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Stabilizing, neutral or destabilizing? The impact of fiscal rules on the GDP volatility in the EU countries

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Abstract

The goal of the present article is to estimate the impact of numerical fiscal rules on the volatility of GDP growth in the European Union countries in 1995–2019 to answer the question about their counter-cyclical and stabilizing properties. The obtained results show that the introduction and the wider use of fiscal rules in the EU countries reduced economic fluctuations – an increase in the Fiscal Rules Index of one standard deviation was associated with a decrease in the volatility of the GDP growth rate of approximately 20%. When analysing different types of fiscal rules existing in the EU countries, the biggest reduction in GDP volatility was obtained for countries where debt rules were in force. In the case of "operational" rules, the budget balance rules have a stronger impact on limiting GDP growth fluctuations, while the impact of expenditure rules in this matter turned out to be insignificant.

Keywords: fiscal policy, fiscal rules, business cycle, GDP volatility, European Union

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1. Introduction

According to Richard Musgrave's (1959) classification, there are three main functions of economic policy: allocative, redistributive and stabilizing. The third one is responsible for mitigating fluctuations in economic activity caused by changes in the phases of the business cycle, establishing conditions that support stable economic growth and maintaining a high level of employment. This function focuses on mitigating cyclical fluctuations in production and limiting the effect of one-off shocks and bringing real GDP growth to the level of potential growth by counter-cyclical fiscal policy. Currently, one of the fiscal measures used for this purpose, apart from automatic economic stabilizers, are numerical fiscal rules.

Counter-cyclical fiscal policy is based on the state's impact on aggregate demand, which is negatively correlated with the phases of the business cycle. The counter-cyclical policy is expansive in the downturn phases and restrictive in the phases of economic expansion. It can be carried out using two main groups of tools: automatic stabilizers (income taxes, unemployment benefits, social assistance) and discretionary measures of the government. However, the discretionary policy has disadvantages resulting from, among other things, the slow pace of the legislative process and delays in its implementation. This slowness means that in fact, active fiscal policy may act pro-cyclically, limiting or eliminating the effect of automatic stabilizers (the phenomenon of time inconsistency of fiscal policy is discussed, among others, by Kydland and Prescott 1977).

Moreover, in the absence of appropriate systemic solutions, fiscal policy also shows an inherent tendency to be pro-cyclical. In the growth phase of the economic cycle, the budget is positively affected by increasing tax revenues with decreasing expenditure on social benefits and public transfers. This creates fiscal space which, if used entirely to reduce the budget deficit, would allow taking full advantage of the positive effects of automatic stabilizers (Romhanyi, Janikowski 2018). However, this approach is rarely practiced and governments usually choose to allocate these funds, in part or in full, to increase spending or reduce taxes (IMF 2015). Moreover, a privilege once granted to a given social group is rarely withdrawn (Afonso, Claeys 2008).

Pro-cyclical fiscal policy contradicts the state's stabilizing function, deepening economic fluctuations through fiscal expansion in good times, thus negatively affecting economic stability by strengthening macroeconomic fluctuations and slowing down economic development in the long term. Moreover, if additional spending in one period is not matched by savings in another, the state risks running into a high, persistent budget deficit, which may lead to an uncontrolled increase in public debt. As a result, pro-cyclical fiscal policy not only strengthens cyclical fluctuations, but may also lead to higher debt servicing costs, which limit growth opportunities and, in extreme cases, lead to the country's insolvency and bankruptcy.

The goal of the presented article is to estimate the impact of numerical fiscal rules at the national level on the volatility of economic growth in the European Union countries using econometric methods. The research hypothesis verified in the article is that the introduction and wider use of fiscal rules by European Union countries has led to a reduction in the volatility of GDP. Establishing its validity will allow answering the question of whether the fiscal rules currently used by all EU countries have counter-cyclical and stabilizing properties. If so, which types of fiscal rules are most associated with mitigating fluctuations in economic growth? There is no conclusion in the literature. One can find voices saying that "tying the hands" of political decision-makers by fiscal rules increases

the pro-cyclicality of the fiscal policy due to the lack of adequate ability to react to external shocks (Levinson 1998). Other authors argue that fiscal policy constraints tend to have a negligible impact on business cycles (Alesina, Bayoumi 1996). There are also voices claiming that budget constraints lead to less volatility of fiscal policy, which reduces the volatility of GDP growth (Fatas, Mihov 2003, 2006). The contribution of this article to the literature is an empirical approach to the analysed issue in a novel way using up-to-date data.

The structure of this text is as follows. After the introduction describing the background of the researched issue, in the next section there is a review of the literature on factors affecting GDP volatility. Next, there is a description of the data and methodology used in the research. The next three sections present results from different types of models and their robustness. The last part of the article contains conclusions from the results, a summary and recommendations.

2. Literature review

The literature on the factors affecting the volatility of economic growth is very extensive. In the context of the presented study, it can be divided into two main parts – the impact of fiscal policy and other economic and political factors.

The first part is articles describing the mechanisms through which fiscal policy can influence business cycles. Positions on this issue are extremely diverse, which makes it a problem worthy of empirical verification. Roubini and Sachs (1989), Poterba (1994) and Lane (2003) showed that constraints in government spending and less volatility in government spending result in slower economic adjustments to unexpected shocks. The main argument of those who oppose the constraints of fiscal policy is that it is an important tool for limiting fluctuations and that "tying the hands" of government leads to an increase in the amplitude of business cycles (Levinson 1998).

However, other authors reached the opposite conclusion. The negative effects of fiscal constraints can easily be offset by at least two positive effects:

1. constraints on fiscal policy ensure that governments do not run excessive deficits leading to unsustainable debt levels,

2. policy constraints will eliminate or at least reduce the possibility that fiscal policy itself is a source of macroeconomic volatility.

Alesina and Bayoumi (1996) showed that fiscal policy constraints tend to have a negligible effect on business cycles and argued that positive and negative effects cancel each other out. This was empirically verified by Fatas and Mihov (2003). Using data from 91 countries and years 1960–2000, they determined that: (1) governments that apply aggressive fiscal policies cause significant macroeconomic instability; (2) output volatility due to discretionary fiscal policy reduces economic growth by more than 0.8 percentage points for every percentage point increase in volatility. Also, Fatas and Mihov (2006), on the basis of data from 48 US states, proved that (1) budget constraints lead to less volatility of fiscal policy (i.e. less aggressive use of discretion in conducting fiscal policy), (2) fiscal constraints reduce policy responsiveness to output shocks. These two outcomes should have opposite effects on GDP volatility. While less discretion in fiscal policy should reduce volatility, less ability to react to shocks may strengthen business cycle fluctuations. Empirical results support the first effect to a greater extent: fiscal rules, by limiting the discretion in fiscal policy, can reduce macroeconomic volatility.

There are very few articles discussing the impact of fiscal rules on fluctuations in economic growth. Combes, Minea and Sow (2017) examined fiscal policy responses to the business cycle in a panel of 56 developed and developing economies in 1990–2011. According to their results, fiscal policy in countries with lower levels of debt is counter-cyclical, while in countries where debt exceeds the threshold level (estimated at 87% of GDP), it becomes pro-cyclical. The impact of fiscal rules is heterogeneous and only some of them can mitigate the pro-cyclicality of fiscal policy. First, according to the authors, there are several types of fiscal rules that do not reduce the pro-cyclicality of fiscal policy in countries with a high level of debt, including expenditure rules, debt rules and supranational rules. Second, rules with exit clauses have a negative impact, making fiscal policy even more pro-cyclical when government debt is high. Third, deficit rules favour the counter-cyclicality of fiscal policy in a situation of high public debt. Finally, national rules and golden rules prove to be more effective when government debt is high, shifting fiscal policy from pro-cyclical to acyclical and counter-cyclical, respectively. Brzozowski and Siwińska-Gorzelak (2010), using average values of different variables from 1995–2006 for 97 countries, showed that fiscal rules have a significant impact on the volatility of fiscal policy, but depending on the type of the rule – debt or budget balance – the rules will increase or reduce fluctuations. Fiscal rules limiting the size of the fiscal deficit tend to be destabilizing, while rules limiting the value of public debt have the opposite effect – they tend to be stabilizing.

The second part of this literature review looks at other economic, political and institutional factors affecting GDP volatility. This part is important because it helps to create appropriate econometric specifications with relevant control variables. In terms of purely economic factors, two main trends in the literature can be distinguished. The first stresses that the decrease in the volatility of economic growth is associated with a higher level of economic development (Acemoglu, Zilibotti 1997; Pritchett 2000), while the second trend refers to the negative relationship between the size of the economy and its volatility (Canning et al. 1998). Acemoglu et al. (2003) also point to another possible explanation for volatility based on the lack of strong institutions that can enforce property rights, reduce corruption and political instability. Empirically, Fiaschi and Lavezzi (2003) using data from 119 countries and years 1960–1998 analysed the impact of three variables on the variability of economic growth (measured by the standard deviation of the growth rate): (1) the level of GDP per capita as an approximation of the level of development, (2) share of agriculture in GDP as an approximation of structural changes and (3) total GDP volume as an approximation of the size of the economy. They showed a negative relationship between economic growth volatility and both GDP per capita and the size of the economy and a positive relationship between volatility and structural changes.

Easterly, Islam and Stiglitz (2000) focused on the development of the financial sector as the cause of the decrease in the volatility of economic growth. Depending on the specifications, their sample includes observations from 60 to 74 countries in a model created by aggregating the periods 1960–1978 and 1979–1997. In their opinion, possibilities of smoothing consumption and production, provided by the existence of a developed financial system, could reduce fluctuations in economic growth. The impact of trade/openness variables was analysed by Cavallo, De Gregorio and Loayza (2008) based on a sample of 77 countries and years 1960–2000. They argued that although openness to trade is commonly associated with greater GDP volatility (due to a greater vulnerability to foreign shocks), more open countries are considered more credible and therefore have fewer credit constraints, which allows them better access to international capital with which fluctuations can be smoothed out.

Concerning political factors, Fatas and Mihov (2001) showed, in a sample of 20 OECD economies and years 1960–1997, that larger governments are associated with less economic fluctuations. Virén (2005), on the other hand, shows that there is no clear direct relationship between the size of the government and the effectiveness of automatic stabilizers.

3. Data and methodology

To assess potential counter-cyclical and stabilizing properties of fiscal rules an analysis of the volatility of GDP in the EU countries over 1995–2019 and possible determinants of the size of these fluctuations was examined using annual data for the EU countries which are presented in Table 1.

One of the variables of particular interest for the conclusions from the research is the Fiscal Rules Index taken from the European Commission *Fiscal Rules Database*,[1] which approximates the strength and restrictiveness of fiscal rules in the EU countries. This index is calculated for each national numerical fiscal rule covering all general government sub-sectors and then standardized to one value for each country each year (since 1990). The index for each fiscal rule takes into account and evaluates the following features: (1) the strength of its legal basis, (2) the precision of the objectives and its binding or nonbinding character, (3) institutions monitoring the compliance with the rules, (4) the existence of appropriate corrective mechanisms and exit clauses, and (5) the resilience of the rules to shocks outside the control of the government. The scores of the five criteria are first standardised to run between 0 and 1. Next, indices available for each fiscal rule in each period of time are aggregated to a single comprehensive score per country per year. Partial indices for each fiscal rule are multiplied by the coverage of general government finances by the respective rule. Next, the products obtained thereby are summed up. If more rules apply to the same general government sub-sector, then the rule with the higher fiscal rules strength index score is assigned weight one, while the second and third weaker rules obtain weights 1/2 and 1/3, respectively, to reflect decreasing marginal benefit of multiple rules applying to the same sub-sector of the general government. Finally, the national index is normalized in such a way that its average in the entire sample is 0 and the standard deviation is 1. The methodology for creating the Fiscal Rules Index is based on the work of Deroose, Moulin and Wierts (2006), and the assessment is carried out annually by the Directorate-General for Economic and Financial Affairs (DG ECFIN) in cooperation with national experts.

Additionally, dummy variables regarding the existence of various types of rules in EU countries (budget balance, expenditure, and debt) were created. The dummy variables were prepared to capture the year of introduction and use of different types of fiscal rules in each country and to analyse differences in their effectiveness. However, it is important to bear in mind that the existence of a particular type of fiscal rule does not, by itself, mean that it is fulfilled. That is why results obtained in the section with dummy variables should be interpreted with some caution. The full list of included numerical fiscal rules with the criteria applied are presented in Appendix.

The econometric models were estimated in two ways. The first approach was the estimation of OLS regressions in which the explained variable was the volatility of the real GDP growth rate in the European Union countries measured by the standard deviation in different ranges of years, and the explanatory variables in this approach were the standard deviations (SD) or averages (AVG)

[1] https://ec.europa.eu/info/publications/fiscal-rules-database_en (accessed on 24 October 2022).

of macro-fiscal and political-institutional variables in 1995–2019 or 2004–2019 (e.g. the average value of the FRI index – see Figures 2 and 3).

The second approach was based on panel models for the European Union countries and the years 1995–2019, in which the dependent variable is the relation between the absolute value of the cyclical component of real GDP compared to the trend, showing the scale of deviation of the current economic activity from the long-term trend. The cyclical component of real GDP was calculated using the Hodrick-Prescott filter (1997), which is defined as a solution to the following optimization problem:

$$y_t = \tau_t + c_t$$

$$\min_{\{\tau_t\}} \left\{ \sum_{t=1}^{T} \left(y_t - \tau_t \right)^2 + \lambda \sum_{t=2}^{T-1} \left[\left(\tau_{t+1} - \tau_t \right) - \left(\tau_t - \tau_{t-1} \right) \right]^2 \right\}$$

where y_t is the real GDP time series, τ_t is the trend component, and c_t is the cyclical component. The smoothing parameter λ was assumed at the level of 6.25 suggested in the literature for annual data (Ravn, Uhlig 2002).

Then the cyclical component in the absolute value was compared to the trend:

$$x_t = \frac{|c_t|}{\tau_t} \cdot 100$$

which documents the scale of deviation of the current economic activity from its long-term trend.

The decrease in the value of the cyclical component of the real growth rate reflects the reduction of fluctuations in the growth rate and a more stable rate of economic growth close to the rate of potential growth.

The signs and the value of estimated coefficients for explanatory variables indicate whether a given factor is positively or negatively related to the value of cyclical components, in other words, whether it is increasing or decreasing economic growth fluctuations. Within this approach, it can be interpreted that the variables negatively affecting the dependent variable exhibit some counter-cyclical, stabilizing properties. What is important, explanatory variables in this approach were searched mostly among macroeconomic and fiscal, political, demographic and other factors determining the medium- and long-term characteristics of individual countries, and not among factors characterizing the current economic situation. Due to the form of the dependent variable (absolute values of cyclical components), it was impossible to use the value of budget balances among explanatory variables because while an increased budget deficit in good times should theoretically increase the positive deviation of GDP from the trend (pro-cyclical action), in the case of bad economic conditions it should decrease the decline in GDP and the negative deviation from the trend (counter-cyclical action). With the absolute value form of the dependent variable, it is impossible to distinguish between these two effects.

Theoretical arguments supported the use of models with fixed individual effects (FE) due to the specificity of business cycles in individual countries. Formally, all individual effects were statistically significantly different from zero, and Hausman's (1978) test confirmed the selection of models with fixed effects.

When interpreting the results, it should be emphasized that the adopted approaches have limitations. They do not allow determining whether fiscal rules make fiscal policy counter-cyclical *per se*. Estimates of the variables' coefficients document only whether they have an impact on reducing fluctuations in the GDP growth rate, which suggests counter-cyclical and stabilizing properties. However, this may still indicate only the reduction of the pro-cyclicality of fiscal policy. These approaches do not analyse the initial positions of fiscal policies in individual countries, but only their change under the impact of the identified factors.

Another limitation concerns empirical research more generally. It allows us to observe the co--occurrence of some economic conditions (e.g. the existence of fiscal rules and lower volatility of GDP) but does not provide a complete answer as to why this happens. For this purpose, a further step in this field of research could be the construction of appropriate theoretical models and/or country cases.

4. Results from cross-sectional regressions

The models presented in Table 2 were estimated using the ordinary least squares method. All specifications fulfil the basic assumptions of linear regression regarding the properties of the residuals, the correct selection of the functional form of the model and the lack of collinearity between the regressors.

In the context of the impact of fiscal rules on the volatility of GDP, the results do not give a clear conclusion and depend on the analysed sample. In the case of the years 1995–2019 (specifications 1–4), the average value of the FRI index has no significant impact on the volatility of economic growth. However, in the case of the sample 2004–2019 (specifications 5–8), there is a negative and significant relationship between the index and the volatility of GDP growth in most of the estimated models. Assuming specification 5 as the main model in this sample (based on the adjusted R^2), an increase in the average value of the FRI by 1 (which is equal to one standard deviation) is associated with a decrease in the standard deviation of the GDP growth rate by 0.51 (around 20% of the average value of the dependent variable).

In the case of a longer sample, the insignificance of the impact of fiscal rules may be the consequence of the construction of the FRI index. In the second half of the 1990s and at the beginning of the 2000s practically most countries did not have fiscal rules and achieved a minimum FRI score (see Table 8). As a result, the 25-year averages are less varied between countries than those from 2004–2019. The average of the FRI index obtained in a shorter sample should better differentiate between countries with weaker and stronger fiscal rules. This is the main caveat of this approach.

In all specifications, an increase in the volatility of economic growth rates is associated with an increase in the volatility of budget balances. This conclusion holds both for different samples and for the use of different variables representing the fiscal variable – the standard deviation of the nominal general government balance (specifications 3–4; 7–8) or less volatile cyclically adjusted general government balance (specifications 1–2; 5–6). The EU countries with higher volatility of general government balances have higher fluctuations in the GDP growth rate. At the same time, stronger fiscal rules reduce the volatility of budget balances (see Table 3). However, if the explanatory variables concerning the volatility of budget balances in the sample of 1995–2019 are omitted, the estimated coefficient of the impact of the average value of the FRI index remains statistically insignificant.

The obtained results provide additional insights. On average, a higher level of debt in relation to GDP is characteristic of countries with lower GDP volatility. This is quite a puzzling relationship, however, in the case of the EU countries, a higher level of debt in relation to GDP is characteristic of most European countries with a higher level of economic development, which may result in lower volatility of economic growth. On the other hand, average levels of GDP or GDP per capita turned out to be insignificant explanatory variables. Analysing other macroeconomic factors that may determine the level of development of economies, smaller fluctuations of economic growth are characteristic of countries with a lower share of agriculture in GDP, which is another feature of countries with a higher level of development and structural changes.

An important factor related to the greater volatility of the economic growth rate is the fact of participation in the euro area. Countries that remained outside the euro area were characterized by lower volatility of GDP growth. This indicates that countries with an independent monetary policy and flexible exchange rate can stabilize their economic growth more effectively. Factors such as the openness of economies and political stability (measured by the World Bank index) turned out to be statistically insignificant in the context of the relationship with the volatility of GDP in this approach. A similar situation occurred in the case of the average ratio of private debt to GDP, which approximates the level of the development of the financial sector.

5. Results from panel regressions

The main results from the panel approach, obtained in the 1995–2019 sample are presented in Table 4. The estimation of the coefficient of the FRI index takes a negative and statistically significant value. Specification 6 with the highest R^2 value can be regarded as the main model. An increase in the value of the FRI index of one standard deviation[2] is associated with a decrease in the cyclical component of 0.28 percentage points (with an average value in the sample at 1.26, this is more than 20%).

When fixed individual effects for countries are taken into account, the increase in the level of public debt increases the fluctuations of economic growth, which is the opposite conclusion to that obtained in the OLS models. As in the literature, the relationship between the size of debt (or, more broadly, the scale of state involvement in the economy) and GDP volatility is not clear and probably non-linear.

The decrease in the size of GDP cyclical deviations from the trend is associated with increase in political stability, measured by the World Bank index (Kaufmann, Kraay, Mastruzzi 2011). Another variable that characterizes countries with smaller deviations of the cyclical component from the GDP trend is a greater openness of economies, which is consistent with the observations that, despite greater vulnerability to foreign shocks, more open countries can smooth out fluctuations through access to international financial markets and greater credibility. However, the negative effect in this case is rather small. In addition, important variables to control were the years of the financial crisis (2007–2008), during which the GDP of most European Union countries significantly deviated from its trend.

[2] This scale of the increase in the FRI is comparable to the situation that occurred in most of the EU countries in different years of the second decade of the 21st century when countries introduced most of the new numerical fiscal rules (see Appendix).

In the case of the results for different types of fiscal rules, they are presented in Table 5. The strongest counter-cyclical features in the analysed sample are displayed by debt rules. The existence of such fiscal rules was associated with a decrease in the value of cyclical components by an average of 0.58 percentage points (in absolute terms). A smaller, but still significant negative impact was obtained by the existence of the budget balance rules with the coefficient equal to -0.49. The relationship between expenditure rules and the size of cyclical components of economic growth turns out to be statistically insignificant, so this type of rule was not significantly associated with a decrease or increase in economic growth fluctuations. The impact of the other variables remains statistically significant, and the estimates are similar to those obtained in the model with the FRI index from Table 4.

6. Robustness analysis

Tables 6 and 7 present results for the sample shortened to the years 2004–2019, and should be treated as a robustness analysis of results obtained in the previous section. The results obtained with the FRI index are very similar to those for a longer sample. The impact of other explanatory variables is similar (level of debt, openness of economies, years of financial crisis), except for the variable representing the share of agriculture in GDP. On the other hand, in a shorter sample, political stability becomes an insignificant explanatory factor.

In the case of the estimated models with a different type of fiscal rules, the results obtained for the years 2004–2019 are consistent with those obtained in the full sample – the existence of debt rules is associated with the largest decrease in the deviation of cyclical components from the GDP trend. Budget balance rules are also an important factor, and the impact of such rules is slightly stronger. Again, expenditure rules turn out to be an irrelevant factor.

7. Conclusions

The obtained results lead to the conclusion that the introduction and wider use of numerical fiscal rules in fiscal policies of the European Union countries had some impact on the reduction of the volatility of GDP. Both approaches – cross-sectional models (on a shorter sample) and panel models – provided consistent results in terms of the direction of impact and its approximate scale. An increase in the FRI index by one standard deviation was associated with a decrease in the volatility of the GDP growth rate by approximately 20%. Fiscal policy based on fiscal rules may be treated as a part of the stabilization function of the state economic policy, contributing to the reduction of fluctuations in economic activity.

Once again, it should be emphasized that the obtained results do not make it possible to determine whether the fiscal policy in the European Union countries has become counter-cyclical under the fiscal rules. The obtained results only show that fiscal rules have some counter-cyclical and stabilizing properties and make it possible to reduce the pro-cyclicality and/or increase the counter-cyclicality of fiscal policy in the EU countries (depending on the initial fiscal position in each of the countries) by reducing fluctuations in the economic growth. Furthermore, the thesis put forward in the literature that fiscal rules "tying the hands" of political decision-makers increase the pro-cyclicality of fiscal policy, can be rejected with a high degree of certainty.

The obtained results also show that the volatility of budget balances of the general government sector in the EU countries – the effect of discretionary fiscal policy – has a positive impact on the volatility of economic growth. This is an additional channel through which fiscal rules may have an impact on limiting the volatility of GDP – by limiting the volatility of fiscal results. Political stability is also an important factor in stabilizing the GDP growth rate.

As far as the types of fiscal rules are concerned, it appears (with the previously described caveats) that the existence of debt rules shows the strongest counter-cyclical properties. This type of fiscal rule in many countries has a strong legal basis and an objective that is easily understood by the public (not exceeding the debt limit or keeping the desired level of debt in relation to GDP), which is consistent with fiscal rules at the EU level. The effectiveness of debt rules may be the consequence of these factors. In the case of fiscal rules used to a greater extent in the construction of general government budgets for the next year (more "operational" rules) – budget balance and expenditure rules – the budget balance rules have a stronger impact on limiting economic growth fluctuations, and the impact of expenditure rules turned out to be statistically insignificant. Expenditure rules, by limiting only the expenditure side and not taking into account the revenue side, may be less effective in stabilizing the economic cycle.

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Appendix

Table 1
Data description and sources

Variable	Description	Source
GDP_YOY	The annual growth rate of the real GDP	AMECO
GDP_CYCLE	The absolute value of the cyclical component of the real GDP compared to the trend calculated using the HP filter (1997)	Own calculations
FRI	Fiscal Rules Index at the country level	European Commission
ER	Dummy variable: 1 – when an expenditure rule was in force, 0 – otherwise	Own calculations
BBR	Dummy variable: 1 – when a budget balance rule was in force, 0 – otherwise	Own calculations
DR	Dummy variable: 1 – when a debt rule was in force, 0 – otherwise	Own calculations
DEBT	General government debt in relation to GDP	Eurostat
BALANCE	General government nominal balance in relation to GDP	Eurostat
CABB	A cyclically adjusted budget balance in relation to GDP	AMECO
AGRICULTURE	The share of agriculture in GDP	Eurostat
OPENNESS	The openness of the economy measured as the sum of imports and exports in relation to GDP	Own calculations based on Eurostat
POLSTAB	Index measuring political stability and the absence of politically motivated violence/terrorism	World Bank
EURO	Dummy variable: 1 – when a country was a member of the euro area, 0 – otherwise	Own calculations

Source: own elaboration.

Table 2
Models explaining the volatility of the GDP growth rate in the EU countries

	Dependent variable: SD_GDP_YOY							
	1995–2019				2004–2019			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
AVG_FRI	-0.075	-0.038	-0.093	0.031	-0.513*	-0.580*	-0.618*	-0.587
	(0.247)	(0.263)	(0.306)	(0.331)	(0.274)	(0.308)	(0.306)	(0.355)
SD_CABB	0.598***	0.626***			0.582***	0.595***		
	(0.110)	(0.118)			(0.111)	(0.117)		
SD_BALANCE			0.478***	0.491***			0.485***	0.486***
			(0.132)	(0.136)			(0.118)	(0.124)
AVG_DEBT	-0.025***	-0.026***	-0.019***	-0.017**	-0.031***	-0.034***	-0.025***	-0.024***
	(0.004)	(0.006)	(0.005)	(0.007)	(0.005)	(0.007)	(0.006)	(0.008)
AVG_AGRICUL-TURE	0.335***	0.246*	0.444***	0.424***	0.409***	0.366*	0.516***	0.547**
	(0.077)	(0.118)	(0.090)	(0.134)	(0.134)	(0.210)	(0.147)	(0.234)
EURO	1.100***	1.004***	1.104***	0.958**	1.558***	1.622***	1.475***	1.463***
	(0.307)	(0.329)	(0.376)	(0.405)	(0.378)	(0.409)	(0.434)	(0.476)
AVG_POLSTAB		-0.611		-0.425		0.030		0.090
		(0.543)		(0.655)		(0.711)		(0.814)
AVG_OPENNESS		0.001		0.004		-0.002		0.001
		(0.003)		(0.003)		(0.003)		(0.004)
Constant	1.273**	2.001*	0.782	0.657	2.002***	2.474*	1.494**	1.202
	(0.466)	(0.965)	(0.634)	(1.174)	(0.574)	(1.422)	(0.680)	(1.651)
Observations	27	27	27	27	27	27	27	27
R2	0.827	0.838	0.745	0.761	0.798	0.803	0.741	0.742
Adjusted R2	0.786	0.778	0.684	0.673	0.750	0.730	0.679	0.646
F Statistics	20.054***	14.005***	12.240***	8.631***	16.593***	11.042***	12.018***	7.791***

Statistical significance at the level of: ***0.01, **0.05, *0.1.

Source: own elaboration.

Table 3
The relationship between the volatility of budget balances and the average value of the FRI index

	(1)	(2)	(3)	(4)
AVG_FRI	-0.843*	-0.979*	-0.849*	-0.795
	(0.438)	(0.493)	(0.432)	(0.497)
Constant	2.520***	2.752***	2.839***	3.117***
	(0.242)	(0.382)	(0.239)	(0.386)
Dependent variable	SD_CABB	SD_CABB	SD_BALANCE	SD_BALANCE
Sample	1995–2019	2004–2019	1995–2019	2004–2019
Observations	27	27	27	27
R^2	0.129	0.136	0.134	0.093
Adjusted R^2	0.094	0.102	0.099	0.056
F Statistics	3.704*	3.946*	3.859*	2.552

Statistical significance at the level of: ***0.01, ** 0.05, *0.1.

Source: own elaboration.

Table 4
Models explaining the size of GDP cyclical components in the EU countries in 1995–2019

	Dependent variable: GDP_CYCLE					
	(1)	(2)	(3)	(4)	(5)	(6)
FRI	-0.344***	-0.385***	-0.464***	-0.491***	-0.473***	-0.280***
	(0.092)	(0.113)	(0.117)	(0.132)	(0.132)	(0.105)
lag(DEBT, -1)		0.011**	0.011**	0.011*	0.012*	0.017***
		(0.006)	(0.006)	(0.006)	(0.006)	(0.006)
POLSTAB			-0.731***	-0.716***	-0.724***	-0.566**
			(0.269)	(0.270)	(0.271)	(0.244)
AGRICULTURE				-0.038	-0.043	0.038
				(0.067)	(0.072)	(0.049)
OPENNESS					-0.002	-0.007**
					(0.003)	(0.003)
D2007						2.338***
						(0.423)
D2008						2.420***
						(0.375)
Model	FE	FE	FE	FE	FE	FE
Observations	650	623	598	598	598	598
R^2	0.049	0.050	0.071	0.072	0.072	0.287
F Statistics	31.999***	15.711***	14.389***	10.964***	8.825***	32.532***

Statistical significance at the level of: ***0.01, ** 0.05, *0.1.
Robust standard errors reported in parenthesis (Arellano 1987).

Source: own elaboration.

Table 5
Types of fiscal rules and the size of GDP cyclical components in the EU countries in 1995–2019

	Dependent variable: GDP_CYCLE					
	(1)	(2)	(3)	(4)	(5)	(6)
lag(DEBT, -1)		0.015**		0.015**		0.016***
		(0.006)		(0.006)		(0.006)
POLSTAB		-0.399*		-0.612**		-0.496**
		(0.220)		(0.253)		(0.238)
AGRICULTURE		0.072		0.067		0.049
		(0.051)		(0.048)		(0.047)
OPENNESS		-0.011***		-0.008**		-0.010***
		(0.004)		(0.003)		(0.003)
D2007		2.419***		2.382***		2.368***
		(0.434)		(0.424)		(0.425)
D2008		2.543***		2.482***		2.467***
		(0.394)		(0.374)		(0.399)
ER	-0.527*	-0.229				
	(0.283)	(0.273)				
BBR			-0.650***	-0.490**		
			(0.215)	(0.234)		
DR					-0.787***	-0.581**
					(0.259)	(0.293)
Model	FE	FE	FE	FE	FE	FE
Observations	650	598	650	598	650	598
R^2	0.015	0.273	0.035	0.283	0.044	0.288
F Statistics	9.680***	30.320***	22.353***	31.821***	28.903***	32.654***

Statistical significance at the level of: ***0.01, ** 0.05, *0.1.
Robust standard errors reported in parenthesis (Arellano 1987).

Source: own elaboration.

Table 6
Models explaining the size of GDP cyclical components in the EU countries in 2004–2019

	Dependent variable: GDP_CYCLE					
	(1)	(2)	(3)	(4)	(5)	(6)
FRI	-0.569***	-0.559***	-0.562***	-0.619***	-0.500***	-0.279**
	(0.127)	(0.142)	(0.146)	(0.156)	(0.125)	(0.108)
lag(DEBT, -1)		0.002	0.002	0.001	0.005	0.017**
		(0.006)	(0.006)	(0.006)	(0.007)	(0.008)
POLSTAB			-0.151	-0.195	-0.104	-0.357
			(0.386)	(0.397)	(0.388)	(0.340)
AGRICULTURE				-0.337**	-0.370**	-0.257**
				(0.148)	(0.156)	(0.124)
OPENNESS					-0.018*	-0.023**
					(0.010)	(0.011)
D2007						2.215***
						(0.421)
D2008						2.325***
						(0.367)
Model	FE	FE	FE	FE	FE	FE
Observations	416	390	390	390	390	390
R^2	0.112	0.093	0.093	0.109	0.134	0.371
F Statistics	48.844***	18.525***	12.351***	10.993***	11.120***	30.135***

Statistical significance at the level of: ***0.01, ** 0.05, *0.1.
Robust standard errors reported in parenthesis (Arellano 1987).

Source: own elaboration.

Table 7
Types of fiscal rules and the size of GDP cyclical components in the EU countries in 2004–2019

	Dependent variable: GDP_CYCLE					
	(1)	(2)	(3)	(4)	(5)	(6)
lag(DEBT, -1)		0.015*		0.014*		0.016*
		(0.008)		(0.008)		(0.009)
POLSTAB		-0.176		-0.507		-0.247
		(0.340)		(0.398)		(0.346)
AGRICULTURE		-0.239**		-0.234*		-0.220**
		(0.117)		(0.120)		(0.103)
OPENNESS		-0.028**		-0.022*		-0.026**
		(0.012)		(0.012)		(0.011)
D2007		2.276***		2.240***		2.244***
		(0.422)		(0.426)		(0.413)
D2008		2.436***		2.378***		2.374***
		(0.379)		(0.367)		(0.387)
ER	-0.699*	-0.361				
	(0.406)	(0.339)				
BBR			-1.141***	-0.524*		
			(0.279)	(0.302)		
DR					-1.086***	-0.577*
					(0.341)	(0.325)
Model	FE	FE	FE	FE	FE	FE
Observations	416	390	416	390	416	390
R^2	0.025	0.361	0.096	0.368	0.083	0.374
F Statistics	9.904***	28.772***	41.121***	29.691***	35.169***	30.446***

Statistical significance at the level of: ***0.01, ** 0.05, *0.1.
Robust standard errors reported in parenthesis (Arellano 1987).

Source: own elaboration.

Table 8
The list of numerical fiscal rules included in the study

Country	Budget balance rule (BBR)	Expenditure rule (ER)	Debt rule (DR)	Country	Budget balance rule (BBR)	Expenditure rule (ER)	Debt rule (DR)
AT	1999–	2009–	2017–	IE	2012–	–	2013–
BE	2014–	–	–	IT	2014–	2014–	2014–
BG	2012–	2012–	2003–	LT	2015–	2008–	–
CY	2013–	–	2015–	LU	2013–	–	–
CZ	2017–	–	2017–	LV	2013–	2015–	2013–
DE	2013–	1990–2009	–	MT	2014–	–	2014–
DK	1992–	2014–	–	NL	2013–	1994–	2014–
EE	1993–	–	2014–	PL	–	2015–	1997–
ES	2002–	2011–	2012–	PT	2002–	–	2013–
FI	2002–	–	2015–	RO	2014–	2014–	2014–
FR	2013–	–	–	SE	2000–	1996–	2019–
GR	2019–	–	2014–	SI	2015–	2010–2011	2000–2009
HR	2019–	2011–	2009–2014	SK	2014–	2003–2015	2012–
HU	2007–2008; 2013–	–	2009–2011; 2014–				

Source: own elaboration.

Figure 1
The average of the FRI and economic growth fluctuations in the EU countries in 1995–2019

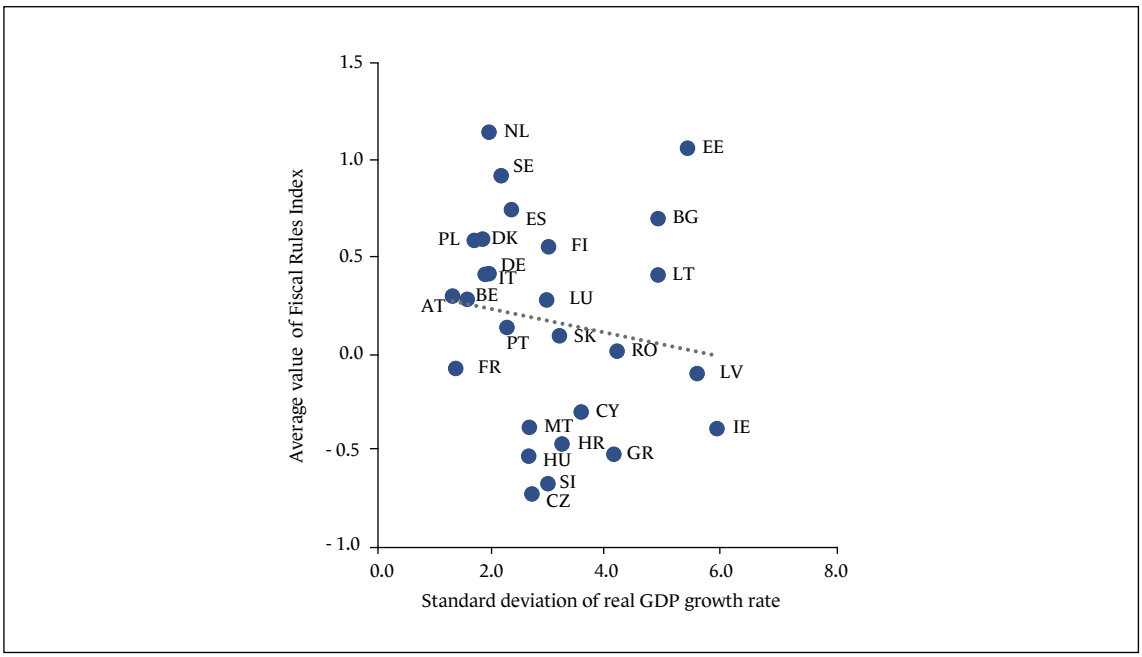
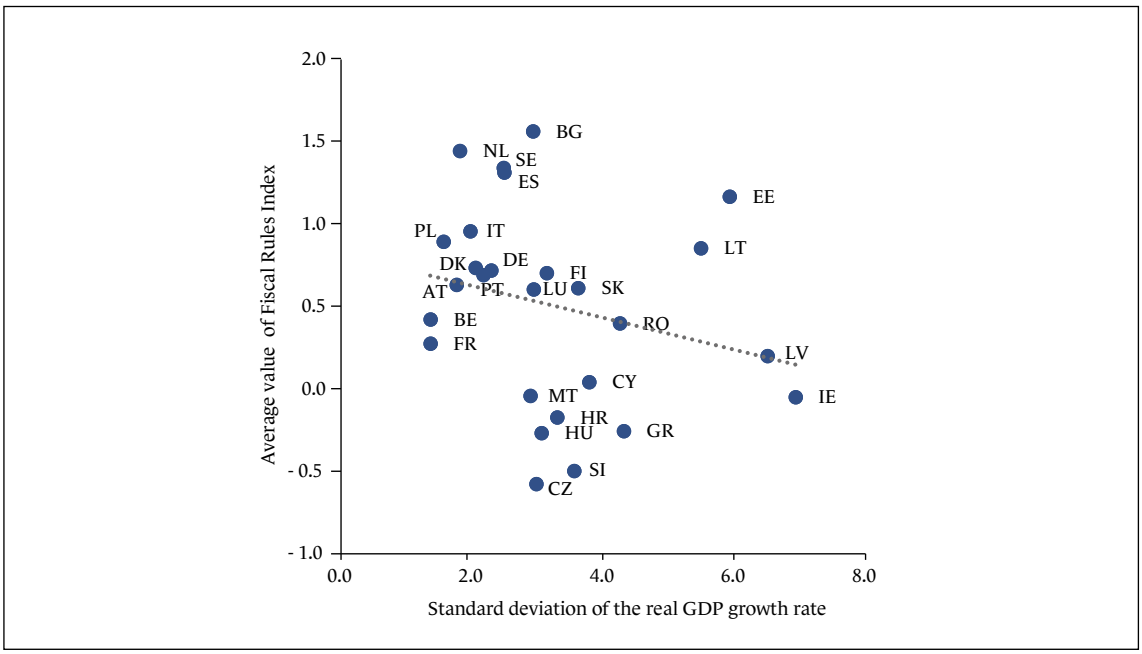


Figure 2
The average of the FRI and economic growth fluctuations in the EU countries in 2004–2019



Numerical fiscal rules included in the study – author's criteria

For the purposes of the econometric study, dummy variables representing the existence of various national numerical fiscal rules (budget balance, expenditure, and debt) in each of the EU countries were constructed on the basis of the abovementioned European Commission database. Only those rules were included in the models which met one of the following criteria: first, they were enshrined in the constitutions of countries, national laws, coalition agreements or agreements between political parties (the ruling party with the opposition); second, they applied at the general government or at least at the central budget level; third, they covered a minimum of 30% of the general government sector. The study did not take into account fiscal rules at the local or regional level. The full list of numerical fiscal rules included in the study is presented in Table 8.

Stabilizujące, neutralne czy destabilizacyjne? Wpływ reguł fiskalnych na zmienność PKB w krajach Unii Europejskiej

Streszczenie

Celem artykułu jest zbadanie wpływu krajowych reguł fiskalnych na zmienność wzrostu gospodarczego w krajach Unii Europejskiej. Pozwoli to odpowiedzieć na pytanie, czy reguły fiskalne, z których korzystają obecnie wszystkie kraje UE, mają własności antycykliczne i wpisują się w funkcję stabilizacyjną polityki gospodarczej państwa (Musgrave 1959), a jeżeli tak, to które rodzaje reguł fiskalnych najsilniej wiążą się z łagodzeniem wahań tempa wzrostu gospodarczego. W literaturze przedmiotu można znaleźć opinie, że wiązanie rąk decydentom politycznym za pomocą reguł fiskalnych zwiększa procykliczność polityki fiskalnej z powodu braku odpowiedniej możliwości reagowania na zewnętrzne szoki (Levinson 1998). Inni autorzy uważają, że ograniczenia polityki fiskalnej mają zwykle znikomy wpływ na cykle koniunkturalne (Alesina, Bayoumi 1996). Są też głosy twierdzące, że ograniczenia budżetowe prowadzą do mniejszej zmienności polityki fiskalnej, co wpływa na zmniejszanie zmienności tempa wzrostu PKB (Fatas, Mihov 2003, 2006).

W celu oceny antycyklicznych własności reguł fiskalnych (oraz, szerzej, oddziaływania w tym zakresie polityki fiskalnej) w artykule dokonano – za pomocą metod ekonometrycznych – analizy empirycznej zakresu fluktuacji tempa wzrostu PKB w krajach UE w latach 1995–2019 oraz możliwych czynników, które wpływały na wielkość tych fluktuacji. Dokonano tego na dwa sposoby.

Pierwszym podejściem było oszacowanie liniowych regresji. Zmienną objaśnianą jest w nich zmienność tempa wzrostu gospodarczego w krajach Unii Europejskiej mierzona poprzez odchylenia standardowe w różnych przedziałach lat. Zmiennymi objaśniającymi są natomiast odchylenia standardowe lub średnie zmiennych makroekonomiczno-fiskalnych oraz polityczno-instytucjonalnych w latach 1995–2019 lub 2004–2019, np. średnia wartość indeksu siły i restrykcyjności reguł fiskalnych (Fiscal Rules Index, FRI) opracowywanego przez Komisję Europejską.

Drugie podejście bazuje na modelach panelowych dla krajów Unii Europejskiej i lat 1995–2019. Zmienną objaśnianą jest wartość bezwzględna z wyznaczonych komponentów cyklicznych realnego PKB, które obrazują skalę odchylenia bieżącej aktywności gospodarczej od długookresowego trendu w poszczególnych krajach. Jako zmienne objaśniane badane są różne czynniki, w tym wartość indeksu FRI oraz, za pomocą zmiennych zero-jedynkowych, lata wprowadzania różnych typów numerycznych reguł fiskalnych w poszczególnych krajach.

Uzyskane wyniki potwierdzają, że wprowadzanie, a następnie coraz szersze wykorzystywanie reguł fiskalnych w polityce fiskalnej w krajach Unii Europejskiej wiązało się ze zmniejszeniem zmienności tempa wzrostu PKB. Obydwa zastosowane podejścia dostarczyły spójnych wyników, zarówno co do kierunku oddziaływania, jak i jego przybliżonej skali. Wzrost indeksu FRI o jedno odchylenie standardowe (które nastąpiło w większości krajów UE w różnych latach drugiej dekady XXI w.) wiązał się ze spadkiem zmienności tempa wzrostu PKB o około 20%. Dowodzi to, że wprowadzone reguły fiskalne mają pewne własności stabilizujące i pozwalają na redukcję procykliczności i/lub zwiększenie antycykliczności polityki fiskalnej w krajach UE (w zależności od stanu początkowego polityki fiskalnej w poszczególnych krajach) przez redukcję fluktuacji tempa wzrostu gospodarczego. Uzyskane wyniki pozwalają ze znaczną pewnością zaprzeczyć tezom, że oparcie polityki fiskalnej na regułach fiskalnych, a więc wiążące ręce decydentom politycznym, zwiększa procykliczność tej polityki.

Jeżeli chodzi o typy reguł fiskalnych, to najsilniejsze własności antycykliczne wykazują reguły długu, a więc reguły określające trwały limit wysokości długu publicznego w relacji do PKB oraz, w niektórych przypadkach, ścieżkę jego redukcji. Ten rodzaj reguł fiskalnych w wielu krajach ma silną podstawę prawną, jest łatwy do zrozumienia przez opinię publiczną i społeczeństwo oraz spójny z regułami fiskalnymi na poziomie UE. Mogą to być powody ich skuteczności. W przypadku reguł „operacyjnych" wykorzystywanych do konstrukcji budżetów państwa, tj. reguł salda budżetowego oraz wydatkowych, silniejszy wpływ na ograniczanie fluktuacji wzrostu gospodarczego wykazywały reguły salda budżetowego, a oddziaływanie reguł wydatkowych okazywało się statystycznie nieistotnie różne od zera. Reguły wydatkowe najczęściej ograniczają wyłącznie stronę wydatkową i nie uwzględniają w pełni strony dochodowej. Przez to mogą być mniej efektywne w stabilizowaniu cyklu koniunkturalnego.

Słowa kluczowe: polityka fiskalna, reguły fiskalne, cykl koniunkturalny, zmienność PKB, Unia Europejska