Comply and invest: The effect of EU fiscal rules on public investment

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Abstract

In the late 1990s, the EU adopted common fiscal rules to keep national public finances on a sustainable path and allow centralised monetary policy to effectively implement its mandate. After the global financial crisis, when public investment posted a particularly sharp decline, the same fiscal rules were seen as culprits. This paper takes a fresh look at the interplay between public investment and EU fiscal rules. Using a new database covering all EU countries from 1998-2023, our analysis shows that compliance with the commonly agreed fiscal rules is not the problem. On the contrary, governments who follow the rules have the space to spend on investment. Policy makers tend to sacrifice public investment expenditure when they face trade-offs within the more general constraints on public finances.

Key words: Public investment, social spending, fiscal rules, compliance, European Union

JEL codes: H54, H63, C23

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1. Introduction

The global financial crisis of 2008-2009 was a watershed moment from many points of view. The deep recession and its aftermath left visible marks beyond the perimeters of the financial sector including public finances. Many governments had to cope with a significant shortfall of revenues for a protracted period of time. One side-effect attracting considerable attention in the policy debate was a major compression of public investment. Between 2009 and 2016, government spending on gross fixed capital formation in the EU dropped by one full percentage point of GDP, a decline rarely seen in such a short period of time.

A prominent hypothesis, resuscitated during the debate around the latest reform of the EU fiscal rules, pertains to the possible role played by EU fiscal rules. In combination with the extensive literature on fiscal consolidation, some observers drew and still draw the seemingly obvious conclusion whereby the marked drop in public investment was the inevitable result of the constraints imposed by the Stability and Growth Pact (SGP) on national fiscal policy makers.[1]

In this paper we take a fresh look at the issue. We examine potential drivers of public investment in the 27 EU member states with a special focus on compliance with EU fiscal rules. Our aim is to discriminate between two competing narratives: The first argues that fiscal rules weigh on public investment because, when they start biting, policy makers will minimise the political fallout and cut investment as opposed to other spending items? The second maintains that compliance with fiscal rules safeguards governments' room for manoeuvre including to protect or even increase public investment when needed.

Our paper is linked to several strands of the literature. The first and probably most prominent one looks into the effects of fiscal consolidation. Focusing on the composition of public spending, several studies suggest that investment is a typical victim of governments' attempts to consolidate public finances (see for instance Balassone and Franco, 2000; Castro, 2017; De Haan et al., 1996; Välilä and Mehrotra, 2005). When it comes to macroeconomic effects, by contrast, the majority of studies indicates that the right type of fiscal consolidation will actually boost output and total investment in

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[1] A recent example is an open letter of civil society organisations, trade unions and academics to the President of the European Council: https://www.socialplatform.org/wp-content/uploads/2024/04/Letter-to-European-Council-Support-public-investments.pdf. Similar views on public investment and fiscal rules are also, more or less regularly, presented in established financial media such as the Financial Times (see for instance 'The case for rethinking fiscal rules is overwhelming' of 16 May 2023; 'A new start for Europe's stability and growth pact' of 21 December 2023; or 'When fiscal rules create a perverse political trade-off' on 10 March 2024.)

the medium term (see Balasundharam et al., 2023 for a comprehensive literature review or Alesina et al., 2017 for a comprehensive empirical analysis).

The second strand of the literature takes a closer look at more general trade-offs in the composition of government spending beyond consolidation episodes. Starting from the obvious and sound assumption that in the medium and long run policy makers need to keep public finances on a sustainable path, regardless of whether they are subject to fiscal rules or not, the expansion of one type of expenditure may lead to the compression of others lest government taxes reach prohibitive levels. Delgado-Tellez et al. (2020) are a recent and very clear example of this approach. They specifically test the so-called social dominance hypothesis whereby a negative trend in public investment mainly results from the simple fact that for a variety of reasons governments prefer to prioritise social expenditure.

A third line of relevant research investigates more directly the effects of fiscal rules on public finances and macroeconomic performance. From a very general perspective, more than one meta study suggests that fiscal rules go along with better fiscal performance (e.g. Heinemann at al. 2018; Braendle and Elsener, 2023). Kopits (2023) finds that compliance with the EU's deficit reference value tends to be linked with more stable and higher economic growth. The impact on public investment is more complex. In the policy debate there have been voices suggesting that fiscal rules weigh on public investment when they should not. Blanchard and Giavazzi (2004) are an early and particularly prominent example. Without explicitly referring to the idea of a 'golden rule', they support arrangements that allow public investment to be financed by raising new debt. Other observers, by contrast, emphasise a more intricate relationship whereby fiscal rules aim to keep public finances on a sustainable path safeguarding enough space for public investment throughout the cycle (see e.g. Turrini, 2004 or Vinturis, 2023). The overriding role of 'fiscal space' beyond the formal presence of fiscal rules, finds further support in econometric studies. For instance, Bacchiocchi et al. (2011) conclude that high government debt-to-GDP ratios – a proxy for the sustainability of public finances - tend to be associated with lower public investment. Focusing on the fiscal reaction in the wake of major economic downturns, Larch et al. (2024) draw similar conclusions. Finally, in a recent review paper covering 20 empirical studies Blesse et al. (2023) do not find evidence suggesting that fiscal rules systematically weigh on public investment yet conclude that the design of rules matters.

Our paper extends the literature in two important ways. First, compared to existing studies analysing the interplay between fiscal rules and public investment in the EU, we use a more comprehensive dataset covering 25 years and all EU countries. We assess developments since 1997, the year in which the SGP - the commonly agreed EU fiscal rules - entered into force. This also allows us to take a closer

look at what happened before and after 2008 when fiscal policy makers faced important if not unprecedented challenges and many countries decided to cut public investment as opposed to other expenditure categories. Second, our analysis is centred on compliance with fiscal rules as opposed to their mere existence or their design. The mere existence of rules - by now, globally more than 100 economies feature fiscal rules defining constraints on fiscal aggregates[2] - does not necessarily mean that governments will follow them. The compliance tracker of the European Fiscal Board (EFB) secretariat measures the degree of numerical compliance with EU fiscal rules.[3] It clearly shows a significant cross-country variation in the capacity or proclivity to meet the constraints on budgetary aggregates implied by the EU rules. Our prior is that, other things being equal, countries with a better numerical compliance record can sustain a higher public investment.

The rest of our paper is organised as follows. Section 2 takes a look at the data highlighting a few important trends around public investment, other government spending items, the evolution of public debt and numerical compliance with EU fiscal rules. In Section 3 we present our empirical strategy and discuss related findings. Section 4 concludes.

2. Government investment: some stylised facts

Investment expenditure is a key driver of economic growth. Economies that forgo a larger share of their current income to accumulate capital – private or public – are, everything else equal, expected to have a higher productive capacity and to record higher rates of economic growth in the medium and long term. Upfront, it may be worth clarifying that throughout this paper we use public investment as shorthand for gross fixed capital formation of the general government sector as defined in the system of national accounts.

Looking back in time, and abstracting from short-term fluctuations, it is important to note that public investment has been retreating as a share of GDP and total government expenditure for decades in most advanced economies. In the early 1970s, US governments spent close to 5% of GDP on increasing

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[2] See the IMF database on fiscal rules: https://www.imf.org/external/datamapper/FiscalRules/map/map.htm
[3] https://commission.europa.eu/business-economy-euro/economic-and-fiscal-policy-coordination/european-fiscal-board-efb/compliance-tracker_en

or maintaining their capital stock. Half a decade later, public investment declined to close to 3% of GDP, around the same number as in the EU and the euro area.[4]

Since 1997, the year in which the EU's Stability and Growth Pact (SGP) entered into force, public investment posted a more cyclical pattern as a share of both GDP and total government expenditure (see Figure 1). It steadily increased until 2008, especially during the boom years leading up the global financial and economic crisis, declined sharply in its aftermath before returning again to the levels observed in the mid-1990s towards the end of our sample. Hence, the often-quoted decline of public investment after the financial crisis is at least in part a correction compared to the boom years leading up to the crisis.

Figure 1: Public investment in % of GDP and total government expenditure.
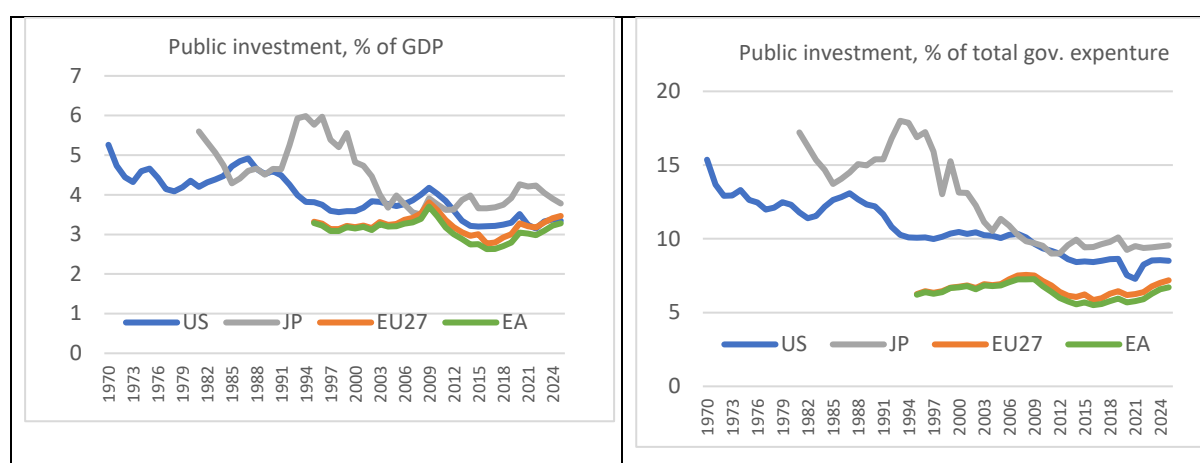
Source: European Commission

A priori, the decline of public investment relative to output also coincided with two important reforms of the EU's fiscal rules which introduced new elements of both flexibility and stringency first in 2011 and then in 2013 (see European Fiscal Board, 2019). The recovery of public investment, by contrast, broadly concurs with the advent or at least announcement of the EU's Recovery and Resilience Facility (RRF) in 2020.

The US economy - where the federal government is not bound by fiscal rules of the same formal stringency as the SGP - exhibits a similar pattern for public investment in percent of GDP but also some notable differences: The share of public investment in total government expenditure is higher compared to the EU and has been shifting downwards after 2008 with no clear sign of recovery.

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[4] For most EU countries comparable national accounts data on government investment are only available from the mid-1990s onward. Countries for which somewhat longer series exist such as France and Finland also exhibit a downward trend albeit from a lower level.

Figure 2: Public investment and social spending in % of total government expenditure, EU27.
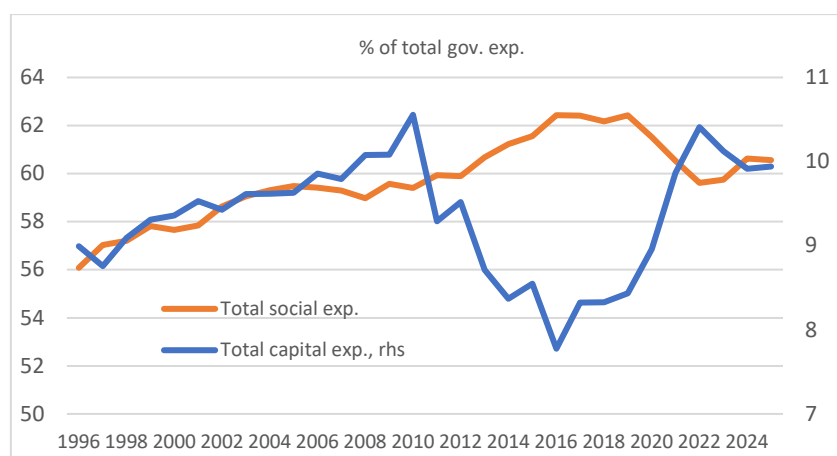
Source: European Commission

Of particular note, the marked drop in public investment in the aftermath of the global financial crisis went along with an important shift in the composition of government expenditure (Figure 2). Most EU countries recorded an increase in social outlays as a result of both automatic stabilisers (e.g. unemployment or other means tested benefits) and discretionary policy interventions. Although it started in the immediate aftermath of the crisis, the expansion of social spending became particularly evident around 2011-2012, the years associated with the so-called euro area sovereign debt crisis. By 2019, which marked the end of a protracted economic recovery, social spending in the EU as a whole stood at more than 62% of total government expenditure, 3 percentage points higher than in 2007. In the same period, the share of public investment dropped to 8.4% of total government expenditure, down from close to 10%. A swift reversal took place in 2020-2021, which, as indicated above, is generally associated with the EU's agreement on the RRF.

At first sight, these shifts would seem to be consistent with the narrative of those who argue that fiscal rules come at the price of lower public investment. If governments' hands were not tied by rules, the argument goes, they could afford both, higher social spending and higher investment. However, a closer look at the data suggests a more complex relationship along the lines suggested by Turrini (2004). For starters, it is instructive to spend a few words on how EU member states entered the crisis. In 2007, the last full calendar year before the shock waves from the financial sector produced serious economic repercussions, countries with a higher size of government - the share of total government expenditure over GDP - also featured, on average, a higher level of government debt relative to aggregate output (Figure 3, panel a). This is an important point, because both the size of government and the level of government debt are commonly used to proxy a country's fiscal space. Linked to this,

it is also important to note that already in 2007 more indebted governments spent on average less on public investment (Figure 3, panel b).

Figure 3: The complex link between public investment and fiscal rules.
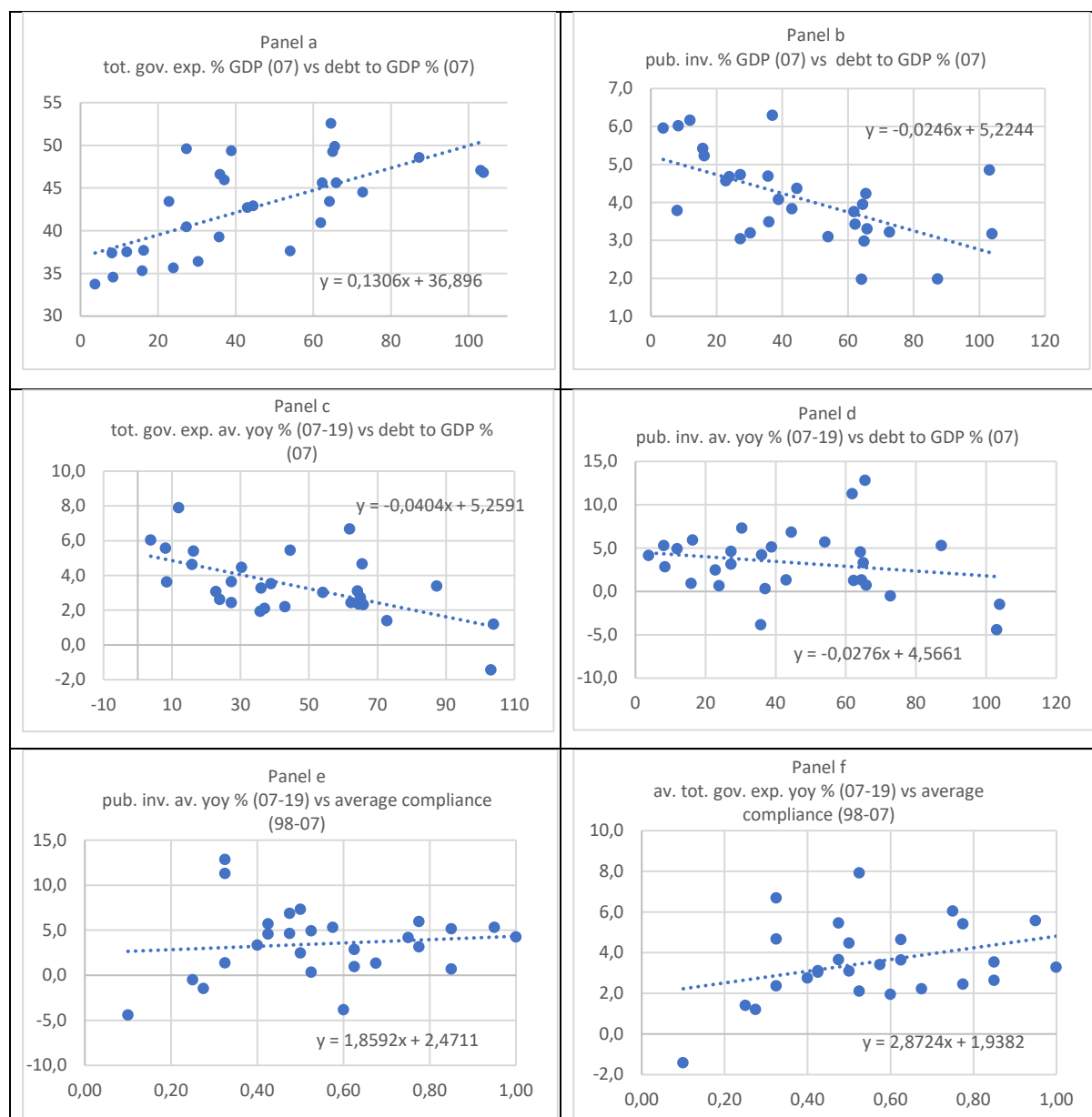
Note: Average compliance = max: 1, min.0.
Source: European Commission

In the years following the global financial crisis, which also triggered a sovereign debt crisis in some euro area economies, more indebted governments afforded markedly lower increases in overall government expenditure (Figure 3, panel c), without, necessarily, crowding out public investment (Figure 3, panel d). Where available, fiscal space was largely used to increase social spending.

Table 1: Analysis of variance - Investment and social expenditure by government debt level and compliance.

	2007-2019	Gov. debt in % of GDP, 2007		t-test: same mean	Numerical compliance with EU fiscal rules (1998-2008)		t-test: same mean
		>= 60	< 60	p-value	< 50%	>=50%	p-value
Total gov. expenditure	av. yoy % ch.	2.3	4.5	0.00	3.0	3.9	0.13
Social expenditure	av. yoy % ch.	2.5	5.2	0.00	3.3	4.6	0.06
Public investment (GFCF)	av. yoy % ch.	2.0	4.7	0.05	4.0	3.1	0.31
Number of EU countries		12	15		11	16	

Source: European Commission and authors' calculations.

A simple analysis of variance confirms this pattern (see Table 1). Countries, which in 2007 had a debt-to-GDP ratio of more than 60%, posted an annual increase in total and social government spending between 2007 and 2019 of on average 2.3% to 2.5% per year, around half the increase observed in countries that entered the crisis with a government debt ratio of less than 60%. As one might expect, higher rates of compliance with EU fiscal rules were also associated with a much stronger average increase in total government and social spending. By contrast, capital expenditure was somewhat more dynamic in countries with higher debt, but differences are not statistically significant.

Obviously, the stark differences presented in Figure 3 and Table 1 need to be seen in light of the fact that high debt countries had a higher level of total and social spending to begin with. Therefore, low debt countries may have been catching up over time. Nevertheless, these preliminary results already point to a more intricate interplay between fiscal rules and public investment, which we will analyse in greater detail using multivariate inferential statistical methods in the next section.

3. Determinants of public investment in the EU

3.1 Estimation results and discussion

Our prior resulting from the descriptive analysis in Section 2 is as follows. Compliance with fiscal rules does not weigh on public investment. On the contrary, compliance with fiscal rules actually safeguards fiscal space which governments can use to increase their preferred spending category which may not

be public investment to begin with. Governments reduce public investment when they approach the limits of their intertemporal budget constraint as proxied by high levels of government debt.

We test this assumption with different empirical strategies. We start with conventional linear panel regressions with public investment as dependent variable. Our reference specification is as follows

$$\Delta\,pinv_{i,t} = \alpha \cdot \Delta\,pinv_{i,t-1} + \beta \cdot debt_{i,t-1} + \delta \cdot \Delta\,psoc_{i,t-1} + \xi \cdot comp_{i,t} + \mu \cdot X_{i,t} + \gamma_i + \theta_t + \varepsilon_{i,t}$$

(1)

where

$\Delta\,pinv_{i,t}$ = change of public investment over GDP or the growth rate of real public investment of country i in year t compared to year t-1; or

$debt_{i,t-1}$ = government debt-to-GDP ratio of country i in year t-1;

$\Delta\,psoc_{i,t-1}$ = change of social spending over total government spending of country i in year t-1 compared to year t-2;

$comp_{i,t}$ = numerical compliance with the EU's 3% of GDP deficit threshold in year t either as dummy (1 for compliance, 0 for non-compliance) or as deviation from the 3% of GDP threshold in % of GDP (a negative value means the budget deficit exceeds the threshold; [5]

$X_{i,t}$ = other controls, e.g. real GDP growth or the yield of 10-year sovereign bonds of country i

γ_i = country-fixed effects;

θ_t = time-fixed effects;

$\varepsilon_{i,t}$ = white noise.

With the exception of the compliance indicator, most dependent variables are lagged for two reasons. First, to avert the possibility of contemporaneous feedback effects from the dependent variable and, second, because the outturn of discretionary expenditure items in year t largely depends on budgetary plans adopted at the end of t-1. Leaving aside items that are specifically designed to vary with the business cycle such as unemployment benefits, discretionary expenditure plans of governments with

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[5] Our compliance data are from the compliance tracker of the Secretariat of the European Fiscal Board: Compliance Tracker - European Commission (europa.eu). Of note, the data refer to numerical as opposed to legal compliance. Numerical compliance abstracts from the many exceptions and elements of discretion allowed by the letter and the spirit of EU law and focuses on the main numerical constraints implied by the rule.

normal access to debt financing are generally implemented as budgeted and, unless additional measures are taken, cyclical revenue short(wind)falls lead to higher(lower) government borrowing.

Table 2 and 3 summarise our regression results where columns represent different specifications of equation (1) ordered by growing degree of complexity from the left. Of particular note, the debt-to-GDP ratio does not turn out to be significant as a standalone variable. This clearly contrasts with the findings of existing research, including in particular Delgado-Tellez et al. (2020) and Bacchiocchi et al. (2011). This is most likely due to our particular sample period which, compared to existing studies, includes the last 10 years when in most EU countries public investment started to rebound from the post-crises lows - regardless of government debt levels – in many cases already around 2018-2019, well before the Covid pandemic triggered EU initiatives in support of public investment. This hypothesis is corroborated by the fact that most estimated coefficients of the debt-to-GDP ratio turn negative, although still not significant at conventional levels, when estimating our regressions with a shorter sample up to 2008 (see Table 6 and 7 in the Annex). This would be consistent with the results of our descriptive analysis in Section 2 whereby public investment was mostly cut in the course of the 1990s when a number of countries implemented comparatively ambitious macroeconomic adjustments to qualify for the single currency while mostly safeguarding the mainstays of national welfare states.

In spite of the inconclusive results about the role of the debt-to-GDP ratio as a stand-alone variable since 1998, our regression analysis corroborates the importance of fiscal space more generally. First, the budget balance relative to the 3% of GDP reference value of the SGP turns out to be highly significant at conventional levels of confidence with the expected sign. This means, a higher (lower) budget surplus or lower (higher) budget deficit go along with a stronger (weaker) increase in public investment both in % of GDP and compared to the previous year.

Second, the yield on sovereign bonds, which measures the governments' cost of financing additional expenditure with new debt, has a clear negative sign across all specifications and is statistically significant at conventional levels. This result merits special emphasis as it is usually not covered in studies looking at the determinants of public investment. It plays a particular role in our sample period because of more than one episode of sudden and significant increases in sovereign bond yields in the wake of major economic shocks when financial markets reassessed sovereign risks.

Third, our results clearly confirm the role of consolidation episodes, that is, when a government concludes that prevailing fiscal trends are to be corrected and takes corrective fiscal measures. Following the relevant literature mentioned in the introduction, we define consolidation episodes as years in which the cyclically-adjusted primary budget balance improves by at least 1% of GDP. In those

years, governments tend - ceteris paribus - to cut investment. The estimated coefficient of our consolidation dummy is highly significant and comes with a negative sign.

Table 2: y-o-y growth rate of general government real gross fixed capital formation (GFCF) in %, EU member states, 1998-2023.

	1	2	3	4	5	6	7	8
Sovereign bond yield (%)	-1.58**	-1.91**	-1.06**	-1.09**	-1.89**	-1.69**	-1.33**	-1.39 ***
	(0.03)	(0.04)	(0.02)	(0.01)	(0.01)	(0.02)	(0.03)	(0.00)
Real GDP growth (%), t-1	0.59	0.34	0.49*	0.62**	0.59*	0.61	0.36	0.59*
	(0.11)	(0.35)	(0.07)	(0.03)	(0.05)	(0.10)	(0.31)	(0.05)
Budget balance rel. to 3% of GDP , t-1		1.08***	0.52**				1.11***	
		(0.00)	(0.04)				(0.00)	
Δ social spending (% of tot. spending)			-2.99***	-2.92***	-3.13***			-3.09***
			(0.00)	(0.00)	(0.00)			(0.00)
Δ social spending (% of tot. spending), t-1			-0.87**	-0.73*	-0.75*			-0.73*
			(0.05)	(0.09)	(0.09)			(0.08)
Consolidation (dummy)				-4.82***				
				(0.00)				
Compliance with deficit rule (dummy)					1.84			6.81***
					(0.19)			(0.01)
Debt-to-GDP ratio (%), t-1						0.05	0.06	0.10***
						(0.19)	(0.12)	(0.00)
Compliance with deficit rules (dummy) * debt-to-GDP ratio (%), t-1								-0.08**
								(0.02)
Constant	12.45**	10.78**	9.93**	9.99**	9.01**	11.12**	8.516	4.83
	(0.01)	(0.04)	(0.04)	(0.03)	(0.04)	(0.04)	(0.16)	(0.33)
Adjusted R-squared	0.15	0.17	0.31	0.32	0.31	0.15	0.17	0.31
Obs	654	654	654	654	654	651	651	651
Countries	27	27	27	27	27	27	27	27

Notes: Fixed effects regression model using EU country-year panel (1998-2023). The dependent variable is the y-o-y growth rate of general government real gross fixed capital formation (GFCF) in %. Standard errors are clustered at the country level. p-values in parentheses: * $p<0.10$, ** $p<0.05$, *** $p<0.01$.

Table 3: Δ general government GFCF in % of GDP, EU member states, 1998-2023.

	1	2	3	4	5	6	7	8
Sovereign bond yield (%)	-0.04*	-0.03	-0.03	-0.03*	-0.03*	-0.05*	-0.03	-0.03**
	(0.08)	(0.16)	(0.11)	(0.09)	(0.07)	(0.07)	(0.13)	(0.04)
Real GDP growth (%), t-1	0.01	0.00	0.01	0.01	0.01	0.01	0.00	0.01
	(0.62)	(0.94)	(0.65)	(0.46)	(0.49)	(0.60)	(0.98)	(0.47)
Budget balance rel. to 3% of GDP , t-1		0.04***	0.02*				0.04***	
		(0.00)	(0.07)				(0.00)	
Δ social spending (% of tot. spending)			-0.11***	-0.10***	-0.11***			-0.11***
			(0.00)	(0.00)	(0.00)			(0.00)
Δ social spending (% of tot. spending), t-1			-0.02	-0.02	-0.02			-0.02
			(0.15)	(0.21)	(0.22)			(0.22)
Consolidation (dummy)				-0.17***				
				(0.01)				
Compliance with deficit rule (dummy)					0.04			0.09
					(0.44)			(0.34)
Debt-to-GDP ratio (%), t-1						0.001	0.002	0.002**
						(0.26)	(0.14)	(0.03)
Compliance with deficit rules (dummy) * debt-to-GDP ratio (%), t-1								-0.001
								(0.51)
Constant	0.22	0.16	0.12	0.12	0.11	0.19	0.09	0.03
	(0.28)	(0.46)	(0.53)	(0.53)	(0.55)	(0.39)	(0.70)	(0.87)
Adjusted R-squared	0.15	0.16	0.29	0.3	0.29	0.14	0.16	0.29
Obs	654	654	654	654	654	651	651	651
Countries	27	27	27	27	27	27	27	27

Notes: Fixed effects regression model using EU country-year panel (1998-2023). The dependent variable is Δ general government gross fixed capital formation (GFCF) in % of GDP. Standard errors clustered at the country level. p-values in parentheses: * $p<0.10$, ** $p<0.05$, *** $p<0.01$.

Last but not least, numerical compliance with the EU's deficit rule, which requires member states to keep their budget balance below 3% of GDP, does not have a negative effect on public investment. The estimated coefficients have a positive sign but are not statistically significant. We focus on compliance with the 3% of GDP deficit threshold of the SGP for at least two reasons. Firstly, it is probably the best-known constraint on national fiscal policies defined by the SGP and the one which the EU has tried to enforce more consistently, conceivably because the EU Treaty outlines a very structured surveillance process – the excessive deficit procedure – aimed to correct deficit in excess of 3% of GDP. The particular role of the deficit threshold is supported by empirical evidence suggesting that it acts as a 'magnet', in the sense that on average EU countries tend to improve their fiscal position if the deficit exceeds 3% of GDP by a wider margin (see Caselli and Wingender, 2018). Secondly, the 3% of GDP reference value refers to the headline budget balance. Unlike the structural budget balance, it does not correct for the budgetary impact of the cycle and can, a priori, be viewed as imposing pro-cyclical fiscal policies especially at the cost of public investment. In fact, its lack of sophistication has regularly been criticised.[6] However, our results do not corroborate the proposition. On the contrary, they rather support the view that compliance is beneficial for public investment or at least does not produce any negative effects. [7]

Turning to the composition of government budgets, and in line with the patterns highlighted in Section 2, our regressions very clearly suggest that social spending tends to crowd out public investment. Everything else equal, public investment declines when governments decide to increase social spending as a share of total spending. This finding is very robust across alternative specifications. In combination with the findings on fiscal space discussed above, it very much supports the notion that whenever governments decide to cut investment spending, they do not necessarily do so because they have to comply with fiscal rules. They do it because within the more general constraints on public finances they favour other types of expenditure, notably social expenditure for reasons of political opportunity. This echoes the well-established political economy literature on intergenerational redistribution.[8] Our findings also weaken the rationale of golden rules. A mere exclusion of public

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[6] In 2002, the then Commission President Romano Prodi characterised the SGP as 'stupid (http://news.bbc.co.uk/2/hi/business/2336823.stm). At the time, the 3% of GDP deficit threshold was *de facto* the only operational constraint of the SGP.

[7] Of note, our regressions would also seem to suggest that the positive effect of compliance on public investment diminishes as the debt-to-GDP ratio increases. This type of non-linearity is fairly intuitive: For low levels of debt, compliance with the 3% of GDP deficit threshold signals room for manoeuvre. At high levels, compliance rather reflects the realisation that some kind fiscal adjustment is needed. The corresponding results emerge in both Table 2 and 3 but are not consistently significant at conventional levels of confidence.

[8] Browning (1975), for instance, predicted a shift of political majorities as a result of demographic ageing that would be less supportive of public investment spending. Cukierman and Meltzer (1989) present a model where

investment from a numerical rule does not ease the more general constraints on public finances – all types of spending need to be financed after all – nor does it effectively influence revealed political priorities for one type of spending over the other.[9]

3.2 Robustness checks

Our results are robust to a number of variations. First, we estimate dynamic panels by including the first lag of the dependent variable on the right hand-side of our regression equations. The key finds described above are invariant to this change (see Table 8 and 9 in the Annex). Second, our main findings also hold in qualitative terms when shortening the sample period to 2008. As mentioned above, the estimated coefficients of government debt change sign, but the significant role of other variables most importantly social spending is clearly confirmed. Third, we complete our robustness checks with binomial panel logit models. By categorising the evolution of public investment into discrete classes we forfeit granularity in the assumed response of the dependent variable and obtain a more broad-brush picture of what drives public investment. Put differently, we abstract from small and possibly purely random or very idiosyncratic variations in public investment and focus on significant drops.

To check for robustness, we use two binary indicators of the evolution of public investment:

(i)   1 if the level of real public investment drops by more than two per cent on the previous year, and 0 otherwise; and

(ii)   1 if public investment over GDP drops by more than 0.25 percentage points on the previous year, and 0 otherwise.

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income inequality in combination with majority voting leads to higher social benefits and more government debt.
[9] A dedicated empirical analysis of the European Commission (2022) found no statistically significant evidence that golden rules in general have supported public investment in the past.

Table 4: Logit model -y-o-y growth rate of general government real GFCF in % < -2 %,
EU member states, 1998-2023.

	1	2	3	4
Real GDP growth (%), t-1	-0.05	-0.04	-0.03	-0.01
	(0.22)	(0.28)	(0.49)	(0.85)
Debt-to-GDP ratio (%), t-1	-0.011	-0.014*	-0.008	-0.007
	(0.13)	(0.06)	(0.26)	(0.35)
Change in social spending over total spending (%)	0.33***	0.25***	0.33***	0.36***
	(0.00)	(0.00)	(0.00)	(0.00)
Change in social spending over total spending (%), t-1	0.10**	0.10**	0.11**	0.12***
	(0.02)	(0.02)	(0.01)	(0.01)
Consolidation (dummy)		1.24***		
		(0.00)		
Compliance with deficit rule (dummy)			-0.63**	
			(0.02)	
Deviation from deficit rule (% of GDP)				-0.18***
				(0.00)
Observations	699	696	699	699
Countries	27	27	27	27
Chi-squared	127.9	152.4	133.7	140.9

Notes: Panel logit models using EU country-year panel (1998-2023). The dependent variable is a dummy equal to 1 for the y-o-y growth rate of real gross fixed capital formation (GFCF) of the general government below -2%. p-values in parentheses: * $p<0.10$, ** $p<0.05$, *** $p<0.01$.

Table 5: Logit model - Δ general government GFCF in % of GDP < -0.25 percentage points,
EU member states, 1998-2023.

	1	2	3	4
Real GDP growth (%), t-1	0.01	0.02	0.03	0.04
	(0.84)	(0.71)	(0.48)	(0.27)
Debt-to-GDP ratio (%), t-1	-0.015*	-0.02**	-0.01	-0.01
	(0.06)	(0.03)	(0.12)	(0.18)
Change in social spending over total spending (%)	0.34***	0.25***	0.34***	0.37***
	(0.00)	(0.00)	(0.00)	(0.00)
Change in social spending over total spending (%), t-1	0.08*	0.08*	0.09**	0.09**
	(0.07)	(0.09)	(0.05)	(0.05)
Consolidation (dummy)		1.21***		
		(0.00)		
Compliance with deficit rule (dummy)			-0.73**	
			(0.01)	
Deviation from deficit rule (% of GDP)				-0.17***
				(0.00)
Observations	647	644	647	647
Countries	25	25	25	25
Chi-squared	120.9	141.8	127.0	132.7

The results are reported in Table 4 and 5 above. They confirm and reinforce the main conclusions of our linear panel regressions. Most importantly, when focusing on larger drops in public investment the role of compliance emerges more clearly and is statistically significant at high levels of confidence. Specifically, staying clear of the 3% of GDP deficit threshold of the SGP, i.e. running deficits of less than 3% of GDP, reduces the likelihood of seeing public investment reduced by a significant amount. Our logit regressions also provide further evidence of the political preference for social spending. The estimated coefficients have a positive sign and are highly significant, indicating that an increase in social spending comes at the cost of cutting public investment.

4 Summary and conclusions

This paper investigates the determinants of public investment in the EU member states since the end of 1990s when the Stability and Growth Pact (SGP) - the EU's commonly agreed fiscal rules - entered into force. Compared to similar studies our empirical analysis is predicated on a broader set of EU countries and more recent years. More importantly, drawing on the compliance tracker of the Secretariat of the European Fiscal Board, we focus on the actual compliance with the EU fiscal rules rather than their mere existence. This allows us to better evaluate the proposition according to which EU fiscal rules weigh on public investment.

Our findings do not corroborate this 'popular' view. On the contrary, in the EU, which combines common fiscal rules with very diverging inclinations to observe them, countries with a better compliance record manage to safeguard fiscal space that can be used for different purposes including public investment. Our findings also corroborate the so-called 'social dominance' hypothesis: Within the more general constraints on governments' finances policy makers tend to sacrifice investment expenditure when social expenditure increases.

Of note, our findings do not defend or justify low levels of public investment. We merely make the important point that compliance with EU fiscal rules is not the culprit. The level of public investment - low or high – rather reflects political priorities which our analysis is not meant to judge. The more

fundamental political trade-offs are also the reason why golden rules, arrangements aimed to exclude public investment from the constraints of fiscal rules, have not worked.

Our findings have possible implications for the latest legislative reform of the EU's fiscal framework. The declared objective of the reform is to combine a return to sustainable levels of public debt – i.e. fiscal consolidation - with the opportunity or incentive to increase public investment. The objective is meant to be achieved by granting member states who present relevant investment and reform projects more time to adjust high debt levels. While only time will effectively tell whether this proposition will work as intended, our analysis points to a few caveats. First, in countries with limited fiscal space a significant increase in public investment may require cuts in social spending, unless, of course, taxes are increased, which is politically rather difficult to achieve. Second, the currently high yields on new sovereign debt may also weigh on any attempt to increase investment. Thirdly, and linked to the previous two points, the revised EU fiscal rules may widen the gap between countries with fiscal space and countries with very high debt as the former my have the scope and possibly also the inclination to take advantage of the incentives for higher public investment, while countries with limited fiscal space may face tougher but ultimately inevitable political choices.

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Annex

Table 6: y-o-y growth rate of general government real gross fixed capital formation (GFCF) in %,
EU member states, 1998-2008.

	1	2	3	4	5	6	7	8
Sovereign bond yield (%)	-2.42	-1.78	-0.94	-1.03	-1.13	2.47	-1.74	-1.18
	(0.13)	(0.25)	(0.27)	(0.24)	(0.20)	(0.12)	(0.26)	(0.17)
Real GDP growth (%), t-1	0.17	-0.56	-0.21	0.15	0.16	0.16	-0.58	0.10
	(0.85)	(0.55)	(0.79)	(0.84)	(0.84)	(0.86)	(0.54)	(0.90)
Budget balance rel. to 3% of GDP , t-1		2.37***	1.41*				2.41***	
		(0.00)	(0.07)				(0.00)	
Δ social spending (% of tot. spending)			-3.39***	-3.33***	-3.66***			-3.61***
			(0.00)	(0.00)	(0.00)			(0.00)
Δ social spending (% of tot. spending), t-1			-0.43	-0.22	-0.25			-0.24
			(0.55)	(0.75)	(0.73)			(0.72)
Consolidation (dummy)				-5.71**				
				(0.05)				
Compliance with deficit rule (dummy)					3.34			11.10
					(0.22)			(0.11)
Debt-to-GDP ratio (%), t-1						-0.08	0.03	0.08
						(0.60)	(0.87)	(0.58)
Compliance with deficit rules (dummy) * debt-to-GDP ratio (%), t-1								-0.14
								(0.15)
Constant	20.48*	19.95*	13.13	12.38	9.99	26.08	18.68	7.20
	(0.09)	(0.09)	(0.11)	(0.12)	(0.23)	(0.11)	(0.27)	(0.59)
Adjusted R-squared	0.02	0.06	0.2	0.2	0.19	0.01	0.06	0.19
Obs	258	258	258	258	258	258	258	255
Countries	27	27	27	27	27	27	27	27

Notes: Fixed effects regression model using EU country-year panel (1998-2008). The dependent variable is the y-o-y growth rate of general government real gross fixed capital formation (GFCF) in %. Standard errors clustered at country level. p-values in parentheses: * $p<0.10$, ** $p<0.05$, *** $p<0.01$.

Table 7: Δ general government GFCF in % of GDP, EU member states, 1998-2008.

	1	2	3	4	5	6	7	8
Sovereign bond yield (%)	-0.05	-0.03	0.01	0.01	-0.01	-0.05	-0.03	-0.01
	(0.40)	(0.64)	(0.87)	(0.87)	(0.87)	(0.38)	(0.66)	(0.85)
Real GDP growth (%), t-1	-0.002	-0.030	-0.015	-0.003	0.000	-0.002	-0.030	0.00
	(0.97)	(0.45)	(0.63)	(0.91)	(0.99)	(0.96)	(0.45)	(0.98)
Budget balance rel. to 3% of GDP , t-1		0.09***	0.05*				0.09***	
		(0.00)	(0.06)				(0.00)	
Δ social spending (% of tot. spending)			-0.14***	-0.13***	-0.15***			-0.15***
			(0.00)	(0.00)	(0.00)			(0.00)
Δ social spending (% of tot. spending), t-1			-0.02	-0.01	-0.01			-0.01
			(0.43)	(0.58)	(0.71)			(0.72)
Consolidation (dummy)				-0.28**				
				(0.01)				
Compliance with deficit rule (dummy)					0.03			0.11
					(0.77)			(0.70)
Debt-to-GDP ratio (%), t-1						-0.005	-0.001	-0.001
						(0.39)	(0.92)	(0.78)
Compliance with deficit rules (dummy) * debt-to-GDP ratio (%), t-1								-0.001
								(0.72)
Constant	0.35	0.33	0.05	0.01	0.02	0.65	0.36	0.13
	(0.49)	(0.52)	(0.89)	(0.97)	(0.96)	(0.33)	(0.60)	(0.83)
Adjusted R-squared	-0.01	0.04	0.21	0.22	0.19	0.04	0.04	0.19
Obs	258	258	258	258	258	255	255	255
Countries	27	27	27	27	27	27	27	27

Notes: Fixed effects regression model using EU country-year panel (1998-2008). The dependent variable is Δ general government gross fixed capital formation (GFCF) in % of GDP. Standard errors clustered at country level. p-values in parentheses: * $p<0.10$, ** $p<0.05$, *** $p<0.01$.

Table 8: y-o-y growth rate of general government real GFCF in %, EU member states, 1998-2023.

	1	2	3	4	5	6	7	8
Dependent variable, t-1	-0.06	-0.06	-0.09**	-0.09***	-0.09**	-0.07	-0.06	-0.08**
	(0.16)	(0.20)	(0.09)	(0.01)	(0.02)	(0.16)	(0.20)	(0.03)
Sovereign bond yield (%)	-1.65**	-1.25**	-1.13**	-1.17**	-1.27**	-1.75**	-1.39**	-1.47***
	(0.02)	(0.03)	(0.02)	(0.01)	(0.01)	(0.02)	(0.02)	(0.00)
Real GDP growth (%), t-1	0.71*	0.45	0.62**	0.76***	0.72**	0.72*	0.47	0.72**
	(0.06)	(0.23)	(0.02)	(0.01)	(0.01)	(0.06)	(0.20)	(0.02)
Budget balance rel. to 3% of GDP , t-1		1.06***	0.57**				1.09***	
		(0.00)	(0.03)				(0.00)	
Δ social spending (% of tot. spending)			-3.00***	-2.83***	-3.16***			-3.11***
			(0.00)	(0.00)	(0.00)			(0.00)
Δ social spending (% of tot. spending), t-1			-1.12**	-0.96**	-0.97**			-0.94**
			(0.01)	(0.04)	(0.04)			(0.04)
Consolidation (dummy)				-4.95***				
				(0.00)				
Compliance with deficit rule (dummy)					1.97			6.81***
					(0.17)			(0.01)
Debt-to-GDP ratio (%), t-1						0.05	0.07	0.10***
						(0.21)	(0.12)	(0.00)
Compliance with deficit rules (dummy) * debt-to-GDP ratio (%), t-1								-0.07**
								(0.03)
Constant	12.43**	10.79**	10.08**	10.18**	9.10**	11.13**	8.56	5.02
	(0.01)	(0.04)	(0.03)	(0.03)	(0.04)	(0.05)	(0.15)	(0.31)
Adjusted R-squared	0.16	0.17	0.31	0.32	0.31	0.16	0.18	0.31
Obs	654	654	654	654	654	651	651	651
Countries	27	27	27	27	27	27	27	27

Notes: Fixed effects regression model using EU country-year panel (1998-2023). The dependent variable is the y-o-y growth rate of general government real gross fixed capital formation (GFCF) in %. Standard errors clustered at country level. p-values in parentheses: * $p<0.10$, ** $p<0.05$, *** $p<0.01$.

Table 9: Δ general government GFCF in % of GDP, EU member states, 1998-2023.

	1	2	3	4	5	6	7	8
Dependent variable, t-1	-0.15***	-0.14***	-0.17***	-0.17***	-0.16***	-0.14***	-0.14***	-0.16***
	(0.01)	(0.01)	(0.00)	(0.00)	(0.00)	(0.00)	(0.01)	(0.00)
Sovereign bond yield (%)	-0.05*	-0.04	-0.03*	-0.03**	-0.04**	-0.05**	-0.04*	-0.04**
	(0.06)	(0.10)	(0.07)	(0.05)	(0.04)	(0.05)	(0.08)	(0.02)
Real GDP growth (%), t-1	0.01	0.004	0.01	0.01	0.01	0.01	0.01	0.01
	(0.37)	(0.78)	(0.40)	(0.22)	(0.26)	(0.35)	(0.74)	(0.24)
Budget balance rel. to 3% of GDP , t-1		0.04***	0.02**				0.04***	
		(0.00)	(0.05)				(0.00)	
Δ social spending (% of tot. spending)			-0.11***	-0.10***	-0.12***			-0.12***
			(0.00)	(0.00)	(0.00)			(0.00)
Δ social spending (% of tot. spending), t-1			-0.04**	-0.04*	-0.04*			-0.04*
			(0.03)	(0.06)	(0.06)			(0.07)
Consolidation (dummy)				-0.18***				
				(0.00)				
Compliance with deficit rule (dummy)					0.04			0.08
					(0.39)			(0.49)
Debt-to-GDP ratio (%), t-1						0.001	0.002	0.002*
						(0.31)	(0.16)	(0.07)
Compliance with deficit rules (dummy) * debt-to-GDP ratio (%), t-1								-0.001
								(0.70)
Constant	0.21	0.16	0.13	0.13	0.12	0.18	0.09	0.05
	(0.28)	(0.45)	(0.50)	(0.49)	(0.53)	(0.40)	(0.69)	(0.81)
Adjusted R-squared	0.16	0.18	0.31	0.32	0.31	0.16	0.18	0.30
Obs	654	654	654	654	654	651	651	651
Countries	27	27	27	27	27	27	27	27

Notes: Fixed effects regression model using EU country-year panel (1998-2023). The dependent variable is Δ general government gross fixed capital formation (GFCF) in % of GDP. Standard errors clustered at country level. p-values in parentheses: * $p<0.10$, ** $p<0.05$, *** $p<0.01$.