

## Article

# The implication of Fiscal Principles and Rules on Promoting Sustainable Public Finances in the EU Countries

Mihaela Onofrei <sup>1</sup>, Anca Gavriluță (Vatamanu) <sup>1</sup>, Ionel Bostan <sup>2,\*</sup>, Florin Oprea <sup>1</sup>, Gigel Paraschiv <sup>3</sup> and Cristina Mihaela Lazăr <sup>4</sup>

<sup>1</sup> Faculty of Economics and Business Administration, Alexandru Ioan Cuza University, 22 Carol I, 700505 Iasi, Romania; onofrei@uaic.ro (M.O.); gavriluta.anca@yahoo.com (A.G.V.); foprea@uaic.ro (F.O.)

<sup>2</sup> Faculty of Law and Administrative Sciences, Ștefan cel Mare University, Universitatii 13, 720229 Suceava, Romania

<sup>3</sup> Faculty of Biotechnical Systems Engineering, Polytechnic University, Bucharest, 313 Splaiul Independenței, 060042 Bucharest, Romania; paraschiv2005@yahoo.com

<sup>4</sup> Faculty of Economic Sciences, Ovidius University, 58 Ion Vodă, 900527 Constanta, Romania; lazarcristinam@yahoo.com

\* Correspondence: ionel\_bostan@yahoo.com or ionel.bostan@fdsa.usv.ro; Tel.: +40 230 216 147

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**Abstract:** The purpose of this study was to analyze fiscal behavior in the European Union countries, to highlight the implications of institutional constraints on healthy fiscal attitudes, and to test the relationship between government decisions, fiscal responsibility instruments, and the sustainability of public finances during the period 2000–2014. By using panel data analysis, we tested the responsiveness of primary balance to government indebtedness, as well as to some determinants of fiscal responsibility, such as the degree of public spending or fiscal rules effectiveness, and we included two different perspectives regarding fiscal rules status. First, we computed a fiscal responsibility index, which measures the applicability of or compliance with the fiscal rules, referring to legal dimensions and administrative and institutional capacity. Second, we established a fiscal responsibility convergence index, which measures the status of the EU Member States regarding the approach of numerical rules. The empirical findings indicate that fiscal authorities do not act to the existing stock of public debt and highlights a negative response of budget balances to the stock of outstanding debt. Fiscal position improves when the index of fiscal responsibility is involved and countries become more sustainable when they are related to the entire level of fiscal governance, with respect to legal framework, institutional and administrative capacity, but at the debt ratio threshold of over 90%, the effect of the overall fiscal rule comes out as less relevant for the improvement of the primary balance.

**Keywords:** sustainability of public finances; budget rules; fiscal governance; fiscal behavior; budgetary consolidation / weakening

## 1. Introduction

In the wake of the financial crisis of 2008–2009, the topic of public finance sustainability received additional attention, with respect to the relationship between the fiscal rules, sound public finance, and government indebtedness. The core purpose of the government's fiscal behavior is to ensure that finance flows to support the long-term needs of care for future generation, which means that the implementation of sound fiscal policy, or the entire improvement of fiscal discipline through fiscal rules, is one of the main constraints that affect all governments, and it is an important topic for policymakers and researchers alike, with public finance sustainability being at the center of any

transition to economic sustainability [1,2]. After 2008, the entire EU fiscal governance framework, based on a set of specific rules, tried to improve the quality of public finances and to control the entire activity performed at a political and economic level, by striking a balance between the conflicting needs of political stakes and sustainable goals. These goals should be tackled to implement an analytical framework for fiscal sustainability and a comprehensive approach to achieve public finance sustainability, with respect to intergenerational fairness in terms of government debt levels and government solvency.

Starting with the incidence of the Maastricht Treaty, which was signed in February 1992, and which, in Articles 101 and 104, lays down the requirements to keep the public deficit at low levels and to ensure budgetary discipline, the requirements for ensuring fiscal sustainability in the European Member States tend to multiply constantly. Subsequently, in order to consolidate the idea of fiscal discipline within the Economic and Monetary Union and to make the previous treaty more precise, the Stability and Growth Pact appeared in June 1997. If we refer, for instance, to the aforementioned legislative instrument (the Stability and Growth Pact), in terms of alignment with imposed standards, there have been different particularities at the level of each Member State, and this idea is applicable to subsequent legislative instruments (Revision of the Stability and Growth Pact of 2005, Treaty on Stability, Coordination and Governance within the Economic and Monetary Union—European Fiscal Pact (2013), the so-called "Two pack", as well as the "Six pack").

Even if empirical evidence tends to confirm the impact of fiscal rules on fiscal performance [3–6], there are some arguments which highlight that the role of fiscal rules in determining fiscal performance can be influenced by preferences for fiscal discipline [7–9]. Subsequently, analyses have been extended to the idea of good governance and the efficiency of government institutions, and according to [10–14], it is shown that in various contexts, the consolidation of sustainable public finances imply efficiency of government jurisdictions and institutions, as well as the good governance indicators. However, the theoretical background for fiscal rules as a solution for consolidated public finance sustainability is not fully articulated, but we should admit that in the absence of more fundamental options, fiscal rules may be useful. Moreover, even if a study of European Commission points that show stronger fiscal rules are conducive to sound public finance [15], we should admit that stronger fiscal rule can contribute to the improvement of primary budget balance only if the political and institutional determinants of a government's fiscal behavior are related to the idea of fiscal consolidation. Furthermore, according to Andersen and Minarik [16], it is important to be related to some design choices for fiscal rules, such as the level of fiscal deficits, the implication of rule on economic recovery and growth, and on maintaining fiscal responsibility and public credibility.

Recent measures and reforms in this area have made considerable changes to the substantiation of fiscal policy strategies, but due to the fact that the strength and enforcement of the rules have substantially diminished the effect on enhancing fiscal sustainability, tools for empowering decision-makers and strengthening the applicability of already existing instruments are still being sought. Thus, we identify two major considerations: the power of constraint of fiscal rules and their endogeneity. In line with these considerations, we could say in the Euro Area, for example, the basic premise was that due to numerical rules, governments could avoid excessive spending and borrow under the conditions of making credible commitments on future government behavior. However, without resorting to forms of coercion, it is not at all certain—and it cannot be guaranteed—that these rules will constrain politicians from running unsustainable budgetary decisions and consolidating a rules-based system, without jeopardizing long-term fiscal sustainability. Laws can be modified formally or less formally, but even if the rules are not formally amended, there is often enough space for circumvention strategies. For instance, in the profile of Germany, debt rules limit the deficit of states, but we do not find limits regarding the deficit of municipalities. Anecdotal evidence suggests that, in response, the fiscal burden is heading towards the municipal level, which is increasingly relying on short-term loans. Alternatively, superficial deficit limits can be exceeded [17,18].

In the above context, we analyse fiscal behavior at the EU level and the implications of institutional constraints on the optimal management of public finances. The hypothesis to be tested

is whether, when there is increase in fiscal rules and fiscal governance framework, governments choose to deliver an optimal management of public finances and to stabilize the level of public debt. In other words, do fiscal rules and fiscal governance frameworks enhance or control the EU fiscal sustainability framework.

The paper also focuses on the current topic in this area of discussion on the level of state involvement in mitigating the impact of the influence of the economic crisis and demographic changes, by highlighting some aspects of healthy fiscal attitudes. With respect to the existing dependence between countries, which can reflect common changes in the behavior of the tax authorities and common political shocks, by using regression analysis, we analyze determinants of government fiscal behavior for the EU countries for the period between 2000 and 2014.

Considering the existing literature on fiscal rules, fiscal consolidation, and fiscal behavior in the EU countries, there are some ways in which our work brings additional insights to research on this area. There are many debates in terms of the variables used as proxies for fiscal rule relevance and their implications for fiscal responsibility. Most of the paper tests the importance of fiscal rules in place by using dummy variables, and assuming one value for the existence of rules in place, and zero otherwise, verifying, for instance, the relationship between the rules on debt and expenditure, and their impact on the level of indebtedness [19,20–24], but not if the status of government insolvency measured by debt levels matters for the effectiveness of fiscal rules. That is why we included in our analysis two different perspectives regarding fiscal rules status, and we computed fiscal responsibility index, which measures the applicability or compliance with the fiscal rules, referring to legal dimensions, administrative and institutional capacity, and the fiscal responsibility convergence index, which measures the status of the EU Member States regarding the approach of numerical rules. Second, we examine how fiscal authorities act to the existing stock of public debt, and we capture the response of budget balances to the stock of outstanding debt by analyzing the interaction between the status of government indebtedness, debt ratio thresholds, and the effectiveness of fiscal rules, in terms of legal, administrative and institutional capacity. Third, we analyze not only the state of the fiscal rules in place, but also the effectiveness of these rules, by testing their implications for a fiscal consolidation path, and we establish when fiscal rule can help to attain and protect the sustainability of public finance. To the best of our knowledge, an analysis on healthy fiscal attitudes from the perspective of applicability or compliance with fiscal rules—referring to legal dimensions, administrative and institutional capacity, and taking into consideration the status of the EU Member States regarding the approach of numerical rules—has not been done before, and our results may be helpful for governments shaping their own policies regarding fiscal governance objectives. In Section Two motivation for our work is provided, and we describe the econometric methodology. Section Three presents and discusses our results, and Section Four highlights the paper's main findings.

## 2. Motivation and Econometric Methodology

The last financial crisis hit EU public finance sustainability in the early stage, thereafter, the phenomenon of fiscal consolidation and the entire fiscal governance framework started to be reanalyzed, and fiscal discipline seems to have become a precondition for financial stability. But given that it is not so easy to establish mechanisms capable of granting policy makers responsibility, in the European Union, most of the member countries now exceed the three percent of the budget deficit set out in the Stability and Growth Pact, without fear at any time of the consequences of the penalization mechanisms. The empirical question, therefore, is whether fiscal rules could and should be used to further restrict government behavior in terms of spending and indebtedness. Most of methodological approaches outlined above tend to lose sight of the fact that discretionary fiscal policy and electoral cycle potentially causes a problem of endogeneity. In other words, it is possible that the rules cannot have a causal impact on fiscal performance, but could be just a symptom of a fundamental fiscal preference, and countries with low fiscal deficits being led by fiscal conservatism, and fiscal prudence of certain collectivities as they are "commonly agreed". Considering the above-mentioned judgement, the question arises whether this association between strict rules and small

deficits, therefore, necessarily indicates that those rules make a difference or are the effect of fiscal conservatism. The general objective of this paper is to identify the status of fiscal behavior in the European Union countries, testing the relationship between government decisions, fiscal responsibility instruments, and the sustainability of public finances during the period 2000–2014. The specific objectives included a phase of our study which helped us to carry out our general objective and address various aspects of the problem: we assessed the EU fiscal governance framework and the practice of the community related to fiscal rules; we developed an empirical analysis that aims to quantify (through an econometric study) and interpret the implications of the impact of the electoral cycle and primary expenses on the consolidation of the sustainability of European public finances; we tested the responsiveness of primary balance to government indebtedness, as well as to some determinants of fiscal responsibility, such as the degree of public spending or the effectiveness of fiscal rules; and we included two different perspectives regarding fiscal rules status (the fiscal responsibility index and the convergence score to fiscal responsibility).

To correct for endogeneity, we used dummy variables, and we assumed that when we considered the determinants of government fiscal behavior, it seemed appropriate to presume that governments obtain primary surpluses if, for example, they want to reduce the existing stock of public debt. The overall rational purpose of judgment might be that, given that fiscal jurisdiction is guided by debt stabilization and sustainability, a positive response to the budgetary balance should be identified, more precisely, on the stock of public debt to be expected. Our rationale is also validated by the literature, with the most recent study from Afonso and Jalles [25] highlighting two main alternatives in measuring fiscal responsibility: first, by analyzing the level of public debt in GDP (countries with lower levels of public debt in GDP being associated with healthier public finances); and secondly analyzing the degree of counter-cyclicality of fiscal policy, in which case the empirical measurements of the contribution of fiscal policy to stability is considered, by assessing the response of some budgetary indicators to changes in economic activity. Therefore, in order to investigate the determinants of government fiscal behavior for the 28 EU countries for the period between 2000 and 2014, we employ panel data analysis. It seems that a fiscal policy reaction function was a measure of the primary balance reactions to debt, which is an adequate way of elucidating our analysis:

$$S_{it} = \beta_i + \delta s_{it-1} + \theta b_{it-1} + \lambda Z_{it-1} + \phi f_{it} + \gamma x_{it} + \alpha t + u_{it} \quad (1)$$

In Equation (1)  $i$  ( $i = 1, \dots, N$ ) denotes the country,  $t$  ( $t = 1, \dots, T$ ) denotes the period and  $\beta_i$  represents the model parameters.  $S_{it}$  represents the government primary balance as a percentage of GDP for country  $i$  in period  $t$ ,  $s_{it-1}$  represents the same observation for country  $i$  in the period  $t - 1$  and  $b_{it-1}$  represents the debt to GDP ratio in the previous period for country  $i$ .  $Z$  indicates the output gap, which is an economic measure of the difference between actual GDP and potential GDP, and is calculated using the Hodrick-Prescott filter,  $f$  represents fiscal attitude in terms of fiscal rule determinants for country  $i$  in period  $t$  and include separately, the fiscal responsibility index (FRL\_index) and the convergence index to fiscal responsibility (CONVERG\_FRL),  $x$  is a vector of the institutional, political, and dummy variables that integrate the electoral cycle, post-crisis period and pre-crisis period. In addition,  $u_{it}$  errors are assumed to be independent, and fixed time effects are also included. Regarding the use of fixed-effects models, we performed an F test and a Hausman test. The results of the F test are reported in the results and are in line with the Hausman test. We estimated our model specification by using two different methods. We first used a pooled ordinary least-squares regression model (OLS), and then we used a panel fixed effects (FE) model. We performed the Hausman test, to select between random and fixed effects models, and the probability was 0.00, which means that is smaller than 0.05. Applying the F test and the Hausman test, we reached similar conclusions, and we validated the choice of fixed effects models. The approach of the primary fiscal balance to the detriment of the total balances is appropriate, in that the implications of the inter-temporal governmental constraints arise mainly on the primary surplus. In addition, the choice of the primary fiscal balance is logical, because the primary expenditures are easier to realize under the aegis of the government's discretionary control, and the exclusion of interest payments related to the

public debt is also explicit, being argued and validated by the previous study [26]. In such a setting with a fiscal reaction function, it is assumed that the primary balance of period  $t$  depends on the primary fiscal balance of period  $t - 1$ .

Therefore, it transforms the primary balance into a function of public debt, which permits examining, for example, if  $\theta > 0$ . More precisely, whether the government is trying to intervene with an increase in the primary balance to react to existing public debt stock, and to comply with budgetary constraints. In other words, the situation could also be interpreted as a signal that primary surpluses are responding positively to government debt, proven empirically in Afonso's and Favero's studies [27,28], which report that fiscal policy responds to debt growth. More precisely, in order to ensure the solvency of the government, it is expected that that primary balance reacts to public debt.

The use of a panel-data framework can be explained first by the fact that, through this method, we control the so-called unobservable constant heterogeneity, and consider the peculiar characteristics of each countries. Second, the method increases the model's reliability and accuracy of the estimated specifications, and the variance of government debt is related to both the cross-section and the time series. However, there are some econometric problems that arise when evaluating the Equation (1). First, the panel data include a small dimension (14 years and 28 countries), which means it is important to check the bias related to the dynamic's specification. Through the bias approach, we provide the model viability, and the regression provides the highest precision results. Second, because  $N$  is small, to reduce the variation, we also used the *vcov* function, and the estimator (LSDV), proposed by Bruno [29], being suitable for panel data an appropriate to estimate Equation (1).

With respect to the relevance of the fiscal rules, we included in our regression model an index of fiscal responsibility, detailed further in the following paragraphs. The judgment is based on the premise that, while many countries have placed fiscal-budgetary responsibility on their agenda, there is currently no simple and comprehensive matrix for assessing fiscal responsibility. When it comes to quantifying fiscal sustainability, most papers pay attention to how countries are entering a 'dangerous new phase', and define debt by highlighting at what level will a country go into a fiscal crisis—see the discussions in some works [30–33]. Others do not contest the relevance and influence of independent fiscal institutions or the status of fiscal transparency [10,34–36].

Therefore, understanding institutional and attitudinal variables, in addition to mechanical rules and to the relative fiscal position of countries is difficult, which suggests the importance of creating an index of fiscal responsibility, constructed from a wide range of such measures taken from sources in the literature mentioned below. Given the fact that the concept itself has different meanings, the first step in developing a fiscal responsibility index (FRLI) is to establish a basic definition and to define fiscal responsibility. While the concept is commonly used to refer to the government's conservatism regarding spending limitations or managing prudent levels of debt, it also refers to government action and procedures in managing its fiscal affairs. For instance, the Maastricht Treaty requires European Member States to perform their fiscal responsibility by maintaining the annual average budget deficit of three percentage points of GDP and with a global debt level at less than 60% of GDP. Instead, the International Monetary Fund talks about the need to set legal standards for transparency of fiscal policy, with respect to the process by which governments manage public finances, and relate fiscal responsibility to the idea of establishing transparent and independent institutions that supervise the pattern of substantiation of the specific expenses of legislative and executive activity.

As far as we are concerned, we consider that fiscal responsibility is more than an economic concern, it is a moral duty, and as a result of both economic and social implications, it involves care for future generations. Fiscal responsibility is indispensable to consolidate a stronger and more prosperous economic context for the next generation. The choices that policymakers make today will decide what kind of future our children and grandchildren have, what legacy they have over 20 or 40 years from now. The nation's economic challenges and fiscal sustainability are directly associated. There is a link between today's budget deficits and what tomorrow's society can enjoy. Implementing a rule-based fiscal responsibility framework and avoiding excessive deficit is an important first step.

A bigger challenge, however, is the reform of programs linked to age-related public expenditure, which are expected to grow at an unsustainable rate due to population ageing pressure.

Thus, we admit that defining fiscal responsibility involves the embodiment of three factors, often debated in the literature, but in a particular way: the current level of government debt, the sustainability of public debt levels over time, and the extent of transparency and accountability in government operations related to fiscal pathways.

According to this argument, we admit that fiscal sustainability and government responsibility represent more than the management of annual deficits. Creating sound institutions, rules, and procedures to set and control the budget process is essential. In addition, the existence of independent fiscal institutions and fiscal governance enforcement mechanisms should be capable of ensuring compliance with the rules. Even though research on particularities, either within the rules or within institutions, has contested the implications of fiscal rules, some studies have shown that even if we cannot talk about the criteria for deciding on the obligatory and optional manners of compliance with fiscal rules, governments need fiscal rules, transparent institutions, and effective enforcement in order to remain responsible from a fiscal point of view [37–42].

Thus, we derive FRLI from theoretical background justifications for fiscal prudence, and we create three fundamental components of fiscal responsibility index. We measure the current level of government debt by establish how high public debt can rise without compromising fiscal solvency, and we consider the fiscal space of a country, which is examined in some studies [43–48]. Then, we assess the sustainability of public debt levels over time, analyzing the fiscal path or trajectory of a country. Finally, in order to determine the degree of transparency and accountability, we evaluate the fiscal governance of each country, addressing the current rules and institutions, and verifying the responsibility of fiscal decisions. These three major components are described in the table below (see Table 1):

**Table 1.** The main components of the fiscal responsibility index.

Variable	Description	Source of Data
<b>I. Fiscal space</b>		
Average public debt–GDP (WAPD)	The (weighted) average ratio of public debt to GDP	International Monetary Fund
Government expenditure gap (EXP_GAP) (calculated using the Hodrick-Prescott filter)	Is calculated as difference between actual and potential real government consumption spending.	Own calculations based on IMF database
Fiscal Gap (calculated using the Hodrick-Prescott filter) (FISCAL_GAP)	Indicates how much the government's spending and debt obligations exceeds its revenue over a specified period	Own calculations based on IMF database
<b>II. Fiscal path</b>		
Government Debt to GDP forecasts (DEBT_FORC)	Debt to GDP forecasts include long-term outlook for the next three decades	European Commission prognosis on public finance <a href="https://ec.europa.eu">https://ec.europa.eu</a>
Future government expenditure (health and pensions) (EXP_FORC)	Projections of future government spending (health and pensions)	European Commission prognosis on public finance <a href="https://ec.europa.eu">https://ec.europa.eu</a>
Projected GDP growth rates (GDP_GR_FORC)	Projected GDP growth rates	European Commission prognosis on public finance <a href="https://ec.europa.eu">https://ec.europa.eu</a>

Variable	Description	Source of Data
Interest rate (INT_RATE)	Based on Fisher equation, we assume the difference between nominal interest rate and the inflation rates	AMECO database/ European Commission
Budget deficit (GOV_DEF)	Represent the differences between total Expenditures of the Government and total income of the government	AMECO database/ European Commission
III. Fiscal governance		
Fiscal Rules		
Budget balance rules (BBR), debt rules (DR), expenditure rules (ER), and revenue rules (R)	Dummy variable equal to one if a country has any type of fiscal rule in a given year, and zero otherwise.	IMF's Fiscal Rules database, 2000–2014
Fiscal transparency and good governance		
Control of Corruption (CORRP), government effectiveness (GOVV_EFF), regulatory quality (REGQ), rule of law (RULEOFLAW), political stability (POL_STAB)	Control of Corruption, government effectiveness, regulatory quality, rule of law, political stability	World Bank
Applicability/execution		
The Scope of fiscal institutions (SCOPEFI)	The Scope of fiscal institutions	AMECO database/ European Commission IMF
Medium-term budgetary frameworks (MTBFs)	Medium-term budgetary frameworks (MTBFs)	
The monitoring body	Nature of the fiscal monitoring body (Test the existence of an independent fiscal Council)	

Note: the variables that compute the fiscal responsibility index and the convergence index on fiscal responsibility represent the author's vision, through particular validation in the extant literature described in the content of the paper.

### 2.1. Fiscal Space

The questions of when the debt is too much or how much a country can owe frequently enter any discussion about fiscal sustainability or government responsibility, especially in international comparisons. As countries can sustainably serve different levels of debt, it is essential to discern the debt limit of each country and the level of debt that can be issue. This depends on the extent of its fiscal space. The fiscal space expresses the supplementary amount of debt that a country could theoretically issue before it is close to the certainty of a fiscal crisis. In other words, the difference between the weighted average level of the country's current public debt and the so-called "debt ceiling". According to the literature, fiscal space represents the difference between the current level of public debt and a country-specific debt limit [19,46,48].

The (weighted) average ratio of public debt to GDP is a rationale approached to create a more accurate indicator than the level of public debt reported by Eurostat. Starting from the definition of public debt established by the IMF, we considered it necessary to include the debt related to the Social Security Fund. Then, we used a second factor that considers the governmental debt related to the other levels: national, state, local. Considering the methodology used by Ostry et al. [46], the debt

ceiling of a country is a terminology that illustrates the level of debt at which a state would probably be incapable of preventing or avoiding a fiscal crisis. Moreover, the above-mentioned authors estimate a debt ceiling for each country based on past behavior, government stability, and some economic indicators. Although no one can accurately anticipate how much space a country still has before experiencing a fiscal crisis, the aforementioned study is among the few that discuss the notion of fiscal space, with slightly different implications identified by other authors [49,50]. Thus, bearing in mind the logical itinerary of the construction of variables related to the fiscal space, we also used the government expenditure gap and the fiscal gap (variables calculated through the Hodrick-Prescott filter), following the coordinates indicated by Ravn and Harald [51].

## 2.2. Fiscal Path

Managing debt levels over time is another important indicator, which we take into consideration in order to compute the fiscal responsibility index. The fiscal path, or the possible future debt levels, imply pro-activeness of government to minimize its expenditure and inculcate a habit of rational spending, and offers many perspectives on the viability of actions taken by governments. A country with a medium level of debt today, but with a budgetary equilibrium over time, is in a better situation than a country with a low level of debt today, but with a rapid increase in public deficits. Using the data provided by the IMF for future government spending, we approach this indicator in order to build our fiscal responsibility index, and we consider fiscal paths for EU Member States by 2050. The judgement computations are based on the IMF forecasts for October 2010. This publication illustrates the data for the cyclically adjusted primary balance (CAPB) of each country, and estimates spending increases in the area of health and pensions until 2050. Thus forecasts of GDP growth rates, interest rates, and government deficit are addressed in the context of the above-mentioned indicators.

## 2.3. Fiscal Governance

As far as fiscal governance influences how budgetary policy is developed and implemented, including most notably numerical rules, this component is indispensable for making a government transparent and accountable to its citizens. Powerful fiscal institutions, solid frameworks for fiscal rules, and viable procedures for circumventing problems in the proper management of public finances are needed. Thus, in the third dimension of our index, analyzing the extant literature and IMF reports, we use three major components of fiscal governance: fiscal rules, fiscal transparency, and the applicability of the rules.

Fiscal rules are effective ways of maintaining social order and consolidating fiscal responsibility. The force of the law limits the ability of a government to spend irresponsibly. Countries such as Australia and New Zealand that have implemented strong fiscal rules have recorded low debt levels and government spending. Given that, as we have mentioned before, the literature comes with different positions regarding their efficiency, we also consider some studies that evaluate types of rules considered to be more important, such as limits on debts or expenses, but we also consider studies that give importance to the rules according to the legal source, whether constitutional or following a political statement [16,52,53].

Fiscal transparency is another important component of fiscal governance, precisely because the degree of fiscal transparency in a country is directly related to greater fiscal discipline [54] and implicitly, reflects sustainability and economic viability [55]. This forces governments to disclose the composition of expenditure or to reduce corruption, and results in better economic performance and lower debt levels. As in the case of fiscal rules, we focus on the empirical evidence so far, considering the opinions of Kaufmann et al. [56], which explains the methodology of the Worldwide Governance Indicators (WGI) project, and relates analytical issues on the subcomponents that constitute fiscal transparency and good governance. We also consider it appropriate to use the variables that the World Bank considers as components of the concept addressed, more precisely, control of corruption, government effectiveness, quality of rules, rule of law, and political stability.

Applicability/execution assesses the degree to which the rules and processes are respected and applied. A rule that is not applied has small implications in limiting fiscal irresponsibility. For



example, historically, the rules on debt and the deficit of the Economic and Monetary Union (EMU) have not been effectively implemented. Thus, based on the European Commission 2012 methodology and Jankovics and Sherwood [57], we used the most appropriate variables to analyse the components concerned with the Scope of fiscal institutions, and medium-term budgetary frameworks (MTBFs), and we finally consider the nature of the fiscal monitoring body, which tests the existence of an independent Fiscal Council in EU countries.

To create the index of fiscal responsibility, we used a method frequently used in the literature: factorial analysis. The works of some authors [58–61] validate the basis of judgment for this itinerary. Given the fact that items are added together, to make sure that all variables contribute evenly to our scale, it is necessary to standardize, precisely to avoid providing variables of different units of measurement, as recommended by Gilthorpe [62]. Standardization means that the values for each of the different variables are converted to the same scale, so that the different variables can be compared. This approach is extremely important in the viability of building an index [63]. In line with the above point of view—regarding the specificity of the fiscal rules and considering the particularities of each country on this subject—we resorted to creating a convergence score that considers all the coordinates of fiscal rules from EU Member States (We consider some studies that were conducted to evaluate the types of rules and are considered to be more important, particularly with regard to the limits on debts or expenses, as well as studies that give importance to the rules according to the legal source, if it is constitutional or following a political declaration [16,50,51]. Depending on the type and number of fiscal rules, a score of 0.25 points has been set for each rule 0.30 points, for those on debt and expenses). In terms of importance, with reference to the origin of the fiscal rules, a score equal to the number of origins was established—5: Constitutional; 4: International Treaty, 3: Common Law; 2: Coalition agreement 1: Political commitment. Thus, we used the sum of the two components, which considers not only the specificity of the literature that assesses which rules on debts and expenses are more efficient, but also the implications of the legal source. For instance, in 2014 Belgium had expenditure on debt, budget, and expenditure, and the origin of these rules is a Coalition agreement, resulting in  $0.30 + 0.25 + 0.30 + 0.20 = 1.05$ ). Factor analysis implies the existence of a correlation between variables. Thus, following the analysis of the correlation matrix of the variables, it was found that all the variables included in the analysis are judiciously chosen, except in a situation that indicates a high degree of correlation and requires the verification of multi-collinearity (public debt forecast and weighted average public debt). In the latter case, we resorted to excluding from the analysis the public debt forecast by testing the normal distribution and analyzing histograms.

Following the analysis of the Component Matrix table (see Table 2), we referred to the contribution of the first three main factors that explain the evolution of the variables used. It was found that the first factor explains 63% of the total variance, being representative for the size of fiscal governance. The second factor explains 19% of the total variance, representing information regarding the forecasts of the long-term budgetary frameworks, and the third factor, explains 17% of the total variance, being representative of the fiscal trajectory and the strategies in this direction. To estimate the index of fiscal responsibility, we calculated the weighted average of the three factors, taking into account the percentage of variance for each one, and then applying a normalization procedure indicated by some authors [64,65], (see Equations (2) and (3)).

$$M = \frac{\sum_{t=1}^n W_t * V_t}{\sum_{t=1}^n W_t} \quad (2)$$

$$Z_{ij} = \frac{x_{ij} - \bar{x}_j}{s_j} \quad (3)$$

Where M represent the average value, V is actual value, W is weighting factor,  $X_{ij}$  represent the data for variable j in sample unit i,  $\bar{x}_j$  is sample means for variable j and  $s_j$  is sample standard deviation for variable j.

**Table 2.** The results of factorial analysis of the main components for estimating the fiscal responsibility index.

	Unrotated Loadings			Cumulative	Uniqueness
	F1	F2	F3		
CONVERG_FRL	0.734644	0.073636	−0.591725	0.895262	0.104738
FISCAL_GAP	0.064241	−0.124986	−0.114034	0.032752	0.967248
EXP_GAP	0.096384	0.340888	−0.015374	0.125731	0.874269
WAPD	−0.069077	0.677948	−0.028545	0.465199	0.534801
EXP_FORC	−0.142674	0.561843	0.250442	0.398745	0.601255
GDP_FORC	−0.000984	0.017840	−0.001600	0.000322	0.999678
GOV_DEF	0.168164	−0.708603	0.006570	0.530440	0.469560
INT_RATE	−0.306196	0.337797	−0.158166	0.232879	0.767121
POL_STAB	0.553371	−0.193156	0.409969	0.511603	0.488397
CORRP	0.888288	−0.069725	0.375748	0.935104	0.064896
GOV_EFF	0.875270	−0.028706	0.413252	0.937700	0.062300
REGQ	0.856867	−0.054679	0.355685	0.863722	0.136278
FISCAL_GOV	0.990390	−0.000135	−0.120376	0.995364	0.004636
RULEOFLAW	0.891033	0.054614	0.424960	0.977513	0.022487
SCOPE_FI	0.026973	0.181692	0.086852	0.041283	0.958717
MTBfs	0.559979	−0.121395	−0.486782	0.565270	0.434730
Factor	Variance	Cumulative	Difference	Proportion	Cumulative
F1	5.384994	5.384994	3.759206	0.632867	0.632867
F2	1.625787	7.010781	0.127679	0.191069	0.823936
F3	1.498108	8.508889	---	0.176064	1.000000
Total	8.508889	20.90466		1.000000	

Source: own calculations.

Table 2 presents the results obtained from the factor analysis. Since the goal of this paper is twofold (theoretical and empirical), at the theoretical level we intend to highlight the state of knowledge on the relationship between the fiscal rules and fiscal sustainability. Second, to contribute to the existing literature, we tested the implication of the fiscal responsibility index and the fiscal convergence score on public finance sustainability, by including these indices in the regression analysis from the subsequent paragraph. As far as politicians face the same kind of incentive for short-term actions that may be detrimental over fiscal diligence and related constraints, this can influence the effectiveness of fiscal constraints and rules.

Referring to EU fiscal governance, the novelty of our paper consists of the fact that we computed some behavioral variables in order to identify the pitfalls of fiscal governance, and we have calculated the convergence to fiscal responsibility and the index of fiscal responsibility. For investigating fiscal variables relationships, and to create a fiscal responsibility index (FRL index), we used a factor analysis statistical method. To establish a convergence score for fiscal responsibility, we analyzed the particularities of fiscal rules (referring to the status of rules—deficit rules, and expenditure rules—based on a legal basis of a Constitutional nature or established based on an organic, ordinary law, or political agreement).

The results of the fiscal responsibility index and fiscal convergence to fiscal responsibility are included in the second part of our study, in which case we want to reveal the implications of a healthy fiscal attitude from the perspective of applicability or compliance with fiscal rules, referring to legal dimensions, administrative and institutional capacity, and taking into account considerations such as the status of the EU Member States regarding the approach of numerical rules.

#### 2.4. The Implications of the Electoral Cycle and the Concept of Fiscal Morality

In order to encourage certain activities and discourage others, governments use the legislative tools to model individual and collective human behavior. The most extreme forms of deterrence arise as a result of prohibition rules—the obligation not to do—with severe sanctions for those who break the law. Moderate penalties, combined with lax enforcement, are a more delicate way to discourage illegal activity. Thus, the concept of fiscal morality could be viewed from a double perspective: as a government imposition requiring judicious intervention in the field of rehabilitation, consolidated by

diligent behavior (through the creation of solid legislative instruments); or as a requirement to comply with this legislative plan, in terms of the social dimension and the political issues hidden behind its highly technical aspects (here referring to the mechanisms by which governments would defy the legal framework, would look for the philosophical dimension of the breach of the norm, preferences for the pro-cyclical policies, and incorrect management of the fiscal path).

With respect to the statute of taxation, seen as a tool for extracting the resources required for payment for public policy, we consider it useful to approach the relevance of the electoral cycle, often referred to in the literature as representing another dimension of fiscal performance [66,67]. We evaluate the significance of the electoral cycle on fiscal behavior by using a dummy variable  $D_{it}^E$  defined as:

$D_{it}^E = 1$ , if in a given country there were elections for the parliament in 0, otherwise

$$S_{it} = \beta_i + \delta s_{it-1} + \theta_1 D_{it}^E b_{it-1} + \theta_2 (1 - D_{it}^E) b_{it-1} + \lambda Z_{it-1} + \phi f_{it} + \gamma x_{it} + u_{it} \quad (4)$$

The hypothesis we are testing is whether, in the wake of elections, governments choose to influence the economy by adopting an expansionary fiscal policy, if indeed the electoral cycle plays a key role in government fiscal decisions. So, we included an interaction term between, for instance,  $b$  and the dummy variables, representing the occurrence of elections. On the profile of EU 15 countries we find that over the period 1970–2003, governments tended to use the primary budget surplus to reduce public debt in GDP, and the response seems to be dependent on the level of government indebtedness [27]. In addition, the results reported by Afonso suggest that the primary balances respond positively to the public debt, when there are no parliamentary elections in the next period.

Another dimension with direct implications on the concept of fiscal morality, and, implicitly, on what we might call fiscal diligence, also concerns the implications of primary expenditure. Thus, Equation (5) reports a reaction function of the primary expenditure, according to the one used for the primary balance:

$$ps_{it} = w_i + w_1 ps_{it-1} + w_2 b_{it-1} + w_3 z_{it-1} + w_4 f_{it} + w_5 x_{it} + w_6 t + v_{it} \quad (5)$$

where  $ps$  represent the primary spending-to-GDP ratio, and the other variables are analogous to those indicated in Equation (1),  $f$  is the fiscal rule indicator and included separately, while fiscal convergence to responsibility and fiscal responsibility index are computed in previous parts of this paper.

### 3. Empirical Results

In this section, we present the estimated results for the equations defined above. The point of interest is represented by the usefulness of the existence of fiscal rules, good practices in fiscal responsibility arising from their viability, and their correct application. By approaching some elements of institutional arrangements and their political nature, we highlight that an analysis of healthy fiscal attitudes from the perspective of applicability or compliance with fiscal rules—referring to legal dimensions, administrative and institutional capacity, and taking into consideration the status of the EU Member States regarding the approach of numerical rules—has not been done before, which means that the results may be helpful for governments in shaping their own policies regarding fiscal governance objectives.

The process of collecting the data was precise and we used reliable sources, such as the European Commission's AMECO database, the IMF, and World Bank databases. The sample consists of annual data from 2000–2014, and, based on panel data analysis, we test the responsiveness of primary balance to government indebtedness, as well as to some determinants of fiscal responsibility, such as the degree of public spending or the effectiveness of fiscal rules, and we included two different perspectives regarding fiscal rules status.

The regression approach follows the literature insights [68–70] and solves the econometric problems that arise when evaluating the regression analysis. First, the results of unit root tests are

reported in Appendix, and exemplify that in most cases, the null hypothesis can be rejected, supporting the stationarity of the fiscal variables. Second, estimates were made for Equation (1), and the results were structured for the baseline fiscal reaction function. Drawing on the primary balance (Table 3), we first solved the problems of bias and unbalanced panels. Since our panel data has relatively small time dimensions (14 years) and 28 units in the panel (28 countries), following the idea pointed by Kiviet [71]—which uses asymptotic expansion techniques to approximate the small sample bias of the LSDV estimator, to also include terms of at most order  $N^{-1} T^{-1}$ , we estimated Equation (1) using an LSDVC estimator suggested by Bruno [29], which is appropriate for unbalanced panels.

The regression results show that the reaction of the primary balance to government debt is negative. In other words, the EU governments do not act in accordance with the existing stock of public debt. By increasing the primary balance as a result of the increase of the public debt stock, a deterioration in the primary fiscal balance occurs when the public debt stock increases. We could say that this is consistent with the prevalence of a fiscal regime in which the fiscal authorities do not respond in a "stabilizing" manner, by increasing primary balances when the debt rate increases. In column 2, we can observe the results of the regression with the implications of the FRL index and fiscal responsibility convergence index, calculated according to the methodology—explained in the previous paragraphs—and in the other two columns, we can capture the implications of the electoral cycle, and of the dummy variable crisis (see Table 3).

Bearing in mind the purposes of this study, in order to identify the variables that would guide the governments in order to improve the fiscal prudence, to gain credibility, and to reduce the degree of indebtedness, we included in the second part of the analysis a variable which inspected a wide sample of what the convergence to fiscal responsibility and the index of convergence to responsibility can mean. The differentiated approach, with reference to the convergence index and the fiscal responsibility index, underlines the novelty of the study and, implicitly, shows that there might be a difference between having a set of fiscal rules with certain particularities (deficit rules, expenditure rules, rules with a legal basis of a Constitutional nature, or established on the basis of an organic, ordinary law, etc.), and obeying those rules, to refer to them by checking all legal and institutional frameworks.

The fiscal responsibility index covers the loopholes for what fiscal responsibility means and how irresponsible debt behavior should be managed. Specifically, by strengthening fiscal diligence, with an emphasis on the dimensions discussed in the preceding paragraphs (see indicators detailed in Table 1). The convergence index to fiscal responsibility shows gaps in the literature which, most of the time, strictly test the implications of some types of fiscal rules on public finance sustainability, without checking, for example, if those rules show only a simple alignment to certain standards, not a respect for the principles of good governance.

**Table 3.** The fiscal reaction function for the primary balance (fixed effects, 2000–2014).

Variable	LSDV (1)	LSDV FRL_INDEX	DUMMY_Electoral Cycle (2)	DUMMY_crisis	DUMMY_fiscal Attitude
Primary balance (−1)	−0.0043 (0.0377)	−0.0304 (0.0364)	0.0651 (0.0362)	0.0409 (0.0369)	0.0646 (0.0415)
Public debt % GDP (−1)	−0.0849** (0.0052)	−0.0915** (0.0050)	−0.0875** (0.0057)	−0.0951** (0.0082)	0.1266* (0.0135)
Output Gap (−1)	0.0026 (0.0063)	0.0023 (0.0062)	0.0092 (0.0070)	0.0078 (0.0069)	0.0060 (0.0053)
CONVERG_FRL	0.9099** (0.1791)		7613** (0.1638)	0.8329** (0.1635)	
FRL_INDEX		1.161** (0.1736)	0.9163** (0.1845)	0.8840** (0.1830)	0.4169** (0.1275)
Electoral cycle dummy			−0.0863 (0.0118)		

Crisis dummy				−1.921** (0.6421)	
High fiscal Attitude dummy (1 if FRL_INDEX > 0)					0.1262* (0.4671)
Observations	405	405	405	405	405
Adjusted R2	0.4613	0.5045	0.4978	0.5017	0.4425
F-test	5.24	5.79			
Wald test			399.44 0.0000	423.11 0.0000	619.58 0.0000

Source: own calculations; (1) LSDV-Bias corrected, least square dummy variable estimator proposed by Bruno (2005); (2) Dummy incorporates the xtreg function, related to panel data OLS; Notes: Standard error in parentheses; \*, \*\* statistically significant at the 10% and 5% level respectively (\*\*  $p < 0.05$ , \*  $p < 0.1$ ). F-statistic tests for fixed effects, H0: fixed effects jointly insignificant. F (20,124)-values reported, 1% critical value = 1.13.

Based on the results provided in Table 3, it is noted that the EU countries' governments do not act consonantly with the existing stock of public debt. According to Escolano and Gasparo [72], a deepening of the deficit invokes the need for the fiscal authorities to intervene with a surplus in the primary fiscal balance, and to stabilize the level of public debt. However, the results obtained underline the fact that fiscal authorities do not respond in a stabilizing manner, given that intervention can cause a deterioration of the primary fiscal balance when the public debt increases.

With reference to the implications of the fiscal responsibility indicators, it can be said that the fiscal position improves when considering the index of fiscal responsibility. A dummy variable that captures the implications of the crisis is also statistically significant. In retrospect, our results indicate that fiscal behavior matters for fiscal sustainability, but in order to study how attitudes shape responses to changes in the environment, we split our sample between the high-attitude and low-attitude countries, and we introduced in our regression a new variable, named the high fiscal attitude dummy. The results indicate that, on the profile of countries with a good fiscal attitude, an improvement in the fiscal balance is recorded. It seems that, in countries with high level of this variable, a good fiscal attitude (referring to legal dimensions and administrative and institutional capacity) matters for fiscal sustainability and affects actual behavior.

An interesting situation is related to the implications of the dummy variable that captures the electoral cycle, in that the results illustrate that the electoral cycle is not statistically significant. However, the impact of elections is mainly reflected on the size of the deficit, and most studies highlight deficit increases of over 1% during this period [24,73]. Therefore, a new dimension of the subsequent research would consist of considering other variables of interest (how can the electoral cycle affect the composition of expenditure, revenue, and deficit). The present approach is still judicious, precisely because it is focused on identifying good practices in fiscal responsibility and the size of fiscal governance.

Table 4 provides a set of results regarding the implications of debt thresholds and primary expenses. The significance of government indebtedness has been assessed using interaction terms between the level of the debt-to-GDP ratio and alternative debt ratio thresholds (50%, 70%, or 90%). The debt threshold dummy variables,  $D_{it}^{TH}$  are defined as follows:

$$D_{it}^{TH} = 1, \text{ if debt ratio} > TH, \text{ in country } i \text{ in period } t, 0, \text{ otherwise. } TH = 0.5, 0.7, 0.9 \quad (6)$$

**Table 4.** Fiscal reaction function for the primary balance (fixed effects, 2000–2014), the relevance of the debt thresholds, and the primary spending reaction function.

Variable	1	2	3	4*	4**	4***
Primary expenditure (−1)				0.1242* (0.0573)	0.1241* (0.0574)	0.0773 (0.0552)
Primary balance (−1)	0.0426 (0.0362)	0.0433 (0.0357)	0.0413 (0.0354)			
Public debt % GDP (−1)	−0.1172** (0.0165)	−0.1224** (0.0103)	−0.1223** (0.0082)	−0.0151 (0.0117)	−0.0152 (0.0117)	−0.0231* (0.0112)
Output Gap	0.0078 (0.0068)	0.0078 (0.0068)	0.0085 (0.0068)	−0.0093 (0.0130)	−0.0096 (0.0131)	−0.0035 (0.0124)
CONVERG_FRL	0.7340** (0.1606)	0.7154** (0.1609)	0.7429 (0.1590)	0.0508 (0.3139)	0.0570 (0.3148)	−0.1162 (0.3006)
FRL_index	1.115** (0.1872)	1.131** (0.1878)	1.120** (0.1850)	2.261** (0.3650)	2.254** (0.3660)	2.300** (0.3483)
Electoral cycle dummy					0.2315 (0.6986)	
Crisis						3.790** (0.5959)
D50 (−1) × Debt (−1) [a]	−3.923** (0.9607)					
(1 − D50 (−1)) × Debt (−1) [b]	0.0588** (0.0191)					
D70 (−1) × Debt (−1) [c]		−5.103** (1.561)				
(1 − D70 (−1)) × Debt (−1) [d]		0.0737** (0.0181)				
D90 (−1) × Debt (−1) [e]			−2.417 (2.418)			
(1 − D90 (−1)) × Debt (−1) [f]			0.0529*** (0.0227)			
Observations	405	405	405	405	405	405
Adjusted R2	0.520	0.522	0.528	0.119	0.119	0.130
Wald test (Wald chi2/Prob > chi2)	433.11 0.0000	434.00 0.0000	447.55 0.0000	46.91 0.0000	46.92 0.0000	92.00 0.0000

Source: own calculations; Notes: Standard error in parentheses; \*, \*\*, \*\*\*—statistically significant at the 10%, 5%, and 1% level, respectively (\*  $p < 0.05$ ; \*\*  $p < 0.01$ ); 4\* Primary spending reaction functions: Equation (5); H0: a = b; c = d; e = f, 4\*\* Electoral cycle: Equation (4); 4\*\*\* crisis implication.

The analysis illustrates the reaction or, rather, the response of the primary balance to the government debt, resulting in a lower implication when the public debt threshold is higher. This could mean that for public authorities it is difficult to increase the primary surplus when faced with higher rates of public debt. Interestingly, the addition of the index of fiscal responsibility in this case also reinforces a significant impact on the primary balance. As can be seen, when the public debt to GDP ratio exceeds the debt threshold (50%, 70%, 90%), the index of fiscal responsibility—and indirectly, a stronger fiscal rule—are integrated into a solid and sustainable governance framework, which contributes to the improvement of the primary fiscal balance. On the other hand, by running a regression with a debt threshold higher than those mentioned above, it was found that the existence of the fiscal rule is not statistically significant and, implicitly, it does not contribute to the improvement of the fiscal behavior of the government. This certifies that in the context of reaching a

level of saturation—and the curve is very inclined towards this level—it is no longer enough to intervene with a legislative instrument. Moreover, it is necessary to point out that as long as there are a series of reforms in the area of the legislative framework regarding fiscal rules and, implicitly, the accountability of political decision-makers, there are problems, and, implicitly, tendencies to circumvent the behaviour prescribed by the norm legally.

The purpose of the regulations is to restructure, improve, or eliminate unethical behaviour. If this behaviour intervenes as a result of the value system, and does not manifest itself externally in the way it produces expected results, then the regulation has no meaning. But if the external manifestation has an intergenerational effect (as in our case), then it is necessary to consolidate a solid regulatory framework, with direct effects on enhancing sustainability. The rationale behind this is also validated by the results regarding the status of convergence to fiscal responsibility. It can be seen that at a debt level of over 90% of GDP, the convergence index for fiscal responsibility no longer has any implications on the consolidation of the primary fiscal balance, making it clear that a simple alignment with the standards in force does not directly imply a change in the vision of fiscal policy, but that these coordinates are guided, rather, by the whole institutional framework, and by the dimensions of the fiscal governance framework, highlighted by the index of fiscal responsibility.

Results are more satisfactory than had been anticipated, offering mainly a concretization of the viability of the research dimension, underlined both by the approach of the characteristics of fiscal responsibility at the level of the European Union, as well as by its correlation with the itinerary of the sustainability of public finances. Therefore, both the lower rates of public debt and the strengthening of fiscal responsibility present viable strategies in order to obtain a positive impulse on the primary balance.

With respect to the implications of the primary expenses, the study highlights that the index which measures the convergence of the fiscal rules does not affect primary expenses. Under the aegis of substantiating some logical explanations of these results, we could say that the analysis could also point out a possible doubt regarding the status of the countries that have adopted no rules on spending, with a national and supranational impact. Specifically, the data provided by the International Monetary Fund underlines that in 2014, only half of the Member States had rules on public spending, with national and supranational monitoring, with the others having rules only on spending at the supranational level, which is why a form of accountability of local bodies has been eliminated. However, under these conditions, convergence cannot identify the applicability or compliance with the tax rules, but it is evidenced as a status of the EU Member States regarding the approach of numerical rules.

In regard to the fiscal responsibility index, with respect to legal dimensions, and administrative and institutional capacity, the results show a significant impact on the primary expenses. It seems that a consolidation of fiscal responsibility coordinates can have a positive impact on the size of the primary expenses. Throughout the analysis, the dummy variable that captures the economic crisis is statistically significant, which underlines the fact that efforts to manage public finances—and, implicitly, the method of creating sustainable public finances—is also guided by economic and social movements. Of course, we must not lose sight of the fact that political factors, through decision-making powers, can distort any sustainable approach in the opposite way, and the insignificant results regarding the implications of the electoral cycle could be explained to a small extent by the unpredictability of political decisions, which can cause not only increases of more than 1% in the public deficit, but even consequences in the medium and long term, which must be supported by future generations.

#### 4. Conclusions

As a key response to the fiscal legacy of the last financial crisis, fiscal rules have started to be seen as an appropriate way of preventing contagious effects in terms of the sovereign debt crisis, and the topic of public finance sustainability received additional attention, with respect to the relationship between the fiscal rules, sound public finance, and government indebtedness. But does this increase in fiscal rules and the fiscal governance framework enhance or control the EU fiscal sustainability

framework? The general objective of this paper is to identify the status of fiscal behavior in the European Union countries, testing the relationship between government decisions, fiscal responsibility instruments, and the sustainability of public finances during the period 2000–2014. In order to answer the research question and to materialize the general objective, we assessed the EU fiscal governance framework and the practice of the community in relation to fiscal rules; we developed an empirical analysis; we quantified (through an econometric study), and interpreted the implications of the electoral cycle and the primary expenses on the consolidation of the sustainability of European public finances; and we tested the responsiveness of primary balance to government indebtedness, as well as responsiveness to some determinants of fiscal responsibility, such as the degree of public spending or fiscal rules effectiveness.

The empirical findings indicate that fiscal authorities do not act to the existing stock of public debt and highlights a negative response of budget balances to the stock of outstanding debt. We have found that it is important to verify not only the relationship between the rules on debt and expenditure and their impact on the level of indebtedness, but also to take into consideration that the level of debt matters for the effectiveness of fiscal rules. Fiscal position improves when the index of fiscal responsibility is involved, and countries become more sustainable when they are related to a wider level of fiscal governance, with respect to legal framework and institutional and administrative capacity, but at the debt ratio threshold of over 90%, the effect of the overall fiscal rule comes out as less relevant to the improvement of the primary balance. It has been found that at a debt level over 90% of GDP, the convergence index for fiscal responsibility no longer has any implications on the consolidation of the primary fiscal balance, as it is clear that a simple alignment with the standards in force does not directly imply a change in the vision of fiscal policy, but that these coordinates are guided, rather, by the whole institutional framework, and by the dimensions of the fiscal governance framework, which is highlighted by the index of fiscal responsibility. We also study how fiscal attitudes shape responses to changes in the environment, and we find that on the profile of countries with a good fiscal attitude, an improvement in fiscal balance is recorded. It seems that in countries with a high level of this variable, good fiscal attitude (referring to legal dimensions and administrative and institutional capacity) matter for fiscal sustainability and affect actual behavior.

To the best of our knowledge, an analysis on healthy fiscal attitudes from the perspective of applicability or compliance with fiscal rules, referring to legal dimensions and administrative and institutional capacity, and taking into considerations the status of the EU Member States regarding the approach of numerical rules, has not been done before, and our results may be helpful for governments in order to shape their own policies regarding fiscal governance objectives. There are some ways in which the paper brings additional insights to the existing research on this area. First, given that above-mentioned theoretical background indicates the existence of many debates in terms of the variables used as proxies for fiscal rule relevance and their implication on fiscal responsibility, most of this paper tests the importance of fiscal rules in place by using dummy variables and assuming a value one for the existence of rules in place, and zero otherwise, verifying, for instance, the relationship between the rules on debt and expenditure and their impact on the level of indebtedness. It seems that important consideration has been overlooked, which is the overlap between rules and the inconsistency of the rule ceiling, which ignores the fact that the level of debt matters for the effectiveness of fiscal rules. Our analysis includes two different perspectives regarding fiscal rules status: we computed a fiscal responsibility index, which measures the applicability of or compliance with the fiscal rules, referring to legal dimensions and administrative and institutional capacity, and a fiscal responsibility convergence index, which measures the status of the EU Member States regarding the approach of numerical rules.

Second, we examined how fiscal authorities act to the existing stock of public debt, and we captured the response of budget balances to the stock of outstanding debt by analyzing the interaction between the level of government indebtedness, the debt ratio thresholds, and the effectiveness of fiscal rules, in terms of legal, administrative, and institutional capacity. Third, we analyzed not only the existence of fiscal rules in place, but also the effectiveness of these rules, by



testing the relevance of fiscal rules for the fiscal consolidation path, and we established when fiscal rule can help to attain and safeguard a sustainable fiscal position.

The idea of fiscal responsibility is more comprehensive, with profound economic, legal, political, and institutional values, and the benefits of deepening the process and achieving an optimal level of sustainability of public finances depends on the way in which each country is fully capable of undertaking viable procedures for circumventing problems in the proper management of public finances. In order to form a union characterized by an itinerary of strengthening the long-term sustainability of public finances, new measures are needed, more direct, coherent, and decisive, because in a globalized world, the European Union needs to be able to maintain its internationally strategic position. The multi-level approach and the need to create an intra- and inter-regional competitiveness mechanism cannot be possible in the absence of a solid fiscal governance framework, which will contribute to the optimal management of public finances and will solve the credibility of fiscal rules, the overlap, and inconsistency between rules

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## Appendix

**Table A1.** Unit root test results for the primary balance (2000–2014).

Method	Statistics	p-value	Cross-sections	Obs.
Null: Unit root (assumes common unit root process)				
382 Levin, Lin & Chu t stat	−7.7335	0.0000	28	355
Breitung t-sta	−11.7447	0.0000	28	382
Null: Unit root (assumes individual unit root process)				
Im, Pesaran and Shin W-stat	−3.8822	0.0000	28	382
ADF—Fisher Chi-square	45.7402	0.0000	28	382
PP—Fisher Chi-square	384.3017	0.0000	28	405

Source: own calculations.

**Table A2.** Unit root test results for primary expenditures (2000–2014).

Method	Statistics	p-value	Cross-Sections	Obs.
Null: Unit root (assumes common unit root process)				
Levin, Lin & Chu t stat	−7.7437	0.0000	28	387
Breitung t-sta	−11.7647	0.0000	28	350
Null: Unit root (assumes individual unit root process)				
Im, Pesaran and Shin W-stat	−12.0599	0.0000	28	387
ADF—Fisher Chi-square	45.2502	0.0000	28	350
PP—Fisher Chi-square	380.5063	0.0000	28	387

Source: own calculations.

**Table A3.** Unit root test results for government debt (2000–2014).

Method	Statistics	p-value	Cross-Sections	Obs.
Null: Unit root (assumes common unit root process)				
Levin, Lin & Chu t stat	−7.0673	0.0000	28	376
Breitung t-sta	−9.8014	0.0000	28	347
Null: Unit root (assumes individual unit root process)				
Im, Pesaran and Shin W-stat	−10.6914	0.0000	28	376
ADF—Fisher Chi-square	29.0027	0.0000	28	347
PP—Fisher Chi-square	254.6536	0.0000	28	376

Source: own calculations.

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