

Blesse, Sebastian; Dorn, Florian; Lay, Max

**Working Paper**

## Do fiscal rules undermine public investments? A review of empirical evidence

ifo Working Paper, No. 393

**Provided in Cooperation with:**

Ifo Institute – Leibniz Institute for Economic Research at the University of Munich

*Suggested Citation:* Blesse, Sebastian; Dorn, Florian; Lay, Max (2023) : Do fiscal rules undermine public investments? A review of empirical evidence, ifo Working Paper, No. 393, ifo Institute - Leibniz Institute for Economic Research at the University of Munich, Munich

This Version is available at:

<https://hdl.handle.net/10419/272300>

**Standard-Nutzungsbedingungen:**

Die Dokumente auf EconStor dürfen zu eigenen wissenschaftlichen Zwecken und zum Privatgebrauch gespeichert und kopiert werden.

Sie dürfen die Dokumente nicht für öffentliche oder kommerzielle Zwecke vervielfältigen, öffentlich ausstellen, öffentlich zugänglich machen, vertreiben oder anderweitig nutzen.

Sofern die Verfasser die Dokumente unter Open-Content-Lizenzen (insbesondere CC-Lizenzen) zur Verfügung gestellt haben sollten, gelten abweichend von diesen Nutzungsbedingungen die in der dort genannten Lizenz gewährten Nutzungsrechte.

**Terms of use:**

*Documents in EconStor may be saved and copied for your personal and scholarly purposes.*

*You are not to copy documents for public or commercial purposes, to exhibit the documents publicly, to make them publicly available on the internet, or to distribute or otherwise use the documents in public.*

*If the documents have been made available under an Open Content Licence (especially Creative Commons Licences), you may exercise further usage rights as specified in the indicated licence.*

**Do Fiscal Rules Undermine Public  
Investments?  
A Review of Empirical Evidence**

*Sebastian Blesse, Florian Dorn, Max Lay*

Imprint:

ifo Working Papers

Publisher and distributor: ifo Institute – Leibniz Institute for Economic Research at the University of Munich

Poschingerstr. 5, 81679 Munich, Germany

Telephone +49(0)89 9224 0, Telefax +49(0)89 985369, email [ifo@ifo.de](mailto:ifo@ifo.de)

[www.ifo.de](http://www.ifo.de)

An electronic version of the paper may be downloaded from the ifo website:

[www.ifo.de](http://www.ifo.de)

# Do Fiscal Rules Undermine Public Investments? A Review of Empirical Evidence\*

## Abstract

Fiscal rules are a frequent policy measure to restrict deficit-taking among incumbent politicians. In times of increased and sustained investment needs to mitigate the consequences of climate change, and to promote the digital and structural transformation, fiscal rules have become subject to criticism for undermining public investments. We review 20 existing empirical studies examining the impact of numerical fiscal rules on public investments. We also discuss whether more public investments typically come at the cost of higher deficits and whether the effect on public investments differs between rigid and more flexible fiscal rules. Overall, we do not find systematic evidence for a negative effect of fiscal rules on overall public investments. Rigid fiscal rules seem to deter public investments as compared to more flexible and investment-friendly rules which, by contrast, rather increase public investments. Existing evidence does not suggest that public investments systematically come at the cost of higher public deficits (except for more flexible fiscal rules). The design of fiscal rules appears to be crucial for higher public investments.

JEL Code: H50, H54, H6, H63

Keywords: Fiscal rules, public investment, fiscal sustainability, golden rule, literature review

Sebastian Blesse  
Ludwig Erhard ifo Center for Social Market  
Economy and Institutional Economics,  
CESifo, ZEW Mannheim, ifo Institute  
blesse@ifo.de

Florian Dorn  
CESifo, ifo Institute,  
University of Munich  
dorn@ifo.de

Max Lay  
ifo Institute  
lay@ifo.de

\* This literature review was conducted as basis for the policy study “A targeted golden rule for public investments? A comparative analysis of possible accounting methods in the context of the review of Stability and Growth Pact” written by the authors which was requested by the European Parliament’s Committee on Economic and Monetary Affairs (Blesse et al. 2023). We thank Désirée Christofzik, Friedrich Heinemann, Niklas Potrafke and Felix Rösel for helpful comments on the paper. We welcome valuable research assistance by Valentin Kissmann.

# 1. Introduction

Recent economic crises and upheavals of the geopolitical situation due to the Corona pandemic and the Russian invasion in Ukraine, notably the challenges of high inflation, to secure energy supply, and calls for higher defence spending, have put pressure on public budgets in many countries around the globe. At the same time, many advanced economies face high public debt levels, increasing societal costs of the unfolding demographic change, as well as challenges that require an extension of public investment spending to promote the structural transformation towards green, digital, and more resilient economies; first and foremost, the challenge to tackle and mitigate the consequences of global warming.

The 2022 Inflation Reduction Act (IRA) in the United States, for example, aims to reduce deficits and inflation while investing into domestic and cleaner energy production. The budget includes investments of \$370 billion in energy security and climate change programs to reduce US greenhouse gas emissions by roughly 40% by 2030 compared to 2005 (The White House, 2023). The European Commission, as another example, launched the 'Fit for 55' program in 2021 that aims at reducing greenhouse gas emissions by 55% compared to 1990 until 2030. To meet this goal in the European Union (EU), estimates for necessary public and private investments point to rough magnitudes of an increase by 57% in the period between 2021 to 2030 compared to the decade 2011 to 2020 (Benassy-Quéré, 2022; European Commission, 2021). The need for public investment is estimated to grow in the EU by additionally 0.6% of GDP per year (Darvas & Wolff, 2022).<sup>1</sup> Additional fiscal pressures arise, among others, from the need for large investments to digitize the economies and societies and to modernize public infrastructure.

The high demand to boost public investment in times of strained public finances and high public debt levels raises the question how the requested resources can be provided. The public discussion emphasizes this problem especially if fiscal rules - which are intended to ensure fiscal sustainability and are present in more than 105 countries (Davoodi et al., 2022) - are believed to limit the fiscal space for governments and their ability to invest.

Fiscal rules are often blamed for a lack of public investment<sup>2</sup> since they were originally a tool to reduce unsustainable deficit-taking and public debt (for some literature reviews, see Wyplosz, 2012; Asatryan et al., 2015; Feld & Reuter, 2017; Turley et al., 2021, Heinemann et al., 2018). A recent meta-study of Heinemann et al. (2018) provides a systematic account of 30 existing evaluations of numerical fiscal rules and finds that fiscal rules are indeed effective in their goal to make public finances more sustainable. The effects of various types of fiscal rules on public investment, however, are less understood. An international survey among economists showed ambiguous results: 45% expect decreasing public investments due to fiscal rules, while 46% rather assume improvements in public investments (Gründler & Potrafke, 2020, p. 28).

Intuitively, if fiscal rules are effective in reducing or even eliminating public deficits, they could lead to lower public expenditures, including lower levels of public investment. As public

---

<sup>1</sup> The EU's Next Generation EU (NGEU) program for the financial framework between 2021-2027, for example, includes grants in the amount of €338 billion within the Recovery and Resilience Facility to subsidize investments in greener, more digital, and more resilient economies and societies.

<sup>2</sup> As, for example, discussed for the German debt brake in Feld et al. (2019).

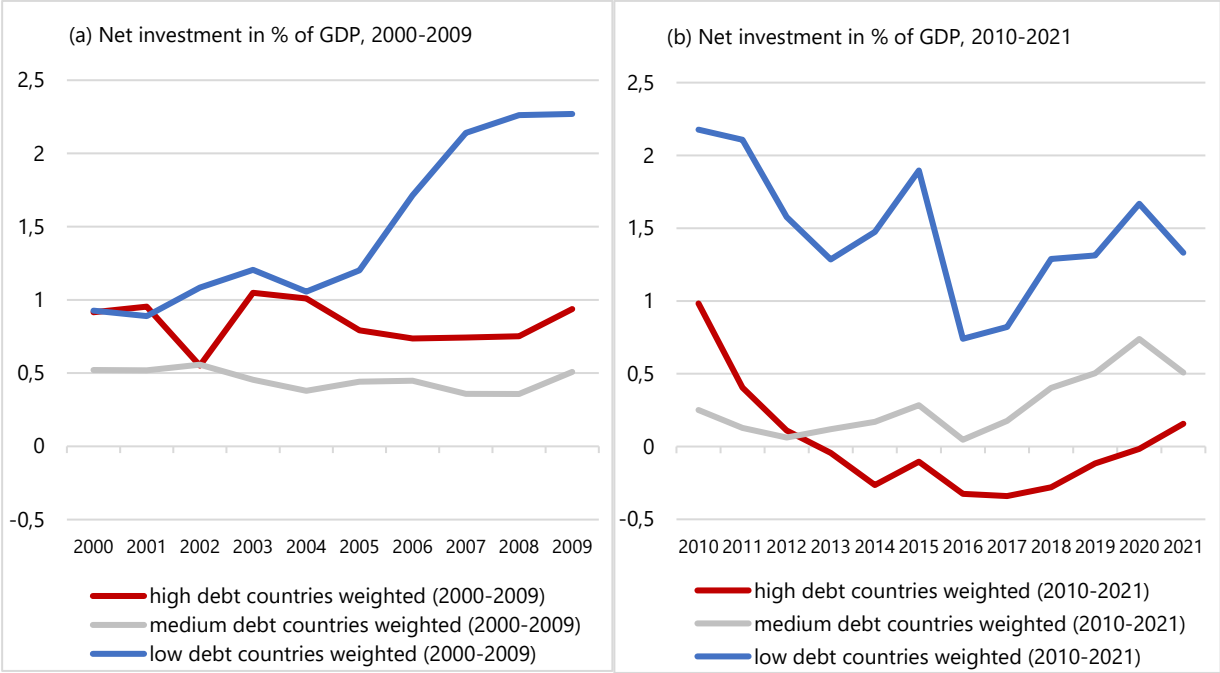
investment is typically determined by discretionary decisions of policy makers, it could make them more prone to fiscal consolidation measures compared to other expenditures. Policy makers also typically cut public investments in bad times while upholding consumptive expenses (Ardanaz & Izquierdo, 2022). An important reason is that public investments are often less salient to voters than the latter<sup>3</sup> and the respective cuts are therefore less subject to significant political opposition. On the other hand, some fiscal rules allow for extended investment, for example by including investment clauses which are not subject to fiscal constraints. Those investment rules may enhance a shift in the composition of spending from consumptive to investment spending to boost economic growth in the future.

Macroeconomic trends on public investments in the EU, for example, suggest that there is heterogeneity conditional on national fiscal space (as indicated by overall public debt levels) while confronted with the same fiscal rule framework. Figures 1 a) and b) show trends before and after the great financial crisis in net public investment (gross fixed capital formation minus depreciation) for three debt groups of countries. The figures show that countries with low public debt levels (and, thus, higher scope to invest) have higher levels of net investment, before and after the great financial crisis. A different picture arises within the medium- and high-debt countries which have presumably less scope to undertake significant public investments under the given fiscal constraints. While net investments are still positive throughout the years for medium-debt countries, high-debt countries faced a sharp decline after the great financial crisis such that public investment could not even compensate for the depreciation of public capital stock for almost a decade. Against this background, it may be conceivable that lower fiscal space may indeed systematically hamper public investments. Specifically, one could argue that highly indebted countries are forced to consolidate their public finances because of existing fiscal rules (reducing fiscal space) and are therefore tempted to cut public investments. However, some fiscal rule arrangements (especially flexible features like investment provisions) may facilitate investment spending.

---

<sup>3</sup> Of course, public investments are heterogeneous in their visibility to voters and public works on buildings or streets may be deemed more visible than other public investment categories (Chong et al., 2014) and politicians may initiate, for instance, many small projects before elections to gain competence and voter support (Havlik et al., 2021). Also „red-ribbon“ cutting of completed projects may be salient to voters. However, one may argue that many consumption expenditures such as social transfers are more visible (and more regularly so) than a lot of investment projects.

Figure 1: Net investment in the EU before (a) and after the Global Financial Crisis (b)



Notes: the country groups are categorised by their average public debt in the respective time period. Low debt = under 60% of GDP, medium debt = between 60% and 90% of GDP, high debt = over 90% of GDP. Source: Eurostat.

To gain insights whether fiscal rules are undermining or facilitating public investments, this paper provides a first systematic review of the empirical literature (Section 2).<sup>4</sup> We focus on empirical ex-post evaluations of numerical fiscal rules and do not consider for example simulation studies. We found 20 empirical papers (published in English) covering various panel estimation strategies, including quasi-experimental designs, cross-country as well as subnational evidence within specific countries. Overall, we do not find systematic evidence for a negative effect of fiscal rules on public investments. Moreover, the findings do not suggest that public investments systematically come at the cost of higher public deficits.

In our review, we review studies which use different accounting definitions of public investments (due to the heterogeneous nature of the respective settings). Depending on the context, the term ‘public investment’ might be based on different concepts. Typically, empirical studies use expenditure on gross fixed capital formation (GFCF) by the general government as measure for public investment, as defined in most systems of national accounts (e.g., the European system of accounts). This includes, amongst others, expenditure on buildings, machinery, intellectual

<sup>4</sup> We employed an extensive literature review, including searches by keywords in Google Scholar (for instance, “fiscal rule AND public investment AND evidence” or “fiscal rule AND capital spending AND evidence”) as well as web-searches by renown authors in the field and in bibliographies and citations of various studies (snowball system). Ultimately, we have included 20 empirical studies published in English. Studies published in German, however, also find mixed results about whether fiscal rules systematically prevent public investments (see Feld et al., 2021 as well Röseler & Wolffson, 2022). While Röseler & Wolffson (2022) find that fiscal rules correlate with a lower share of public investments to GDP in a sample of EU countries (after controlling for a wide set of possible confounding variables), Feld et al. (2021) show that Swiss cantons with relatively stringent fiscal rules are expanding their public investments as compared to cantons with less stringent rules after the interest rate cut of 2015.

property, military weapon systems and software or databases. The other major definition of public investment in national accounts, gross capital formation (GCF), includes in addition changes in inventories and acquisitions less disposals of valuables. One might also see investment grants and other capital transfers to households and firms, e.g., for building energy-efficient housing, as a public investment because the society as a whole possibly gains from their positive returns, e.g., by reduced greenhouse gas emissions. However, most empirical studies discussed in this paper focus on public investment defined as government expenditure on gross (fixed) capital formation. Beyond overall public investment or capital spending in a narrow sense (in accounting terms and specific items like infrastructure, digitization, and national defence), we also review findings of specific budget items which are regularly considered in studies or the political debate as investments in a broader sense (spending on health, education, or housing).<sup>5</sup> We examine the heterogeneous effects of fiscal rules on overall investments as well as specific public investment items. While there is some evidence for lower health spending due to fiscal rules, the few papers on specific investment outcomes of fiscal rules do not show systematic effects on public investments in the narrow sense.

We also provide an overview on the effects of flexible arrangements on public investments, for example golden rules and investment clauses, as well as existing evidence on the impact of flexible versus more rigid fiscal rule designs (Section 3). More rigid fiscal rules seem to deter public investments more than flexible rules. By contrast, investment clauses may even stimulate public investment. But depending on the design of the fiscal rules, investment clauses may come at the cost of deficit-taking. We also discuss the take-aways from the systematic review and compare the effects of investment provisions to other design features to increase fiscal rule flexibility. The last section concludes and discusses avenues for future research.

## **2. What are the effects of fiscal rules on public investments?**

Starting from the somewhat optimistic take-away that numerical fiscal rules seem to be effective in reducing deficits (Heinemann et al., 2018), it is yet unclear how public investments are affected by fiscal rules on average across studies. Theoretically, investments are more discretionary than current spending and could therefore be more affected by fiscal constraints. Moreover, investments may be less salient than current spending items (say, social transfers) to voters and are, therefore, more likely to be subject to fiscal consolidations than current spending and transfers. Table 1 gives an overview of existing empirical findings on the effects of fiscal rules on public

---

<sup>5</sup> Investments in health and education, for example, can increase the availability of human capital and therefore also be considered as an investment in a broader sense. Health spending can be argued as an investment in human capital in a broader sense if the health expenditure is intended to maintain or increase labour capacity through health services; or as investments in physical capital if investments are targeted, for example, on medical equipment.



investments.<sup>6</sup> First, we discuss the general effect of fiscal rules on overall public investments according to the reviewed literature. We then focus on the effect on specific investments and heterogeneous effects according to different definitions of public investments. Finally, we examine whether the studies report a trade-off between public investments and deficit-taking.

## 2.1. Average effects of fiscal rules on public investments

Table 1 shows 20 empirical studies that evaluate numerical fiscal rules regarding their effects on public investments or related sub-components. Importantly, the review considers the effects of fiscal rule presence (i.e., the introduction or the abolishment of fiscal rules or the respective changes in fiscal rule components), but explicitly does not cover the empirical estimates of compliance with fiscal rules.

Numerical fiscal rules appear to have no significant effect in most studies (12 studies) on overall public investment (see Table 1).<sup>7</sup> This is remarkable given that public investments are assumed to be more prone to fiscal consolidations due to their large degrees of freedom in budgetary decision making when compared to operating or consumptive expenses. Additionally, politicians want to be re-elected and are, therefore, more likely to cut public investments first as compared to more salient operational spending (e.g., social spending; for a discussion on this see above in footnote 3).

The lack of significance in the impact of fiscal constraints on overall public investments are also not limited to specific types of rules and can be found for *expenditure rules* (Carreri & Martínez, 2021; Gregori, 2014; Dahan & Strawczynski, 2013; Vinturis, 2022), *balanced budget rule* (Grembi et al., 2016; Alpino et al., 2022; Salvi et al., 2020; Venturini, 2020; Dahan & Strawczynski, 2013; Vinturis, 2022), *debt rules* (de Biase & Dougherty, 2022; Vinturis, 2022) or a *specific investment cap* which is newly added to an expenditure target and zero deficits (Mancini & Tommasino, 2022). Null effects also extend from national level rules to subnational fiscal frameworks (frequently studied in case of the Domestic Stability Pact for Italian municipalities, e.g., Alpino et al., 2022; Grembi et al., 2016 as well as Daniele et al., 2019). To the best of our knowledge, *revenue rules* – which are admittedly rare in practice – are not studied with regards to public investment outcomes.

The studies in Table 1 also use various econometric approaches to account for potential endogeneity of fiscal rule adoption ranging from a Difference-in-Difference (DiD) estimation (e.g., Carrieri & Martínez, 2021, Daniele et al., 2019), a combination of DiD with a Regression Discontinuity

---

<sup>6</sup> We focus on empirical ex-post evaluations of numerical fiscal constraints and do not refer to individual accounts on whether different fiscal rules (their rigidity, their escape clauses or their cyclical adjustment and so forth) actually provide enough room for investment (for a discussion of the case of the German debt brake, see Feld et al., 2019). We also do not reflect on the welfare effects of different types of rules in terms of simulation models, as studied in, among others, Azzimonti et al. (2016), Bom & Ligthart (2014) or Bom (2016). Moreover, we do not review the literature on austerity measures (for instance, bailouts or horizontal transfers that come with specific consolidation conditions, e.g. Fremerey et al., 2022; Baskaran, 2017; Christofzik & Schneider, 2019) or the fiscal constraints that come with the adoption of alternative accounting methods in the public sector (for the effects of accrual accounting on public finances, e.g. see Christofzik, 2019, Raffer, 2020 as well as Dorn et al., 2021). We also do not consider papers that solely study the effects of supranational rules, say, by introducing a dummy for a time period after the introduction of the European Stability and Growth Pact on the country level, on public investments or by using mean-comparisons of EU countries only.

<sup>7</sup> The evidence that most studies find no significant results is even more remarkable as a potential publication bias would rather suggest a bias towards significant findings (see for instance, Mandon & Cazals, 2019).

Design (RDD) which is labelled as Difference-in-Discontinuities (e.g. Grembi et al., 2016 or Alpino et al., 2022), entropy balancing as a form of matching on covariates determining fiscal rule adoption on the country level (Vinturis, 2022), synthetic control methods (Salvi et al., 2020), or they use cross country fixed effects panel regressions to examine relationships between fiscal rules and public investments on the macro-level (Grosse-Steffen et al., 2021, Ardanaz et al., 2021, de Biase & Dougherty, 2022, Delgado-Téllez et al., 2022). Furthermore, available studies use heterogeneous accounting measures of public investments (partly due to the different empirical settings of the studies considered, e.g., local or national levels of observation). Cross-country studies often refer to gross fixed capital formation (e.g., Vinturis, 2022) or gross fixed capital (including changes in inventories and acquisitions less disposals of valuables, e.g. Salvi et al., 2020). No studies were found that use net investment measures. Outcome measures range from overall public investments (sometimes also labelled as capital spending or expenditures) to specific public investment items in a more narrow or broader sense (for a discussion on related results, see Section 2.2). Outcomes are also differently measured, for instance, in levels (or logarithmised sums) of public investment (items), per capita (or per pupil in Pavese & Rubolino, 2021; or logs per capita in Venturini, 2020), in % to overall government expenditures (de Biase & Dougherty, 2022) or GDP (e.g. Vinturis, 2022) or respective changes or growth rates of the latter (e.g. Dahan & Strawczynski, 2013; Delgado-Téllez et al., 2022).

A few studies, however, report positive (2 studies) or negative effects (4 studies) of fiscal rules on public investment. On the one hand, both Burret & Feld (2018) and Gregori (2014) report an increase in overall public investment in their evaluations of fiscal rules. It appears that investment increases are driven by the specific design of the respective fiscal constraints. Burret & Feld (2018) examine the effect of cantonal *balanced budget rules* (BBRs) in Switzerland and their effects on public finances and find that these rules reduce deficits, but also let politicians move funds towards public investments. These funds (unlike the current accounts) are not always included by the balanced budget requirements. While this may be indicative to some degree of a form of creative accounting, the authors report that investment increases do not come at the cost of consumptive spending. Gregori (2014) shows that separate expenditure caps indeed affect local budgets while a joint expenditure cap for Italian municipalities for both consumptive and investment spending does not shift budgetary decisions and is, therefore, weaker in its economic incentives. The study shows that allowing municipalities a certain growth rate in public investments indeed increases municipal investments, but this comes at the costs of higher deficits (for a discussion on the effects of public investment on deficit-taking, see Section 2.3; and on the effect of more flexible rules and design alternatives, see Sections 3 and 4 below).

On the other hand, findings by Daniele et al. (2019), Jürgens (2022), Venturini (2020) and de Biase & Dougherty (2022) suggest that fiscal rules can indeed deteriorate public investment. Daniele et al. (2019) and Venturini (2020) examine the relationship on the municipality level in Italy, whereas Jürgens (2022) and de Biase & Dougherty (2022) use cross-country evidence. Daniele et al. (2019) show that the Domestic Stability Pact (a BBR with an expenditure target in their period of study) for Italian municipalities significantly decreases overall spending and public investment. However, this effect is limited to regions that receive relatively few transfers from the European level. The authors argue that these regions are more constrained by the fiscal rule in

terms of investments than regions with higher availability of cohesion funds (where no significant effect on overall investment is observable), as the latter can afford to maintain their previous levels of public investment. In an evaluation of a former alteration of the Domestic Stability Pact where an expenditure ceiling became a strict BBR, Venturini (2020) finds that constrained Italian municipalities significantly decrease public investments, including education and infrastructure spending, resulting in a reduction of total expenditure. In a cross-country setting, Jürgens (2022) shows a negative correlation between fiscal rules and overall public investments using fixed effects panel regressions. This effect is especially large for rigid fiscal rules and driven by several specific investment components, such as health, housing and social protection. Flexible rules (i.e., rules with escape clauses, cyclical adjustments of target variables and/or the exclusion of public investment spending from the fiscal constraints), by contrast, do not appear to have such overall negative investment effects. These three studies show that public investment can decrease with the adoption of a fiscal rule, especially if co-financing is not well available (in the context of sub-national units), or if the adopted rules are relatively rigid and the definition of public investments is relatively broad.<sup>8</sup> A study by de Biase & Dougherty (2022) shows in cross-country ordinary least squares regressions that the effect may depend on the type of fiscal rule. In regimes with *expenditure rules* and *balanced budget rules*, investment to overall spending ratios, i.e. the composition of budget towards investment spending, deteriorates among European countries. However, they do not find a related effect for *debt rules*.

## 2.2. Do fiscal rules have effects on specific investments?

While the literature gives an overall impression that fiscal rules may, on average, not harm investment spending systematically, Table 1 also shows that only 10 studies examine effects of specific investment categories on the public sector. Findings on specific investments are less conclusive. While this is based on relatively few studies, the more mixed findings seem to depend on the exact question, context, and fiscal rule.

Fiscal rules tend to decrease health care expenditures in three studies (Bordignon et al., 2020; Schakel et al. 2018; Jürgens 2022). While Bordignon et al. (2020) find that *deficit rules* in the sub-national level among Italian regions decrease health care spending (and do not deteriorate health care quality), Schakel et al. (2018) find in a cross-country setting that health care spending decreases for all *debt*, *expenditure* and *balanced budget rules* alike. Jürgens (2022) shows that especially rigid and less flexible fiscal rules result in lower health care expenditures. Alpino et al. (2022), however, do not find health care expenditures (or any relevant spending category) to be responsive to the introduction of a new *balanced budget rule* among Italian municipalities.

Health spending, however, is usually not classified as a public investment in a narrow or accounting sense. Beyond health spending, it appears that the existing literature depicted in Table 2 does not show strong or conclusive results for other sub-components of investments in a narrower (infrastructure, education) or in a broader sense (defence, housing). One study finds a negative correlation between fiscal rules and spending on housing (Jürgens 2022), while another study

---

<sup>8</sup> Some of these studies include a very broad definition of public investment. Some categories, like health care, are defined as public investment in some studies, but have rather a consumptive than investive character. By including such categories, the impact of fiscal rules on public investment could be differ between a broad and a narrow definition of public investment.

suggests a decrease in defence spending (Salvi et al. 2020). The results for the effect of fiscal rules on infrastructure spending are mixed among the five studies at the subnational level (Coviello et al., 2022; Pavese & Rubolino, 2020; Gregori 2014; Alpino et al, 2022; Venturini, 2020). Two studies, however, find a negative effect on education spending from fiscal rules at the subnational level in Italy (Pavese & Rubolino, 2020 as well as Venturini, 2020), whereas most studies do not find significant effects on education spending resulting from fiscal rules (Carreri & Martínez, 2021; Pavese & Rubolino, 2020; Jürgens 2022).

### **2.3. Do public investments come at the cost of higher deficits?**

Table 1 also allows a tentative glimpse on whether fiscal-rule-driven changes in investment come at the cost of increased public deficits. In the table, 2 out of 8 studies depict a rise in deficits (Gregori, 2014; Grosse-Steffen et al. 2021). However, the majority of studies (5 out of 8 studies, where both overall investment and deficit estimates are available) show that fiscal rules can rather reduce public deficits (in line with the results of the meta-analysis of Heinemann et al., 2018), but do not change overall investment (Carreri & Martínez, 2021; Alpino et al., 2022; Salvi et al., 2020; Grembi et al., 2016; Dahan & Strawczynski, 2013). Fiscal consolidation seems to be achieved by other means than cutting back on public investments.

Burret & Feld (2018) rather show that cantonal BBRs in Switzerland increase public investment (likely as a means of creative accounting) and decrease public deficits. By contrast, Gregori (2014) finds a rise in deficits due to increasing investments when the expenditure target of the fiscal constraint allows for a certain growth of public investment. Lastly, Grosse-Steffen et al. (2021) show in their cross-country estimates rising public deficits but insignificant increases of overall investments due to fiscal rules. Overall, based on the findings of the studies listed in Table 1, there do not seem to be clear indications for either an increase or a decrease of deficits as well current or overall spending that come along with changes in overall public investments. However, given the low number of relevant studies, more research is needed and studies on the effect of fiscal rules on public investments need to specify whether investment comes at the cost of deficits.

It is important to note that not only fiscal rules themselves (or their respective design) but also their enforcement can affect public investment behaviour. For instance, Coviello et al. (2022) find that Italian municipalities that were exposed to stricter enforcement of the subnational fiscal rule, significantly dropped their investment spending. Christofzik & Kessing (2018) find that less oversight of a golden rule for municipalities in the German state of North-Rhine Westphalia led to significant and sizeable increases in public debt. The authors, however, do not explicitly refer to changes in municipal investment behaviour (that is why the Table does not list this paper). Based on these studies, a lack of oversight and enforcement may thus deter public investment and have negative effects for fiscal sustainability in terms of higher debt as well.

Table 1: Review of the evidence of fiscal rules on public investment outcomes

Study	Method	Country	Fiscal rule	Public Investment						Total expenditure	Current/Operating expenditure	Public Deficit
				Total	Health care	Housing	Education	Defence	Infrastructure			
<b>National level</b>												
Ardanaz et.al (2021)	Panel FE regression	75 countries	BBR/ER/DR/IR/CAR/CR	●								
Dahan & Strawczynski (2013)	DiD	22 OECD countries	BBR/ER	●						▼ <sup>e</sup>	▼ <sup>f</sup>	
de Biase & Dougherty (2022)	OLS	Cross-country, EU countries	BBR, DR, ER	▼/● <sup>g</sup>								
Delgado-Téllez et al. (2022)	Panel FE regressions and Local Projections	22 OECD countries	Fiscal rule dummy. and rigid versus flexible rules	●								
Grosse-Steffen et al. (2021)	Panel FE regression	68 countries	BBR/ER/DR/RR	●					▲		▲	
Jürgens (2022)	Panel FE regression	23 EU Countries	Rigid versus flexible rules (IR, CAR, CR)	▼	▼ <sup>d</sup>	▼ <sup>d</sup>	● <sup>d</sup>	● <sup>d</sup>				
Salvi et al. (2020)	Synthetic control	35 OECD countries, focus: CH	Structural BBR with escape clause	●				▼			▼ <sup>c</sup>	
Vinturis (2022)	Entropy Balancing	185 countries	BBR/DR/ER	●					▼			
Schakel et al. (2018)	OLS	32 OECD	ER/BBR		▼							
<b>Subnational level</b>												
Alpino et al. (2022)	Diff in Disc	IT (subnational)	BBR	●			●		●	●		▼
Bordignon et al. (2020)	DiD	IT (subnational)	BBR		▼							
Burret & Feld (2018)	DiD	CH (subnational)	Various BBRs	▲					●			▼
Carreri & Martínez (2021)	DiD	CO (subnational)	Golden rule (ER targeting current spending)	●	●		●			▼		▼

Coviello et al. (2022)	DiD	IT (subnational)	BBR+ER enforcement						▼		●	
Daniele et al. (2019)	DiD	IT (subnational)	BBR	▼ <sup>a</sup>						▼	●	
Gregori (2014)	Diff in Disc	IT (subnational)	ERs (effect of overall/separate caps on expenditure growth for consumption and public investment)	●/▲					-/▲			-/▲
Grembi et al. (2016)	Diff in disc	IT (subnational)	BBR	●							●	▼ <sup>b</sup>
Mancini & Tommasino (2022)	Diff in Disc	IT (subnational)	BBR+ER	●							▲	
Pavese & Rubolino (2021)	RDD	IT (subnational)	Different variations of BBRs (+ ER) in sample period				▼		●			
Venturini (2020)	Diff in Disc	IT (subnational)	ER changes to BBR	▼			▼		▼		▼	
# ▲				2	0	0	0	0	1	1	1	2
# ●				12	1	0	3	1	2	2	4	0
# ▼				4	3	1	2	1	1	3	2	6
<b>Take-away (=&gt; 2 studies and a gap of more than one study needed)</b>				●	▼	-	●/▼	-	-	-	●	▼

Notes: ▲ (▼) Statistically significant positive (negative) effect. ● Statistically insignificant effect. Please note that the definition of outcome variables may differ across studies. Methods: DID = Difference in Difference, OLS = Ordinary Least Squares, Diff in Disc = Difference in Discontinuities, RDD = Regression Discontinuity Design, FE = Fixed Effects. Types of Fiscal Rules: BBR = Balanced Budget Rule, ER = Expenditure Rule, DR = Debt rule, IR = Investment friendly rule, CAR = Cyclically adjusted rule, RR = Revenue rule, CR = rules with escape clauses. Additional information: (a) only in regions which receive relatively little European cohesion funds and have therefore relatively little support for public investment, no effect on other regions. (b) effect of relaxation of fiscal rule which increased deficits. Therefore, we invert the sign of direction for the sake of comparability across studies such that deficits decrease in the presence of a fiscal rule. (c) Cyclically adjusted primary balance. (d) Interaction effect on recessions, no respective effect in other years. (e) Effect on expenditures for expenditure rule, balanced budget rule has no effect. (f) Effect on deficit for balanced budget rule, expenditure rule has no effect. (g) Significant negative effects for BBR and expenditure rules but no effect for debt rules.

### 3. Disentangling effects of flexible and rigid rules

While our review of the literature indicates that fiscal rules *per se* appear to improve fiscal sustainability and do not systematically undermine public investments on average, it also shows that they did not contribute to larger public investments either (at least for a broad set of fiscal rules and with respect to their past effects on public investments).

Fiscal rules can be further distinguished by rigid rules and flexible rules. Flexible rules can, for example, include cyclically adjusted balance rules or escape clauses which allow for deficits in certain economic situations. Flexible rules, however, may also include investment-friendly rules which explicitly allow investment provisions.

In order to prioritize public investments governments may include a *golden rule* or *investment clauses* for public investments, e.g., a balanced rule that explicitly allows borrowing for (at least some) clearly defined public investments and principal repayments but prevents borrowing for current (primary) expenditures. These provisions were, for instance, suggested by Blanchard & Giavazzi (2004) and were discussed in detail, among others, by Mintz & Smart (2006) and lately also by Blesse et al. (2023). Essentially, this type of fiscal constraint requires a balanced current budget or even a current budget surplus where revenues surpass operational expenditures, and which favours investment spending over current expenditures by design. However, there may be a (potentially severe) trade-off between the ability to deliver on public investment expenditures and concerns about fiscal sustainability through a golden rule or investment clause. In this light, we discuss potential design features to favour public investments while also preserving healthy public budgets.

Golden fiscal rules allowing for investments may give politicians the opportunity to take public investments off the books and to finance them by debt. This may be abused especially since some public investments are hard to distinguish from recurring operation expenses (and may be only labelled as such) and are not easily assessed at market values. By contrast, the golden rule also potentially disciplines current spending towards a surplus, i.e., current revenues minus operational expenses, including depreciation and interest expenses, to finance debt for public investment. Policy makers under golden rule regimes have a larger interest to shift their attention towards investment than to current spending. This, however, may also coincide with larger public debt accumulation.

There are only a few econometric evaluations of investment exceptions in fiscal balance targets of fiscal rules which can be used to shed light on this trade-off regarding (the politically targeted goal of) more public investments and higher public debt incidence. Even fewer studies provide a full pass-through of the effects of investment clauses or golden rules on public budgets, which allows to examine whether golden rules did not only give rise to more public investment but also whether this rise in capital spending came at the cost of lower current spending or resulted in higher levels of public debt. We



describe the insights of the few ex-post evaluations of fiscal rules with explicit investment exemptions and their fiscal outcomes with a focus on public investment (see Table 1).

### 3.1. Cross-country evidence

Ardanaz et al. (2021) analyse in a panel of 75 countries of developed and developing countries for 1990-2018 how public investment reacts to fiscal consolidations in the presence of different types of fiscal rules. They pay attention to the design of fiscal rules by differentiating flexible rules (e.g., cyclically adjusted fiscal targets, well-defined escape clauses, and differential treatment of investment expenditure) and rigid numerical rules without such provisions. The authors find that when having either no or having a rigid fiscal rule, fiscal consolidations decrease public investments. For rigid rules, this decline is persistent. Flexible rules do not have such negative and pro-cyclical effects on public investments through fiscal consolidations. In fact, fiscal consolidations have significant positive effects on public investment when combined with flexible fiscal rules. Importantly, Ardanaz et al. (2021) distinguish flexible rules further by investment-friendly rules (those with investment provisions), escape clauses and cyclically adjusted balance rules and find that all these features help to reduce the negative effect of (rigid) fiscal rules on public investments. Given that also current spending is less harmed by flexible fiscal rules in times of fiscal contraction (as compared to having a rigid fiscal constraint), flexible rules may possibly be less binding and highlight potential concerns about a trade-off of flexibility and fiscal sustainability in times of fiscal consolidation. According to the authors, that may not necessarily be the case since they also study the effect of fiscal rule design on the probability of sovereign default and find that both fiscal rules in general and flexible rules in particular decrease the likelihood for public debt to default. However, they do not investigate whether fiscal sustainability decreases on the intensive margin, i.e., by means of higher deficits and higher debt levels rather than the more extreme case of a sovereign default which is rather rarely observed.

Supportive evidence for the negative effect of rigid rules in comparison to more flexible rule instalments comes from Jürgens (2022). This study examines 22 OECD countries by using panel data methods and shows that negative baseline effects of fiscal rules on public investments are driven by their rigid features while flexible rules do not show such negative effects of public investment outcomes. These negative effects are emphasized in economic downturns but also appear to be the case in terms of lower investment during economic upswings. Similarly, stronger fiscal rules (i.e., that are more binding which is, however, not the same as their rigidity) are also reducing public investment irrespective of the economic cycle. The author, however, does not reflect on potential implications of rule design on the rule compliance and fiscal sustainability.

Similarly, Dahan & Strawczynski (2013) find, although displaying null effects on average, that at least one fiscal rule, namely the *golden rule* in Japan, increased the difference of



public investments over the sum of government wage bills. By contrast, Delgado-Téllez et al. (2022) do not find statistically significant negative effects for fiscal rules per se or for flexible rules on the share of public investments to GDP in a sample of 22 OECD countries from 1960 to 2018. They also do not find significant effects of these rules when interacted with fiscal consolidation periods, possibly indicating potential sample selection differences between the studies. Indirect evidence comes from the European Commission (2017, p. 153-154) which reports that public debt is less constraining for public investments in countries where fiscal rules are weaker, and especially so for the long run.

Interestingly, Vinturis (2021) provides a detailed heterogeneity analysis of fiscal rule design on public investment behaviour of national governments and contrasts these effects with spending outcomes. For our purposes, it is worth noting that investment-clauses in her setting increase public investment over consumption expenditures as intended. However, since rules with investment provisions typically rely on current budget surpluses, total expenditures and current expenditures decrease. Given that overall public investment is not positively affected by these flexibility provisions, investment expenditures increase only as a share of consumption expenditures since the latter significantly fall due to the investment-clauses. The effects are relatively similar for both advanced and emerging economies. Excluding public investments from relevant target values from supranational fiscal frameworks significantly increases overall public investments and the share of investment over consumptive expenditures, while still reducing overall expenditures. In emerging countries, there does not seem to be a relevant trade-off between a larger scope for investment and decreasing overall expenditures for this set of investment clauses. For advanced economies, neither investment provisions for national nor for supranational rules can stimulate public investments significantly. This may also be an explanation for the different results in the study of Ardanaz et al. (2021), including developing countries aside from advanced economies, and Delgado-Téllez et al. (2022), including only OECD countries, due to different samples in their estimations.<sup>9</sup>

### **3.2. Evidence from the subnational level**

While cross-country studies are few in numbers and inconclusive about the trade-off between flexibility of and compliance with fiscal rules in general and investment-clauses in particular, empirical studies at the subnational level can be considered to learn more about the effect of more flexibility in fiscal rules on public investments. Related results can also inform the debate on the design of flexible rules at the national level, notwithstanding obvious concerns about the generalisability from effects of fiscal institutions at the local level to the national one. However, these studies are typically better in

---

<sup>9</sup> The fiscal rule data set of the IMF suggest that supranational investment clauses for emerging countries may be represented by the fiscal convergence criteria from the Economic and Monetary Community of Central Africa and West African Economic and Monetary Union.

identifying the causal effects<sup>10</sup> of fiscal rules on fiscal outcomes than studies which are based on comparisons of fiscal aggregates at the national level (see above).

Carreri & Martínez (2021) examine the introduction of a golden rule at the municipal level in Columbia using a DiD design. The golden rule allows for public investments but puts a cap on current expenditures as a share of current revenues. The authors find that this flexible investment rule is effective in decreasing the likelihood of municipalities running overall and operational deficits (among others, by decreasing operating expenses) without affecting local public goods provision. Moreover, public investment is not affected by the rule. This suggests that numerical constraints on the current balance do not necessarily result in “creative” accounting actions in the capital budget.

Alternatively, Burret & Feld (2018) examine various balanced budget rules at the cantonal level in Switzerland, where each of them constrains the current balance but a few do not cover investments. Interestingly, they do find that while deficits can be reduced overall by the installation of balanced budget rules, golden rules (which leave capital accounts untouched by fiscal constraints) increase investments, especially in election years. The authors interpret this effect as an outcome of creative accounting.

A study by Gregori (2014) on reform iterations of the Domestic Stability Pact for subnational governments in Italy gives further indication of the effectiveness of investment clauses regarding public investment and fiscal sustainability. The study first examines the effects of a new cap on overall municipal spending at a threshold of 3,000 inhabitants in a difference-in-discontinuities design and finds that neither public investment nor consumption expenditure are affected. Even the abolishment of the rule did not influence either outcome. However, in another analysis of a separate treatment of consumption expenditures (with a cut at 6.5%) and capital expenditures (allowing for 8.1% increase as compared to the municipality-specific value two years before) in municipalities above 5,000 inhabitants from 2005 onwards, the study finds that consumptive spending significantly decreases, and public investment (especially infrastructure spending) increases alongside with public deficits in response to the new investment permit. The rise in public investments and fiscal deficits are also of similar size, indicating that investment-friendly rules may be effective in raising public investments, but may indeed go hand in hand with new overall deficits.

In the same context of the Domestic Stability Pact, Daniele et al. (2019) show (albeit not directly related to an explicit investment-clause) evidence that the availability of alternative opportunities for public investment makes a newly introduced balanced budget rule less binding and prevents a reduction in public investments. Specifically, the authors find that the Domestic Stability Pact significantly decreases overall spending and public

---

<sup>10</sup> That is, the causal impact of fiscal rules on public investments independent of all other observable and unobservable factors that otherwise might influence the relationship between fiscal rules and public investments.

investments only in regions that receive relatively few European transfers. The authors argue that these regions are effectively more constrained by the fiscal rule in terms of scope for public investment spending. By contrast, regions with higher availability of European cohesion funds (where no significant effect on total investment is observable) can afford to maintain their previous levels of public investment.

### **3.3. Discussion and design alternatives**

The literature review shows that more flexible fiscal rules can be effective in terms of reducing overall fiscal imbalances or increasing investments. Some studies examining subnational investment rules, however, partially highlight the potential danger of creative accounting, i.e., relabelling of current spending as investment spending to signal competence to voters in times of election or just for mere budgetary tricks. However, it seems that increased investments (as in the case of the newly introduced investment permit among Italian municipalities; Gregori, 2014) and lower or at least unaffected deficits do not coincide (Gregori, 2014; Daniele et al., 2019). The golden rule in Carreri & Martínez (2021) merely constrained current accounts which were then disciplined but did not incentivise public investments, although capital expenditures or public service provisions did not deteriorate either. These findings from subnational settings highlight a certain trade-off between more flexibility through investment provisions and more commitment to comply with deficit limits. However, more research is needed on the full pass-through of public investment changes of fiscal rules through public budgets. Specifically, there is still a lack of cross-country studies that analyses both the public investment effects of fiscal rules as well as deficit or debt outcomes.

Several studies are supportive of a stimulating effect of more flexible (and, thus, investment-friendly) rules on public investments. However, the evidence that sovereign defaults are not more likely in response to flexible rules (Ardanaz et al., 2021) is not sufficient to argue against the trade-off between more flexibility and the commitment to limit deficits. While sovereign debt defaults may be an indicator of missing fiscal sustainability, it is a rather extreme approximation, and it measures the extensive margin of fiscal sustainability.<sup>11</sup> It is largely unclear from the cross-country evidence whether investment provisions in fiscal rules affect the intensive margin of fiscal sustainability, namely in terms of public deficits and levels of public debt. According to Vinturis (2021), however, overall and current spending cuts may be attained by investment clauses as well as a shift towards relatively more investment over consumption expenses. But there is no evidence of higher overall investment at similar deficit or debt levels.

If investment provisions in fiscal rule frameworks cannot limit budget deficits while also stimulating public investments as politically intended, one may look for alternative

---

<sup>11</sup> Deficits due to public investments, however, produce net assets and therefore do not necessarily harm fiscal sustainability, but may rather foster sustainable growth.

designs for more flexibility. Jürgens (2022), Ardanaz et al. (2021) as well as Delgado-Téllez et al. (2022) turned not only to investment-friendly rules in order to categorise flexible fiscal rules but also to escape clauses and cyclical adjustments of target values of fiscal rules. Ardanaz et al. (2021) show that all three aspects of flexibility provided similarly positive effects on public investments. But the authors do not distinguish them in statistical terms, likely due to a lack of statistical power. Therefore, it is worth looking at how well these other measures of flexibility affect public investments and budget deficits. Cyclically-adjusted balance budget rules indeed increase public investment but only in emerging economies according to Vinturis (2021). The latter also reports that cyclical adjustments may be even slightly harmful for public investments when studying a sample of advanced economies. In either sample, cyclically-adjusted balanced budget rules discipline overall and current spending. The same holds for escape clauses (see Caselli et al., 2020). However, public investment does not seem to be stimulated by escape clauses (at least not beyond fiscal consolidation periods as studied in Ardanaz et al., 2021).

Altogether, it seems that neither flexibility measures to adjust fiscal rules by escape clauses, a cyclical adjustment or an investment provision in the fiscal framework can escape the trade-off between incentivising (or even achieving) public investments while limiting deficit-taking. For instance, *golden rules* can be installed and seem effective to attain more public investments, but this seldom coincides with similar trajectories of limiting public budget deficits (and vice versa) if additional fiscal rules ensuring fiscal sustainability are not implemented (see, for example, a suggestion by Blesse et al. (2023) to include a golden rule while limiting overall spending). More studies are needed to receive more evidence on how this trade-off between the effectiveness of rules in taming deficit-taking and more flexibility can be shaped by appropriate designs of the fiscal governance architecture.

## 4. Conclusions

This paper reviews how fiscal rules affect public investments based on a discussion of empirical ex-post evaluations of fiscal rules on the national and subnational level. We provide insights to a debate on how large and sustained government investments can be realized to promote a green, digital and resilient economy and society, while confronted with high public debt levels and additional fiscal pressure from current crisis and the rising societal costs from demographic change in the welfare states of several advanced economies.

Our literature review of empirical studies that analyse fiscal rules and public investments hints on no systematic average effects of fiscal rules on public investments. Positive or negative effects of fiscal rules on public investment are found in some studies but are conditional on the specific design of rules or specific settings those rules are applied to.

Studies also use heterogeneous measures of public investments (mostly, gross measures but in various specifications). In general, there is no clear evidence that fiscal rules come at the expense of lower public investment spending. At the same time, the evidence neither suggests that fiscal rules in general give rise to higher public investment.

However, flexible fiscal rules, e.g., excluding investment expenditure from balanced budgets, seem to stimulate investment spending. But flexible elements of fiscal rules do not seem to coincide with unaffected or even lower public deficits. A trade-off between binding fiscal rules and higher investment appears to exist under flexible rule regimes. Flexible rules could be combined with fiscal rules for overall budget deficits to incentivize a composition shift in government budgets (see Blesse et al. 2023).

More research is needed to fully understand the pass-through of different investment provisions on fiscal sustainability and the scope for public investments under different institutional frameworks to draw policy conclusions on how possible fiscal rules designs undermine or facilitate public investments. Our review provides, however, first systematic insights that a general rejection of numerical fiscal rules in the discussion regarding more and sustained public finances may be misleading. Ultimately, more evidence is also needed on whether numerical rules should be more country-specific rather than a one-size-fits all approach as is, for e.g., now implemented in the EU governance framework.

## REFERENCES

- Alpino, M., Asatryan, Z., Blesse, S., & Wehrhöfer, N. (2022). Austerity and distributional policy. *Journal of Monetary Economics*, 131, 112-127.
- Ardanaz, M., & Izquierdo, A. (2022). Current expenditure upswings in good times and public investment downswings in bad times? New evidence from developing countries. *Journal of Comparative Economics*, 50(1), 118-134.
- Ardanaz, M., Cavallo, E., Izquierdo, A., & Puig, J. (2021). Growth-friendly fiscal rules? Safeguarding public investment from budget cuts through fiscal rule design. *Journal of International Money and Finance*, 111, 102319.
- Asatryan, Z., Foremny, D., Heinemann, F., Solé-Ollé, A., Stratmann, T., & Yeter, M. (2015). Better fiscal rules for Europe: Reflections based on new empirical evidence. *ZEW policy brief*, No. 4.
- Azzimonti, M., Battaglini, M., & S. Coate (2016). The costs and benefits of balanced budget rules: Lessons from a political economy model of fiscal policy. *Journal of Public Economics*, 136, 45–61.
- Baskaran, T. (2017). Local fiscal policy after a bailout: austerity or soft budget constraints?. *Economics of Governance*, 18(3), 209-238.
- Bénassy-Quéré, A. (2022). How to ensure that European fiscal rules meet investment, *VoxEU.org*, 6 May.
- Blanchard, O. J., & Giavazzi, F. (2004). Improving the SGP Through a Proper Accounting of Public Investment. *CEPR Discussion Paper* No. 4220.
- Blesse, S., Dorn, F., & Lay, M. (2023). A targeted golden rule for public investments? A comparative analysis of possible accounting methods in the context of the review of Stability and Growth Pact. *Study requested by the ECON committee, European Parliament*.
- Bom, P. R. (2019). Fiscal rules and the intergenerational welfare effects of public investment. *Economic Modelling*, 81, 455-470.
- Bom, P. R., & Ligthart, J. E. (2014). Public infrastructure investment, output dynamics, and balanced budget fiscal rules. *Journal of Economic Dynamics and Control*, 40, 334-354.
- Bordignon, M., Coretti, S., Piacenza, M., & Turati, G. (2020). Hardening subnational budget constraints via administrative subordination: The Italian experience of recovery plans in regional health services. *Health Economics*, 29(11), 1378-1399.

- Burret, H. T., & Feld, L. P. (2018). (Un-) intended effects of fiscal rules. *European Journal of Political Economy*, 52, 166-191.
- Carreri, M., & Martinez, L. R. (2021). Economic and Political Effects of Fiscal Rules: Evidence from a Natural Experiment in Colombia. *Working Paper*, September 2021.
- Chong, E., Klien, M., & Moore, J. (2014). Elections and project delivery in public work procurement: A red ribbon effect? *EPPP Discussion Paper No. 11*.
- Christofzik, D. I. (2019). Does accrual accounting alter fiscal policy decisions? - Evidence from Germany. *European Journal of Political Economy*, 60, 101805.
- Christofzik, D. I., & Kessing, S. G. (2018). Does fiscal oversight matter? *Journal of Urban Economics*, 105, 70-87.
- Christofzik, D. I. & Schneider, B. (2019). Fiscal Policy Adjustments to Budget Shocks: Evidence from German Municipalities. *German Council of Economic Experts Working Paper 10/2019*.
- Coviello, D., Marino, I., Nannicini, T., & Persico, N. (2022). Demand Shocks and Firm Investment: Micro-evidence from fiscal retrenchment in Italy. *The Economic Journal*, 132(642), 582-617.
- Dahan, M., & Strawczynski, M. (2013). Fiscal rules and the composition of government expenditures in OECD countries. *Journal of Policy Analysis and Management*, 32(3), 484-504.
- Daniele, G., & Giommoni, T. (2021). Corruption under Austerity. *CESifo Working Paper No. 8909*.
- Darvas, Z. & Wolff, G. (2022). How to reconcile increased green public investment needs with fiscal consolidation, *VoxEU.org*, 7 March.
- Davoodi, H. R., Elger, P., Fotiou A., Garcia-Macia, D., Han, X., Lagerborg, A., Lam, W.R., & Medas, P. (2022). Fiscal Rules and Fiscal Councils: Recent Trends and Performance during the Pandemic. *IMF Working Paper No. 22(11)*.
- De Biase, P., & Dougherty, S. (2022). The past and future of subnational fiscal rules: An analysis of fiscal rules over time. *OECD Working Papers on Fiscal Federalism No. 41*.
- Delgado-Téllez, M., Gordo, E., Kataryniuk, I., & Pérez, J. J. (2022). The decline in public investment: "social dominance" or too-rigid fiscal rules? *Applied Economics*, 54(10), 1123-1136.

Dorn, F., Gaebler, S., & Roesel, F. (2021). Ineffective fiscal rules? The effect of public sector accounting standards on budgets, efficiency, and accountability. *Public Choice*, 186(3), 387-412.

European Commission (2017). Government investment in the EU: the role of institutional factors. *Report on Public Finances in EMU 2017*.

European Commission (2021). Impact Assessment Report Accompanying the Proposal for a Directive of the European Parliament and of the Council on energy efficiency. *SWD (2021)*, 623, final.

European Commission (2022). Communication on orientations for a reform of the EU economic governance framework. *COM (2022)*, 583 final.

Feld, L. P., & Reuter, W. H. (2017). Wirken Fiskalregeln. Eine Übersicht über neuere empirische Befunde. *Wirtschaftspolitische Blätter*, 64(2), 179-91.

Feld, L. P., Reuter, W. H., & Yeter, M. (2019). Öffentliche Investitionen: Die Schuldenbremse ist nicht das Problem. *Perspektiven der Wirtschaftspolitik*, 20(4), 292-303.

Feld, L. P., Schaltegger, P., Zell, L., Bury, Y., & Zetzmann, S. (2021). Öffentliche Investitionen und Fiskalregeln im Tiefzinsumfeld. *Grundlagen für die Wirtschaftspolitik*, Nr. 28. Staatssekretariat für Wirtschaft SECO, Bern, Schweiz.

Fremerey, M., Lichter, A., & Löffler, M. (2022). Fiscal and Economic Effects of Local Austerity. *CESifo Working Papers* No. 9800.

Grembi, V., Nannicini, T., & Troiano, U. (2016). Do fiscal rules matter? *American Economic Journal: Applied Economics*, 1-30.

Grosse-Steffen, C., Pagenhardt, L., & Rieth, M. (2021). Committed to Flexible Fiscal Rules. *Banque de France Working Paper* No. 854.

Havlik, A., Heinemann, F., & Nover, J. (2021). Election Cycles in European Public Procurement. *FinanzArchiv: Public Finance Analysis*, 77(4), 376-407.

Heinemann, F., Moessinger, M. D., & Yeter, M. (2018). Do fiscal rules constrain fiscal policy? A meta-regression-analysis. *European Journal of Political Economy*, 51, 69-92.

Jürgens, E. (2022). The effects of fiscal rules on public investments over the cycle. *FMM Working paper* No. 84.

Mancini, A. L., & Tommasino, P. (2022). Fiscal rules and the reliability of public investment plans: evidence from local governments. *Bank of Italy Temi di Discussione (Working Paper)* No. 1360.



- Mandon, P., & Cazals, A. (2019). Political budget cycles: Manipulation by leaders versus manipulation by researchers? Evidence from a meta-regression analysis. *Journal of Economic Surveys*, 33(1), 274-308.
- Mintz, J. M., & Smart, M. (2006). Incentives for public investment under fiscal rules. *World Bank Policy Research Working Paper* No. 3860.
- Pavese, C., & Rubolino, E. (2021). Do Fiscal Restraints Harm Test Scores? Evidence from Italy. *University Ca'Foscari of Venice, Dept. of Economics Research Paper Series* No. 2.
- Raffer, C. (2020). Accrual Accounting and the Local Government Budget-A Matching Evaluation. Available at SSRN 3547302.
- Rösel, F., & Wolffson, J. (2022). Chronischer Investitionsmangel – eine deutsche Krankheit. *Wirtschaftsdienst*, 102(7), 529-533.
- Salvi, M., Schaltegger, C. A., & Schmid, L. (2020). Fiscal Rules Cause Lower Debt: Evidence from Switzerland's Federal Debt Containment Rule. *Kyklos*, 73(4), 605-642.
- Schakel, H. C., Wu, E. H., & Jeurissen, P. (2018). Fiscal rules, powerful levers for controlling the health budget? Evidence from 32 OECD countries. *BMC Public Health*, 18(1), 1-17.
- The White House (2023). Building a Clean Energy Economy: A Guidebook to the Inflation Reduction Act's Investments in Clean Energy and Climate Action.
- Turley, G., Raffer, C., & McNena, S. (2021). Budget institutions for subnational fiscal discipline: Local fiscal rules in post-crisis EU countries. In Geissler, R. Hammerschmid, G., & Raffer, C. (eds.). *Local Public Finance* (pp. 23-38). Springer, Cham.
- Venturini, F. (2020). The unintended composition effect of the subnational government fiscal rules: The case of Italian municipalities. *European Journal of Political Economy*, 63, 101874.
- Vinturis, C. (2022). How do fiscal rules shape governments' spending behavior? *Economic Inquiry*, 61 (2), 322-341.
- Wyplosz, C. (2012). *Fiscal rules: Theoretical issues and historical experiences*. In Alesina, A., & Giavazzi, F. (eds.). *Fiscal policy after the financial crisis* (pp. 495-525). University of Chicago Press.