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# The European fiscal framework: Counterfactual Analysis to its compliance in the hypothetical scenario without the Covid-19 pandemic

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## Abstract

This paper analyses the compliance patterns of the European fiscal rules of the public debt and budget deficit in a group of twelve Member States. The aim is to make a contrafactual analysis to the compliance of those rules from 2020 to 2022 in a hypothetical scenario without the Covid-19 pandemic. Our intention is to discuss the necessity and structure of a future reform of the European fiscal framework. To that effect it is developed a forecasting analysis based on an ARIMA model, from which there will be examined the behaviour of the public finance variables in the context of the Covid-19 pandemic against the scenario without it. Our results point to an improvement in the public finance variables in the absence of the pandemic, as well as better compliance in the respective fiscal rules. Nevertheless, it is recommended a moderate reform of the European fiscal rules by the time of its predicted return in the beginning of 2024. The budget deficit rule should be maintained to prevent dangerous indebtedness dynamics. In contrast, the public debt rule should be partially restructured, due to its inadequacy with and without the Covid-19 pandemic.

JEL classification: C15, E61, E62, F47

Keywords: ARIMA, Counterfactual analysis, Covid-19 pandemic, European Union, Fiscal rules

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## 1. Introduction

The pandemic caused by the respiratory virus SARS-CoV-2 has caused profound changes in the macroeconomic environment of the European Union (EU). The Member States pursued expansionary fiscal policies to face multiple necessities, such as those related to the reinforcement of the respective healthcare systems, as well as those concerning the protection of employment in the general lockdown of the population. Fiscal policy gained a renewed importance in a time of constraints of the monetary policy due to low interest rates. These types of policies generated large increases in the budget deficits and public debts of the countries, which lead to the activation of the escape clause present in the Stability and Growth Pact (SGP) (Martin, Pisani-Ferry, & Ragot, 2021).

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‡ This work has been funded by national funds through FCT – Fundação para a Ciência e a Tecnologia, I.P., Project UIDB/05037/2020

The countries were released from the garrot of the European fiscal rules, namely the numerical criteria of not having a public debt higher than 60% of the Gross Domestic Product (GDP) and a budget deficit higher than 3% of the GDP. Nevertheless, this is not a permanent situation. It is predicted that by the beginning of 2024, the rules that assure public finance stability in the EU countries will be reactivated, relaunching the debate about the European fiscal framework between major political agents.

It should be noticed that this is not a recent discussion, having already been explored in the aftermath of the financial crisis of 2007-2008 and in the subsequent sovereign debt crisis in Europe. In this timeframe, not only countries in a fragile situation applied programs of fiscal consolidation, but also Member States with stable public finances opted for reductions in public expenditure and increases in state revenue. This is due to the procyclical bias, induced by the European fiscal framework (Constâncio, 2020; Barnes and Oliinyk, 2021). However, now with the suspension of the rules, there was instead a fiscal expansion during a recession, in accordance with the keynesian school of thought.

Due to the relevance of this theme, it is considered crucial to make a systematic analysis of the criteria that rules fiscal policy in the EU Member States. It is essential to look at the public finance data, compare the macroeconomic environment in which the first European fiscal rules were created with today's context and, after that, evaluate the need for a reform of the fiscal framework. In case of an affirmative response, possible guidelines and solutions for a new paradigm in the public accounts of EU Member States will be searched within recent literature.

With this paper, answers to a group of questions relative to this theme in the post-pandemic macroeconomic scenario are being pursued, from which it can be highlighted: What is the utility and compliance of fiscal rules, based on the literature available? Would EU countries be able to comply in trend with the numerical criteria in the absence of the pandemic shock? How would a European fiscal framework reform be structured, based on our results and in the suggestions of current literature?

It should be highlighted that this study is not focused in providing the most accurate forecasts had the pandemic crisis not occurred. We simply project a macroeconomic scenario in which the public finance variables follow their pre-

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pandemic trend and then analyze what would be the consequences in terms of the European fiscal framework criteria. Our contribution to the literature is therefore to understand what this hypothetical scenario would mean in terms of the current European fiscal rules and what are its implications in terms of the reforms proposed by preeminent authors in this area.

In a first stage, it is conducted a comprehensive analysis of descriptive statistics of the main variables present in the numerical criteria of the EU's fiscal legislation, more specifically, public debt and nominal budget deficit in percentage of the GDP.

In the following phase, it is pursued a counterfactual analysis, similar to the one made by Duarte and Murta (2022), to determine if a selected and heterogeneous group of EU countries would be able of complying in trend with the main fiscal regulations in the absence of the pandemic shock. For that purpose, it was used an Autoregressive Integrated Moving Average (ARIMA) model, which will provide predictions for the 2020, 2021 and 2022 years.

Naturally, the pandemic crisis was an exogenous shock that could not have been predicted by policymakers. This study allows us to look at an alternative scenario and how the variables would have behaved without it. Fortunately, given that this public health threat is now controlled, Member States can search for guidance in what the predicted economic trends would have been had this exogenous shock had not appeared. To the best of our knowledge, no study has analyzed the compliance of the European fiscal framework in a hypothetical scenario without the Covid-19 crisis.

Our results confirm that the compliance with the European fiscal rules has been low in many countries and quite heterogeneous, depending on the different macroeconomic circumstances of each Member State. The counterfactual analysis points, however, to an improvement in the variables and in the compliance with the regulations in the absence of the pandemic.

Nevertheless, it was demonstrated that the rules present in the Stability and Growth Pact should probably be moderately reformed when they are reactivated. Besides the macroeconomic risks of them being reinstated too early, it should be stated that some of the regulations are disconnected from reality. Although the budget deficit rule maintains its utility and, as it will be demonstrated, it would most likely have high compliance levels in the absence of the pandemic, when we look at the public debt

regulation, it probably needs to be restructured. Even without the public health crisis in our estimation, many countries would not be able of complying with such a rule. Therefore, it is proposed an increased consideration for the idiosyncratic situation of each Member State, with specific limits for the public debt of each one, as well as particular paces of reduction towards it.

The rest of this paper is organized in the following manner. Section 2 corresponds to a review of the literature, seeking to synthetize the history of the European fiscal framework. Section 3 describes the data and analyses the behavior of the variables studied. Section 4 has a theoretical explanation of the methodology, followed by its practical application to the subject. In section 5, there is a discussion of the results in terms of the debate about the need of a reform of the European fiscal rules, and a forecast of what a new structure of those rules could look like, based on existing literature. Finally, in section 6, the main conclusions of this paper are presented.

## **2. Review of the Literature**

The Maastricht Treaty was signed in 1992 by European Union (EU) Member States with the purpose of creating a common currency. During its negotiation, the focus was on the change of a sovereign group of countries starting to share a same monetary unit and of possessing a unique central bank (European Fiscal Board, 2021). The national governments maintained, however, the power to decide about the composition of their revenues and expenditures. Therefore, there was a centralization of the monetary policy, while the fiscal policy was maintained at the national level (Căpraru, Georgescu and Sprincean, 2022).

The EU Members State faced however two potentially problematic questions for which they needed to formulate neutralizing strategies. One of them was the risk of having a fiscal policy dominance over its monetary counterpart, which would constitute a threat to price stability. The other one was the risk of “moral hazard in the form of fiscal free-riding by one Member State on the others” (Maduro et al., 2021, p. 3). To face these problems, the Treaty predicted the creation of a European Central Bank (ECB), based on the principles of independence, with the objective of keeping inflation in a sustainable trajectory and unable of conducting monetary financing. The existence

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of excessive deficits in the public accounts of the Member States was also forbidden, as well as their financial rescue.

Considering the common monetary policy, each Member State should adopt a fiscal policy subject to a set of rules that would promote its discipline. In a monetary union such as the Euro Zone (EZ), it should be noted that an irresponsible fiscal policy in a Member State could constitute a negative externality to the monetary stability of the whole area, and that the excessive indebtedness of a EZ country could also become a systemic danger to an integrated financial market (Bénassy-Quéré et al., 2010). Constâncio (2020) equally believes that fiscal rules should be established to fight a series of problems that arise from the denominated deficit bias. These are the electoral competition, informational problems, and time inconsistency behaviors (Căpraru, Georgescu and Sprincean, 2022). Constâncio (2020) states that fiscal rules of high quality decrease this bias, avoiding vast accumulations of debt, as well as giving a stabilizing role to the fiscal actions, especially when monetary policy is constrained by matters such as negative interest rates. Even the International Monetary Fund states that well designed fiscal frameworks give considerable credibility to its subscribers, keeping financing conditions benign even in the event of major increases in the country's public debt (International Monetary Fund, 2021).

To stimulate healthy public finances, in 1997 it was created a set of fiscal rules denominated Stability and Growth Pact (SGP). The Member States increased the supervision and coordination of their fiscal and economic actions with the objective of complying with the deficit and debt ceilings established in the Maastricht Treaty. The article 1 of Protocol 12 presents the numerical criteria relative to article 126 (2) of the Treaty on the Functioning of the European Union (Consolidated version of the Treaty on the Functioning of the European Union, 2016). They are 3% and 60% of the Gross Domestic Product (GDP), respectively, for the budget deficit and for the public debt.

The SGP is composed by two elements, a preventive arm and a corrective or dissuasive arm. The preventive arm tells us that each Member State must promote its own fiscal discipline, but there should also be some room for the role of fiscal policy in the smoothing of the business cycle fluctuations. The corrective arm establishes that the nominal budget balance should never be lower than -3% of the GDP, unless in temporary and exceptional circumstances. In case the budget deficit threatens to exceed

or exceeds 3%, or if public debt exceeds 60% of the GDP and is not decreasing at a satisfactory pace, the European Commission should put in place an Excessive Deficit Procedure which puts pressure on the noncomplier, initiating a process that goes from an initial warning to a final penalty (Bénassy-Quéré et al., 2010). Until today, however, no final penalty has been applied although the multiple Excessive Deficit Procedures Member States have been subjected to.

In the subsequent years, complaints to the original SGP started to appear, namely: to its procyclical bias, incentivizing States to increase their budget balances in times of economic recession and not in times of expansion; to its scarcity of economic rationale; to its dogmatic numerical criteria, without flexibility in terms of the macroeconomic circumstances of each country; to its low compliance patterns, due to the impunity of noncompliers (Bénassy-Quéré et al., 2010; Arnold et al., 2022). This last aspect is crucial to introduce the 2005 reform of the SGP.

In 2003, the European Conseil refused to impose Excessive Deficit Procedures to France and Germany. This decision reflected a structural change in the line of thought regarding the weight of the sustainability v. stability binomina of fiscal policy in the EU (Larch & Santacrose, 2020). The deficit expressed in nominal terms gave too much importance to the role of sustainability, ignoring the basic principle that budget balances become more negative during a recession of the business cycle in the absence of the State's stabilizing action (Heimberger, 2020). In 2005, the European legislators introduced therefore an amendment to improve the SGP's economic rationality. It was added the concept of structural balance to the preventive arm, which excludes the impacts of the business cycle and any temporary and/or extraordinary actions. That allowed more flexibility and consideration for the idiosyncratic situation of each Member State in the evaluation of the compliance to the criteria.

Notwithstanding, the North American subprime crisis and the consequent sovereign debt crisis in the EZ revealed a new wave of inconsistencies and problems with the fiscal legislation in place. The 2005 reform promoted indeed some additional fiscal discipline, namely a decrease in budget deficits. Nevertheless, it maintained an excessive focus on short-term aspects in detriment of a longer-term analysis in variables such as the debt. This made countries that in the pre-crisis period presented balanced or surplus public accounts to fall into great deficits as soon as the interest rates started to

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increase. In summary, whether the budget balance was measured in nominal or structural terms, the fiscal rules when this crisis started were not able to prevent major increases in the debt levels of the Member States (Larch & Santacroce, 2020; Arnold et al., 2022).

In 2011 it takes place a new reform of the SGP, denominated Six-Pack. It had the objective of making the rules more comprehensive and stable to improve the economic governance of Member States (European Commission, 2022). In this phase, two new regulations were introduced. There was now an expenditure rule in the preventive arm, assisting in the guidance of its trajectory to a sustainable debt objective (Marinheiro, 2021). It revealed to be less procyclical than the structural balance (Heimberger, 2020) and it was easier to supervise (Kamps & Leiner-Killinger, 2019), contributing to more prudence in the expansionary phase of the cycle. The other regulation defined the satisfactory pace at which the public debt must decrease to achieve its goal of less than 60% of the GDP. In a 3-year average, countries must reduce 5% per year their public debt, in case this exceeds the reference value of 60%. It is also in this reform that it is introduced the concept of escape clause, which suspends the generalized compliance of the fiscal rules in case of an exceptional and temporary event. It applies both to the preventive and corrective arm, allowing deviations from the numerical criteria when it does not put at risk medium-term budgetary sustainability.

In the middle of the EZ crisis, two more reforms were created, the Treaty on Stability, Coordination and Governance and its law commonly known as Budget Treaty. They made the fiscal targets, specified by the SGP's preventive arm, to be implanted into the national legislation of each country. In 2013, the SGP itself is subject to a reform denominated Two-Pack, which fortified the economic coordination between EU countries and introduced innovating supervision instruments (European Commission, 2022), such as the need of the EZ Member States to submit their budgetary drafts so that they may be assessed by the European Commission and Eurogroup. It was also at this time that Independent Fiscal Institutions were created to properly supervise the public finance statistics and the compliance of the fiscal rules. This organizations have shown to have a positive influence in the countries budgetary results (Căpraru, Georgescu and Sprincean, 2022).

Finally, we arrive at March 23<sup>rd</sup>, 2020, a date that profoundly changed the paradigm of the European fiscal framework. It is in this day that the escape clause is activated for the first time, suspending the European fiscal rules. This decision derives from the spread of the respiratory virus SARS-CoV-2 to all EU countries, that forced Member-states' governments to declare mandatory confinements and created the need to incur in expansionary fiscal policies of unheard magnitudes to reinforce their health and social security systems. Naturally, this lead budget deficits and public debts to increase in a scale unique in various decades, which reinforced the growing inadequacy of the fiscal rules present in the SGP. Considering the data of that fatidic year, less than half of the Member States complied with the public debt's reference value, only two complied with the structural balance rule and only one obeyed to the numerical criterion of the nominal budget deficit and to the expenditure rule (European Fiscal Board, 2021). Therefore, it is possible to conclude the total impossibility of maintaining the SGP in place during this profound economic recession.

The suspension of the SGP's rules and the rebirth of fiscal policy in a deteriorated macroeconomic context that appeared with the Covid-19 pandemic bring, however, a unique opportunity to accomplish a comprehensive reform of the European fiscal framework. In a future reform of the EU's fiscal rules, it must however be considered that the Maastricht paradigm belongs to a distant past (Martin et al., 2021; Regling, 2022). Nowadays, the macroeconomic context is characterized by: high levels of public indebtedness, even in Member States that were once denominated as frugal; interest rates that remained low for a long period of time, constraining the ECB's action; return of high inflation, with effects that still derive from the recovery of the pandemic crisis and that were aggravated by Ukraine's invasion by Russia; low economic growth in the major European players, with a risk to fall into stagflation; mutualized debt to finance the recovery plans after the pandemic, Next Generation EU, which was unthinkable in the period that came before it; low and very heterogeneous compliance of the SGP in the years that preceded the pandemic, with authors such as Gaspar and Amaglobeli (2019) even stating that noncompliance with the European fiscal legislation has been more a tendency rather than an occasional event.

The fiscal rules of the SGP, with all their reforms and amendments, reveal therefore an aggregate of problems that remain to be solved. They did not predict



situations where the “monetary policy is particularly constrained and limited” (Constâncio, 2020, p. 366) and they continue to demonstrate excessive procyclicality (Kamps & Leiner-Killinger, 2019; Heimberger, 2020; Larch & Santacrose, 2020). The legislation remains also insufficiently flexible, with immoderate quantitative rigidity, abstracted from its focus of avoiding major errors (European Fiscal Board, 2021; Maduro et al., 2021) and profoundly complex (Marinheiro, 2021; Regling, 2022), which makes it difficult to manage and execute.

Even with the evident flaws in the current fiscal legislation, the European Fiscal Board (2021) lists a number of reasons concerning why it will be difficult to build a consensus around an improvement of the SGP: i) the fiscal positions’ heterogeneity is not viewed as a threat to the EZ’s integrity; ii) in the view of certain countries, like Germany, the escape clause gave sufficient flexibility to the fiscal framework so that Member States could overcome the adverse macroeconomic context that came with the pandemic; iii) some fiscal rules have already gone from the supranational to the national legislation paradigm, when the Six-Pack and the Budget Treaty were implemented; iv) more fragmented governments and integrated in heterogeneous coalitions do not give sufficient political solidity to address the debate concerning structural changes in the fiscal legislation of the SGP.

Still, even if this debate turns out to be more difficult than predicted, the situation cannot remain as it is. Kamps and Leiner-Killinger (2019) warn about the threat of new public debt crisis and about the need of radical adjustments in a next recession if there isn’t a renewed fiscal framework. Maduro et al. (2021) state in addition that today’s numerical criteria of the SGP are a “restraining vest” that forbid the countercyclical action of fiscal policy and even say that these rules may lead to a prolonged economic stagnation in Europe.

### **3. Data**

The data used in this paper was collected from the macroeconomic database of AMECO of the European Commission’s Directorate General of Economic and Financial Affairs and from the historical public debt database of the IMF. Time series were used for the two macroeconomic variables, public debt and nominal budget balance. For a description of them, it was designed Table 1.

**Table 1 – Description of the variables**

<b>Variable</b>	<b>Description</b>
Public debt	Gross public debt (UDGG) in % of GDP at current prices (EDP)
Budget balance	Budget balance (UBLGE) in % of GDP at current prices (EDP)

*Source: AMECO, and IMF for Denmark's public debt between 1995 to 1999.*

In the Review of the Literature, two other criteria were addressed related to the structural balance and the public expenditure, introduced in the sequence of the multiple reforms to the SGP. However, in this paper the focus will be placed on the public debt and on the nominal budget balance, given the fact that a great number of the reviews and critics made nowadays to the SGP concern mainly these two variables and also because the two rules that are being excluded at this time are of a high complexity of calculus (Heimberger, 2020; Marinheiro, 2021) and of reduced scrutiny by citizens in general in their respective Member States (Kamps & Leiner-Killinger, 2019).

The sample will concern the years of 1995 until 2022. The values of 2021 and 2022 will be past forecasts, corresponding to the AMECO's Autumn 2021 Economic Forecast of November 11<sup>th</sup>, 2021. The choice of the year of 1995 to start the analysis is due to the necessity of having some context prior to the creation of the SGP in 1997 and to its subsequent reforms. The year of 2022 corresponds to the most recent consolidated forecast that was possible to obtain at the time of the beginning of this research.

Concerning the choice of countries that will be studied in this paper, the criterion for their selection was adapted from Larch and Santacrose (2020, p. 7). These authors divided EU Member States into three groups according to their public debt average in percentage of the GDP in the period that goes from 2011 to 2019: "Very high-debt" (more than 90% of the GDP); "High-debt" (between 60 and 90% of the GDP); "Low-debt" (less than 60% of the GDP). In the approach pursued, the criterion was modified to manage the higher indebtedness of EZ countries when compared to those that do not belong to it, given the tendency of public debt to be substantially distinct between those who adopted the common currency and those that did not. Therefore, there will be 3 groups of countries: "Very high-debt" (more than 90% of the GDP for EZ Member States and more than 75% for the remaining Member States); "High-debt" (between 60 and 90% of the GDP for EZ countries and between 55 and 75% for the

remaining Member States); “Low-debt” (less than 60% of the GDP for EZ countries and less than 55% for the remaining). Consequently, the selection fell on the group of countries that can be observed in Table 2.

Table 2 – Group of countries in study

Group of Counties	Countries	Average public debt between 2011 and 2019
“Very high-debt” of the EZ	France	94.9%
	Italy	131.9%
	Portugal	126.1%
“Very high-debt” non-EZ	Croatia	75.6%
“High-debt” of the EZ	Germany	71.3%
	Austria	80%
	the Netherlands	60.9%
“High-debt” non-ZE	Hungary	74.4%
“Low-debt” of the EZ	Slovakia	50.8%
	Finland	58.4%
	Lithuania	38.5%
“Low-debt” non-ZE	Denmark	40%

Source: Authors, using the database.

Apart from the simplicity of the application of the numerical criterion in the choice of the countries, there were also some research choices in these twelve countries and not others. France, Italy and Portugal are all Southern Mediterranean countries that are usually seen as being less cautious with their fiscal choices. Croatia is the most recent EZ country and is already recording high levels of indebtedness. In the “High-debt” group, we chose mostly Northern countries that are considered to belong to the frugal group of the EU. Finally, we opted for both Scandinavian and Eastern former communist countries, which are commonly viewed as examples of fiscal discipline.

For an initial analysis, it was constructed the graphs present in Figure 1, which represent the evolution of the variables between 1995 and 2022. They also present the numerical criteria for the public debt and nominal budget deficit<sup>1</sup>. However, their compliance during normal phases, in which the escape clause is not active like at the time of research, is granted some leeway. In the debt rule, a country may be considered

<sup>1</sup> All the graphics and results of the empirical research were obtained using the econometric software *Gretl 2022a*.

compliant even if its public indebtedness level exceeds 60% of the GDP, if it has been decreasing at a 5% average in the last three years. For the nominal deficit rule, in case it isn't 3% or less, a country will still be considered compliant if its deviation is limited to a maximum of 0.5% of the GDP (Larch & Santacroce, 2020, p. 4) and if it is exceptional and temporary (Consolidated version of the Treaty on the Functioning of the European Union, 2016, p. 67), which will be interpreted as being restricted to one year only.

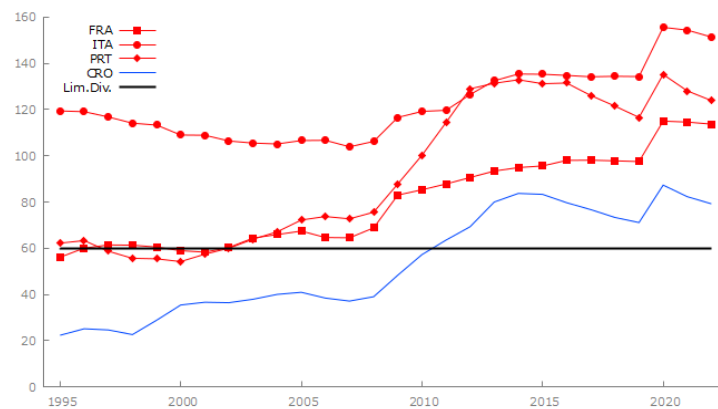
Therefore, it will be analyzed the compliance levels of these two regulations between 1998, first year of the SGP's preventive arm, and 2019, last year before the fiscal rules were suspended. Considering the leeway explained above, the countries' compliance levels of the debt and deficit rules can be observed in Table 3. It should be referred that not all countries in analysis were already in the EU, and consequently in the SGP, in earlier years, meaning that some of the compliance analysis is merely academic. It is equally considered the hypothetical compliance to these regulations in the SGP's suspension period that was in place at the time of research.

In an analysis of the graphs, it is possible to see some important trends. In the "Very high-debt" Member States of the EZ, we can see that the public indebtedness levels throughout the years have been consistently above the numerical value of 60% of the GDP, excluding a short period between 1995 and the 21<sup>st</sup> century beginning. It should be noted that the Member State that did not belong to the EZ at the time of research, Croatia, maintains its public debt below the criterion until 2010, and afterwards, even with its EU's membership, never again was able to accomplish that performance. Nevertheless, this former Yugoslavian member registers a substantially lower public debt than the other three countries in analysis. Italy negatively distinguishes itself because of its very low 5% of compliance in this SGP's regulation between 1998 and 2019, and it should be highlighted that no country of this group was going to be able of complying with this rule in the absence of the fiscal legislation's suspension between 2020 and 2022.

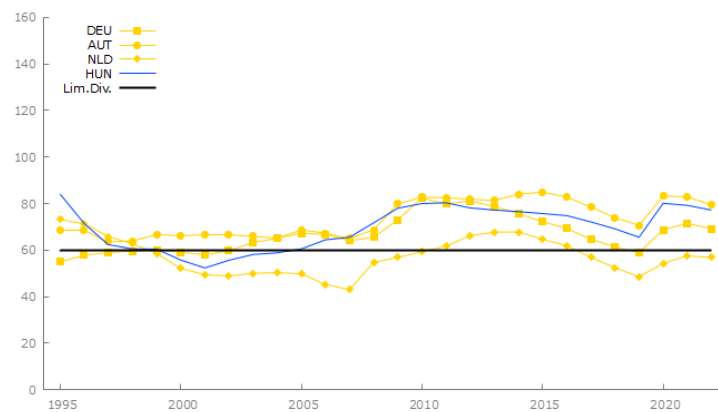
Observing the "High-debt" countries, it is clear that the public debt trajectory is closer to the reference values firstly introduced in Maastricht. In contrast with the "Very high-debt" Member States, in this group it can be observed a much greater similitude between the degrees of public indebtedness of the countries that are part of the EZ and the one that is not, Hungary.

Finally, it is important to look at the case of the “Low-debt” Member States. Excluding Denmark in a short period between 1995 and 1998 and Finland in a brief period after 2015, only the Finnish and Slovakian states overcome the 60% numerical criterion of public debt in percentage of the GDP in the sequence of the economic recession originated by the pandemic. During the most part of the timeframe in analysis, the countries in observation register levels of indebtedness quite lower than the reference value. Only in one year in Denmark and in two in Finland is noncompliance with the rule recorded between 1998 and 2019. Highlight should also be given to the fact that, although the SGP’s rules were suspended in 2020, all countries except Finland were still able of complying with the public debt regulation in that fatidic year. For 2021 and 2022, it was possible to predict an identical situation for Denmark and Lithuania with the predictions that AMECO then provided.

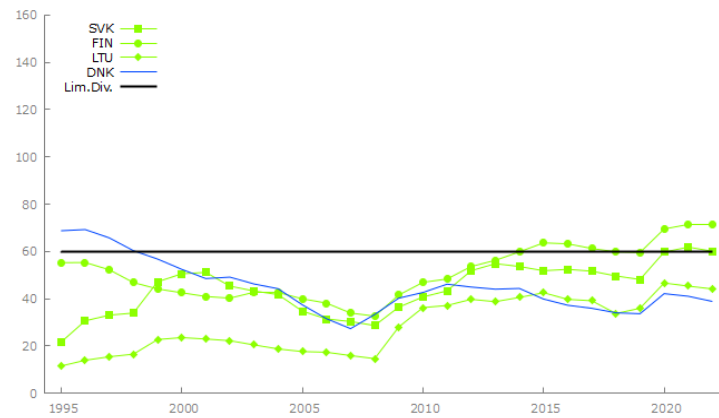
Figure 1 – Behavior of the public finance variables (1995-2022)



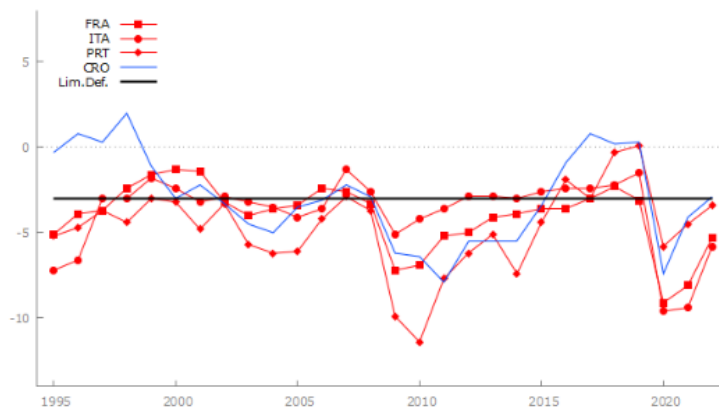
*Public debt – “Very high-debt”*



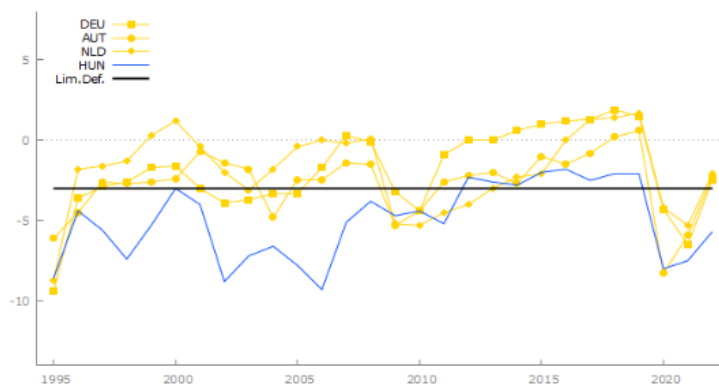
*Public debt – “High-debt”*



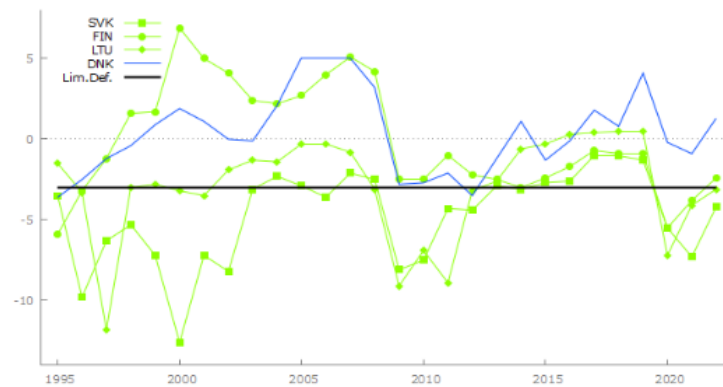
Public debt – “Low-debt”



Budget balance – “Very high-debt”



Budget balance – “High-debt”



Budget balance – “Low-debt”

Source: Authors, using the database.

Notes: The values of the variables presented for the 2021 and 2022 years are AMECO's forecasts. The countries are represented using the following abbreviations, symbols and colors : France (FRA) – red squares; Italy (ITA) – red circles; Portugal (PRT) – red diamonds; Germany (DEU) – yellow squares; Austria (AUT) – yellow circles; the Netherlands (NLD) – yellow diamonds; Slovakia (SVK) – green squares; Finland (FIN) – green circles ; Lithuania (LTU) – green diamonds; Croatia (CRO), Hungary (HUN) and Denmark (DNK) in their respective groups – blue; Public debt limit (Lim.Div.) and budget deficit limit (Lim.Def) in their respective groups – black.

Table 3 – Compliance levels of the public debt and nominal budget deficit rules in the selected Member States between 1998 and 2019, and hypothetical compliance in 2020, 2021 and 2022

MS	Compliance with the rule (1998-2019)		Hypothetical compliance <sup>2</sup> with the PD rule			Hypothetical compliance <sup>3</sup> with BD rule		
	PD	BD	2020	2021	2022	2020	2021	2022
FRA	23%	36%	NO	NO	NO	NO	NO	NO
ITA	5%	68%	NO	NO	NO	NO	NO	NO
PRT	27%	23%	NO	NO	NO	NO	NO	NO
CRO	77%	45%	NO	NO	NO	NO	NO	YES
DEU	55%	68%	NO	NO	NO	NO	NO	YES
AUT	32%	86%	NO	NO	NO	NO	NO	YES
NLD	82%	77%	YES	YES	YES	NO	NO	YES
HUN	59%	36%	NO	NO	NO	NO	NO	NO
SVK	100%	50%	YES	NO	NO	NO	NO	NO
FIN	91%	100%	NO	NO	NO	NO	NO	YES
LTU	100%	64%	YES	YES	YES	NO	NO	NO
DNK	95%	100%	YES	YES	YES	YES	YES	YES

Source: Authors, using the database. Notes: The variables are represented using the following abbreviations: Public Debt (PD); Budget Deficit (BD).

<sup>2,3</sup> Given the data of AMECO's Autumn 2021 Economic Forecast for the 2020, 2021 and 2022 years.

Concerning the nominal budget deficit rule, we can see a similar trajectory in the “Very high-debt” group between the EZ Member States and the Member State that had not adopted the single currency at the time of research. Croatia even registered consecutive budget surpluses between 2017 and 2019, with only Portugal matching such performance in the last pre-pandemic year. In this variable, compliance levels tend to improve in EZ Member States, with Italy curiously being the one that most surprises with its 68%. It is important to highlight the very negative and generalized impact that occurs with the explosion of the pandemic crisis in 2020, which exponentially aggravated the deficit in the public accounts of the diverse Member States. Like in the public debt scenario, none of the Member States belonging to this group are expected to obey to the nominal deficit regulation between 2020 and 2022. There is one exception however, which is Croatia, who was predicted to only register 2.9% of budget deficit in 2022.

Next, the “High-debt” Member States situation. In the nominal budget deficit graph (e), the worst performance is the Hungarian one. Since its entrance in the EU in 2004, Hungary only complies with this SGP’s legislation half the time, with total noncompliance between 2004 and 2011, and with full compliance from 2012 to 2019. It should be referred that between 2015 and 2019, all the Member States from this group present a high level of compliance, falling in an abrupt way at the time of the Covid-19 shock. For 2022, it was expected that all EZ countries from this group were already able of returning to the compliance of this numerical criterion. In contrast, Hungary would still register a significantly deteriorated budget balance of -5.7% of the GDP, according to AMECO’s previsions at the time.

Finally, the focus is back on the EU countries denominated as “Low-debt”. They present a large heterogeneity in their levels of budget balance throughout the years. The countries that entered most recently in the EU, Slovakia and Lithuania, have high levels of nominal budget deficit in some of the years that preceded that adhesion. This may derive from the fact that they were, for long periods of the 20<sup>th</sup> century, under communist rule and under its conception of a centrally planned economy, having the need of modernizing their productive and social security models in the years that followed the Eastern Bloc disintegration. Therefore, they ended up incurring into high negative balances in their public accounts. In the Danish and Finnish Member States,



the balances registered have been exceptional, with multiple years in budget surplus. Quantifying the compliance levels with this regulation, Finland and Denmark don't fail a single year between 1998 and 2019. Denmark would even comply with this rule if the SGP had been in place between 2020 and 2022, and Finland would return to the values defined by the numerical criterion in 2022.

In summary, the data's analysis points to conclusions similar to the ones obtained in Gaspar and Amaglobeli (2019) and in Larch and Santacroce (2020). The compliance with the regulations in study, between 1998 and 2019, has been low in many countries and quite heterogeneous, depending on the different macroeconomic circumstances of each Member State. In the post-pandemic recovery scenario of 2022, it should be noted that only three countries would be able of complying with the debt criterion, while six Member States would already be able of complying with the nominal budget deficit regulation, using the predictions provided by AMECO in their Autumn 2021 Economic Forecast.

#### **4. Methodology and Analysis of the Results**

In this section, our aim is to evaluate the macroeconomic shock of the Covid-19 pandemic in the public finance variables selected from the European fiscal rules. This will be accomplished through a counterfactual analysis, with a simple forecast of the values of the variables in a hypothetical situation in which the public health crisis has not occurred. Therefore, it will be compared the values of the public debt and budget deficit of 2020, 2021 and 2022 of the real scenario against a straightforward hypothetical situation without the pandemic. By assuming this, it is being supposed that the variables follow their normal course, as they have behaved since the beginning of the analysis' period. The period of the data that is going to be used in this counterfactual research is from 1999, the year of the adoption of the single currency, until 2019, the last pre-pandemic year when the fiscal policy regulations of the EU were still in place. In Table 4, it is presented the descriptive statistics.

It is going to be used an ARIMA model to forecast the values of the two public finance variables, similar to what is done by Duarte and Murta (2022). In section 4.1, it will be made a theoretical explanation of the methodology that is going to be applied, based on the paper just quoted.

Table 4 – Descriptive Statistics (1999-2019)

	Mean	Median	Std.Dv.	Min.	Max.	C.V.	Skn.	Exc.K.
<b>FRA</b>								
Public debt	78.84	83	15.8	58.3	98.1	0.20	-0.01	-1.74
Budget balance	-3.56	-3.4	1.55	-7.2	-1.3	0.44	-0.82	0.47
<b>ITA</b>								
Public debt	118.8	116.6	12.64	103.9	135.4	0.11	0.25	-1.65
Budget balance	-2.92	-2.9	0.91	-5.1	-1.3	0.31	-0.36	0.09
<b>PRT</b>								
Public debt	94.04	87.8	30.49	54.2	132.9	0.32	0.07	-1.69
Budget balance	-4.78	-4.4	2.83	-11.4	0.1	0.59	-0.50	0.12
<b>CRO</b>								
Public debt	55.08	48.3	19.46	28.8	83.7	0.35	0.25	-1.61
Budget balance	-3.37	-3.3	2.38	-7.9	0.8	0.71	0.08	-0.79
<b>DEU</b>								
Public debt	67.89	65.5	7.88	57.9	82.4	0.12	0.53	-1.01
Budget balance	-1.10	-0.9	2.05	-4.4	1.9	1.87	-0.14	-1.41
<b>AUT</b>								
Public debt	73.8	70.6	7.66	65	84.9	0.10	0.21	-1.73
Budget balance	-2.06	-2	1.47	-5.3	0.6	0.71	-0.50	0.14
<b>NLD</b>								
Public debt	55.5	54.7	7.45	43	67.8	0.13	0.22	-1.07
Budget balance	-1.35	-0.4	2.21	-5.3	1.7	1.64	-0.39	-1.03
<b>HUN</b>								
Public debt	68.11	69.1	9.12	52.3	80.3	0.13	-0.20	-1.37
Budget balance	-4.45	-4	2.33	-9.3	-1.8	0.52	-0.71	-0.66
<b>SVK</b>								
Public debt	44.67	47.1	8.21	28.6	54.8	0.18	-0.67	-0.84
Budget balance	-4.31	-3.1	3.01	-12.6	-1	0.70	-1.16	0.70
<b>FIN</b>								
Public debt	48.15	44.1	10.04	32.6	63.6	0.21	0.24	-1.33
Budget balance	0.86	-0.7	3.15	-3	6.9	3.68	0.35	-1.31
<b>LTU</b>								
Public debt	28.9	28	9.76	14.6	42.5	0.34	-0.04	-1.63
Budget balance	-2.31	-1.4	2.86	-9.1	0.5	1.24	-1.27	0.72
<b>DNK</b>								
Public debt	41.39	42.6	7.40	27.3	56.76	0.18	0.08	-0.56
Budget balance	0.87	0.9	2.61	-3.5	5	3.01	0.11	-0.92

Source: Authors, using the database. Notes: "Std.Dv." is the standard deviation. "Min." Is the minimum. "Max." is the maximum. "C.V." is the coefficient of variation. "Skn." is the skewness. "Exc.K." is the excess Kurtosis.

We have considered the concerns regarding the potential impact of significant economic crises, such as the global financial crisis and the European sovereign debt crisis, that occurred during the 1999-2019 period of study. Such breaking points in economic history can introduce structural breaks in the data, potentially leading to biased estimations if not accounted for. Econometric techniques, in general, are sensitive to such structural breaks as they can influence the parameters and the general stability of the chosen models.

ARIMA, known for its capability to model and forecast time series data based on its own past values, inherently acknowledges the influence of past shocks or irregularities without specifically modeling them. By using differencing alongside autoregressive and moving average components, ARIMA can capture the underlying patterns and dynamics in the data, making it a suitable choice for our research, which emphasizes overarching trends over the study period.

However, it is essential to contextualize the scope of our study. While the presence of these breaking points is undeniable and their ramifications expansive, the primary aim of our research is not to provide a granular examination of the data within these crisis periods, but rather to focus on the overarching trends, patterns, and dynamics of the selected variables over the full sample period.

In synthesis, while ARIMA can implicitly accommodate certain structural breaks by modeling the general trend and seasonality in the data, we are fully aware of its limitations in capturing sharp, crisis-induced fluctuations.

#### 4.1. Methodology

The ARIMA model was first introduced by Box and Jenkins (1976), corresponding to the acronym: Autoregressive (AR); Integrated (I); Moving Average (MA). The forecasts derived from the autoregressive method consist in linear combinations of past values. We can write a regression of order  $p$  or AR ( $p$ ) in the following way<sup>4</sup>:

$$y_t = c + \varphi_1 y_{t-1} + \varphi_2 y_{t-2} + \dots + \varphi_p y_{t-p} + \varepsilon_t, \quad (1)$$

---

<sup>4</sup> We follow closely Duarte and Murta (2022).

being  $\varepsilon_t$  the Gauss error term. It is also known as white noise and it means that the errors are not dependent of past values, which means that they are not autocorrelated.

The second part of the ARIMA model, moving average, uses past errors to predict future values, by means of linear combinations once again. A moving average procedure of order  $q$  or MA ( $q$ ) may be represented through the following equation:

$$y_t = c + \varepsilon_t + \theta_1 \varepsilon_{t-1} + \theta_2 \varepsilon_{t-2} + \dots + \theta_q \varepsilon_{t-q} \quad (2)$$

Similar to the autoregressive procedure, in moving average the errors are also not autocorrelated, which means that once again  $\varepsilon_t$  is a white noise.

Finally, the last component of the ARIMA model is integrated, which represents the number of differences that must be applied to the model to make the variable stationary.

The forecasts that are intended to do through the ARIMA model require an analysis of the stationarity characteristics of the series. For a time series  $y_t$  to be stationary, it needs to comply with a set of three conditions (Asteriou & Hall, 2011, p. 267):

Constant mean:

$$\forall_t, E(Z_t) = \mu, \quad (3)$$

Constant variance:

$$\forall_t, V(Z_t) = \sigma_Z^2, \quad (4)$$

The same autocovariance function through time:

$$\forall_t, \forall_s, \forall_k, E[(Z_t - \mu)(Z_{t-k} - \mu)] = E[(Z_s - \mu)(Z_{s-k} - \mu)] = f(k) \quad (5)$$

---

Time series will have the same characteristics through time if the conditions established in the former three equations, (3), (4) and (5), are verified.

We are aware of the fact that our sample is not very long. However, for short time forecasts, like the ones that will be made, this model is perfectly acceptable. Nevertheless, we highlight that our focus here is not to provide the most accurate previsions of the public finance variables if the Covid-19 crisis did not occur. What we want is to: set up a simple macroeconomic hypothetical scenario; analyze it in terms of the current European fiscal framework criteria; examine its implications to the suggestions made in literature concerning its reform.

The next step is consequently verifying the stationarity of the series of the variables, for which it will be applied two tests. It will be executed the Augmented Dickey-Fuller (ADF) unit root test (Dickey & Fuller, 1979), who's main contribute is that looking for non-stationarity is the same as testing for the existence of a unit root (Asteriou & Hall, 2011, p. 342), and the Kwiatkowski-Phillips-Schmidt-Shin (KPSS) stationarity test, whose null hypothesis is that the series is stationary (Kwiatkowski, Phillips, Schmid, & Shin, 1992).

## **4.2. Results**

Starting by the study of the stationarity of the variables, the ADF and KPSS tests were applied, as it was referred in the methodology. Table 5 shows the results of the unit root and stationarity tests on the variables in analysis. They point towards a great diversity between countries and variables.

Table 5.a) – Unit root and stationarity tests in “Very high-debt” countries

	ADF				KPSS			
	Level		First Difference		Level		First Difference	
	C	T	C	NC	C	T	C	T
FRA								
PD	-0.443	-1.809	-3.207**	-2.603***	0.753***	0.098	0.118	0.118
BB	-2.744*	-1.738			0.231	0.150**		
ITA								
PD	-1.537	-33.331***			0.667**	0.143*		
BB	-1.332	-3.483**			0.196	0.150**		
PRT								
PD	-2.054	-5.126***			0.714***	0.103		
BB	-1.560	-1.642	-3.893***	-3.985***	0.182	0.162**	0.216	0.059
CRO								
PD	0.672	-3.976***			0.697***	0.096		
BB	-1.294	-1.369	-3.692***	-3.756***	0.176	0.157**	0.264	0.061

Source: Authors, using the database.

Notes : see below.

Table 5.b) – Unit root and stationarity tests in “High-debt” countries

	ADF				KPSS			
	Level		First Difference		Level		First Difference	
	C	T	C	NC	C	T	C	T
DEU								
PD	-1.826	-6.672***			0.287	0.165**		
BB	1.967	6.777	4.031	1.294	0.588**	0.092	0.100	0.061
$\Delta$ _BB			-2.668*	-2.829***			0.068	0.064
AUT								
PD	-1.778	-0.850	-2.865**	-2.956***	0.515**	0.122	0.215	0.139*
BB	-1.029	0.226	-0.506	-5.170***	0.282	0.152**	0.123	0.062
NLD								
PD	-10.785***	-6.183***			0.303	0.111		
BB	-1.412	-1.317	-3.538***	-3.641***	0.143	0.144*	0.192	0.064
HUN								
PD	-4.281***	-0.597			0.509**	0.167**		
BB	-1.169	-2.688	-4.941***	-5.085***	0.531**	0.116	0.114	0.092

Source: Authors, using the database.

Notes : see below.

Table 5.c) – Unit root and stationarity tests in “Low-debt” countries

	ADF				KPSS			
	Level		First Difference		Level		First Difference	
	C	T	C	NC	C	T	C	T
SVK								
PD	-3.315**	-4.444***			0.244	0.142*		
BB	1.590	-2.096	-2.605*	-3.023***	0.430*	0.081	0.064	0.064
FIN								
PD	-1.311	-7.399***			0.587**	0.148*		
BB	-1.471	-1.589	-5.120***	-5.080***	0.587**	0.095	0.095	0.095
LTU								
PD	-0.080	-14.771***			0.563**	0.104		
BB	-1.758	-2.690	-2.801*	-4.640***	0.148	0.116	0.091	0.068
DNK								
PD	1.621	14.067	10.647	2.318	0.304	0.112	0.140	0.100
$\Delta$ _PD			-5.203***	-5.232***			0.075	0.061
BB	-2.525	-0.591	-3.180**	-3.312***	0.138	0.091	0.126	0.097

Source: Authors, using the database.

Notes: The variables are represented using the following abbreviations: Public Debt (PD); Budget Balance (BB). The number of lags included in the test's regressions were chosen using the Akaike Information Criterion (AIC). While we understand the merits of Schwarz/Bayesian information criterion (BIC) and its consistent property in selecting the true model, we believe that for our specific study's objectives and given our data, AIC offers a more balanced trade-off between model fit and complexity. “T” identifies tests where it was used a constant and a trend. “C” identifies tests that used only a constant. “NC” identifies tests that did not used a deterministic term. “ $\Delta$ ” identifies the first differences of a series. In the ADF test, the null hypothesis corresponds to the existence of a unit root. In the KPSS test, the null hypothesis corresponds to the series being (trend-) stationary. Statistical significance levels of 1%, 5% and 10% are represented with “\*\*\*”, “\*\*” and “\*”, respectively.

Following the methodology applied by Duarte and Murta (2022), the next step consists in choosing the most suitable ARIMA model. It will be used the one that presents the lowest Schwarz/Bayesian information criterion (BIC). The results are presented in Table 6. The observation of the different Schwarz minimum values leads to the choice of distinct formats of the ARIMA forecasting model for each country and for each variable.

Table 6 – ARIMA forecasting model's parameters

<b>ARIMA models selection (AR, <math>d</math>, MA)</b>				
<b>Schwarz/Bayesian information criterion (BIC)</b>				
	FRA	ITA	PRT	CRO
Public debt	(0,1,0) 111.0378	(2,0,2) 120.3195	(2,0,0) 131.4581	(2,0,0) 123.6729
Budget balance	(1,0,0) 71.77173	(0,0,1) 52.67143	(0,1,0) 95.60056	(0,1,0) 78.34559
	DEU	AUT	NLD	HUN
Public debt	(2,0,0) 118.6668	(0,1,1) 107.9032	(2,0,1) 121.5328	(2,0,1) 104.9514
Budget balance	(2,2,1) 73.48617	(0,1,0) 77.84702	(0,1,0) 80.13383	(0,1,0) 86.67830
	SVK	FIN	LTU	DNK
Public debt	(1,0,1) 118.4098	(1,0,1) 111.1538	(1,0,0) 127.0955	(0,2,0) 108.0214
Budget balance	(0,1,0) 100.8760	(0,1,0) 92.56705	(0,1,2) 91.81664	(0,1,0) 92.92986

Source: Authors, using the database. Below the ARIMA parameters, it is presented the lowest value of the Schwarz/Bayesian Information Criterion (BIC) after testing with multiple reasonable combinations of the autoregressive and moving average parameters.

Finally, it will be made simple forecasts of the public finance variables for the 2020, 2021 and 2022 years (“Counterfactual scenario without the Covid-19 pandemic”), and, after that, it will be confronted its dynamics with the effective ones of the variables in the macroeconomic context of the public health crisis caused by SARS-CoV-2 (“Real scenario with the Covid-19 pandemic”). The ARIMA, or ARMA models, in case the variable doesn't need to be differentiated to be stationary ( $I(0)$ ), will be estimated using the exact maximum likelihood, also known as the Kalman filter, and the standard errors will be based on the Hessian. The forecast will be automatic with out-of-sample dynamic. The results of the counterfactual research are presented in Table 7, also having a reference to the compliance or not of the fiscal rules in the real<sup>5</sup> and hypothetical scenarios.

Starting by Table 7.a) and by the public debt in the “Very high-debt” group, it is possible to see that, similar to what happens in the other two groups of countries, this variable registers considerably lower values in the counterfactual scenario when

<sup>5</sup> Already referred in Table 3 and interpreted in the respective section 3.



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compared with the pandemic reality. This result was expected given the huge fiscal effort made in the health and social security systems, which traditional Welfare States pursued in the fight against the pandemic, consequently increasing their indebtedness levels. It can be observed that the two biggest economies from this group, France and Italy, would never be able of complying with the public debt rule even in this hypothetical scenario, with France following a trajectory of increased indebtedness, 5.5 percentage points (p.p.) until 2022, even surpassing the predicted values for Portugal in that year. In contrast, Italy would reduce its levels of public indebtedness without, however, reaching the annual 5% mean in the last three years, that would allow it to be compliant with the fiscal legislation. Similar situation would be verified in Croatia, with the reduction of public debt never reaching the pace stated in the SGP. Nevertheless, it would be getting closer to the numerical criterion of 60% of the GDP. It is even forecasted that in 2022 Croatia would reach its lowest value of public indebtedness since 2010. Portugal would proceed with its reduction of public debt started in 2016, and in the 2018-2022 period, only in 2020 the counterfactual scenario points to noncompliance with the regulation in question. It is even predicted a 16.5 p.p. reduction in that scenario until 2022.

Table 7.a) – Counterfactual analysis in “Very high-debt” countries

	Effective/estimated values “Real scenario with the Covid-19 pandemic”			Forecasted values “Hypothetical scenario without the Covid-19 pandemic”			Hypothetical changes of the counterfactual scenario v. the real scenario		
	2020	2021e	2022e	2020	2021	2022			
<b>FRA</b>									
Public debt	115	114.6	113.7	99.3	101.2	103	↓	↓	↓
	(NO)			(NO)					
Budget balance	-9.1	-8.1	-5.3	-3.2	-3.2	-3.2	↑	↑	↑
	(NO)			(NO)					
<b>ITA</b>									
Public debt	155.6	154.4	151.4	132.5	129.7	126.6	↓	↓	↓
	(NO)			(NO)					
Budget balance	-9.6	-9.4	-5.8	-2.2	-2.9	-2.9	↑	↑	↑
	(NO)			(YES)					
<b>PRT</b>									
Public debt	135.2	128.1	123.9	111.2	105.6	100.1	↓	↓	↓
	(NO)			(NO)	(YES)				
Budget balance	-5.8	-4.5	-3.4	0.3	0.4	0.6	↑	↑	↑
	(NO)			(YES)					
<b>CRO</b>									
Public debt	87.3	82.3	79.2	68.4	65.4	62.3	↓	↓	↓
	(NO)			(NO)					
Budget balance	-7.4	-4.1	-2.9	0.4	0.4	0.5	↑	↑	↑
	(NO)		(YES)	(YES)					

Source: Authors, using the database.

Notes: “e” corresponds to the use of AMECO’s estimates. Under each value it can be found (“(YES)”) or (“(NO)”) that correspond, respectively, to compliance or noncompliance of that fiscal rule by that Member-state in that year. Up (“↑”) or down (“↓”) state, respectively, that in the counterfactual scenario of no Covid-19 pandemic, the forecasted value of the public finance variable is higher or lower than the effective/estimated value that has been verified or that is expected to be verified in the pandemic panorama of the year in question.

Analyzing the “High-debt” Member States in Table 7.b), the counterfactual results of the States’ indebtedness are quite diverse. Germany presents, like in the real scenario, an increase in its public debt, although nothing compared in terms of magnitude with the one that was verified in the pandemic scenario. Germany would even fail to comply with the public debt rule in 2021, which is unique since 2012. It is curious that a country like Portugal, who went through an aggressive budget adjustment program because of imbalances in its public accounts, would be able of complying with such regulation in 2021 and 2022, in opposition to a Member State that is historically known for its fiscal

rigor, as it is Germany. Austria would maintain its public indebtedness levels around 69% of the GDP in the three years in analysis, never complying with the debt rule.

Table 7.b) – Counterfactual analysis in “High-debt” countries

	Effective/estimated values “Real scenario with the Covid-19 pandemic”			Forecasted values “Hypothetical scenario without the Covid-19 pandemic”			Hypothetical changes of the counterfactual scenario v. the real scenario		
	2020	2021e	2022e	2020	2021	2022			
<b>DEU</b>									
Public debt	68.7	71.4	69.2	58.9	60.1	61.9	↓	↓	↓
	(NO)			(YES)	(NO)				
Budget balance	-4.3	-6.5	-2.5	1.6	2.5	3.3	↑	↑	↑
	(NO)		(YES)	(YES)					
<b>AUT</b>									
Public debt	83.2	82.9	79.4	69.6	69.7	69.8	↓	↓	↓
	(NO)			(NO)					
Budget balance	-8.3	-5.9	-2.3	0.8	0.9	1.1	↑	↑	↑
	(NO)		(YES)	(YES)					
<b>NLD</b>									
Public debt	54.3	57.5	56.8	46.2	45.4	45.9	↓	↓	↓
	(YES)			(YES)					
Budget balance	-4.2	-5.3	-2.1	1.8	1.8	1.9	↑	↑	↑
	(NO)		(YES)	(YES)					
<b>HUN</b>									
Public debt	80.1	79.2	77.2	62.7	60.4	58.9	↓	↓	↓
	(NO)			(YES)	(NO)	(YES)			
Budget balance	-8	-7.5	-5.7	-1.9	-1.8	-1.6	↑	↑	↑
	(NO)			(YES)					

Source: Authors, using the database.

Notes: “e” corresponds to the use of AMECO’s estimates. Under each value it can be found (“(YES)”) or (“(NO)”) that correspond, respectively, to compliance or noncompliance of that fiscal rule by that Member-state in that year. Up (“↑”) or down (“↓”) state, respectively, that in the counterfactual scenario of no Covid-19 pandemic, the forecasted value of the public finance variable is higher or lower than the effective/estimated value that has been verified or that is expected to be verified in the pandemic panorama of the year in question.

An opposite situation would occur in the Netherlands, who justify their frugal designation, always maintaining the compliance with this regulation in the counterfactual scenario, similar to what they were surprisingly able to do even in the pandemic environment. At last, in Hungary, it can be concluded that in the three forecasted years, only in 2021 would the country not be able of complying with the fiscal legislation in

analysis, and it would even reach 2022 with a public debt lower than the numerical criterion of 60% of the GDP. This situation was not verified in Hungary since its entrance in the EU in 2004.

Finally, let's put the focus on the "Low-debt" countries in Table 7.c). In the estimated counterfactual scenario, the compliance with the public debt rule between 2020 and 2022 would be total among countries. With the exception, of residual dimension, of Denmark, all states would even proceed with a reduction of their already very low indebtedness levels.

Changing the focus to the nominal budget balance, the highlight must be given to France. Not only in the "Very high-debt" group, but also among every country in analysis, this is the only Member State that was not going to be able of complying with the nominal budget deficit rule in any of the years of the timeframe estimated in this simple counterfactual scenario. It consecutively registers a 3.2% deficit, which in the leeway conceded by Larch and Santacroce (2020) would be considered acceptable if it was restricted to one year only, which is not the case. The performance of this variable explains the increase in the French public debt that was already highlighted. However, looking at the Member State in sociopolitical terms, it is important to notice that France is one of the maximum exponents of the European social model, with a reduced retirement age fixated at 62 years, and of industrialization, in a paradigm of constant offshoring of industrial activities. This may derive from a strong state support in the sustainment of the functioning of the Welfare State and of a consistent aid to the productive industry.

Table 7.c) – Counterfactual analysis in “Low-debt” countries

	Effective/estimated values “Real scenario with the Covid-19 pandemic”			Forecasted values “Hypothetical scenario without the Covid-19 pandemic”			Hypothetical changes of the counterfactual scenario v. the real scenario		
	2020	2021e	2022e	2020	2021	2022			
<b>SVK</b>									
Public debt	59.7 (YES)	61.8 (NO)	60	46.4	46 (YES)	45.8	↓	↓	↓
Budget balance	-5.5 (NO)	-7.3	-4.2	-1	-0.7 (YES)	-0.4	↑	↑	↑
<b>FIN</b>									
Public debt	69.5 (NO)	71.2	71.2	58.8	57.8 (YES)	56.9	↓	↓	↓
Budget balance	-5.5 (NO)	-3.8	-2.4 (YES)	-1	-1.2 (YES)	-1.3	↑	↑	↑
<b>LTU</b>									
Public debt	46.6 (YES)	45.3	44.1	35.2	34.6 (YES)	34	↓	↓	↓
Budget balance	-7.2 (NO)	-4.1	-3.1	0.2	0 (YES)	0	↑	↑	↑
<b>DNK</b>									
Public debt	42.1 (YES)	41	38.8	33.4	33.4 (YES)	33.7	↓	↓	↓
Budget balance	-0.2 (YES)	-0.9	1.3	4.3	4.4 (YES)	4.6	↑	↑	↑

Source: Authors, using the database.

Notes: “e” corresponds to the use of AMECO’s estimates. Under each value it can be found (“(YES)”) or (“(NO)”) that correspond, respectively, to compliance or noncompliance of that fiscal rule by that Member-state in that year. Up (“↑”) or down (“↓”) state, respectively, that in the counterfactual scenario of no Covid-19 pandemic, the forecasted value of the public finance variable is higher or lower than the effective/estimated value that has been verified or that is expected to be verified in the pandemic panorama of the year in question.

As it was already verified for the public debt variable, it is equally obvious that, in the absence of the macroeconomic shock of the public health crisis, the budget balance would present values considerably better in terms of healthy public finances.

Apart from the French case, between the generalized compliance of the nominal budget deficit regulation, it should be referred that almost all countries would proceed with a trajectory of increasing their levels of budget balance, except for Italy, Finland, and Lithuania. In Italian territory, the compliance with the rule would be tangent to the numerical criterion, 2.9% of deficit in 2021 and 2022. It is important not to forget its contribution to a very high public debt, which is however quite concentrated in the

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hands of national creditors. It should also be referred that this country has been characterized by political instability in recent years, with governments based on fragile coalitions of great heterogeneity. Meanwhile in Finland, it is forecasted an increase in the budget deficit, which is yet quite distant from the 3% of the GDP. According to the head of the economics department of the Finnish Ministry of Finance Mikko Spolander<sup>6</sup>, such behavior is due to a low economic growth derived from budgetary obligations originated by a high ageing of the population, with 29% of it being on subsidies by the end of 2020, and by an anemic growth of productivity. Finally, Lithuania would register only a residual reduction of its budget balance in 2021, going from surplus to equilibrium.

In synthesis, the results of this counterfactual research are in line with the ones obtained in Duarte and Murta (2022), with an improvement in the public debt and budget balance variables in EU countries in a hypothetical scenario without the Covid-19 pandemic.

## 5. Discussion and implications to economic policy

After the analysis made to the results obtained in our simple counterfactual research, it is possible to conclude two main aspects. In the absence of the macroeconomic shock originated by the pandemic, the countries would, in general, comply with the budget deficit rule, independently of the group of Member States they belonged to. The only exception would be France; and even this country is initiating a set of structural reforms with the purpose of reducing its deficit in the public accounts, wanting, for example, to raise the retirement age from 62 to 65 years<sup>7</sup>.

Converging to the point of view of the European Fiscal Board (2021) and Regling (2022), it is suggested that the nominal budget deficit rule should be maintained in a future reform of the EU's fiscal framework. Most countries would comply with such regulation in the absence of the pandemic, being very useful at refraining dangerous indebtedness dynamics.

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<sup>6</sup> See Teivainen, A. (2021, 11, 30). Finnish economy recovering rapidly, but slower growth is on horizon. Helsinki Times. Retrieved from: <https://www.helsinkitimes.fi/finland/finland-news/domestic/20070-finnish-economy-recovering-rapidly-but-slower-growth-is-on-horizon.html>

<sup>7</sup> See Bissuel, B. (2022, 12 ,5). Pensions: French PM Borne insists on necessity of high-risk reform. Le Monde. Retrieved from: [https://www.lemonde.fr/en/politics/article/2022/12/05/pensions-french-pm-borne-insists-on-necessity-of-high-risk-reform\\_6006680\\_5.html](https://www.lemonde.fr/en/politics/article/2022/12/05/pensions-french-pm-borne-insists-on-necessity-of-high-risk-reform_6006680_5.html)

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The other conclusion is that the compliance with the public debt rule is quite more heterogeneous. “Very high-debt” economies like the French and the Italian ones, independently of being some of the larger and more important in the European context, would not be able of complying with the public debt rule in the scenario that was forecasted. Even countries traditionally known for their fiscal discipline, like Germany and Austria, would follow the same path.

It is therefore possible to see that it is the major players in the EU’s economy the ones that do not comply with the public debt rule. This probably indicates that the regulation is disconnected from the pre-pandemic macroeconomic environment. Nevertheless, it is still important that even in these countries the public indebtedness remains under control, given the contagion risks in future crisis and the demand externalities that they have in the Common Market (Martin et al., 2021). Because of that, it is suggested a reform of this fiscal rule, but only in a partial way.

Like the European Fiscal Board (2021), it is argued that it should be taken more into account the idiosyncratic situation of each Member State adjusting, namely, the paces of reduction of the public indebtedness to the country’s macroeconomic condition. The annual 5% average decrease in the last three years may be difficult to accomplish when a Member State that exceeds the 60% of public debt in percentage of the GDP suffers an exceptional asymmetric shock derived, for example, from a fragility in its economic structure (Arnold et al., 2022). In the results presented, Italy would register consecutive reductions in its levels of indebtedness, but because they never occur at the pace stated in the legislation, this country would end up being subjected to Excessive Deficit Procedures in each of the three years for which predictions were made, which could turn out to be more harmful than beneficial. Only with primary surpluses of large dimension in consecutive years would it be possible to revert that situation (Barnes and Oliinyk, 2021), which may not be advisable in terms of economic fundamentals. For instance, Martin et al. (2021) suggest that the uniform numerical criterion of 60% of public debt in percentage of the GDP, and its consequent pace of reduction, should be substituted for a 5-year debt target, taking into account the debt’s sustainability of each country.

In summary, the results obtained in this paper point towards the necessity of a reform of the European fiscal framework, based on the existing literature. This reform

would, however, be a relatively moderate one, in line with the European Fiscal Board (2021), Regling (2022) and Martin et al. (2021), given that it is recognized that some fiscal rules maintain its logic and utility both in the hypothetical absence of the pandemic and in the real scenario of economic stabilization post-public health crisis that is being lived. The idea of abandoning all numerical fiscal regulations defended by Blanchard, Leandro and Zettelmeyer (2021) is, therefore, considered to be excessively radical, going against our results that Member States tend to comply or approach compliance with the nominal deficit rule, both in the hypothetical and in the real scenario. In addition, numerical rules are easy to supervise by citizens in each Member State and they constitute useful guides to the design of sound fiscal policies, given the reputational damage of large deviations from the objectives and the consequent opening of Excessive Deficit Procedures (European Fiscal Board, 2021).

## **6. Conclusion**

Today's historical moment in the European fiscal framework, with the activation of the escape clause of the Stability and Growth Pact for the first time, presents itself as a unique opportunity to rethink its economic rationality, to evaluate its compliance patterns and to debate the need and structure of reforms in time of its reactivation in 2024.

It should be referred that the reactivation of the European fiscal rules was predicted for the beginning of 2023, but because of the Russian's invasion of Ukraine started in February 2022, the European Commission and the Ministers of Finance of the Member States decided to adjourn for another year the reactivation of the regulations that seek to assure sound public finances in EU's countries. It is expected that in that time hiatus, the countries will need to make extraordinary investments in the defense sector as well as in their energetic independence (Arnold et al., 2022), crucial after the embargo on Russian natural resources. It is thus conceded some more leeway regarding the Member States' deficits and debts, so that they may proceed with such expenditures.

In summary, the objective of this paper consisted in analyzing the compliance patterns of the European fiscal rules of the budget deficit and public debt between 1998 and 2022 in a selected group of twelve Member States. It was made a simple counterfactual analysis to the compliance of such rules between 2020 and 2022 in a



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basic hypothetical scenario in which the Covid-19 pandemic did not occur, in order to analyze the need and structure of a future reform of the European fiscal framework. To that effect, it was conducted an analysis of descriptive statistics and a forecasting analysis based on an ARIMA model, through which it was examined the behavior of the public finance variables in the context of the public health crisis against a simplified hypothetical scenario without the Covid-19 pandemic. Our results confirm that the compliance with the European fiscal rules has been low in many countries and quite heterogeneous, depending on the different macroeconomic circumstances of each Member State. The counterfactual analysis points, however, to an improvement in the variables and in the compliance with fiscal regulations in the absence of the pandemic.

Notwithstanding, it was demonstrated that the rules present in the Stability and Growth Pact should be moderately reformed when they are reactivated. Besides the macroeconomic risks of them being reinstated too early, it should be noted that some of the regulations are disconnected from reality. Although the budget deficit rule maintains its utility and, as it was demonstrated, it would most likely have high compliance levels in the absence of the pandemic, when we look at the public debt regulation, it needs to be restructured. Even without the public health crisis in our simple estimation, many countries would not be able of complying with such a rule. Therefore, it is proposed an increased consideration for the idiosyncratic situation of each Member State, with specific limits for the public debt of each one, as well as a particular pace of reduction towards it.

Finally, we should highlight that the focus of the paper is not to provide the most accurate forecasts relatively to the evolution of these two public finance variables had the Covid-19 pandemic not occurred. Nevertheless, for short time forecasts the ARIMA model is perfectly acceptable. Our intention is simply to frame a simple hypothetical macroeconomic scenario, compare it with the pandemic crisis one and analyze it in terms of the current European fiscal framework criteria. At last, we confront it with suggestions for the reform of the rules, that have been made by preminent researchers in the area.

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