Determinants of Public Investments in the EU Countries. Role and Importance of Fiscal Rules.

Rafał CHMURA - SGH Warsaw School of Economics (rchmur@sgh.waw.pl)

Abstract

The goal of this study is to identify factors determining the size of public investment in the EU countries and to verify the hypothesis about the negative impact of fiscal rules on the public investment. Panel models estimated on the data from 1995 to 2019 confirmed the hypothesis. The increase in Fiscal Rules Index (which describes the strength and restrictiveness of fiscal rules in each country) by one standard deviation is associated with the decrease in public investment by almost 0.4% GDP. Moreover, the strongest negative impact on public investment has the existence of debt rules. Assuming that public investment is a desirable instrument of economic policy (e.g. supporting the recovery after a crisis or achieving long-term climate goals), obtained results are an empirical contribution to the current discussion on the reform of the fiscal framework in the EU, supporting addition to the fiscal rules investment clauses.

1. Introduction

Before the crisis following the COVID-19 pandemic, the ratio of public investment to GDP in major EU countries was falling (see Figure 1). At the level of the EU as a whole, in the last 10 years public investment decreased from 3.8 % of GDP to 3 % of GDP in 2019. Also, compared to the 1990s, the level of public investment has been significantly lower in recent years. However, in response to the crisis, it is postulated to increase the role of the state in supporting the reconstruction of European economies. According to one of the recent recommendations by the International Monetary Fund (2020), public investment can have a significant positive impact on economic growth and improve labour market conditions in events of high uncertainty, such as the pandemic or energy crisis. The values of public investment multipliers can have very different values (e.g. Perotti 2004, Afonso & Aubyn 2009, Abiad et al. 2014, Levrero et al. 2019), but there is a common agreement that fiscal expansion during a recession lead to higher values of these multipliers. Also, public investment can help to achieve long-term goals which cannot always be directly included in national accounts (e.g. green transformation, decarbonization).

In the last decade, the EU continued the process of strengthening the fiscal framework, the intensification of which took place after 2011 as a result of 2011/85/EU directive (Council of European Union 2011), which tightened the rules

of the Stability and Growth Pact from 1997[2]. With the directive, new standards for creating national budgetary frameworks were introduced, including numerical fiscal rules imposing top-down numerical restrictions on categories such as debt, deficit or expenditures. Currently, the rules are commonly used by the Member States – both those at the EU level and those at the national level. Based on the data from the European Commission, in 2019 26 out of 27 EU countries had budget balance rules (nominal or structural) at the general government level, or at least at the central budget level. Additionally, 20 of them also had debt rules and 12 of them had expenditure rules (a detailed list of the rules included in the study with applied criteria is included in Appendix B).

Figure 1 Public Investment (in % of GDP) in Selected EU Countries
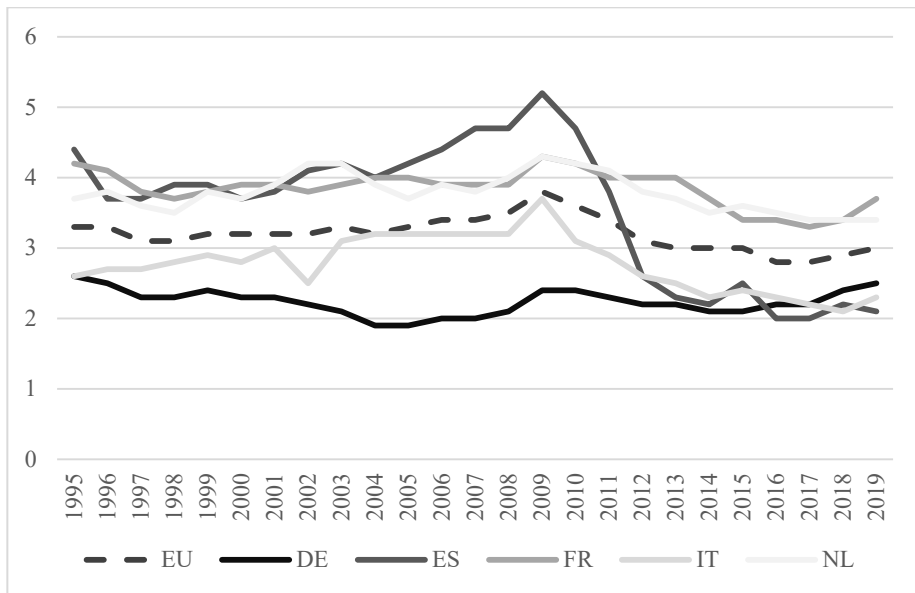
Source: Own calculations based on Eurostat.

In the economic debate, there are voices saying that the fiscal framework based on numerical fiscal rules could be an obstacle for increasing public investment (Thygesen et al. 2019, Basdevant et al. 2020). Rules created to ensure the macro-fiscal stability of countries in a situation of the politicians' tendency to generate excess deficits (Wyplosz 2005, 2011, 2013, Badinger & Reuter 2017) may have a side effect on the structure of government expenditure, including limiting public investment. However, few analyses have been presented to support this hypothesis. When briefly analysing the correlations between the value of the European Commission's Fiscal Rules Index (which could be an approximation of their restrictiveness) and the size of public investment in relation to GDP in the EU

---

[2] The Stability and Growth Pact was established by the resolution of the European Council of 17 June 1997 on the Stability and Growth Pact. It consists of Council Regulation No. 1466/97 (Council of European Union 1997a), and Council Regulation No. 1467/97 (Council of European Union 1997b).

countries, a slightly negative correlation is observable – both in the results for 2019 (see Figure 2) and in the analysis of changes over the years 2012-2019 (see Figure 3) But in both cases the value of Pearson's linear correlation is not significantly different from zero for standard confidence levels.

Hence, the key questions posed in this article are: what are the main determinants of public investment in the EU countries, and are the countries using more strict numerical fiscal rules characterized by a lower level of public investment? If so, is this issue connected with specific types of rules? To answer these questions, appropriate econometric panel models were created, taking into account the problem of endogeneity with a novel strategy of instrumental variables. The contribution of this research is a new empirical approach to the interaction between fiscal rules and public investment limited and focused on the EU countries to obtain recommendations for the current discussion on the reform of the fiscal framework in the EU.

Figure 2 The Relationship between the FRI and the Level of Public Investment in EU in 2019
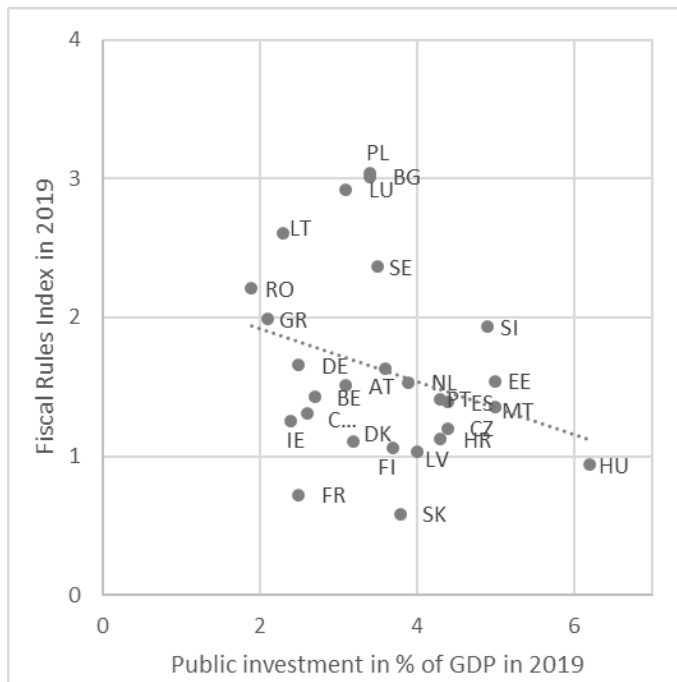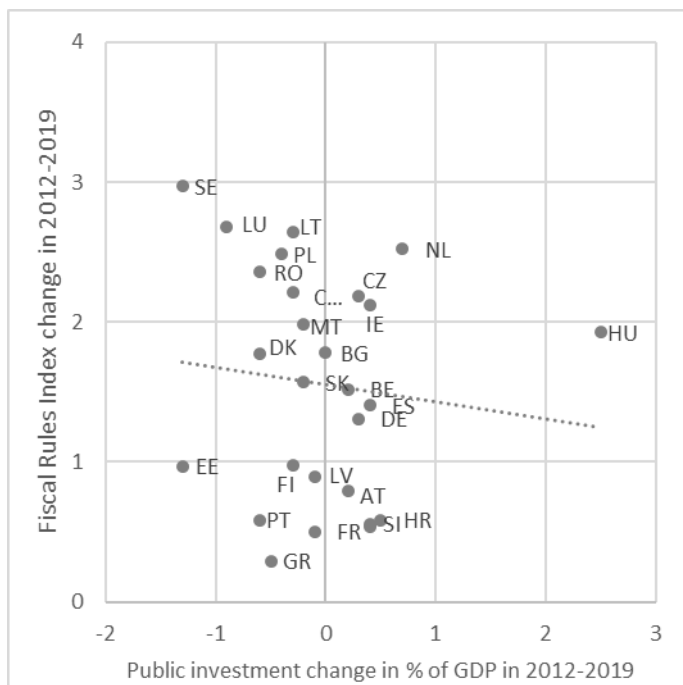
Figure 3 The Relationship between the FRI and the Level of Public Investment in EU in 2019

The main results of this study, obtained on the sample of the EU countries and years 1995-2019, suggest a negative impact of the numerical fiscal rules and the increase of their strength and restrictiveness on the level of public investment in relation to GDP. The increase in Fiscal Rules Index by one standard deviation is associated with the decrease in public investment by almost 0.4% GDP. Results of this study support the currently proposed concepts of investment clauses allowing for the exclusion of all or some types of public investment in limits imposed by fiscal rules.

The structure of this article is as follows. After this introduction, there is a review of the literature, with particular emphasis on the determinants of the public investment used so far. Then, there are presented econometric methods and data used in the models, covering European Union countries and years 1995-2019. Next, main results from panel models explaining the level of public investment and taking into account the impact of numerical fiscal rules are presented. In the last part, there are conclusions and recommendations from obtained results.

2. Literature Review

In the literature several groups of factors determining the level of public investment can be distinguished – macroeconomic, fiscal, institutional, political and demographic.

Mehrotra & Välilä (2006), using data from 1970-2003 for 14 EU countries (excluding Luxembourg), estimated panel models, in which the main determinants of public investment were: the level of real GDP and the fiscal situation of the countries (size of the public debt and the balance of general government sector). In their opinion, neither the cost of debt financing nor joining the EMU (with its fiscal rules in those times) had a significant impact on public investment level. Bacchiocchi et al. (2011) estimated reaction functions of public expenditure response to public debt for OECD countries in 1990-2008. They documented that at a sufficiently high level of debt, with the increase in debt, governments reduce expenditure on investments in all OECD countries, regardless of membership in EMU or EU. In their opinion, at high levels of public debt, problems with its service impose strong enough restrictions on fiscal policy to disrupt the allocation of public spending even in the absence of formal fiscal rules, such as those introduced by the Stability and Growth Pact. They also showed that such behaviour can be easily rationalized in the basic growth model, in which the government must limit public investment to ensure debt sustainability when it exceeds the threshold level. At the same time, in countries with a sufficiently low level of indebtedness, public investments may increase even with the increase of debt, which improves the dynamics of their growth and the convergence process (these mainly concerned countries recently joining to the EU and EMU). An earlier article with a similar approach was Galí & Perotti (2003) in which authors, comparing the countries of the EMU and OECD in 1980-2002, concluded that the decrease in public investment in EU countries was not greater than in the others, and therefore it did not result from the rules introduced in the Stability and Growth Pact and the Maastricht Treaty, but from a global ("secular") trend that affects most OECD countries.

Vergne (2009) using data on 42 developing countries in 1975-2001, showed that election years have an impact on the allocation of public expenditure. The results of his research showed that in election years, public expenditure is shifted to current expenditure (in particular salaries and subsidies), and the capital expenditures are reduced. Afonso & Jalles (2015), based on a sample of 95 countries in 1970-2008, showed that public investment increases with the increase in the demographic dependency ratio. They explained this by a greater need in these countries for expenses related to medical care (investments in public hospitals and health care facilities) and public education (investments in schools). Additionally, according to their results, population growth is also associated with an increase in investment.

Some of the few empirical studies on the relationship between fiscal rules and public investment were conducted by Tkacevs (2020) and Ardanaz et al. (2021). Using panel models covering 35 OECD countries (of which 22 EU countries) and the period 1995-2015, Tkacevs (2020) showed a negative impact of expenditure rules on the level and share of investment expenditure in total expenditure of the general government sector. However, his estimates suggested a relatively small scale of the negative impact of this type of fiscal rule. His baseline results show that an increase

in the IMF index of national expenditure rules by one standard deviation causes a decrease in the public investment-to-GDP ratio by 0.09 percentage point. Moreover, according to his results, budget balance rules do not affect the size of public investment in relation to GDP in the analysed countries. As the main negative determinants of the level of public investment, he indicated: lagged cyclically-adjusted budget balance, the level of public debt, the openness of the economy and inflation. Ardanaz et al. (2021) in the sample of 75 advanced and emerging economies during 1990–2018 find that impact of fiscal rules on public investment differ significantly depending on fiscal rule design. In countries with either no fiscal rule or with a rigid fiscal rule, a fiscal consolidation of at least 2% of GDP is associated with an average 10 % reduction in public investment. Instead, in countries with flexible fiscal rules (e.g., cyclically adjusted fiscal targets, well-defined escape clauses, and differential treatment of investment expenditures), the negative effect of fiscal adjustments on public investment vanishes, which suggests that flexible rules protect public investment during consolidation episodes.

3. Data and Methodology

To estimate panel models explaining the level of public investment in relation to GDP, data for EU countries in 1995-2019 was used[3].

One of the variables, particularly interesting for the conclusions from the article, is the Fiscal Rules Index (FRI) taken from the European Commission's *Fiscal Rules Database*[4], which approximates the strength and restrictiveness of fiscal rules in each Member State. 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. Index for each fiscal rule takes into account and evaluates the following features: (1) the strength of their legal basis, (2) the precision of the objectives and binding 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. Next, indices available for each fiscal rule in each period of time are aggregated to a single comprehensive score per country per year. Finally, the national indices are normalized in such a way that their average in the entire sample is 0 and the standard deviation is 1. The methodology for creating the index evaluating fiscal rules was based on the work of Deroose et al. (2006), and the evaluation is performed annually by the DG EFCIN in cooperation with national experts. The data depicting the evolution of the FRI in all Member States are presented in Appendix A. Additionally, for the purposes of this study, dummy variables regarding the existence of different types of rules (budget balance, expenditure and debt rules) in each country were constructed. Details of this process are described in Appendix B.

To minimize the risk of omitting important determinants of public investment and errors in the results, the panel models use a number of control variables inspired

---

[3] Some specifications start from 1996 due to the availability of data. In 2020, all but three Member States suspended at least one key national fiscal rule due to the outbreak of the COVID-19 pandemic and the activation of the "general escape clause". Also in some specifications, Malta was excluded because of the unavailability of data for key explanatory variables.
[4] https://ec.europa.eu/info/publications/fiscal-rules-database_en [Accessed: 2022-05-29]

by the literature and economic intuition. These variables can be divided into several main categories: macroeconomic, political and institutional. The estimation strategy was to include at least one explanatory variable from each of the distinguished group. The list of variables used in various model specifications, together with a description and data sources, is presented in Appendix C.

Panel models with fixed effects (FE) and instrumental variables (IV) were estimated. FE models can be written in a simplified form as follows:

$$y_{it} = \alpha_i + \beta' x_{it} + \varepsilon_{it}$$

where i is a particular country, t is a year, α_i is a constant individual effect for a given country, the component $\beta' x_{it}$ are the remaining explanatory variables with the parameters standing next to them, and y_{it} is the dependent variable. The choice of FE models is supported by theoretical arguments (different economic policies of each country), as well as the fact, that when comparing the FE model with the pooled model, the fixed individual effects are statistically significant. Moreover, Hausman (1978) test strongly rejects the null hypothesis ($\chi^2 = 35.83$, *p-value* < 0.01)[5] about the consistency of both fixed effects and random effects models in favour of the alternative hypothesis which stands for the consistency of only FE models, what indicates the choice of models with fixed effects.

Due to the potential endogeneity models with IVs were also estimated. The causality between institutional variables and fiscal outcomes is often difficult to define. One of the main reasons for mutual or even reverse causation is that governments have a better incentive to change fiscal institutions in response to worsening fiscal positions. In addition, there may also be unobserved, omitted variables affecting both fiscal performance and rules. The tendency to introduce fiscal rules and maintain budget discipline may be created by similar factors, e.g. a preference for a restrictive fiscal policy, reflecting the tastes of voters (Caselli & Reynaud 2020).

Therefore, the study tried to control endogeneity of fiscal rules and fiscal variables. First, instrumental variables were used. Second, the specifications used lags of the explanatory variables as far as possible. Third, by including fixed individual effects for countries in the specifications, the unobserved individual heterogeneity in terms of fiscal preferences was to some extent taken into account (Krogstrup & Wälti 2008).

There are at least two methods of instrumentalization of variables related to fiscal rules in the literature. The most common is to use instrumental variables related to political or institutional aspects, which are closely related to fiscal rules but exogenous to fiscal performance. One such approach was presented by Badinger & Reuter (2017), who used three instruments for the restrictiveness of fiscal rules: the index of checks and balances, the degree of political fragmentation and the fact whether a country uses an inflation-targeting strategy in monetary policy. A similar approach was used by Ardanaz et al. (2021), who used as an instrument the institutional quality index. A different approach was proposed by Caselli & Reynaud

---

[5] Result of the test for main specification.

(2020). Their instrumental strategy was based on the assumption that the adoption of fiscal rules in neighbouring countries may induce a country to introduce rules (reflecting international pressure or diffusion of public policies).

The approach used in this study combines two approaches found in the literature, obtaining satisfactory results. In the sample of the EU countries and the years 1995-2019, a combination of the openness of economies and political fragmentation works best as instruments for the Fiscal Rules Index (see specification 1 in Table 1). Use of an openness variable as an instrument is based on the hypothesis that countries with more developed trade relations are also more inclined to adopt international public policy standards. In the case of party fragmentation in parliament, countries with a higher value of index have a stronger tendency to introduce and strengthen fiscal rules, to counteract spending pressures, which is in line with the literature about a common pool theory and data[6]. When many decision-makers are involved in the budgetary process, each of them may be lobbied by or depend on specific interest groups. As a consequence, the likelihood of excess spending and large deficits increases with the number of decision-makers. Hence, political fragmentation leads to greater pressure to increase public spending, creating incentives for voters and governments to establish or strengthen fiscal rules to counter these pressures (see Appendix D).

Proposed combination of instrumental variables explains the Fiscal Rules Index in a better way than a combination proposed by Badinger & Reuter (2017) (see specification (2) in Table 1).

Table 1 Instrumental Variables for the Fiscal Rules Index – First Step Regressions

	Dependent variable: Fiscal Rules Index	
	(1)	(2)
Fragmentation	1.763***	2.167***
	(0.528)	(0.743)
Openness	0.021***	
	(0.005)	
Inflation target		1.077***
		(0.129)
Checks & balances		0.107
		(0.088)
Observations	674	673
R^2	0.316	0.221
Adjusted R^2	0.286	0.186
F Statistic	149.096***	60.703***

Notes: ***Significant at the 1 percent level, **significant at the 5 percent level, *significant at the 10 percent level. In the table robust standard errors are reported in parentheses.

---

[6] Roubini & Sachs (1989) and Alesina & Perotti (1995) documented public spending pressures associated with political fragmentation in OECD countries.

4. Results and Robustness

One of the main goals of the estimated models was to check the statistical significance of the variables responsible for numerical fiscal rules and to obtain the sign of coefficients standing next to the variables associated with them. This allows answering the question, whether it is justified to think that the existence of particular types of fiscal rules and their increased restrictiveness (measured by the FRI) is related to the decline in the level of public investment in the EU countries. Results for Fiscal Rules Index are presented in Table 2 and results for different types of fiscal rules are in Table 3.

Moving on to the interpretation of the results, the estimations of the coefficients behind Fiscal Rules Index are mostly statistically significant and negative. Taking specifications 7 and 8 from Table 2 as the main ones, the increase in the strength of fiscal rules in a given country by 1 point (which is equal to one standard deviation)[7] is associated with a decrease in the value of the public investment by almost 0.4% of GDP. In the case of dummy variables representing the existence of different types of fiscal rules the strongest negative impact on public investment have debt rules and the negative effect amounts to a maximum of 0.6% of GDP. The possible explanation here is that debt ceilings are the most precise and understandable rules, and often have the strongest legal bases what are reasons for the highest compliance. Also existence of budget balance rules and expenditure rules is associated with a decrease in public investment with the negative effect of almost 0.5% of GDP in both cases.

In the case of other significant determinants of public investment, their signs of coefficients are mostly consistent with the literature and economic intuition. The higher level of unemployment is associated with a lower level of public investment due to the necessity to pay unemployment benefits reducing the fiscal space for investment. With the decrease in the share of agriculture in GDP, what may be treated as a proxy of development, public investment grows. Most of the developed countries are welfare states with higher levels of government spending as % of GDP. The increase in corporate investment in relation to GDP (which accounts for the majority of private sector investment) is associated with lower public investment. This documents the effect of crowding-out between government and private investment and substitution between these two categories, but this effect is relatively small. The relationship with the lagged GDP growth rate affecting both the numerator and denominator of the dependent variable is not clear. In the case of political variables, public investment significantly increase in the years of parliamentary elections what documents the existence of the political cycle.

Other explanatory variables suggested in the literature, in the case of the sample of EU countries and years 1995-2019, did not improve the models, and in most cases were statistically insignificant. This applies to, among others, demographic variables (dependency ratio), and institutional variables other than fiscal rules (existence of fiscal councils). Also adding a linear trend to the models,

---

[7] This scale of the increase of 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 Appendices A and B).

that could document the secular decline in investment in recent decades, also turned out to be insignificant.

The obtained results had various robustness analyses. The first step was to estimate models for a shorter sample – since 2004, the largest enlargement of the European Union with new countries. The results of the estimates based on this sample are presented in Appendix E. When the sample is shortened, the main conclusions of the study remain unchanged. The negative impact of the existence and the increase of strength and restrictiveness of numerical fiscal rules on the level of public investment in relation to GDP remains valid and has a similar scale. It is stronger in the case of expenditure rules and slightly weaker in the case of budget balance rules.

In a shorter sample, slightly puzzling is the significant and negative impact of government efficiency on public investment. Government efficiency is measured by World Bank's World Development Indicators and reflects "perceptions of the quality of public services, the quality of the civil service and the degree of its independence from political pressures, the quality of policy formulation and implementation, and the credibility of the government's commitment to such policies" (Kaufmann et al. 2010). A possible explanation is that countries which have more efficient governments could have less investment but of better quality.

Similar results were obtained when the sample was divided into the "old"[8] and "new"[9] Member States (see Appendix F), but with some additional interesting findings. The negative impact of the increase in the Fiscal Rules Index on public investment is slightly weaker in the subgroup of countries that joined the UE in 2004 and later than in the core countries but the difference is not substantial. The results in the subgroups also confirmed the strongest impact of the debt rules – especially in the case of the "old" countries which have on average higher debt-to-GDP levels (hence debt rules are more strict for them). The impact of expenditure rules in the subgroup analysis turned out to be statistically insignificant, so the conclusion for this type of fiscal rule should be drawn with caution. The negative impact of budget balance rules turned out to be statistically significant only for the "old" EU countries.

In the case of other determinants, the role of GDP growth seems to be more important in the case of new Member States (but in all specifications with negative coefficient estimates), while the negative impact of unemployment is similar in both subgroups. The crowding-out effect between public and private investment is significant only in the subgroup of the core countries, which is another interesting observation. The greater importance of the share of agriculture in GDP in the "new" EU countries may be the consequence of the fact that the changes in this variable (approximating the economic development of countries and structural changes) were greater in this group of countries (especially the CEE region). The negative impact of government efficiency was significant in some cases in both subgroups. The existence of a political cycle reflected in an increase in public investment during the years of parliamentary elections has been confirmed only in countries that joined the EU in 2004 and later.

---

[8] AT, BE, DE, DK, ES, FI, FR, GR, IE, IT, LU, NL, PT, SE ("EU-14")
[9] BG, CY, CZ, EE, HR, HU, LT, LV, MT, PL, RO, SI, SK ("nEU-13")

Table 2 Determinants of the Level of Public Investment in the EU Countries (1995-2019)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Dependent variable: Public investment (% GDP)							
Fiscal Rules Index	-0.157	-0.157	-0.199**	-0.191**	-0.347***	-0.347***	-0.376***	-0.390***
	(0.099)	(0.104)	(0.080)	(0.095)	(0.080)	(0.080)	(0.081)	(0.133)
lag(GDP growth, -1)		-0.029	-0.046**	-0.043***	-0.030**	-0.030*	-0.027	-0.026
		(0.019)	(0.019)	(0.015)	(0.015)	(0.015)	(0.019)	(0.020)
lag(Unemployment, -1)			-0.090***	-0.095***	-0.091***	-0.091***	-0.098***	-0.098***
			(0.014)	(0.015)	(0.015)	(0.015)	(0.014)	(0.013)
lag(Corporate investment, -1)				-0.018	-0.032	-0.032	-0.043**	-0.043**
				(0.030)	(0.023)	(0.023)	(0.020)	(0.019)
Agriculture					-0.209***	-0.210***	-0.233***	-0.237***
					(0.018)	(0.018)	(0.018)	(0.034)
Elections						0.108*	0.092*	0.095*
						(0.060)	(0.055)	(0.055)
Government efficiency							-0.371	-0.381
							(0.349)	(0.380)
Model	FE	FE	FE	FE	FE	FE	FE	IV
Observations	675	648	648	621	621	621	595	594
R^2	0.026	0.036	0.136	0.143	0.242	0.245	0.266	0.266
Adjusted R^2	-0.015	-0.008	0.095	0.101	0.203	0.205	0.224	0.224
F Statistic	17.073***	11.462***	32.335***	24.718***	37.637***	31.818***	29.048***	143.81***

Notes: ***Significant at the 1 percent level, **significant at the 5 percent level, *significant at the 10 percent level. In the table robust standard errors are reported in parentheses (Arellano et al. 1987).

Table 3 The Impact of Different Types of Numerical Fiscal Rules (1995-2019)

	(1)	(2)	(3)	(4)	(5)	(6)
		Dependent variable: Public investment (% GDP)				
lag(GDP growth, -1)		-0.032[*]		-0.033[*]		-0.029
		(0.018)		(0.018)		(0.018)
lag(Unemployment, -1)		-0.085[***]		-0.093[***]		-0.088[***]
		(0.020)		(0.016)		(0.016)
lag(Corporate investment, -1)		-0.039		-0.032		-0.029
		(0.031)		(0.026)		(0.025)
Agriculture		-0.168[***]		-0.179[***]		-0.190[***]
		(0.032)		(0.029)		(0.026)
Elections		0.098[*]		0.084		0.088
		(0.054)		(0.054)		(0.057)
Government efficiency		-0.068		-0.288		-0.215
		(0.320)		(0.354)		(0.346)
Expenditure rule	-0.185	-0.457[*]				
	(0.274)	(0.277)				
Budget balance rule			-0.253	-0.497[***]		
			(0.168)	(0.149)		
Debt rule					-0.302	-0.601[***]
					(0.243)	(0.194)
Observations	675	595	675	595	675	595
R^2	0.005	0.187	0.013	0.206	0.017	0.218
Adjusted R^2	-0.037	0.141	-0.028	0.160	-0.024	0.174
F Statistic	2.977[*]	18.472[***]	8.810[***]	20.768[***]	11.073[***]	22.396[***]

Notes: [***]Significant at the 1 percent level, **significant at the 5 percent level, *significant at the 10 percent level. In the table robust standard errors are reported in parentheses (Arellano et al. 1987).

5. Conclusion

The results of this study, obtained on the sample of the EU countries and years 1995-2019, document a negative impact of the numerical fiscal rules and the increase of their strength and restrictiveness on the level of public investment in relation to GDP. They also confirm some of the other determinants of public investment previously observed in the literature. The level of unemployment, the level of corporate investment, the share of agriculture in GDP, and, surprisingly, government efficiency turned out to be significant determinants which have a negative impact on the explained variable. On the other hand, the political cycle indicates that public investment increases in the years of parliamentary elections.

The obtained results provide an empirical contribution to the discussion on reforms of the fiscal framework after the end of the crisis following the COVID-19 and energy crisis. One of its main postulates is to add to fiscal rules investment clauses allowing for the exclusion of all or some types of public investment in the imposed limits (e.g. Truger 2020, Darvas & Anderson 2020, Dullien et al. 2020). Assuming that public investments are a desirable instrument of the state's economic policy (e.g. supporting the recovery after a crisis or achieving long-term climate goals), the results of this study support the currently proposed concepts of investment clauses. Such clauses could effectively protect public investment from budget cuts during fiscal consolidation and help to reduce the pro-cyclicality of public investment (Ardanaz et al. 2021).

The analysis of the subgroups of the "old" and "new" Member States shows one of the caveats of the panel approach regarding only limited capturing of the heterogeneity of the analysed countries. While in subgroups the main conclusions hold (the overall negative impact of fiscal rules represented by the FRI and the strongest impact of debt rules), the impact of some determinants is different. Because of that, one of the interesting further steps in this research field may be clustering similar groups of countries and further analysis. Also, to look deeper into the relation between fiscal rules and public investment it would be interesting to analyse the evolution and determinants of various types of public investment based on COFOG classification[10] as well as a breakdown of public investments into different subsectors (central and local government).

What is more, the "puzzling" result for government efficiency poses a question of whether it is possible that fiscal rules, despite lowering the level of public investment, have a positive effect on their quality and the value of multipliers (interpreted as how much an increase in public investment spending has a more than proportionate positive impact on aggregate demand and the general economy). This is another interesting field that requires further research.

---

[10] Classification of the Functions of Government: (1) general public services, (2) defence, (3) public order and safety, (4) economic affairs, (5) environmental protection, (6) housing and community amenities, (7) health, (8) recreation, culture and religion, (9) education, (10) social protection.

APPENDIX

A. Fiscal Rules Index

Table A1 Fiscal Rules Index Evolution in the EU Countries in 1995-2019

	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
AT	-0.99	-0.99	-0.99	-0.99	0.10	0.10	0.24	0.24	0.24	0.24	0.12	0.12	0.12	0.08	0.42	0.42	0.51	0.72	0.72	0.72	0.69	0.69	1.51	1.51	1.51
BE	0.27	0.27	0.27	0.27	0.07	-0.12	-0.12	-0.12	-0.12	-0.12	-0.12	-0.12	-0.12	-0.12	-0.12	-0.12	-0.12	-0.09	-0.09	1.18	1.18	1.27	1.43	1.43	1.43
BG	-0.99	-0.99	-0.99	-0.99	-0.99	-0.99	-0.99	-0.99	0.30	0.30	0.33	0.72	0.72	0.72	0.72	0.72	1.03	1.24	1.24	2.60	2.77	2.84	3.01	3.01	3.01
CY	-0.91	-0.91	-0.91	-0.91	-0.91	-0.91	-0.91	-0.91	-0.91	-0.91	-0.91	-0.91	-0.91	-0.91	-0.91	-0.91	-0.91	-0.91	0.95	1.31	1.31	1.31	1.31	1.31	1.31
CZ	-0.99	-0.99	-0.99	-0.99	-0.99	-0.99	-0.99	-0.99	-0.99	-0.99	-0.99	-0.99	-0.99	-0.99	-0.99	-0.99	-0.99	-0.99	-0.99	-0.99	-0.99	-0.99	1.20	1.20	1.20
DE	-0.13	-0.13	-0.13	-0.13	-0.13	-0.13	-0.13	-0.13	-0.13	-0.13	-0.13	-0.13	-0.13	-0.13	0.30	0.06	0.35	0.35	1.56	1.56	1.56	1.56	1.56	1.66	1.66
DK	0.13	0.13	0.13	0.13	0.13	0.13	0.75	0.75	0.75	0.75	0.75	0.75	0.65	0.65	0.65	0.65	-0.08	-0.66	0.74	1.19	1.19	1.19	1.11	1.11	1.11
EE	0.60	0.60	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	1.09	1.09	0.57	0.93	1.54	1.54	1.54	1.54	1.54	1.54
EL	-0.99	-0.99	-0.99	-0.99	-0.99	-0.99	-0.99	-0.99	-0.99	-0.99	-0.99	-0.99	-0.99	-0.99	-0.99	-0.99	-0.99	0.22	0.22	0.30	0.30	0.39	0.81	0.81	0.72
ES	-0.54	-0.54	-0.54	-0.54	-0.54	-0.54	-0.54	0.58	0.72	0.72	0.72	0.62	0.62	0.62	0.62	0.62	1.24	1.70	1.70	1.95	1.99	1.99	1.99	1.99	1.99
FI	-0.03	-0.03	-0.03	-0.03	0.51	0.51	0.56	0.56	0.53	0.53	0.53	0.53	0.53	0.21	-0.11	-0.11	0.02	-0.02	1.28	1.25	1.25	1.32	1.32	1.32	1.39
FR	-0.83	-0.83	-0.83	-0.63	-0.63	-0.63	-0.63	-0.63	-0.63	-0.63	-0.63	-0.46	-0.46	-0.33	-0.16	-0.25	0.09	0.09	1.02	0.95	1.02	1.02	1.02	1.06	1.06
HR	-0.99	-0.99	-0.99	-0.99	-0.99	-0.99	-0.99	-0.99	-0.99	-0.99	-0.99	-0.99	-0.99	-0.99	-0.33	-0.33	0.54	0.54	0.54	0.54	-0.11	-0.11	-0.11	-0.11	1.12
HU	-0.99	-0.99	-0.99	-0.99	-0.99	-0.99	-0.99	-0.99	-0.99	-0.99	-0.99	-0.99	-0.99	-0.99	-0.99	-0.99	-0.99	-0.53	-0.53	0.76	0.82	0.82	0.82	0.94	0.94
IE	-0.99	-0.99	-0.99	-0.99	-0.99	-0.97	-0.97	-0.97	-0.97	-0.86	-0.86	-0.86	-0.86	-0.86	-0.86	-0.86	-0.86	-0.87	0.84	0.84	0.76	0.76	1.25	1.25	1.25
IT	-0.99	-0.99	-0.99	-0.99	-0.60	-0.60	0.04	0.04	0.04	0.04	0.04	0.04	-0.14	-0.15	-0.09	-0.06	-0.04	-0.04	0.00	2.61	2.63	2.61	2.61	2.61	2.61
LT	-0.79	-0.79	-0.28	-0.28	-0.28	-0.28	-0.28	-0.28	-0.28	-0.28	-0.28	-0.24	-0.24	0.22	0.22	0.22	0.22	0.24	0.24	0.24	2.33	2.47	2.47	2.92	2.92
LU	-0.73	-0.73	-0.73	-0.51	-0.01	-0.01	-0.01	-0.01	-0.01	0.47	0.47	0.47	0.47	0.47	0.47	0.14	0.14	0.14	0.39	0.91	1.04	1.04	1.04	1.04	1.04
LV	-0.64	-0.64	-0.64	-0.64	-0.64	-0.64	-0.64	-0.64	-0.64	-0.64	-0.64	-0.64	-0.64	-0.64	-0.64	-0.64	-0.64	-0.64	0.81	1.35	1.35	1.35	1.35	1.35	1.35
MT	-0.99	-0.99	-0.99	-0.99	-0.99	-0.99	-0.99	-0.99	-0.99	-0.99	-0.99	-0.99	-0.99	-0.99	-0.99	-0.99	-0.99	-0.99	-0.99	1.53	1.53	1.53	1.53	1.53	1.53
NL	0.85	0.85	0.85	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.56	0.56	2.99	2.92	3.07	3.04	3.04	3.04
PL	-0.99	-0.99	0.32	0.32	0.32	0.32	0.32	0.32	0.32	0.32	0.32	0.86	0.86	0.32	0.60	0.60	0.85	0.83	0.72	0.94	1.41	1.41	1.41	1.41	1.41
PT	-0.99	-0.99	-0.99	-0.99	-0.99	-0.99	-0.99	-0.45	-0.31	-0.31	-0.31	-0.31	-0.28	-0.28	-0.28	-0.28	-0.28	-0.15	1.21	1.32	2.21	2.21	2.21	2.21	2.21
RO	-0.75	-0.75	-0.75	-0.75	-0.61	-0.61	-0.61	-0.61	-0.61	-0.61	-0.61	-0.61	-0.61	-0.61	-0.61	-0.61	-0.61	-0.61	-0.61	2.01	2.01	2.01	2.01	2.01	2.37
SE	-0.99	-0.99	-0.35	-0.35	-0.35	1.13	1.13	1.13	1.13	1.13	1.13	1.13	1.26	1.26	1.26	1.37	1.37	1.37	1.37	1.37	1.37	1.37	1.37	1.37	1.93
SI	-0.99	-0.99	-0.99	-0.99	-0.99	-0.99	-0.99	-0.99	-0.99	-0.99	-0.99	-0.99	-0.99	-0.99	-0.99	-0.99	-0.99	-0.99	-0.99	-0.99	0.58	0.58	0.58	0.58	0.58
SK	-0.99	-0.99	-0.99	-0.99	-0.99	-0.99	-0.99	-0.26	-0.26	-0.26	-0.26	-0.26	-0.26	-0.26	-0.28	-0.28	-0.28	1.10	1.10	1.63	1.63	1.63	1.63	1.63	1.63

Source: European Commission Fiscal Rules Database.

B. Numerical Fiscal Rules Included in the Study – Author's Criteria

For the purposes of the econometric study, dummy variables about the existence of various national, numerical fiscal rules (budget balance, expenditure and debt) in each of the EU countries were constructed basing on the European Commission's *Fiscal Rules Database* (2022). In the models only those rules were included which, first of all, are enshrined in the constitutions of countries, national laws, coalition agreements or agreements between political parties (the ruling party with the opposition). Second, rules that are at the general government or at least at the central budget level and, third, which 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 A2.

Table A2 List of Numerical Fiscal Rules Included in the Study

Country	Budget balance rule (BBR)	Expenditure rule (ER)	Debt rule (DR)	Country cont.	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 based on European Commission.

C. Data Description and Sources

Table A3 Description and Sources of Variables Used in the Models

Variable	Description	Source
Public investment	The level of public investment (gross fixed capital formation) undertaken by the general government sector in relation to GDP. Explained variable in the models.	Eurostat
Corporate investment	The level of corporate investment in relation to GDP.	Eurostat
GDP growth	The annual growth rate of the real GDP.	AMECO
Unemployment	Average annual unemployment rate.	ILO
Agriculture	The share of agriculture in GDP.	Eurostat
Openness	Openness of the economy measured as the sum of imports and exports in relation to GDP.	Own calculations based on Eurostat
Government efficiency	Government efficiency index reflecting the quality of public services, the civil service and the degree of its independence.	World Bank (WGID)
Elections	Dummy variable. 1 – for the years of parliamentary elections, 0 – otherwise.	DPI (2021)
Checks & balances	Checks and balances index measuring separation of power between bodies that control each other (typically a legislature, an executive and a judiciary.	DPI (2021)
Fragmentation	Index representing party fragmentation in the parliament using the method of Rae (1971).	DPI (2021)
Inflation target	Dummy variable. 1 – when a country use inflation-targeting strategy in monetary policy, 0 – otherwise.	Own calculations
Fiscal Rules Index	Fiscal Rules Index at the country level.	European Commission
Expenditure rule	Dummy variable. 1 – when an expenditure rule was in force, 0 – otherwise.	Own calculations based on EC
Budget balance rule	Dummy variable. 1 – when a budget balance rule was in force, 0 – otherwise.	Own calculations based on EC
Debt rule	Dummy variable. 1 – when a debt rule was in force, 0 – otherwise.	Own calculations based on EC

Source: Own elaboration.

D. Relationship between Fiscal Rules and Political Fragmentation

Figure A1 The Relationship between the FRI and the Party Fragmentation (1995-2019)
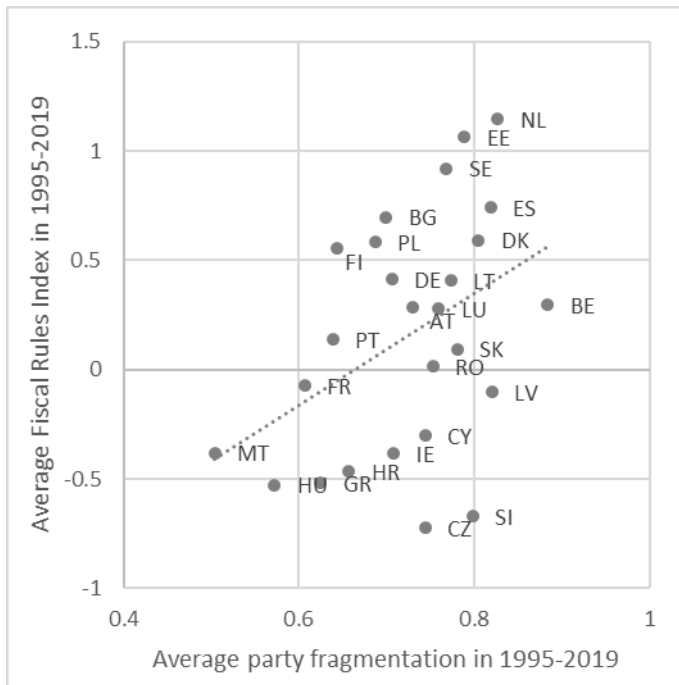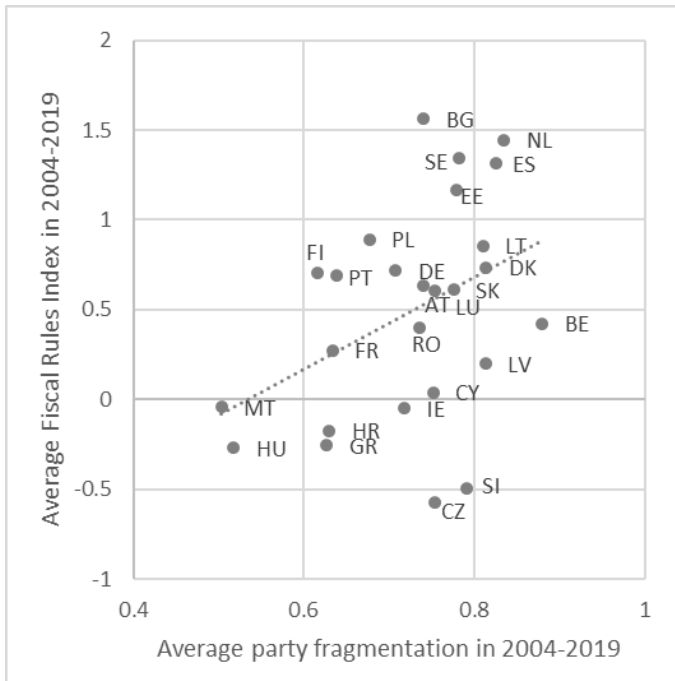
Figure A2 The Relationship between the FRI and the Party Fragmentation (2004-2019)

Source: Own calculations based on Database of Political Institutions and European Commission.

E. Results from a Shorter Sample (2004-2019)

Table A4 Determinants of the Level of Public Investment in the EU Countries (2004-2019)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Dependent variable: Public investment (% GDP)								
Fiscal Rules Index	-0.306***	-0.291***	-0.303***	-0.322***	-0.342***	-0.342***	-0.345***	-0.593***
	(0.084)	(0.081)	(0.070)	(0.075)	(0.085)	(0.085)	(0.074)	(0.129)
lag(GDP growth, -1)		-0.037***	-0.053***	-0.046***	-0.044***	-0.044***	-0.043***	-0.029**
		(0.011)	(0.009)	(0.010)	(0.009)	(0.010)	(0.009)	(0.013)
lag(Unemployment, -1)			-0.066***	-0.078***	-0.077***	-0.076***	-0.089***	-0.092***
			(0.014)	(0.014)	(0.014)	(0.014)	(0.016)	(0.016)
lag(Corporate investment, -1)				-0.043**	-0.037	-0.037	-0.053**	-0.059**
				(0.018)	(0.023)	(0.023)	(0.021)	(0.024)
Agriculture					-0.127	-0.130	-0.132	-0.211*
					(0.107)	(0.109)	(0.113)	(0.108)
Elections						0.058	0.049	0.060
						(0.071)	(0.075)	(0.074)
Government efficiency							-1.118***	-1.153***
							(0.263)	(0.343)
Model	FE	FE	FE	FE	FE	FE	FE	IV
Observations	432	405	405	387	387	387	387	386
R^2	0.116	0.143	0.202	0.233	0.240	0.242	0.275	0.258
Adjusted R^2	0.057	0.079	0.141	0.171	0.176	0.175	0.210	0.191
F Statistic	52.844***	31.415***	31.740***	27.100***	22.540***	18.839***	19.193***	114.851***

Notes: ***Significant at the 1 percent level, **significant at the 5 percent level, *significant at the 10 percent level. In the table robust standard errors are reported in parentheses (Arellano et al. 1987).

Table A5 The Impact of Different Types of Numerical Fiscal Rules (2004-2019)

	(1)	(2)	(3)	(4)	(5)	(6)
Dependent variable: Public investment (% GDP)						
lag(GDP growth, -1)		-0.053***		-0.053***		-0.049***
		(0.009)		(0.011)		(0.010)
lag(Unemployment, -1)		-0.077***		-0.090***		-0.083***
		(0.024)		(0.019)		(0.018)
lag(Corporate investment, -1)		-0.056**		-0.047*		-0.044*
		(0.028)		(0.027)		(0.026)
Agriculture		-0.096		-0.070		-0.070
		(0.110)		(0.128)		(0.137)
Elections		0.061		0.039		0.050
		(0.073)		(0.077)		(0.079)
Government efficiency		-1.001**		-1.132***		-1.124***
		(0.388)		(0.301)		(0.299)
Expenditure rule	-0.601**	-0.575**				
	(0.242)	(0.259)				
Budget balance rule			-0.395**	-0.422***		
			(0.164)	(0.136)		
Debt rule					-0.541***	-0.551***
					(0.193)	(0.164)
Observations	432	387	432	387	432	387
R^2	0.063	0.209	0.042	0.199	0.075	0.227
Adjusted R^2	0.000	0.138	-0.022	0.127	0.013	0.157
F Statistic	27.125***	13.402***	17.580***	12.568***	32.733***	14.867***

Notes: ***Significant at the 1 percent level, **significant at the 5 percent level, *significant at the 10 percent level. In the table robust standard errors are reported in parentheses (Arellano et al. 1987).

F. Results from Subgroups

Table A6 Determinants of Public Investment in the EU Countries – Subgroups (1995-2019)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
			Dependent variable: Public investment (% GDP)					
lag(GDP growth, -1)	-0.015	-0.044*	-0.039*	-0.048*	-0.032	-0.050*	-0.012	-0.052**
	(0.016)	(0.025)	(0.023)	(0.025)	(0.021)	(0.026)	(0.014)	(0.025)
lag(Unemployment, -1)	-0.097***	-0.092***	-0.102***	-0.075**	-0.105***	-0.075***	-0.080***	-0.076***
	(0.015)	(0.021)	(0.023)	(0.032)	(0.019)	(0.024)	(0.022)	(0.023)
lag(Corporate investment, -1)	-0.050***	-0.020	-0.067***	-0.013	-0.056***	0.003	-0.038**	0.008
	(0.012)	(0.035)	(0.012)	(0.045)	(0.013)	(0.038)	(0.017)	(0.035)
Agriculture	-0.065	-0.237***	0.142	-0.208***	0.038	-0.193***	0.020	-0.199***
	(0.111)	(0.022)	(0.198)	(0.026)	(0.165)	(0.030)	(0.143)	(0.026)
Elections	0.012	0.174*	0.024	0.184*	0.018	0.150	0.009	0.159
	(0.034)	(0.105)	(0.034)	(0.109)	(0.038)	(0.108)	(0.035)	(0.111)
Government efficiency	-0.754**	-0.254	-0.404	0.068	-0.568*	-0.290	-0.576*	-0.305
	(0.299)	(0.693)	(0.353)	(0.620)	(0.319)	(0.700)	(0.303)	(0.695)
Fiscal Rules Index	-0.378***	-0.331***						
	(0.106)	(0.112)						
Expenditure rule			-0.102	-0.681				
			(0.353)	(0.444)				
Budget balance rule					-0.440***	-0.312		
					(0.133)	(0.272)		
Debt rule							-0.904***	-0.312*
							(0.311)	(0.164)
Model	FE	FE	FE	FE	FE	FE	FE	FE
Sample	EU-14	nEU-13	EU-14	nEU-13	EU-14	nEU-13	EU-14	nEU-13
Observations	321	274	321	274	321	274	321	274
R^2	0.413	0.223	0.255	0.215	0.311	0.191	0.399	0.194
Adjusted R^2	0.374	0.168	0.206	0.160	0.265	0.134	0.359	0.137
F Statistic	30.117***	10.440***	14.702***	10.004***	19.345***	8.614***	28.449***	8.762***

Notes: ***Significant at the 1 percent level, **significant at the 5 percent level, *significant at the 10 percent level. In the table robust standard errors are reported in parentheses (Arellano et al. 1987).

REFERENCES

Abiad A, Almansour A, Furceri D, Granados CM, Topalova P (2014): Is it Time for an Infrastructure Push? The Macroeconomic Effects of Public Investment. *World Economic Outlook* pp. 75-114.

Afonso A, Aubyn MS (2009): Macroeconomic Rates of Return of Public and Private Investment: Crowding-In and Crowding-Out Effects. *The Manchester School* 77:21-39.

Afonso A, Jalles JT (2015): How Does Fiscal Policy Affect Investment? Evidence from a Large Panel. *International Journal of Finance & Economics,* 20(4):310-327.

Alesina A, Perotti R (1995): Fiscal Expansions and Adjustments in OECD Countries. *Economic policy,* 10(21):205-248.

Ardanaz M, Cavallo E, Izquierdo A, Puig J (2021): Growth-Friendly Safeguarding Public Investment from Budget Cuts through Fiscal Rule Design. *Journal of International Money and Finance,* 111:102319.

Arellano M et al. (1987): Computing Robust Standard Errors for Within-Groups Estimators. *Oxford bulletin of Economics and Statistics,* 49(4):431-434.

Bacchiocchi E, Borghi E, Missale A (2011): Public Investment under Fiscal Constraints. *Fiscal studies,* 32(1):11-42.

Badinger H, Reuter WH (2017): The Case for Fiscal Rules. *Economic Modelling,* 60:334-343.

Basdevant O, Chaponda T, Gonguet F, Honda J, Thomas S (2020): Designing Fiscal Rules to Protect Investment. *Well Spent: How Strong Infrastructure Governance Can End Waste in Public Investment* p. 106.

Caselli F, Reynaud J (2020): Do Fiscal Rules Cause Better Fiscal Balances? A New Instrumental Variable Strategy. *European Journal of Political Economy* 63:101873.

Council of European Union (1997a): Council Regulation No 1466/97 of 7 July 1997 on the Strengthening of the Surveillance of Budgetary Positions and the Surveillance and Coordination of Economic Policies. http://data.europa.eu/eli/reg/1997/1466/oj

Council of European Union (1997b): Council Regulation no 1467/97 of 7 July 1997 on Speeding Up and Clarifying the Implementation of the Excessive Deficit Procedure. http://eur-lex.europa.eu/eli/reg/1997/1467/oj

Council of European Union (2011): Council Directive 2011/85/EU of 8 November 2011 on Requirements for Budgetary Frameworks of the Member States. http://data.europa.eu/eli/dir/2011/85/oj

Darvas Z, Anderson J (2020): New Life for an Old Framework: Redesigning the European Union's Expenditure and Golden Fiscal Rules.

Deroose S, Moulin L, Wierts P (2006): National Expenditure Rules and Expenditure Outcomes: Evidence for EU Member States. *Wirtschaftspolitische Blätter,* 1(2006):27-41.

Dullien S, Paetz C, Watt A, Watzka S (2020): Proposals for a Reform of the EU's Fiscal Rules and Economic Governance, Technical report, IMK Report.

European Commission (2022): Fiscal Rules Database, https://ec.europa.eu/info/publications/fiscal-rules-database_en. Accessed: 2022-05-29.

Galí J, Perotti R (2003): Fiscal Policy and Monetary Integration in Europe. *Economic policy* 18(37):533-572.

Hausman JA (1978): Specification Tests in Econometrics. *Econometrica: Journal of the econometric society* pp. 1251-1271.

International Monetary Fund (2020): Public Investment for Recovery, *in* `Fiscal Monitor'. Washington DC, chapter 2.

Kaufmann D, Kraay A, Mastruzzi M (2010): The Worldwide Governance Indicators: A Summary of Methodology. *Data and Analytical Issues, World Bank Policy Research Working Paper* 5430.

Krogstrup S, Wälti S (2008): Do Fiscal Rules Cause Budgetary Outcomes? *Public choice* 136(1):123-138.

Levrero ES, Deleidi M, Iafrate F et al. (2019): Public Investment Fiscal Multipliers: An Empirical Assessment for European countries, Technical report, Department of Economics-University Roma Tre.

Mehrotra A, Välilä T (2006): Public Investment in Europe: Evolution and Determinants in

perspective. *Fiscal Studies,* 27(4):443-471.

Perotti R (2004): Public Investment: Another (Different) Look'. IGIER (Innocenzo Gasparini Institute for Economic Research) Working Papers 277, Bocconi University.

Rae DW (1971): *The Political Consequences of Electoral Laws*, Yale University Press, New Haven.

Roubini N, Sachs JD (1989): Political and Economic Determinants of Budget Deficits in the Industrial Democracies. *European Economic Review,* 33(5):903-933.

Scartascini C, Cruz C, Keefer P (2021): The Database of Political Institutions 2021 (DPI2021). *Washington, Banco Interamericano de Desarrollo.*

Thygesen N, Beetsma R, Bordignon M, Duchêne S, Szczurek M (2019): Assessment of EU Fiscal Rules with a Focus on the Six and Two-Pack Legislation.

Tkacevs O (2020): Secular Decline in Public Investment: Are National Fiscal Rules to Blame? Technical report.

Truger A (2020): Reforming EU Fiscal Rules: More Leeway, Investment Orientation and Democratic Coordination. *Intereconomics,* 55(5):277-281.

Vergne C (2009): Democracy, Elections and Allocation of Public Expenditures in Developing Countries. *European Journal of Political Economy,* 25(1):63-77.

Wyplosz C (2005): Fiscal Policy: Institutions Versus Rules', *National Institute Economic Review* 191:64-78.

Wyplosz C (2011): Fiscal Discipline: Rules Rather Than Institutions. *National Institute Economic Review,* 217(1):R19-R30.

Wyplosz C (2013): *Fiscal Rules: Theoretical Issues and Historical Experiences*. Chicago Press.