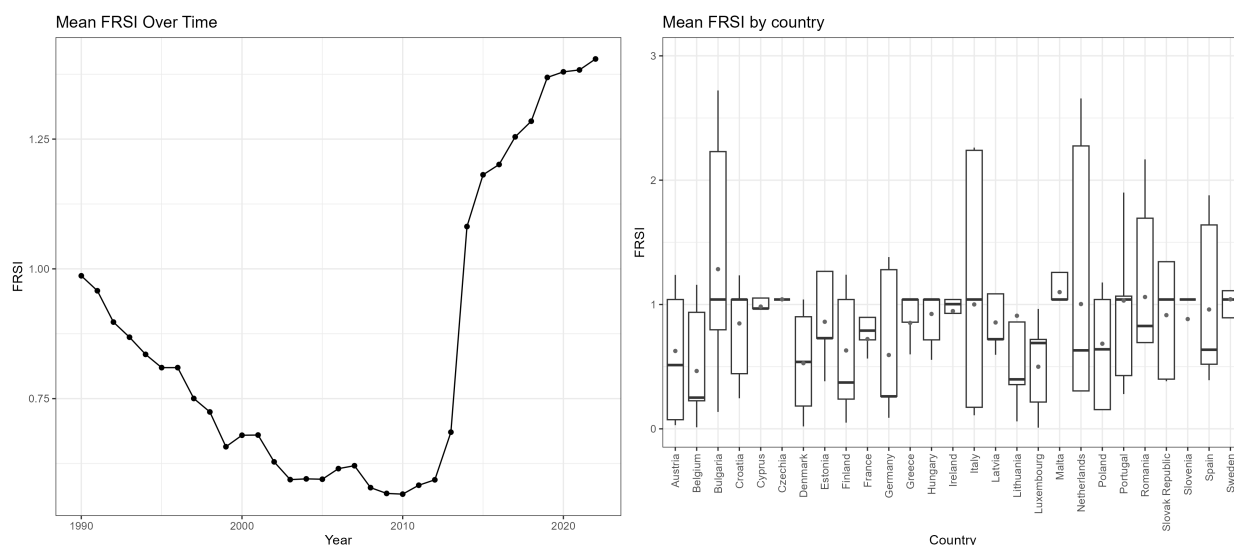


Notes: Compliance takes the value of 1 when the rule is accomplished (gray zone) and zero otherwise (white zone).

Finally, the two graphs in Figure 3 show the features of fiscal rule strength index. Looking at the development over the past two decades, there has been a clear upward trend for the member states of the European Union since 2010, which could be interpreted as a reaction to the crisis and a bid to improve fiscal sustainability. The second plot shows also noticeable differences among countries. For instance, Bulgaria, Malta, and Romania are characterized by having strong fiscal rules on average over the period. This implies that fiscal rules in these countries have wide coverage, a strong legal base, independent monitoring or/and well-specified consequences for non-compliance.

These are all characteristics generally thought to make FRs more effective. On the opposite side, Austria, Belgium, and Luxembourg have relatively weaker fiscal rules on average. The score of fiscal rules in Germany and Sweden suggests that they have consistent moderate fiscal rule strengths.

Figure 3: Fiscal rule strength index in EU-27 countries. Average evolution and Box-Whisker plot. 1995-2022



Notes: The first figure shows the average value over countries, by year. The boxes in the Box-Whisker plot represent the interquartile range of the data distribution for each country. The line inside the box represents the median. The whiskers extend up to 1.5 times the IQR from the edges of the box. The dots represent the mean of the variable for each country.

4. Empirical strategy

In addition to questions related to the binding nature of the rules, identifying their causal effect is not straightforward due to endogeneity issues. One source of endogeneity may come from selection bias, particularly if past fiscal performance influences the probability that a country accomplishes a rule. Second, endogeneity could also arise from the failure to account for variables that simultaneously drive the implementation of fiscal rules and correlate with the fiscal outcomes.

Nevertheless, we believe that our empirical methodologies offer reliable means to recover a causal estimate of the impact of fiscal rule compliance and strength on fiscal outcomes. The first one relies on instrumental variables. The second is a treatment effects framework.

4.1. Instrumental variables

Our departing point is the following panel data model:

$$Y_{i,t} = \beta_1 FRSI_{i,t} + \beta_2 Compliance_{i,t} + \beta_3 X_{i,t} + \alpha_i + trend_i + \epsilon_{i,t} \quad (1)$$

, where Y_{it} is the fiscal outcome (i.e. primary balance, public expenditure, or public investment), i and t , denote country and year, respectively. $FRSI$ is the fiscal rule strength index and $Compliance$ is a dummy variable that takes the value of 1 if in a specific year, the rule is active according to the SGP and there is compliance in country i . X is the set of control variables previously described. α_i is a fixed effect that controls for any country-specific constant characteristic and $trend_i$ is a country-specific time trend that allows us to take into account all time-varying unobserved heterogeneity. The inclusion of the country-specific trend (together with the fixed effects) may then pick up preferences for fiscal discipline which may vary over time and are potentially unobservable. Finally, ϵ_{it} is the error term.

To address reverse causality in Eq. (1), we follow [Eklou and Joanis \(2019\)](#) and [Caselli and Reynaud \(2020a\)](#) and exploit the geographical pattern of the region in terms of strength and compliance of fiscal rules. In particular, diffusion arguments state that the likelihood that a country complies with a fiscal rule should increase as the number of neighboring countries that have complied becomes larger. The literature also documents the possibility of “regulation contagion” where the choices of policymakers in other countries influence policymakers and regulators in the country. For instance, [Demirgüç-Kunt and Detragiache \(2002\)](#) suggest that, as a policy or regulation becomes more widespread, it becomes a “universal best practice” and hence countries are more likely to adopt it. Furthermore, as regulators or policymakers learn more about the workings of regulation from those countries implementing the regulation, regulators might modify their regulations after observing regulatory changes in other countries.

We follow these propositions and define two *contiguity* variables as follows:

$$contiguity_compliance_{i,t} = \sum_{j \neq i}^{n-i} Compliance_{j,t} \quad (2)$$

$$contiguity_FRSI_{i,t} = \frac{\sum_{j \neq i}^{n-i} FRSI_{j,t}}{N - 1} \quad (3)$$

Where j is the country in the region of domestic country i and $Compliance$ is the dummy variable defined as in Eq. (1). Therefore, the variable $contiguity_compliance_{i,t}$ captures the number of countries that have complied with the fiscal rule in place. In the case of the strength of the fiscal rule, we use the average $FRSI$ in the region as a possible instrument, as shown in Eq.(3).

4.2. A staggered difference in difference approach

For our DID setup, we rely on [de Chaisemartin and D’Haultfoeuille \(2020\)](#) and [de Chaisemartin and D’Haultfoeuille \(2024\)](#) recent DID heterogeneous estimator (DID_ℓ , henceforth), which overcome limitations recently identified for two-way fixed effects (TWFE) estimators widely utilized for policy evaluations with panel data. In particular, the recent DID literature has shown that TWFE relies on a homogeneous treatment assumption.

The DID_ℓ can accurately account for the characteristics of our setup and to provide consistent estimates of the Average Treatment effect on the Treated (ATT) for several reasons. First, our

context implies a binary treatment with variation in the timing of treatment conditions. Indeed, in our design, countries may get treated and leave the treatment, i.e. alternate between compliance and no-compliance, several times during the period. New DID estimators, in contrast, do not rely on homogeneous treatment effects for identification.

Second, the heterogeneous DID estimation procedure allows us to recover the contemporaneous effect of the treatment. Moreover, for full compliance and constitutional BBR, we are also able to identify the dynamic effect. Analyzing a static case can be more straightforward than a dynamic one since it assumes that the treatment effect remains constant. However, the dynamic case may provide a more accurate representation of the real-world scenario, where FRs' compliance effects can change over time due to various factors.

Third, if TWFE regressions include multiple treatments as is our case – simultaneous debt and deficit compliance, for instance – a TWFE estimator for the impact of one treatment can be ‘contaminated’ by other treatments’ impacts. Our estimation results in the static case are robust to having multiple treatments.¹⁰ The static specification also includes non-parametric trends. This implies that the DID estimators computed only compare switchers to controls whose treatment has not changed yet, with the same baseline treatment, and with the same value of the rest of the rules complied. As such, estimators are unbiased even if groups experience differential trends, provided all groups with the same value of the rest of the rules complied experience parallel trends.¹¹

The starting point in [de Chaisemartin and D’Haultfoeuille \(2020\)](#) and [de Chaisemartin and D’Haultfoeuille \(2024\)](#) is the definition of the treatment, which is a binary variable specified as follows:

$$\forall(g, t), D_{g,t} = 1\{E_g \geq t \geq F_g\}, \text{ with } 2 \leq F_g \leq E_g \quad (4)$$

where a panel of G groups is observed at T periods, indexed by g and t respectively. Then, $D_{g,t}$ denotes the treatment of group g at period t , F_g the first treatment, and E_g is the treatment before the first exit. We have then a treatment (complying) which is observed over multiple periods ($T > 2$) and where treated counties start receiving the treatment at different periods.

For each treatment, i.e. compliance, the DID_ℓ estimator produces an “event-study” graph, where the event at $t = 0$ is the first time that the FRs' compliance status switches on. In the dynamic case, the graph displays both the instantaneous effect at $t = 0$ and the dynamic effects which are “reduced-form evidence of whether increasing the treatment for $\ell + 1$ periods increases or decreases the outcome on average”. Then, the dynamic effect compares the evolution of outcomes between the units that switched into treatment ℓ periods ago and those that have not yet changed

¹⁰For instance, in the case of the static DID model for the deficit rule compliance, the specification excludes observations where there are changes in the other treatments, i.e. if the observation changed for no compliance to compliance for the other rules. This implies that any significant ATT is due to the change of the status regarding the specific rule.

¹¹See Section 1.4 of the Web Appendix of [de Chaisemartin and D’Haultfoeuille \(2024\)](#) for further details.

into treatment. Note, however, that the dynamic estimation does not take into account the case of multiple treatments. Indeed, to be able to distinguish the effect of an individual-compliant rule, there must be countries that comply with this rule exclusively. Applying this restriction would limit the number of observations drastically. Since this is not the case for full compliance and BBR constitutional exclusively, the results have a straight interpretation.

If we consider the proportion of those units to which each dynamic effect applies, then the DID_ℓ estimator's average total effect has a policy interpretation and is an estimator of an ATT, i.e., the proportional FRs' compliance effects are for all g and n . The weighted average of the effects of the current and $\ell - 1$ first treatment lags is noted $\delta_{g,\ell}^n$:

$$\delta_{g,\ell}^n = \frac{1}{\ell} \sum_{k=0}^{\ell-1} E[Y_{g,F_g-1+\ell}(0_{F_g-1}, 1_{\ell-k-1}, 1, 0_k) - Y_{g,F_g-1+\ell}(0_{F_g-1}, 1_{\ell-k-1}, 0, 0_k) | D] \quad (5)$$

where $E[Y_{g,F_g-1+\ell}(0_{F_g-1}, 1_{\ell-k-1}, 1, 0_k) | D]$ is the potential outcome of the treated cohort g at time t and $E[Y_{g,F_g-1+\ell}(0_{F_g-1}, 1_{\ell-k-1}, 0, 0_k) | D]$ is the potential outcome in the never treated state (or not yet treated), i.e., of units not subjected to the treatment over a particular period. $\delta_{g,\ell}^n$ is the average, across k , ranging from 0 to $\ell - 1$, of the effect of switching the k th treatment lag from 0 to 1, holding the previous treatments at 1 and subsequent treatments at 0.

Note that for identification, DID relies on a “parallel trends” assumption that implies that treated and untreated units' mean post-treatment outcomes would have proceeded along parallel paths, had there been no treatment. Finally, the use of a set of country and continent-specific year fixed effects enables us to control for unobservable factors that do not vary within countries in given years. We also control for country-specific parametric time trends and capture the effect of several time-varying observable variables.

5. Results and Discussion

5.1. IV estimation results

Table [Appendix A.1](#) in the Appendix shows the results of the probit model for the probability of compliance with each rule. As seen, an increase in the number of countries in the region that achieve the requirement of the rule in place increases the probability of compliance with the rule in the domestic country. Note also that stronger rules can decrease the probability of BBR or full compliance, even though the coefficients are significant only at the 10% significance level. Given these results, we use as instruments for compliance and strength the contiguity variables as defined in Eq.(2) and (3).¹² Table [5.1](#) presents the results of three specifications: model (1) includes dummy variables for the compliance of each of the four rules, separately; model (2) includes a dummy variable for full compliance; model (3) tests the effect of the constitutional BBR. All three models include control variables as well as time and country fixed effects.

¹²For the IV models, the dependent variable and all the rest of the explanatory variables are instrumented by their first lag.

Table 1: Compliance and primary balance. IV estimates

Dependent variable	Primary balance (1)	Primary balance (2)	Primary balance (3)
L.primary balance	0.538*** (0.049)	0.655*** (0.048)	0.662*** (0.048)
FRSI	-0.104 (0.128)	-0.116 (0.141)	-0.132 (0.142)
Deficit rule comp.	1.228*** (0.179)		
Debt rule comp.	0.303 (0.193)		
Exp. rule comp.	0.042 (0.199)		
BB rule comp.	1.340*** (0.119)		
Full comp.		0.745*** (0.217)	
BB rule constitutional			-0.144 (0.279)
L.Gross debt	0.022*** (0.004)	0.028*** (0.005)	0.024*** (0.005)
GDPG	0.100** (0.031)	0.086** (0.036)	0.088** (0.035)
Openness	0.010** (0.004)	0.010** (0.004)	0.013*** (0.003)
Observations	635	635	635

Note: (a) Standard errors are presented in parentheses; (b) * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$; (c) All the models include country and time fixed effects; (d) L. represents the lagged variable. IV are the number of countries complying with the rule each year, the average value for FRSI in the rest of the countries and lagged values of the dependent and control variables.

Regarding the control variables, for all specifications, we confirm the so-called “fiscal reaction function” proposed by [Bohn \(1998\)](#). Indeed, an increase of the level of public debt is significantly associated with the government’s surplus to stabilize possible unsustainable debt dynamics. As expected, the previous level of the primary balance, the GDP growth, and trade openness have all had a positive effect on the primary balance.

Let us now turn to our variables of interest. The first one is the FRSI, the variable that captures the strength and the quality of the fiscal rule. As seen, the coefficient is not significantly different from zero. Likewise, the introduction of a constitutional budget balance rule does not imply any significant improvement in the fiscal stance. These first results seem to indicate that strong fiscal rules, those that have a strong statutory or legal base, or rules that do not leave room for setting or revising objectives and impose strong corrective mechanisms in case of deviations and are set and monitored by independent bodies, do not really make any difference, in terms of fiscal stability, compared with softer rules.

For the different rules, the results show that complying with the debt or expenditure rules has no immediate impact on the primary balance. On the contrary, a positive effect on the primary balance is observed after the introduction of deficit and budget balance rules when countries comply with them. Likewise, full compliance has a positive effect on the primary balance. Note, however, that complying with all the rules set by the SGP does not seem to represent an advantage to the single compliance of the debt and/or BB rules.

Regarding the variables capturing the government’s fiscal decisions, [table 2](#) reports the results of the instrumental variables estimation for public expenditure and investment. The results show the expected inertia of the fiscal behavior, the coefficients associated with the past fiscal variables being statistically significant at a 1% confidence level. Again, the FRSI and constitutional BBRs’ do not significantly influence these fiscal variables.

The results also show that reducing public spending in EU countries requires at least compliance with budget balance and deficit rules established in the SGP. Compliance with these two leads to lower public expenditure, but compliance with expenditure and debt rules does not significantly change public expenditure, at least in the short term. Regarding the part of government spending that is directed towards the creation or improvement of physical or human capital assets, i.e., public investment, columns (4) to (6) in the table show that complying with the budget balance has a negative and significant coefficient at a 1% level of significance.

5.2. *Difference-in-difference estimators*

Our previous results show that compliance with the budget balance supranational fiscal rule significantly leads to excellent fiscal performance in European Union countries. However, it is not enough to observe short-term improvements. A complete picture of the effects of well-designed fiscal rules needed to ensure that fiscal stability is maintained in the long run.

Table 2: Compliance and public expenditure and investment. IV estimates

	Public Expenditure			Public Investment		
	(1)	(2)	(3)	(4)	(5)	(6)
L.Expenditure	0.677*** (0.068)	0.713*** (0.070)	0.641*** (0.069)			
L.Investment				0.666*** (0.053)	0.658*** (0.054)	0.580*** (0.158)
FRSI	0.222 (0.133)	0.292* (0.138)	0.186 (0.375)	-0.058 (0.063)	-0.040 (0.063)	-0.039 (0.064)
Deficit rule comp.	-0.444* (0.201)			0.070 (0.075)		
Debt rule comp.	-0.389 (0.256)			-0.015 (0.076)		
Exp. rule comp.	-0.386 (0.213)			-0.100 (0.098)		
BB rule comp.	-1.093*** (0.159)			-0.261*** (0.055)		
Full comp.		-0.659** (0.204)			-0.228* (0.109)	
BB rule constitutional			0.315 (0.279)			0.234 (0.149)
L.Gross debt	0.001 (0.006)	-0.005 (0.006)	-0.000 (0.008)	-0.003 (0.002)	-0.005* (0.003)	-0.006 (0.003)
GDPG	-0.302*** (0.028)	-0.279*** (0.028)	-0.373*** (0.032)	-0.001 (0.013)	0.008 (0.012)	0.005 (0.017)
Openness	-0.014* (0.007)	-0.016* (0.007)	-0.021*** (0.006)	-0.002 (0.002)	-0.001 (0.002)	0.001 (0.003)
Priv. investment				0.492** (0.161)	0.508** (0.173)	0.533** (0.192)
Observations	683	683	683	605	605	602

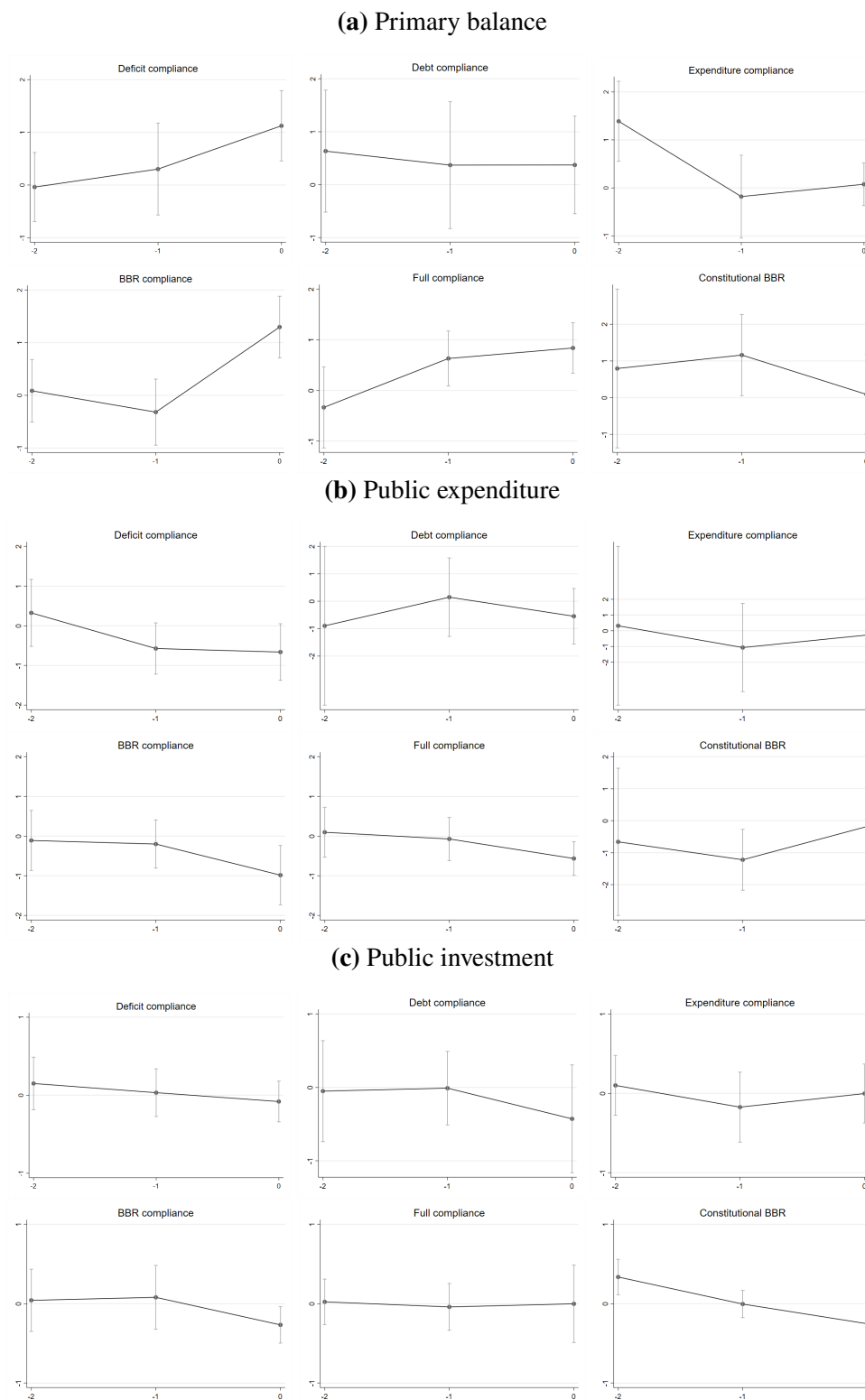
Note: (a) Standard errors are presented in parentheses; (b) * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$; (c) All the models include country and time fixed effects; (d) L. represents the lagged variable.

To this end, we now present the results of the DID analysis. The placebo analysis allows us to distinguish the true effects of the FRs' compliance from spurious correlations or external factors. Moreover, for some cases, the DID approach provides the dynamic effects to assess whether the impact of FRs' compliance is sustainable over time and to exclude if, for instance, a budget deficit reduction in one year is followed by a rebound in subsequent years if the underlying structural issues are not addressed.

Figures 4 plot the static effects for the primary balance –panel (a) –and its components –panel (b) and (c) –. The graphs show the placebo estimators for each year before the treatment ‘switches on’ for the first time and the effect at the time of the treatment. The graphs show that all of the placebo estimators, except for constitutional BBR, are near zero, and all are statistically insignificant (Figures 4 to left of $t = 0$), with a joint test of these placebos' significance failing to reject the null hypothesis that all placebo estimators are zero. The placebo test indicates that in the years leading to compliance with rules, the differences in outcome variables between treatment and control countries are, on average, close to zero. This absence of pre-trends suggests no systematic bias coming from selection. Thus, the parallel-trends assumption is not violated. This result point implies that, before complying with fiscal rules, the difference in primary balance between compliance and non-compliance countries is negligible. Economically, the advanced economic integration within the EU, the similar institutional structures imposed, for example, by the SGP and the Maastricht criteria, support the hypothesis of parallel trends.

The instantaneous effect (at $t = 0$), which estimates an impact at the start of treatment, suggests no immediate effects of compliance with debt and expenditure rules on the primary balance, public expenditure, and public investment. In other words, once countries complying with debt and expenditure rules, there are no immediate effects on these fiscal outcomes. We do not find evidence that constitutional BBRs affect these variables either. However, compliance with deficit and budget balance rules has a positive and significant effect on the primary balance. This suggests that adhering to these specific rules can immediately improve fiscal stability. Likewise, complying with BB rules positively impacts the primary balance and reduces public expenditure and investment. This implies that countries adhering to these rules tend to cut back on public spending and public investment in order to meet the compliance requirements. These two effects probably explain the significance of full compliance.

Figure 4: Effect of compliance on the primary balance, public expenditure and investment. DiD static coefficients



Notes: The figures show the average effect of FRs' compliance on the countries that comply. It measures the average difference in the fiscal primary balance, expenditure and investment between those countries that complied with the FRs and those that did not. In the x-axis values before zero represent the placebo. The zero value represents the date of the treatment.

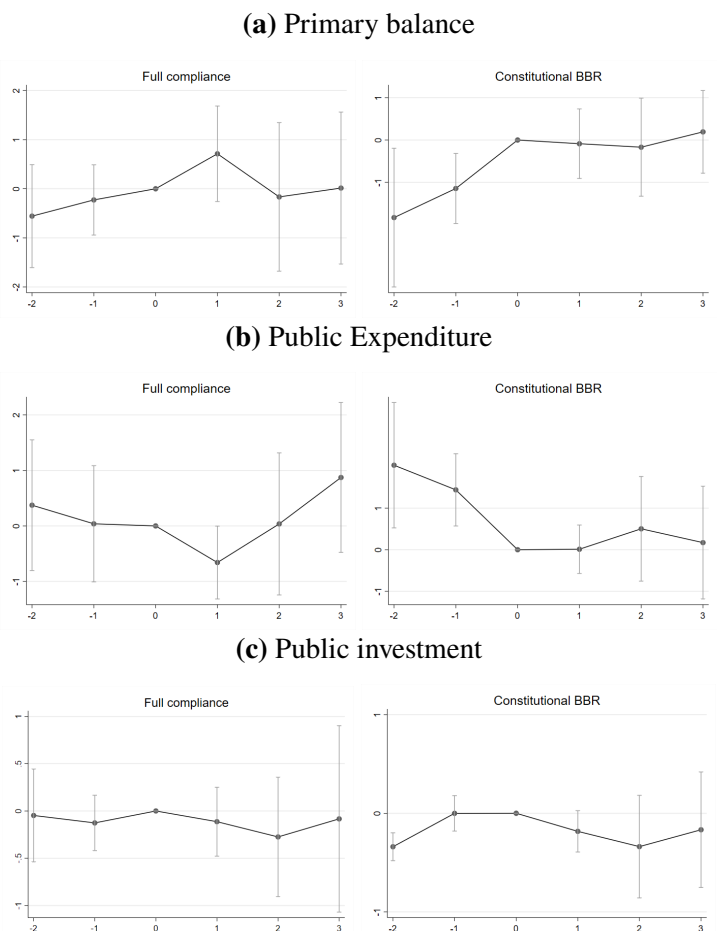
The dynamic DiD, presented in Figure 5, should be interpreted as follows. For either treatment, when there are cohorts, i.e., multiple treatment-start years, the dynamic effects blend those cohorts by combining them using common years after the treatment.¹³ This presumes that the impact is a function of years after treatment, which is well justified since discouraging the non-compliance of the rule can work better over time if word gets out about strong enforcement. Even if the dynamic DiD allows the study of the long-term implications, a drawback, in this case, is that, in order not to have bias, countries should comply exclusively with one rule. Yet, in our case, compliance is not exclusive, i.e., we can observe compliance with more than one rule. For instance, assume that there are only two rules: deficit and debt. Controlling by deficit compliance does not solve the problem if we are interested in the effect of debt compliance unless we assume that deficit compliance affects the fiscal variables only at the date of compliance with the deficit rule. Otherwise, we run into the problem of false control.¹⁴

Thus, for the dynamic DiD, we limit the analysis to two cases. The first one is for complying with all the rules simultaneously; the control is for all the rest of the possibilities (not complying or complying with one, two, or three rules). In the second case, the treatment is constitutional BBR. The dynamic effects, shown to the right of $t = 0$ in figure 5, indicate no significant persistent effect of full compliance on the primary balance, public expenditure, or investment. These graphs suggest that complying with all the rules set in the SGP does not increase fiscal stability over the medium term. Constitutional BBRs included in national legislation do not affect these variables either. nor does setting constitutional.

¹³For instance, the second dynamic effect combines effects in 2000 for 1998 compliance or in 2022 for compliance in the year 2020. In a dynamic model, this would mean that even after suspending the rules in 2020, the fact that a country complied with the rule in the past will potentially have an effect in 2022.

¹⁴Imagine we have three periods (1, 2, 3) and two rules, R1 and R2. Suppose that country A has never complied with rule R1 but complies with the R2 rule in years 2 and 3. Country B complies with rules R1 and R2 only in year 3. If we are interested in the effect of rule R1, by controlling with rule R2, we will be using country A as a control for country B. However, A is a false control because A applied the R2 rule in year 2, whereas B did not. If the model is dynamic, the fact that B applied R2 in year 2 influences its outcome at date 3, an effect that country A does not have. Note, however, that controlling by the presence of other treatments works in a static model, i.e., under the hypothesis that the rule compliance affects the primary balance only during the year of application.

Figure 5: Effect of compliance on the primary Balance, public expenditure and investment. DiD dynamic estimates



Notes: The figures show the average effect of FRs' compliance on the countries that comply. It measures the average difference in the fiscal primary balance between those countries that complied with the FRs and those that did not. In the x-axis, values before zero represent the placebo. The zero value represents the date of the treatment. The values above are dynamic effects.

6. Conclusions

Fiscal rules are designed to enhance fiscal discipline and ensure sustainable public finances. Ideally, such rules should lead to better fiscal control by setting clear constraints on budgetary policies. However, as the global financial crisis of 2008 and the COVID-19 pandemic in 2020 showed, governments do not always adhere to national or supranational fiscal rules. In particular, in 2020, European countries temporarily suspended their fiscal rules to implement necessary economic support measures. The reapplication and potential reform of fiscal rules in the region calls for a better understanding of the implications of strict adherence to fiscal rules in the future.

This paper contributes to this debate using data for the EU-27 countries from 1995-2022. We propose a robust evaluation of the causal impact of fiscal rules using methodologies to deal with

the endogenous decision to adopt the rules in the first place. Importantly, instead of evaluating the impact of fiscal rules' presence on fiscal outcomes, we focus on the effects of true adherence and the implementation of strict rules and pay special attention to the sustainability of complying with fiscal rules on fiscal stability.

We find that countries that comply with a budget balance rule achieve better fiscal outcomes in terms of primary balance, public expenditure, and public investment than countries that fail to comply with this rule. However, complying with the debt and expenditure rules imposed by the SGP, or enshrining budget balance rules at the highest level of law, i.e., national constitutions, do not provide any significant advantage compared to simple BBRs. We also show that compliance with all the fiscal rules simultaneously does not ensure fiscal stability in the long term.

While our study provides important insights, it is not without limitations. Despite using instrumental variables and DID methodologies, the potential endogeneity of fiscal rule adoption cannot be entirely ruled out. Countries may adopt or comply with rules in response to underlying fiscal conditions not fully captured by our instruments.

Finally, even if BBR compliance leads to better fiscal outcomes in the short term, our investigation is not informative about the desirability of these rigid rules on welfare. Indeed, as we show, when a government is under a budget constraint and it commits to this constraint, it restrains public expenditure and thus affects its public spending composition. This, in turn, may lead governments to reduce social or health expenditures, which could, in turn, have negative consequences for inequalities and quality of life. These are important issues that deserve further research.

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Appendix A.

Table Appendix A.1: Probability of compliance. Marginal effects using all other countries in the EU

	Deficit comp. (1)	Debt comp. (2)	BBR comp. (3)	ER compl. (4)	Full comp. (5)
Region's deficit compl.	0.185*** (0.021)	0.016 (0.021)	-0.008 (0.013)	0.082** (0.032)	
Region's debt compl.	0.051 (0.029)	0.310*** (0.047)	0.062** (0.020)	-0.116* (0.055)	
Region's BB compl.	0.036 (0.024)	0.031 (0.029)	0.095*** (0.017)	0.087 (0.051)	
Region's expend. compl.	-0.009 (0.019)	-0.019 (0.024)	0.023 (0.014)	0.177*** (0.038)	
Region's full compl.					0.244*** (0.042)
FRSI	0.127 (0.228)	0.543 (0.302)	-0.343* (0.174)	-0.602 (0.360)	-0.853* (0.415)
Observations	756	756	756	756	532

Note: (a) Standard errors are presented in parentheses; (b) The marginal effects are for a discrete change of dummy variable from 0 to 1; (c) * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$; (d) All the models include country-specific linear trends and fixed effects.

Appendix B.

Table Appendix B.1: Scores for the Fiscal Rule Strength Index

Criterion	Score
Criterion 1 Statutory/legal base	3: Constitutional 2: Legal Act of ordinary nature 1: Coalition agreement 0: Political commitment by a given authority or an annual budget law
Criterion 2 Room for setting or revising objectives	3: The target of the rule cannot be changed 1: Subject to parliamentary approval, the Gov. can temporarily change the target or it is mandated to decide on the target 0: Political commitment by a given authority ;or an annual budget law
Criterion 3a Body in charge of the monitoring	3: Monitoring by an independent authority 2: Monitoring by the court of auditors and/or parliament 1: Monitoring only by the ministry of finance or other government body 0: No regular public monitoring of the rule
Criterion 3b Real time monitoring	1: real-time monitoring takes place and the statutory base of the rule specifies corrective actions in case a risk of non-respect 0.5: Real-time monitoring takes place but the statutory base of the rule does not specify corrective actions 0: No real-time monitoring takes place
Criterion 3c Body in charge of monitoring the correction mechanism in case of deviation	1.5: An independent authority 1: The court of auditors and/or parliament 0: The ministry of finance or other government body 0: No specific body in charge of monitoring the correction mechanism 0: No correction mechanism in place
Criterion 3d: Independent body providing endorsing macro/budgetary forecasts	2: if there is an independent body for both 1: if there is an independent for either body providing the macroeconomic or the budgetary forecasts 0: if there is no independent body
Criterion 4: Correction mechanisms in case of deviation from the rule	4: Triggered automatically and there are pre-determined rules of the correction 2: Triggered automatically or there are pre-determined rules of the correction 1: The government is obliged to take or present corrective measures before the parliament but without a predefined timeline 0: The government is not obliged to take or present corrective measures
Criterion 5: Resilience to shocks or events outside the control of the government	The score is the sum of the following elements defined: Does the rule contain clearly defined escape clauses in line with the SGP? (1/0) Is there a budgetary margin defined in relation to the rule? (1/0) Are targets defined in cyclically-adjusted terms ? (1/0) Are there exclusions from the rule that fall outside authorities' control? (1/0)

Notes: Criteria for the calculation of the Fiscal Rule Strength Index (FRSI). See the Directorate General for Economic and Financial Affairs for more details.

Appendix C.

Table Appendix C.1: Variables, sources and definitions

Variable	Source	Definition
Fiscal Rules' compliance	Calculations based on the IMF's Fiscal Rules Dataset and ECFIN	1 = country has adopted a FR established by the SGP and complied with specific rule, 0 otherwise
FRSI	Fiscal Rules Database. Fiscal governance database, European Commission	Indices on the strength and quality of budgetary rules.
BB rule constitutional	see Asatryan et al. (2018)	1 = country for the country/period after the change in the constitution, 0 otherwise
Primary balance	IMF	Government primary balance, percent of GDP (% of GDP)
Public Expenditure	WB World Economic Outlook	General government final consumption expenditure (% of GDP).
Public investment	Calculations based on IMF Investment and Capital Stock	General government investment (gross fixed capital formation), percent GDP
Private investment	Calculations based on IMF Investment and Capital Stock	Private investment (gross fixed capital formation), percent GDP
Gross debt	IMF	General government gross debt (Percent of GDP)
GDP growth rate	WB	GDP deflator growth rate, annual
Trade openness	WB	Exports plus imports as percent of GDP

Notes: IMF: International Monetary Fund. WB: World Bank.