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ORIGINAL ARTICLE

# Signaling to creditors and voters: the determinants of national fiscal rules

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## Abstract

Fiscal rules are spreading fast among countries. However, why and when governments enact fiscal rules and strengthen their national fiscal legal frameworks are less well understood. This article argues that governments use fiscal rules to signal commitment to fiscal prudence to both creditors and national voters. It investigates this theoretical argument empirically by using a worldwide panel of countries from 1985 to 2015. The empirical analyses find robust evidence that fiscal rules enactment becomes more likely, and that fiscal rules stringency increases when government debt is high and in election years but less evidence that being under an IMF program increases the strength of fiscal rules.

**Keywords** Fiscal rules · Elections · Government debt · IMF · States–markets relations

## Introduction

One of the fastest spreading governance institutions over the past decades has been national numerical fiscal rules. National fiscal rules can be defined as rules governing national fiscal policy, including balanced budget rules, rules which set ceilings for public expenditure levels as well as rules for the maximum allowed level of national debt. Even ignoring supranational fiscal rules such as the European Union's Economic and Monetary Union's (EMU) Stability and Growth Pact and the later Fiscal Compact, an increasing number of both developing and developed countries have enacted some sort of fiscal rule in the past two decades (Schaechter et al. 2012, 5–16). Figure 1 shows the share of countries with at least one national fiscal rule in place 1985–2015.

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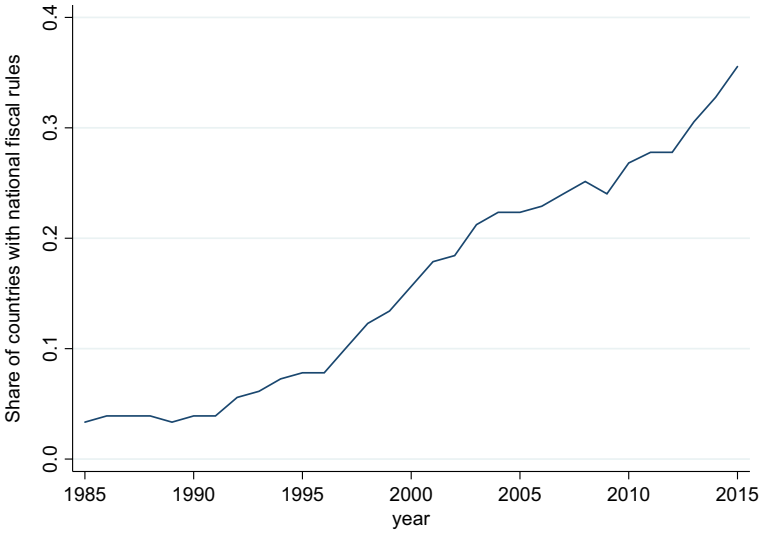


**Fig. 1** Share of countries with at least one national fiscal rule in place 1985–2015. Source: The IMF's Fiscal Rules Database

In response to the recent decades' fiscal crises in many European countries and the ongoing discussion about government debt and deficits in many developed and developing economies, national fiscal rules have been an often-discussed potential solution to the problem of unsustainable public finances (Hauptmeier et al. 2011; Wyplosz 2013, 523). They are also increasingly being promoted by international organizations like the International Monetary Fund (IMF) (Schaechter et al. 2012) and the European Union, where the European Union's 2012 Fiscal Compact treaty specifically called for the implementation of the compact's provisions into the member states' national fiscal rules frameworks. The trend toward greater reliance on these fiscal rules for fiscal policymaking potentially represents a shift away from fiscal policy as a discretionary policy tool, and, according to some scholars, even a partly depoliticization of national fiscal policy (Fernández-Albertos 2015, 31). Consequently, the rise and institutional setup of these national fiscal rules are not trivial concerns from an international political-economy point of view.

However, while there has been a general trend toward more and more stringent national fiscal rules, there still exists great variation between countries with regards to the existence, numbers, legal basis and scope of these rules. Some fiscal rules are introduced as merely stated government priorities, while other fiscal rules are part of countries' constitutions. In certain cases, rules only cover the central government, while other types of rules set rules and guidelines for all parts of the public sector. Some fiscal rules have automatic enforcement mechanisms and/or independent fiscal councils to monitor whether the rules are upheld, while other rules have none of these auxiliary institutions. Furthermore, some countries have experienced periods with both strengthening and loosening of fiscal rules and their auxiliary frameworks. Taking Argentina as an example, according to data from the International Monetary

Fund (IMF) Argentina had a so-called Fiscal Responsibility Law in place from 2000 to 2008 but had significant changes to their legal fiscal framework from 2009 and onward making their fiscal framework less strict. Sweden on the other hand enacted an expenditure rule and a balanced budget rule through government coalition agreements in the late 1990s and early 2000s and later gave these rules statuary status in 2010 (Bova et al. 2015).

These differences and tendencies remain largely unexplained. There is still a limited amount of research on why countries enact fiscal laws, and why they strengthen their scope and legal basis, which constitutes a significant scholarly void, especially given the relatively fast spread of these types of institutions. Most previous research on fiscal rules has concerned their actual effect on fiscal policy aggregates (Debrun et al. 2008; Holm-Hadulla et al. 2012; Reuter 2015; Bergman and Hutchison 2015; Bäck and Lindvall 2015, 65–67; Asatryan et al. 2018) and has generally found that fiscal rules do indeed seem to affect and constrain government fiscal policy. A summary of the empirical evidence of the effects of fiscal rules can be found in Heinemann et al. (2018).

Thus, only a minority of the scholarship on fiscal rules deals with the causes of between and within-country differences in fiscal rules, especially outside countries of the European Union, where there is generally more scholarship about the origins of national fiscal rules and institutions (Hallerberg et al. 2009; Doray-Demers and Foucault 2017). Examples of studies of the adoption of fiscal rules beyond the European Union include Altunbas and Thornton (2017) who find that fiscal rules are more likely to be adopted in countries with high levels of government debt[1] and a high level of trade openness as well as Badinger and Reuter (2017a) who find that countries with more stable governments, a parliamentary system of government, less checks and balances and membership of a monetary union have stricter fiscal rules frameworks. However, these articles provide no in-depth theoretical framework for their results, and they do not consider the role of international credit institutions such as the IMF for national fiscal rules.

This article specifically investigates the economic and political determinants of national fiscal rules both theoretically and empirically. It thus provides a theoretical approach to study the decision to implement and strengthen national fiscal rules. As an analytical approach, it takes the perspective of an incumbent government to analyze when national governments have an incentive to, at least de-jure, tie themselves fiscally through the use of national fiscal rules. The key theoretical argument is that national governments will use fiscal rules as a tool to signal commitment to fiscal prudence and competence to creditors, including international bond market actors and the IMF, as well as to national voters but only when they need to.

Analyses based on panel data with a majority of the World's countries in the years 1985–2015 robustly support this argument. Fiscal rules are more likely to be enacted and fiscal rules stringency increases when debt to GDP is higher, which might induce national and international creditors to demand higher interests. Fiscal

[1] In contrast, Doray-Demers and Foucault (2017), in a study of European Union countries, find that the effects of government debt on fiscal rules strictness vary from the short to the long run.

rules are also more likely to be enacted and strengthened in election years, which suggests that governments use fiscal rules to signal commitment to fiscal responsibility to voters when they need to. There is less robust evidence that the involvement of another type of creditor, the IMF, causes fiscal rules to be enacted and strengthened. National governments thus seem to use fiscal rules to appease national and international market and non-market creditors as well as national voters. In this way, the results of this article contribute to the wider scholarly and policy discussions about whether and how market actors and voters independently and simultaneously exhibit pressure on incumbent national and subnational governments within the contexts of government fiscal policy and fiscal policy rules (Hallerberg 2011; Kelemen and Teo 2014; DiGiuseppe and Shea 2015; Ezrow and Hellwig 2014).

## Theory: Fiscal rules as a government signaling tool

This article's theoretical argument is that the enactment and strengthening of fiscal rules will be used by national governments to signal fiscal prudence to both government creditors and voters. National governments are assumed to be concerned with increasing discretionary spending opportunities and to be reelected/stay in power. While enacting and strengthen national fiscal rules might decrease the fiscal discretionary power of the government, it might improve overall spending opportunities and the reelection prospects of the government by sending a signal of fiscal prudence to government creditors and national voters.

### Fiscal rules as creditor signaling

The core argument, with regards to fiscal rules as creditor signaling, is that a government enact new national fiscal rules and/or strengthen existing national fiscal rules when they need to appear fiscally prudent to their creditors.

While a stricter fiscal rules framework entails a disadvantage for an incumbent government, since they decrease a government's discretion with regards to public spending, enacting and tightening fiscal rules and auxiliary institutions is a way of signaling that the government is concerned with the sustainability of public finances, which might improve overall spending opportunities due to access to cheaper credit. Everything else being equal, a government which has a (stricter) national fiscal rules framework in place is less likely to be subject to higher interest rates, which might depress overall government spending opportunities. An assumption which is in line with previous studies of the effect of fiscal rules on credit ratings (Feld et al. 2013; Badinger and Reuter 2017b)[2] and sovereign bond spreads (Heinemann et al. 2014; Iara and Wolff 2014; Afonso and Jalles 2019) Consequently, an incumbent

[2] According to the arguments brought forward by Kelemen and Teo (2014), this is (at least partly) because transparent fiscal rules act as focal points around which bond investors can coordinate to impose market sanctions on a government breaking its fiscal rules, which in turn makes governments less likely to break these in the first place leading to higher credit ratings.

government will be inclined to enact and strengthen national fiscal rules when it worries that creditors will charge higher interest rates.

An implication of this argument is that enacting and strengthening national fiscal rules should be more likely when government debt is high. The reasoning behind this argument is that government creditors, including domestic and international bond market actors, might be inclined to demand higher interest rates in the case of high government debt due to worries about government fiscal sustainability and thus the government's ability to repay its creditors.[3] Previous research has found that the level of government debt is indeed a predictor of government creditworthiness (Afonso et al. 2010; Dell'Erba et al. 2013) and thus the average interest rate the government has to pay for its debt. So, the government should have a greater incentive to enact and strengthen national fiscal rules and their general fiscal rules framework when government debt is high in order to prevent interest rates from going up.

This logic, that a government will use fiscal rules to signal fiscal prudence to its creditors when it needs to, can also be applied in the case of non-market financiers such as the IMF. When a country is under an IMF lending programs, enacting and strengthening the fiscal rules might give a government access to more funds on better terms and/or fiscal institutional reforms might be part of the conditions for receiving IMF funding.[4] The IMF has generally promoted fiscal rules as a solution to issues of fiscal discipline and conducted analysis and data collection on the topic for some time (Kopits 2001). Consequently, IMF does indeed seem to take national fiscal rules into account when assessing the outlook for countries' public finances as exemplified by a 2016 country report on Brazil (IMF 2016, 2).

### Fiscal rules and voter signaling

On the pure domestic political side, the enactment of new fiscal rules and strengthening of existing fiscal rules also serves as a signal of fiscal responsibility and competence to national voters. Of course, voters might like increased public spending and decreased taxation, and government may thus strategically increase public spending/decrease taxation in line with the logic of political budget cycles, where governments run higher fiscal deficits in election years (Alesina et al. 1997), a phenomenon found both in democracies and non-democratic states (Aaskoven and Lassen 2017; Geddes et al. 2018, 144–150).

However, research suggests that voters also care about government fiscal sustainability and that they might punish incumbent governments for public deficit increases (Brender and Drazen 2008) as well as public debt increases (Kim and Kwon 2015). Perhaps since voters are concerned about the longer-term sustainability of public finances and thus the public goods and public transfers they receive.

[3] It should be noted that government creditors can be both its own citizens and/or international bond market actors. However, no matter whether government creditors are domestic or international, they should all be interested in the government's ability to repay.

[4] See Stone (2008), Steinwand and Stone (2008, 135–138) and Dreher (2009) for some discussions about IMF program conditionality.

Since fiscal rules, at least de-jure, provide a tool for increased fiscal sustainability, an incumbent government which enact and/or strengthen fiscal rules signals that it is concerned with fiscal sustainability and is working to ensure it, which, at least from the viewpoint of the government, should be positively evaluated by voters.

However, in line with empirical findings of voter evaluation (Healy and Lenz 2014), voters are assumed to mainly evaluate their incumbent government just before elections. Therefore, reelection concerned governments should be more likely to enact and tighten fiscal rules when they have the largest need to appear fiscally responsible and competent to voters which should be just before elections. Additionally, since fiscal rules enacted in an election year will usually only be binding after an election, the incumbent government is not forced to implement election-year fiscal contractions due to this increase in the stringency of the national fiscal rules framework. Consequently, the government can, according to this logic, reap the benefits of appearing to be concerned with the longer-term sustainability of public finances through the enacting/strengthening of national fiscal rules in an election year, while not being forced to live up to these fiscal rules by implementing potential unpopular budget cuts the election year itself. Consequently, this logic is not necessarily in opposition to logic of political budget cycles where government spending is higher in election years but might contract relatively after the election (Alesina et al. 1997).[5]

A potential empirical example of this dynamic includes New Zealand's Fiscal Responsibility Act, which among other elements included provisions for the government budget balance and debt levels (Bova et al. 2015, 49). The act was presented to parliament by the incumbent finance minister Ruth Richardson in September 1993 just months before the New Zealand general election in November 1993. The act was passed into law the year after following a narrow electoral victory for the incumbent National Party, see Scott (1995).

### Empirical implications

Thus, according to the above logic, national governments can use the enactment and strengthening of national fiscal rules to signal fiscal prudence to creditors and voters but they will time this to occasions when they need to appear fiscally prudent. The arguments above give three implications which are empirically testable:

(1) The stringency of the fiscal rules framework should increase when government debt is higher, as the government will try to prevent interest rates from rising.
(2) The stringency of the fiscal rules framework should also increase when the government is receiving funding from the IMF, as the government attempts to appease this creditor.

[5] In the longer term, increased stringency of the fiscal rules framework might of course drive down the occurrence of political budget cycles. See Rose (2006) and Gootjes et al. (2021) for the effect of fiscal rules on political budget cycles.

(3) Finally, the stringency of the fiscal rules framework should increase in election years when the government needs to signal fiscal prudence to voters.

#### A short note on the theory's assumptions

In the above theoretical framework, the incumbent government's changes to the national fiscal rules framework are due to anticipated reactions from creditors and voters. The incumbent government thus views the strengthening of the national fiscal framework as a tool to signal fiscal prudence to these actors. However, it is important to stress that this does not entail that these signals are necessarily credible for the intended audience. The theoretical arguments do not rest on the assumption that fiscal rules and their auxiliary frameworks have causal effects on overall fiscal performance, see Heinemann et al. (2018) for a discussion of this issue, but only on the assumption that national governments perceive them as useful tools to signal fiscal prudence to creditors and voters. An independent theoretical argument about voters' and market and non-market creditors' actual reactions to the strengthening/loosening of the national fiscal framework is a very relevant topic but beyond the scope of this article.

## Data and estimation

To test the above theoretical argument, I use a worldwide panel with the majority of the world's countries from 1985 to 2015. The data cover 170 independent countries, and in general, only very small countries (usually less than 100,000 inhabitants) are excluded due to lack of data for political variables such as election occurrence.

The three central independent variables of interest deriving from the theoretical argument are government debt, the occurrence of an IMF program and a national election which can—at least theoretically—cause government turnover.

Government debt is measured by the government gross debt as a percentage of GDP and is from the IMF's World Economic Outlook. Gross debt rather than net debt is arguable easier and more transparent for government creditors to assess, so this debt variable should more than other fiscal variables induce governments to change the national fiscal framework. As the government debt variable is highly skewed, it is included in the analysis in log format. According to the logic of the theoretical argument, an alternative variable to measure the creditor pressure on national governments to increase fiscal rules' stringency might be total interest payments. However, this variable is not readily available for most countries over time. So, I have chosen to stick with general government gross debt as a percentage of GDP as the key measure of credit worthiness pressure.[6]

[6] However, to test for an alternative measure of the debt (and creditor) pressure, in Appendix 3, I replace the log of gross debt to GDP variable with a log of general government gross debt to average tax revenues the from the Fiscal Space Dataset (Kose et al. 2022).

To test whether national fiscal rules change due to concerns to appease external non-market creditors such as the IMF, I use a dummy for whether the country is currently part of an IMF lending program, based on data from the IMF's website.[7]

As the election-year variable, I construct an *election* dummy, which scores 1 if an election is held which can, at least theoretically, cause a shift in government. This is defined as a presidential election in presidential systems and a legislative election in parliamentary and semi-presidential systems. Data for both elections and regime classifications are from the Database of Political Institutions (Cruz et al. 2018). One concern could be that some unobservable factor which drives fiscal rules adoption/strengthening might be endogenous related to the likelihood of an incumbent government calling early elections, which might provide a challenge for the interpretation of a potential election effect. However, the results are largely similar if early elections are not coded as elections. These results can be found in Appendix 3.[8]

### Measuring fiscal rules

To measure the stringency of the fiscal rules framework, I rely on two dependent variables, one which measures the very enactment of a national fiscal rule and the second which measures the strength of the national fiscal rules framework. The second variable consequently takes into account the legal/institutional nature of the various national fiscal rules in place.

The data source for the existence and nature of national fiscal rules is the IMF's Fiscal Rules Database, which contain information about both supranational and national fiscal rules in all countries, which had any of these from 1985 and onward (Bova et al. 2015). I have coded all fiscal rules variables for countries not included in the Fiscal Rules Database to 0, since countries are not included in the database if they have no fiscal rules in place in the above time period. The database distinguishes between four types of fiscal rules (Schaechter et al. 2012, 7–9):

- Debt rules which set limit or target for public debt, typically in percent of GDP.
- Budget balance rules which set guidance and rules for the public budget balance.
- Expenditure rules which set limits for government spending through spending caps or multi-year expenditure limits.
- Revenue rule which set rules for public revenue by ceilings and/or floors for public revenues.

[7] It should be noted that given that IMF lending programs are usually entered by countries with high levels of government debt, and which might simultaneously undergo a debt restructuring program. Alternatively, an IMF program could also mean that the country under the program takes up additional loans. Consequently, there is a potential overlap between entering an IMF program and an increase in the government debt level. There is a positive yet not particular high correlation between IMF program and log of government debt, which suggest that these factors are related yet still somewhat independent.

[8] This appendix also shows the robustness of the results to an alternative measure of elections, which takes into account the month the election is held in. This is an index which takes the value (X-1)/12 in an election year, where X is the month in which the election held. This index is inspired but not entirely similar to the one used in Dreher (2003).

These rules can vary in their statuary basis (from government announcement/official commitment to constitutional basis), scope (general or central government) and coverage (are some types of expenditures/revenues exempt?). It is worth noticing that the IMF Fiscal Rules Database concerns de-jure fiscal rules and their auxiliary institutions and does not cover whether and to what extent the rules are actually upheld. However, the scope of this article is to investigate when and why governments strengthen their official fiscal frameworks and not whether these rules actually affect government fiscal policy.[9]

The first dependent variable is a dummy which measures the simple enactment of a national fiscal rules. It takes the value one, if a national fiscal rule of any kind was in place in the current year but not in the previous year. Consequently, this variable takes into account the very decision to implement a national fiscal rule. However, it does not measure the overall strength of the national fiscal rules framework, which, according to the theory, might also be strengthened in order to signal to creditors and voters.

To measure the strength of the national fiscal rules framework, I use a second dependent variable which is the overall strength of national fiscal rules and their legal/institutional framework. Fiscal rules, even if they concern the same fiscal policy aggregate such as debt and deficits, are heterogeneous and can have very different attributes and might be more or less strict and binding. To quantitatively measure the combined de-jure strength of a country's national fiscal rules framework, I use a method which is very similar to the approach described by Schaechter et al. (2012, 29–31) and construct a general index of national fiscal rules based on an addition of sub-indexes for the four types of national fiscal rules. The logic behind this choice being that a combination of several fiscal rules should everything else equal be more effective (Schaechter et al. 2012, 31). The strength of each national fiscal rules sub-index is based on a simple addition of indicators[10] for each type of rule:

- The legal basis of the rule: Political commitment/coalition agreement/statutory/constitutional.
- Coverage of the rule: Central or general government.
- The existence of formal enforcement procedures.
- The existence of multi-year expenditure ceilings (common for all rules except revenue rule).
- The existence of a Fiscal Responsibility Law (common for all rules).
- Whether an independent body sets budget assumptions (common for all rules).
- Whether an independent body monitors budget implementation (common for all rules).

This addition construct sub-indexes for the strength of the four types of national fiscal rules, which run theoretically from 0 to 7 in the case of debt, balanced budget

[9] Confer again Heinemann et al. (2018) for a wider scholarly discussion about this subject.

[10] Each indicator is rescaled to run from 0 to 1 in the case of non-binary indicators. If a country does not receive a score for a given indicator in the Fiscal Rules Database, usually because it has no fiscal rules associated with that indicator in place, the value of the indicator is set to 0.

and expenditure rules and 0–6 in the case of revenue rules. Before the final addition, the sub-indexes are rescaled to run from 0 to 5.[11] The overall fiscal rules index is also rescaled to run from 0 to 5. Over the analyzed time period, the actual score on the index run from 0 to 4.58. This method is also the inspiration for the index constructed by Bergman and Hutchison (2015, 84–85), who, however, construct their fiscal rules index in a somewhat different way. A histogram of the fiscal rules index and a graph of its average trend over the analyzed time period can be seen in Appendix 1. Most countries score either 0, given that they have not fiscal rules in place, or relatively low on the index, given that they only have one fiscal rule in place at the same time. However, three countries, Lithuania, Latvia and the Netherlands, at some point over the analyzed time period, have scores on the fiscal rules strength index above 3. However, the core results mostly remain if these countries are excluded from the analysis.[12]

### Control variables

In the later statistical specifications, I control for several potential confounders of changes in government debt, an IMF program and elections. One is the occurrence of an economic crisis. The occurrence of economic crises might be endogenous to government fiscal crises, which normally includes rising debt to GDP, and both economic and fiscal crises in general might influence the fiscal institutional framework (Hallerberg and Scartascini 2015). To measure an economic crisis, I include a dummy which takes the value 1, if the country is currently undergoing a systemic banking crisis based on data from Laeven and Valencia (2018). In Appendix 4, I also show models, where I also add a dummy for a currency crisis and a sovereign debt crisis from the same dataset. As both level of democracy and economic development might influence government institutional quality including in areas related to fiscal governance (Renzio and Wehner 2013), I include log of GDP per capita and a dummy which measures whether the country is a democracy. GDP per capita comes from the World Bank's Database, while the democracy dummy comes from the Bjørnskov and Rode (2020) dataset which is an update of the Cheibub et al. (2010) dataset.[13]

As an additional political control, I include whether the chief executive is from a leftwing party as defined by the Database of Political Institutions. While some scholars (Hallerberg and Scartascini 2015) have found no effect of incumbent ideology on fiscal institutional change, the classic view from the literature on partisan

[11] Since the indicators, multi-year expenditure ceilings, Fiscal Responsibility Law, independently set budget assumption and independently monitored budget implementation are common for all or most of the sub-indexes, the final index give relatively high influence to these indicators.

[12] With the exception that the IMF program variable becomes positive and statistically significant in the fiscal rule strength analysis. Results are available upon request.

[13] In Appendix 4, I also add a control for economic openness (measured as trade to GDP ratio), which has been found to a predictor of fiscal rules (Altunbas and Thornton 2017) from the dataset provided by Gräbner et al. (2021). The results are slightly less statistically robust for the debt to GDP variable and the chief executive election in the case of fiscal rules adoption but including trade to GDP also entails a non-trivial loss of countries and observations.

**Table 1** Descriptive statistics

| Variable | Mean | Std. Dev | Min | Max | Observations |
|---|---|---|---|---|---|
| Fiscal rule enactment | 0.03 | 0.16 | 0 | 1 | 3511 |
| Fiscal rules index | 0.26 | 0.57 | 0 | 4.58 | 3511 |
| Log of general government gross debt | 3.76 | 0.81 | −2.66 | 6.24 | 3511 |
| Under IMF program | 0.30 | 0.46 | 0 | 1 | 3511 |
| Election | 0.20 | 0.40 | 0 | 1 | 3511 |
| Systemic banking crisis | 0.06 | 0.23 | 0 | 1 | 3511 |
| Log of GDP per capita | 8.49 | 1.55 | 5.10 | 11.63 | 3421 |
| Democracy | 0.60 | 0.49 | 0 | 1 | 3483 |
| Leftwing chief executive | 0.28 | 0.45 | 0 | 1 | 3426 |

preferences could suggest that leftwing parties will hold more pro public spending views[14] and would be less inclined to tighten fiscal rules as a consequence. However, evidence from European Union countries suggests that under some circumstances leftwing parties could be more prone to implement budgetary reforms (Fabrizio and Mody 2010). See also Milesi-Feretti (1995) on why a leftwing rather than a right-wing government should have more incentives to "tie their own hands" with regards to economic policy. The potential effects of a leftwing government on fiscal rules are thus ambiguous.

The previous literature on the determinants of fiscal rules has considered a number of additional political determinants of fiscal rules (Badinger and Reuter 2017a). These include political veto actors and checks and balances within the political system, which has also been found to influence central bank independence (Fernandez-Albertos 2015, 220–221).[15] However, re-running the main estimations including two measures of veto actors, government fractionalization and a measure of checks and balances from the Database of Political Institutions, does not change the core results, see Appendix 4. Descriptive statistics for all variables can be found in Table 1.

## Estimation

The estimation method used to test the theoretical model is OLS with country-fixed effects. Fixed effects enable me to analyze deviations from country averages both in terms of the score on the fiscal rules index and the independent variables and to hold country-specific idiosyncrasies constant. Year-fixed effects are also added to control for the general trend toward tighter fiscal frameworks in the analyzed period (Schaechter et al. 2012, 10–12), which might otherwise be spuriously correlated with a

[14] Although the empirical evidence for this assumption is more mixed and perhaps not unconditional (Imbeau et al. 2001).

[15] Many of the other political determinants of fiscal rules are either captured by the country-fixed effects used in the later estimation, such as a parliamentary system of government, or should not be endogenous to (exogenous) election occurrence. Also confer Appendix 3 for the robustness of the results to the removal of endogenous elections.

trend in the level of government debt. As most formal changes to legal frameworks and institutional settings are normally agreed upon, potentially voted on in parliament and publicly announced at least the year before they take effect, all independent variables are lagged one year.[16] The regression equation can be found in Eq. 1, where Fiscal rule$_{it}$ is either a dummy capturing the enactment of a national fiscal rules or the score on the aggregate fiscal rules index in country $i$ at time $t$. Gov.Debt, IMF and Elec. are the three key independent variables, while $X$ is a vector of controls. $\gamma_t$ and $\delta_i$ are the year- and country-fixed effects, respectively, and $\varepsilon$ is the error term.

$$\text{Fiscal rule}_{it} = \beta_1 \text{Gov.Debt}_{it-1} + \beta_2 \text{IMF}_{it-1} + \beta_3 \text{Elec.}_{it-1} + \beta_4 X_{it-1} + \gamma_t + \delta_i + \varepsilon_{it} \quad (1)$$

When the fiscal rule enactment dummy is used as the dependent variable, the above estimation is equal to a linear probability model, which is increasingly used to analyze binary dependent variables, see Hallerberg and Wehner (2020), especially as it, unlike a logit model, enables the researcher to cluster the standard errors and does not imply loss of observations with no variation on the dependent variable, which would be the case for fixed-effect logit and fixed-effect probit. When the fiscal rules index is analyzed as the dependent variable, it is included in first-difference format. However, in Appendix 7, I show a version of the estimation with the fiscal rules index included as the dependent variable in level format.[17] In order to address issues of autocorrelation, in all estimations, standard errors are clustered at the country level.

## Empirical results

### Enactment of fiscal rules

In Table 2, the results for the enactment of fiscal rules can be seen. Column one presents the results for the three main variables deriving from the theoretical argument. In accordance with the argument that higher government debt incentivizes an incumbent government to send a signal of credit worthiness to market actors, an increase in government debt to GDP of about one log point (about the standard deviation for this variable) increases the chance of a country enacting a national numerical fiscal rule with about one percentage point. An effect is highly statistically significant. However, there seems to be less evidence in favor of the argument that signaling to a non-market creditor, in this case the IMF, plays a role in the choice of whether to enact a national numerical fiscal rule. While the

[16] In Appendix 5, the results are redone with alternative lag structures which do not change the core results. The results are also similar if a lagged dependent variable is added to the estimations. These results can be found in Appendix 6.

[17] In this estimation, debt to GDP is a statistically significant predictor of fiscal rules index level. While this is also the case for being under an IMF program this is not the case for the occurrence of an election. In appendix G, I also add a version of the first-difference analysis, where I control for the level of the fiscal rules index variable. However, the effects from this analysis are largely similar to those of the main analysis.

**Table 2** Main results: Enactment of fiscal rules

| | (1) | (2) | (3) | (4) | (5) |
|---|---|---|---|---|---|
| Log of general government gross debt | 0.01 (0.00)*** | 0.01 (0.00)*** | 0.01 (0.01)** | 0.01 (0.01)** | 0.01 (0.01)** |
| Under IMF program | 0.00 (0.01) | 0.00 (0.01) | 0.00 (0.01) | 0.00 (0.01) | 0.00 (0.01) |
| Election | 0.02 (0.01)* | 0.02 (0.01)* | 0.02 (0.01)* | 0.02 (0.01)* | 0.02 (0.01)* |
| Systemic banking crisis | – | 0.01 (0.02) | 0.01 (0.02) | 0.01 (0.02) | 0.01 (0.02) |
| Log of GDP per capita | – | – | 0.00 (0.01) | 0.00 (0.01) | 0.01 (0.01) |
| Democracy | – | – | – | 0.01 (0.01) | 0.01 (0.01) |
| Leftwing chief executive | – | – | – | – | −0.00 (0.01) |
| Country-fixed effects | Yes | Yes | Yes | Yes | Yes |
| Year-fixed effects | Yes | Yes | Yes | Yes | Yes |
| Number of countries | 170 | 170 | 167 | 165 | 163 |
| Number of observations | 3,356 | 3,356 | 3,270 | 3,244 | 3,170 |
| Within R-squared | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 |

Dependent variable is fiscal rule enactment. All independent variables are lagged one year. Country-clustered standard errors in parentheses

$^{*}p<0.10$, $^{**}p<0.05$, $^{***}p<0.01$

IMF dummy has the expected positive sign, it is not statistically significant at conventional levels. However, there is evidence for the argument that fiscal rules might be used as a tool to signal fiscal prudence and competence to voters. The occurrence of a national election with the theoretical potential for a change in the chief executive increases the chance of the enactment of a national fiscal rule with about two percentage points. An effect is statistically significant at the $p<0.10$ level. Given the relatively rarity of the enactment of new national fiscal rules, confer Table 1, these are far from trivial effects.

There is indeed evidence that national governments use the enactment of national fiscal rules to signal fiscal prudence and competence to creditors and voters when this is needed. Namely, when government debt is high and before national elections. However, there seems to be less certainty that governments use the enactment of fiscal rules to appease another type of creditor, the IMF. An empirical finding which goes again the theoretical argument, but which is more in line with previous studies, which have found no or even negative effects of IMF involvement on the tightening of fiscal institutions (Hallerberg et al. 2009, 145–157; Hallerberg and Scartascini 2015).

These results do not change with the inclusion of the various control variables in column two to five. In accordance with the argument that an economic crisis increases the chance of a fiscal reform (Hallerberg and Scartascini 2015), a systemic banking crisis is positively associated with the chance of a national fiscal rule

enactment. However, this effect is not statistically significant. GDP per capita and the democracy dummy also have positive coefficients indicating that as countries get richer and become democratic, they are more likely to enact fiscal rules. However, neither of these two coefficients are statistically significant either. Finally, the leftwing chief executive dummy has a negative sign, indicating that leftwing governments might indeed be less likely to enact new national fiscal rules but again this coefficient is not statistically significant. While some scholars have found partisanship significantly associated with differences in fiscal institutions at the subnational level (Alt et al. 2006; and Guillamòn et al. 2011), when it comes to cross-national fiscal rules, partisanship does not seem to matter.

### Fiscal rules strength

The previous results suggest that, at least for the enactment of fiscal rules, there is substantial support for the article's theoretical argument that incumbent governments use national fiscal rules to signal fiscal prudence and competence to both government creditors, especially market creditors, and national voters. However, does this argument not only apply to the simple enactment of fiscal rules but also to the strength of these fiscal rules, including their legal coverage and the existence of auxiliary rules and institutions, which might make compliance with these fiscal rules more likely (Bergman and Hutchison 2015).

To test whether the creditor and voting signaling argument also help explain fiscal rules stringency rather than just the existence of fiscal rules, in column one of Table 3, the first difference of the fiscal rules index is regressed on the government debt, IMF program and the election variable. The results provide substantial evidence that governments use not only the enactment but also the stringency of their national fiscal framework to signal fiscal prudence and competence to creditors and national voters when they need to. The government debt variable has a positive effect size and is strongly statistically significant, while the election variable is also positive and statistically significant at the $p < 0.05$ level. While the IMF program dummy clearly has a positive effect size, it is not strictly statistically significant at conventional levels, indicating that there is less certainty that a country's involvement with the IMF through a lending program leads to a stricter national fiscal rules framework.

While the effect sizes are positive and, for government debt and election, statistically significant, they are not of a particular large size, indicating that they do not explain the largest fraction of the within-country variation in the strength of the national fiscal rules framework. This is also reflected in the low within-country $R$-squared values. The inclusion of the various control variables does not fundamentally change the coefficient size or the statistical significance of the government debt and election variable. There is thus robust evidence in favor of the theoretical argument that national governments use the strengthening of fiscal rules and their auxiliary institutions as signaling tools of competence and concern with fiscal policy to both creditors and national voters. In Appendix 2, the subindexes measuring the strength of each individual type of fiscal rules are analyzed

**Table 3** Main results: Strength of fiscal rules

| | (1) | (2) | (3) | (4) | (5) |
|---|---|---|---|---|---|
| Log of general government gross debt | 0.02<br>(0.01)*** | 0.02<br>(0.01)*** | 0.02<br>(0.01)*** | 0.02<br>(0.01)*** | 0.02<br>(0.01)*** |
| Under IMF program | 0.02<br>(0.01) | 0.02<br>(0.01) | 0.02<br>(0.01) | 0.02<br>(0.01) | 0.02<br>(0.01) |
| Election | 0.03<br>(0.01)** | 0.03<br>(0.01)** | 0.03<br>(0.01)** | 0.03<br>(0.01)** | 0.03<br>(0.01)* |
| Systemic banking crisis | – | 0.02<br>(0.02) | 0.02<br>(0.02) | 0.01<br>(0.02) | 0.02<br>(0.02) |
| Log of GDP per capita | – | – | 0.02<br>(0.02) | 0.02<br>(0.02) | 0.02<br>(0.02) |
| Democracy | – | – | – | 0.00<br>(0.01) | 0.00<br>(0.01) |
| Leftwing chief executive | – | – | – | – | −0.01<br>(0.02) |
| Country-fixed effects | Yes | Yes | Yes | Yes | Yes |
| Year-fixed effects | Yes | Yes | Yes | Yes | Yes |
| Number of countries | 170 | 170 | 167 | 165 | 163 |
| Number of observations | 3,343 | 3,343 | 3,258 | 3,232 | 3,158 |
| Within R-squared | 0.02 | 0.02 | 0.02 | 0.02 | 0.02 |

Dependent variable is first-difference of the fiscal rules index. All independent variables are lagged one year. Country-clustered standard errors in parentheses

$^{*}p<0.10$, $^{**}p<0.05$, $^{***}p<0.01$

separately, which with some variation also shows support for the basic theoretical arguments in line with the results from Table 3.

## Alternative explanations

According to the results above, there is substantial empirical evidence in favor of the article's main theoretical argument that national governments use the enactment and strengthening of national fiscal rules, when they need to signal fiscal prudence to market creditors and voters, that is when government debt is high and before elections. However, there might be alternative explanations for these results and thus the variation in fiscal rule enactment and strength, especially with regards to the effect of elections on the enactment and strengthening of fiscal rules. To address some of these concerns, I test for alternative explanations of the previous results.

First, I test for whether the effect of elections instead reflects the role of a democratization. Countries sometimes democratize as a consequence of an election, and the need for a new regime to appear fiscally prudent to international creditors might be the real reason for why fiscal rules change in these countries, rather than an attempt to signal to domestic voters. To test this, I add a dummy

**Table 4** The effect of democratization spells

| | Fiscal rule enactment | Fiscal rules index |
|---|---|---|
| Log of general government gross debt | 0.01<br>(0.01)** | 0.02<br>(0.01)*** |
| Under IMF program | 0.00<br>(0.01) | 0.02<br>(0.01) |
| Election | 0.02<br>(0.01)* | 0.03<br>(0.01)** |
| Systemic banking crisis | 0.01<br>(0.02) | 0.02<br>(0.02) |
| Log of GDP per capita | 0.01<br>(0.01) | 0.02<br>(0.02) |
| Democracy | 0.01<br>(0.01) | 0.00<br>(0.02) |
| Leftwing chief executive | −0.00<br>(0.01) | −0.01<br>(0.02) |
| Democratization | −0.01<br>(0.01) | −0.02<br>(0.01) |
| Country-fixed effects | Yes | Yes |
| Year-fixed effects | Yes | Yes |
| Number of countries | 163 | 163 |
| Number of observations | 3,170 | 3,158 |
| Within R-squared | 0.01 | 0.02 |

The fiscal rules index is first difference. All independent variables except democratization are lagged one year. Country-clustered standard errors in parentheses

$^{*}p<0.10$, $^{**}p<0.05$, $^{***}p<0.01$

variable, based on data from Bjørnskov and Rode (2020) which takes the value 1 if there is a democratization spell in the country, to the main estimations in Table 4. However, the effect and statistical significance of the election variable for both fiscal rule enactment and the fiscal rule strength index remain, while the democratization dummy itself seems to have no effect on these two variables.

Then, I test for another alternative interpretation of the effect of an election on national fiscal rules. Instead of reflecting an attempt for an incumbent government to signal fiscal prudence to national voters, the enactment and strengthening of fiscal rules just before an election could represent an attempt by an incumbent government to "tie" the hands of its successor fiscally similar to the logic of Alesina and Tabellini (1990). An incumbent government, which knows it might be replaced after an election, might be tempted to prevent its successor from having full discretion over fiscal policy by implementing fiscal reforms. Especially, as reflected in the theoretical argument and the empirical analysis' lag structure, fiscal rules will usually be binding after rather than before the election. To test for this alternative "tying hands" interpretation of the results, I redo the main analysis in Table 5 without the observations where a new government comes into office in the current year (the year of the fiscal rule). If the "tying hands" interpretation

**Table 5** Testing for "tying hands" argument: Excluding observations with new chief executives

| | Fiscal rule enactment | Fiscal rules index |
|---|---|---|
| Log of general government gross debt | 0.01<br>(0.01) | 0.02<br>(0.01)* |
| Under IMF program | −0.00<br>(0.01) | 0.01<br>(0.02) |
| Election | 0.02<br>(0.01)** | 0.03<br>(0.02)* |
| Systemic banking crisis | 0.02<br>(0.02) | 0.01<br>(0.02) |
| Log of GDP per capita | 0.00<br>(0.01) | 0.02<br>(0.02) |
| Democracy | 0.01<br>(0.01) | −0.01<br>(0.01) |
| Leftwing chief executive | 0.00<br>(0.01) | -0.01<br>(0.02) |
| Country-fixed effects | Yes | Yes |
| Year-fixed effects | Yes | Yes |
| Number of countries | 163 | 163 |
| Number of observations | 2,669 | 2,659 |
| Within R-squared | 0.01 | 0.02 |

The fiscal rules index is first difference. All independent variables are lagged one year. Country-clustered standard errors in parentheses
$^{*}p<0.10$, $^{**}p<0.05$, $^{***}p<0.01$

of the result would be true, the effect of the election variable would be much weaker or disappear without these observations, as the previous government's incentive to enact or strengthen fiscal rules would be much higher in an election year where it knows it will not remain in government after the election, e.g., poor polling results. However, the effects of the election variable remain positive and statistically significant even with the removal of these observations, which supports the signaling rather than the "tying hands" interpretation of the effect of the election dummy. A similar test of the "tying hands" argument also support this. Here, the dummy for whether a new government comes into office the year after is interacted with the election variable, and this interaction yields a null, whereas the election variable remains positive and statistically significant.[18]

Finally, I consider that changes to fiscal rules might be related to the experiences of other countries. As stated in Gootjes and Haan (2022, 15), the existence of fiscal rules is affected by other countries' adoption of these both globally and in neighboring countries, and public debt dynamics and political events such as elections and partisan shifts might also be correlated spatially (Kayser 2009). Consequently, in Table 6, I add as a control the average of fiscal rule enactment/the score on the fiscal rules index among the countries in each country's continent at a given time.

[18] Results are available upon request.

**Table 6** Controlling for trends in other countries in the same continent

| | Fiscal rule enactment | Fiscal rules index |
|---|---|---|
| Log of general government gross debt | 0.01<br>(0.01)** | 0.02<br>(0.01)*** |
| Under IMF program | 0.00<br>(0.01) | 0.02<br>(0.01) |
| Election | 0.02<br>(0.01)* | 0.03<br>(0.01)** |
| Systemic banking crisis | 0.01<br>(0.02) | 0.01<br>(0.02) |
| Log of GDP per capita | 0.01<br>(0.01) | 0.02<br>(0.02) |
| Democracy | 0.01<br>(0.01) | 0.01<br>(0.01) |
| Leftwing chief executive | −0.00<br>(0.01) | −0.01<br>(0.02) |
| Continent average fiscal rule enactment/fiscal rule index score | 0.08<br>(0.14) | 0.03<br>(0.07) |
| Country-fixed effects | Yes | Yes |
| Year-fixed effects | Yes | Yes |
| Number of countries | 163 | 163 |
| Number of observations | 3,158 | 3,158 |
| Within R-squared | 0.01 | 0.02 |

The fiscal rules index is first difference. All independent variables are lagged one year. Country-clustered standard errors in parentheses

$^{*}p<0.10$, $^{**}p<0.05$, $^{***}p<0.01$

However, including this control for regional trends in fiscal rules does not change the core results.

### The role of the European Union

Table 7, I test for the role of supranational institutions such as international currency unions as well as membership of the European Union based on data from IMF's Fiscal Rules Database. These supranational institutions and organizations sometimes, especially the European Union, come with fiscal rules or their own which might spill over into the national fiscal rules framework, see Badinger and Reuter (2017a), and/or might spread the idea and institutional practices of national fiscal rules through institutional isomorphism (McNamara 2002). While currency union membership seems to increase both the chance of fiscal rule enactment and the strengthening of the national fiscal rules framework, the mere membership of the European Union does not seem to affect neither of these two variables. However, the inclusion of these variables does not change the effects of government debt and election occurrence on fiscal rule enactment and fiscal rules strength.

**Table 7** The effect of currency unions and the European Union

| | Fiscal rule enactment | Fiscal rules index |
|---|---|---|
| Log of general government gross debt | 0.01<br>(0.01)** | 0.02<br>(0.01)*** |
| Under IMF program | 0.00<br>(0.01) | 0.02<br>(0.01) |
| Election | 0.02<br>(0.01)* | 0.03<br>(0.01)* |
| Systemic banking crisis | 0.01<br>(0.02) | 0.02<br>(0.02) |
| Log of GDP per capita | 0.01<br>(0.01) | 0.02<br>(0.02) |
| Democracy | 0.01<br>(0.01) | 0.00<br>(0.01) |
| Leftwing chief executive | −0.00<br>(0.01) | −0.01<br>(0.02) |
| Currency union membership | 0.03<br>(0.01)*** | 0.04<br>(0.01)*** |
| Membership of the European Union | −0.01<br>(0.04) | −0.08<br>(0.06) |
| Country-fixed effects | Yes | Yes |
| Year-fixed effects | Yes | Yes |
| Number of countries | 163 | 163 |
| Number of observations | 3,158 | 3,158 |
| Within R-squared | 0.01 | 0.02 |

The fiscal rules index is first difference. All independent variables are lagged one year. Country-clustered standard errors in parentheses

$^{*}p<0.10$, $^{**}p<0.05$, $^{***}p<0.01$

Then, in Table 8, I restrict the analysis to the countries of the European Union.[19] Among these countries, we see that the government debt level exhibits an even stronger effect on the adoption and strengthening of national fiscal rules. However, the election variable does not seem to have a statistically significant effect among these countries, and there is clearly no effect on an IMF program.

## Differences across regime types

Finally, I test whether the issues of creditor and voter signaling through fiscal rules enactment/strengthening differ between democracies and non-democracies (autocracies) by splitting the sample into democracies and non-democracies and re-running the full estimations in Table 9. Interestingly, increases in debt levels are only associated with enactment/strengthening of fiscal rules in democracies,

[19] Since all these countries are considered democracies, the democracy variable is dropped from the estimation.

**Table 8** Restricting the analysis to countries of the European Union

| | Fiscal rule enactment | Fiscal rules index |
|---|---|---|
| Log of general government gross debt | 0.11<br>(0.04)*** | 0.12<br>(0.05)** |
| Under IMF program | −0.01<br>(0.05) | 0.00<br>(0.07) |
| Election | 0.01<br>(0.03) | 0.03<br>(0.04) |
| Systemic banking crisis | 0.01<br>(0.04) | 0.01<br>(0.06) |
| Log of GDP per capita | 0.33<br>(0.13)** | 0.45<br>(0.22)* |
| Leftwing chief executive | 0.02<br>(0.03) | 0.05<br>(0.04) |
| Country-fixed effects | Yes | Yes |
| Year-fixed effects | Yes | Yes |
| Number of countries | 585 | 578 |
| Number of observations | 27 | 27 |
| Within R-squared | 0.09 | 0.12 |

The fiscal rules index is first difference. All independent variables are lagged one year. Country-clustered standard errors in parentheses
$^{*}p<0.10$, $^{**}p<0.05$, $^{***}p<0.01$

since dynamics and the relative cost-benefits of government debt differ between democracies and non-democracies (DiGiuseppe and Shea 2015; Aaskoven 2023). In both regime types, an election is associated with the introduction and strictness of fiscal rules, although these effects are not statistically significant.

## Conclusion

Why do countries differ with regards to the existence and strength of national fiscal rules, and why do countries change their national fiscal frameworks? This article has argued that national governments use the enactment and strengthening of the national fiscal framework to signal commitment to fiscal discipline to both voters and creditors. Introducing stricter fiscal rules can be used by a national government to assure creditors of the government's commitment to sound public finances and can also to be used before national elections to signal to voters that the government is fiscally prudent and committed to securing fiscal sustainability in the future. In accordance with these expectations, results from analyses of a worldwide panel of countries show that the stringency of the national fiscal framework tends to be higher when government gross debt is high and in election years, where incumbent governments need to be positively evaluated by voters. The involvement of another potential creditor, the IMF, through lending arrangements seems to have less strong and certain effects. The effect of government

**Table 9** Split sample: Democracies and non-democracies

| | Fiscal rule enactment democracies | Fiscal rule enactment Non-democracies | Fiscal rules index democracies | Fiscal rules index non-democracies |
|---|---|---|---|---|
| Log of general government gross debt | 0.04<br>(0.01)*** | −0.01<br>(0.00) | 0.05<br>(0.02)*** | −0.00<br>(0.00) |
| Under IMF program | 0.00<br>(0.01) | 0.00<br>(0.00) | 0.02<br>(0.02) | 0.01<br>(0.00) |
| Election | 0.02<br>(0.01) | 0.01<br>(0.01) | 0.03<br>(0.02) | 0.02<br>(0.01) |
| Systemic banking crisis | 0.01<br>(0.02) | −0.01<br>(0.01) | 0.03<br>(0.03) | −0.03<br>(0.03) |
| Log of GDP per capita | 0.05<br>(0.05) | −0.00<br>(0.00) | 0.08<br>(0.07) | 0.00<br>(0.00) |
| Leftwing chief executive | −0.00<br>(0.01) | 0.00<br>(0.00) | −0.01<br>(0.02) | 0.00<br>(0.00) |
| Country-fixed effects | Yes | Yes | Yes | Yes |
| Year-fixed effects | Yes | Yes | Yes | Yes |
| Number of countries | 109 | 86 | 109 | 86 |
| Number of observations | 1,952 | 1,218 | 1,942 | 1,216 |
| Within R-squared | 0.02 | 0.03 | 0.03 | 0.04 |

The fiscal rules index is first difference. All independent variables are lagged one year. Country-clustered standard errors in parentheses

$^{*}p<0.10$, $^{**}p<0.05$, $^{***}p<0.01$

gross debt seems to be mainly present in democracies and have generally seems more statistically robust than the occurrence of elections.

Factors related to both economic forces and national politics apparently shape the evolvement of fiscal rules and their auxiliary institutions. The results this article show that within the area of fiscal rules governments need to respond to the dual interests of market actors and domestic voters, as is often the case of economic policymaking (Ezrow and Hellwig 2014).

However, the findings of this article do neither prove nor disprove whether fiscal rules and their legal-institutional strength have a causal effect on government fiscal policy. The strengthening of fiscal rules seems to be used as a signaling tool for the fiscal prudence of an incumbent government, but whether a stronger de-jure fiscal framework causally affects the governments' future fiscal policy or whether they are the fiscal institutional *cheap talk* remains a more open question. Endogeneity remains a potential problem in most studies, which tries to access the effects of any institutions perhaps, especially fiscal institutions (Hallerberg and Scartascini 2015, 72), and this article has shown that increases and decreases in fiscal rules stringency are potentially caused by political and economic factors which might also be endogenous to fiscal performance. Another question is whether voters actually

perceive a government which strengthens the national fiscal framework to be more fiscally responsible and are more likely to reelect such a government, as the government's reasoning in the article's theoretical argument rests on. Future research could address these questions. As the effects of elections are somewhat uncertain, it suggests that differences in voter preferences within and between countries might matter substantially for these issues.

The results of this article also speak to the wider both scholarly and policy-oriented discussion about the role of international organizations in national fiscal and general institutional reform. The empirical findings provided little statistically robust evidence of an effect of IMF involvement on national fiscal rules frameworks. Being under an IMF lending program might not increase the stringency of the national fiscal rules framework, perhaps since the IMF is a less risk averse creditor than market bondholders.[20] Alternatively, the lack of a strong and statistically significant direct effect of an IMF program on national fiscal rules might hide heterogeneous effects of the IMF on national fiscal rules, which might again depend on other contingent factors. For an example, the role of the IMF for national fiscal rules might be dependent on the quantitative size of the lending program[21] or other qualitative features of the lending program. Additionally, we could expect this effect of IMF on fiscal rules stringency to vary with the degree to which the IMF is perceived to be biased in favor of the country receiving IMF funding, as previous research suggest can be the case for IMF programs (Dreher et al. 2015). Future research could explore these issues in greater detail.

Finally, while the findings of this article have been mostly statistically robust, the relatively modest size effects of the key explanatory variables suggest that they are perhaps not the sole explanations for the variation in national fiscal rules and their auxiliary institutions. The key predictors of the strength of these fiscal institutions might still be missing. Future research could explore additional international and domestic determinants of the strengthening of the fiscal rules framework and the introduction of national fiscal rules further both theoretically and empirically.

## Appendix 1: The fiscal rules index

See Fig. 2

[20] I am grateful to one of the previous reviewers for pointing this issue out.

[21] I am grateful to a previous commenter for pointing out this potential contingent factor out.

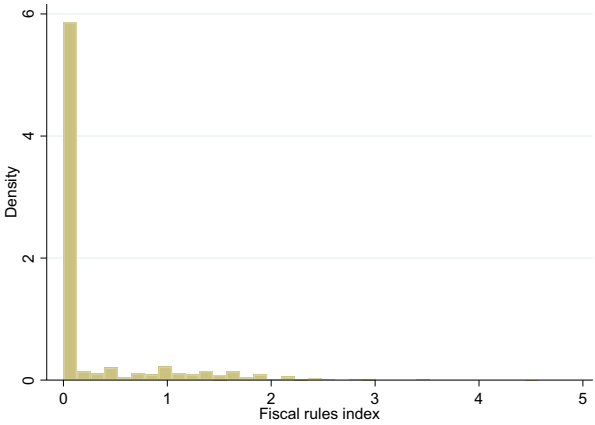


**Fig. 2** Distribution of the fiscal rules index

See Fig. 3

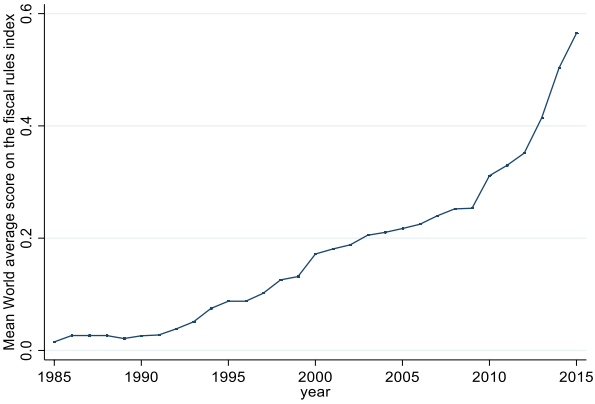


**Fig. 3** World average score on the fiscal rules index 1985–2015

## Appendix 2: Determinants of fiscal rules strength by sub-indexes

In Table 10, the determinants of the strength of the four sub-indexes of the overall fiscal rules index are analyzed. In all specifications, the positive effects of both general government gross debt and election remain, although their effect sizes vary. The statistical significance level of the government debt variable remains but for the expenditure rule index. The results lend support to the theory that increasing fiscal rule stringency serve as a form of signaling to creditors but suggests that governments are more likely to use some fiscal rules rather than others. The election variable is statistically significant for all fiscal rules indexes but the revenue rule strength index and has by far the largest effect size for the balanced budget rule strength index. Being under an IMF program still seems to have a

**Table 10** Determinants of fiscal rules strength by type of fiscal rule

| | Debt rule strength | Budget balance rule strength | Expenditure rule strength | Revenue rule strength |
|---|---|---|---|---|
| Log of general government gross debt | 0.04<br>(0.01)*** | 0.04<br>(0.02)** | 0.02<br>(0.01) | 0.02<br>(0.01)*** |
| Under IMF program | 0.02<br>(0.02) | 0.04<br>(0.03) | 0.03<br>(0.02) | 0.01<br>(0.01) |
| Election | 0.03<br>(0.02)* | 0.06<br>(0.02)** | 0.04<br>(0.02)* | 0.01<br>(0.01) |
| Systemic banking crisis | 0.04<br>(0.04) | 0.01<br>(0.05) | 0.03<br>(0.04) | 0.01<br>(0.02) |
| Log of GDP per capita | 0.04<br>(0.02)* | 0.02<br>(0.03) | 0.03<br>(0.03) | 0.03<br>(0.02) |
| Democracy | 0.01<br>(0.03) | 0.00<br>(0.03) | 0.00<br>(0.01) | 0.00<br>(0.01) |
| Leftwing chief executive | −0.01<br>(0.02) | −0.02<br>(0.03) | −0.01<br>(0.03) | −0.01<br>(0.01) |
| Country-fixed effects | Yes | Yes | Yes | Yes |
| Year-fixed effects | Yes | Yes | Yes | Yes |
| Number of countries | 163 | 163 | 163 | 163 |
| Number of observations | 3,158 | 3,158 | 3,158 | 3,158 |
| Within R-squared | 0.02 | 0.03 | 0.02 | 0.01 |

Dependent variable is first-difference of the fiscal rules indexes. All independent variables are lagged one year. Country-clustered standard errors in parentheses

$^{*}p<0.10$, $^{**}p<0.05$, $^{***}p<0.01$

positive effect for all the indexes but again without reaching the conventional level of statistical significance.

These results suggest that the perceived value of using stringency of fiscal rules to signal fiscal prudence to voters is different across types of fiscal rules. It suggests that governments might be more inclined to signal competence by increasing the strength of rules targeted at fiscal policy measures, where some studies have detected that voters respond negatively to increases, especially public deficits (Brender and Drazen 2008). Another possible explanation for the lack of effect on the revenue rule index might be that the revenue rule index captures both minimum and maximum revenue targets, where the latter might be perceived by the government to be unpopular among voters. On the contrary, governments might perceive bond market actors to have a more positive understanding of the introduction and increased stringency of revenue rules (see Table 10).

Overall, the results support the general theory of fiscal rules as signal to creditors and voters but suggest that the governments might be more inclined to use the introduction and increased stringency of budget balance rules as a signaling tool to voters rather than other types of fiscal rules.

## Appendix 3: Alternative measures of debt and elections

See Table 11

**Table 11** Debt as percent of average tax revenues

| | Fiscal rule enactment | Fiscal rules index |
|---|---|---|
| Log of general government gross debt (as percent of average tax revenues) | 0.01<br>(0.01)* | 0.03<br>(0.01)** |
| Under IMF program | 0.00<br>(0.01) | 0.01<br>(0.01) |
| Election year | 0.02<br>(0.01) | 0.03<br>(0.01)** |
| Systemic banking crisis | 0.01<br>(0.02) | 0.01<br>(0.02) |
| Log of GDP per capita | 0.01<br>(0.01) | 0.03<br>(0.02) |
| Democracy | 0.02<br>(0.01) | 0.01<br>(0.01) |
| Leftwing chief executive | 0.00<br>(0.01) | −0.01<br>(0.02) |
| Country-fixed effects | Yes | Yes |
| Year-fixed effects | Yes | Yes |
| Number of countries | 161 | 161 |
| Number of observations | 3,088 | 3,088 |
| Within R-squared | 0.01 | 0.02 |

The fiscal rules index is first difference. All independent variables are lagged one year. Country-clustered standard errors in parentheses

$^{*}p<0.10$, $^{**}p<0.05$, $^{***}p<0.01$

See Table 12

**Table 12** Excluding early elections

| | Fiscal rule enactment | Fiscal rules index |
|---|---|---|
| Log of general government gross debt | 0.01<br>(0.01)** | 0.02<br>(0.01)*** |
| Under IMF program | 0.00<br>(0.01) | 0.02<br>(0.01) |
| Election year (excluding early elections) | 0.01<br>(0.01) | 0.03<br>(0.02)* |
| Systemic banking crisis | 0.01<br>(0.02) | 0.02<br>(0.02) |
| Log of GDP per capita | 0.01<br>(0.01) | 0.02<br>(0.02) |
| Democracy | 0.01<br>(0.01) | 0.00<br>(0.01) |
| Leftwing chief executive | −0.00<br>(0.01) | −0.01<br>(0.02) |
| Country-fixed effects | Yes | Yes |
| Year-fixed effects | Yes | Yes |
| Number of countries | 163 | 163 |
| Number of observations | 3,170 | 3,158 |
| Within R-squared | 0.01 | 0.02 |

The fiscal rules index is first difference. All independent variables are lagged one year. Country-clustered standard errors in parentheses

$^{*}p<0.10$, $^{**}p<0.05$, $^{***}p<0.01$

See Table 13

**Table 13** Election-year index

| | Fiscal rule enactment | Fiscal rules index |
|---|---|---|
| Log of general government gross debt | 0.01<br>(0.01)** | 0.08<br>(0.04)** |
| Under IMF program | 0.00<br>(0.01) | 0.10<br>(0.04)** |
| Election year index | 0.03<br>(0.02)* | 0.04<br>(0.03)* |
| Systemic banking crisis | 0.01<br>(0.02) | 0.02<br>(0.06) |
| Log of GDP per capita | 0.01<br>(0.01) | −0.00<br>(0.09) |
| Democracy | 0.01<br>(0.01) | −0.05<br>(0.05) |
| Leftwing chief executive | −0.00<br>(0.01) | −0.00<br>(0.04) |
| Country-fixed effects | Yes | Yes |
| Year-fixed effects | Yes | Yes |
| Number of countries | 163 | 163 |
| Number of observations | 3,170 | 3,170 |
| Within R-squared | 0.01 | 0.02 |

The fiscal rules index is first difference. All independent variables are lagged one year. Country-clustered standard errors in parentheses
$^{*}p<0.10$, $^{**}p<0.05$, $^{***}p<0.01$

## Appendix 4: Additional control variables

See Table 14

**Table 14** Additional economic crises

| | Fiscal rule enactment | Fiscal rules index |
|---|---|---|
| Log of general government gross debt | 0.01<br>(0.01)** | 0.01<br>(0.01)*** |
| Under IMF program | 0.00<br>(0.01) | 0.02<br>(0.01) |
| Election year (excluding early elections) | 0.02<br>(0.01)* | 0.03<br>(0.01)* |
| Systemic banking crisis | 0.01<br>(0.02) | 0.02<br>(0.02) |
| Currency crisis | −0.03<br>(0.01)*** | −0.04<br>(0.02)** |
| Sovereign debt crisis | 0.04<br>(0.06) | 0.07<br>(0.07) |
| Log of GDP per capita | 0.01<br>(0.01) | 0.02<br>(0.02) |
| Democracy | 0.01<br>(0.01) | 0.00<br>(0.01) |
| Leftwing chief executive | −0.00<br>(0.01) | −0.01<br>(0.02) |
| Country-fixed effects | Yes | Yes |
| Year-fixed effects | Yes | Yes |
| Number of countries | 163 | 163 |
| Number of observations | 3,170 | 3,158 |
| Within R-squared | 0.01 | 0.02 |

The fiscal rules index is first difference. All independent variables are lagged one year. Country-clustered standard errors in parentheses

$^{*}p<0.10$, $^{**}p<0.05$, $^{***}p<0.01$

See Table 15

**Table 15** Controlling for economic openness

| | Fiscal rule enactment | Fiscal rules index |
|---|---|---|
| Log of general government gross debt | 0.01<br>(0.01)* | 0.02<br>(0.01)** |
| Under IMF program | 0.00<br>(0.01) | 0.02<br>(0.01) |
| Election year | 0.02<br>(0.01) | 0.03<br>(0.01)** |
| Systemic banking crisis | 0.01<br>(0.02) | 0.01<br>(0.02) |
| Economic openness (trade to GDP) | 0.00<br>(0.00)** | 0.00<br>(0.00)** |
| Log of GDP per capita | 0.00<br>(0.02) | 0.01<br>(0.03) |
| Democracy | 0.01<br>(0.01) | 0.00<br>(0.01) |
| Leftwing chief executive | −0.00<br>(0.01) | −0.01<br>(0.02) |
| Country-fixed effects | Yes | Yes |
| Year-fixed effects | Yes | Yes |
| Number of countries | 157 | 157 |
| Number of observations | 2,974 | 2,963 |
| Within R-squared | 0.01 | 0.02 |

The fiscal rules index is first difference. All independent variables are lagged one year. Country-clustered standard errors in parentheses

$^{*}p<0.10$, $^{**}p<0.05$, $^{***}p<0.01$

See Table 16

**Table 16** Controlling for veto actors

| | Fiscal rule enactment | Fiscal rules index |
|---|---|---|
| Log of general government gross debt | 0.01<br>(0.01)** | 0.02<br>(0.01)** |
| Under IMF program | 0.01<br>(0.01) | 0.02<br>(0.01)* |
| Election year (excluding early elections) | 0.02<br>(0.01)* | 0.03<br>(0.01)** |
| Systemic banking crisis | 0.01<br>(0.02) | 0.02<br>(0.03) |
| Government fractionalization | −0.01<br>(0.02) | −0.00<br>(0.02) |
| Checks and balances | −0.01<br>(0.00)** | −0.01<br>(0.00)* |
| Log of GDP per capita | 0.00<br>(0.01) | 0.02<br>(0.02) |
| Democracy | 0.02<br>(0.02) | 0.01<br>(0.02) |
| Leftwing chief executive | −0.00<br>(0.01) | −0.01<br>(0.02) |
| Country-fixed effects | Yes | Yes |
| Year-fixed effects | Yes | Yes |
| Number of countries | 163 | 163 |
| Number of observations | 2,971 | 2,959 |
| Within R-squared | 0.02 | 0.02 |

The fiscal rules index is first difference. All independent variables are lagged one year. Country-clustered standard errors in parentheses

$^{*}p<0.10$, $^{**}p<0.05$, $^{***}p<0.01$

## Appendix 5: Alternative lag structures

See Table 17

**Table 17** IMF program lagged two years

| | Fiscal rule enactment | Fiscal rules index |
|---|---|---|
| Log of general government gross debt | 0.01<br>(0.01)** | 0.02<br>(0.01)*** |
| Under IMF program (lagged two years) | −0.01<br>(0.01) | −0.01<br>(0.01) |
| Election | 0.02<br>(0.01)* | 0.02<br>(0.01)** |
| Systemic banking crisis | 0.01<br>(0.02) | 0.02<br>(0.02) |
| Log of GDP per capita | 0.00<br>(0.01) | 0.01<br>(0.02) |
| Democracy | 0.01<br>(0.01) | 0.01<br>(0.01) |
| Leftwing chief executive | −0.00<br>(0.01) | −0.01<br>(0.02) |
| Country-fixed effects | Yes | Yes |
| Year-fixed effects | Yes | Yes |
| Number of countries | 163 | 163 |
| Number of observations | 3,170 | 3,158 |
| Within R-squared | 0.01 | 0.02 |

The fiscal rules index is first difference. All independent variables expect "Under IMF program" are lagged one year. Country-clustered standard errors in parentheses

$^{*}p<0.10$, $^{**}p<0.05$, $^{***}p<0.01$

See Table 18

**Table 18** Government debt lagged two years

| | Fiscal rule enactment | Fiscal rules index |
|---|---|---|
| Log of general government gross debt (lagged two years) | 0.02<br>(0.01)*** | 0.02<br>(0.01)** |
| Under IMF program | 0.01<br>(0.01) | 0.02<br>(0.01) |
| Election | 0.02<br>(0.01)* | 0.03<br>(0.01)** |
| Systemic banking crisis | 0.01<br>(0.02) | 0.02<br>(0.03) |
| Log of GDP per capita | 0.02<br>(0.01) | 0.03<br>(0.02)* |
| Democracy | 0.01<br>(0.01) | −0.00<br>(0.02) |
| Leftwing chief executive | −0.00<br>(0.01) | −0.01<br>(0.02) |
| Country-fixed effects | Yes | Yes |
| Year-fixed effects | Yes | Yes |
| Number of countries | 163 | 163 |
| Number of observations | 3,023 | 3,012 |
| Within R-squared | 0.02 | 0.02 |

The fiscal rules index is first difference. All independent variables except government debt are lagged one year. Country-clustered standard errors in parentheses

$^{*}p<0.10$, $^{**}p<0.05$, $^{***}p<0.01$

See Table 19

**Table 19** Non-lagged control variables

| | Fiscal rule enactment | Fiscal rules index |
|---|---|---|
| Log of general government gross debt | 0.01<br>(0.01)** | 0.02<br>(0.01)*** |
| Under IMF program | 0.01<br>(0.01) | 0.02<br>(0.01) |
| Election | 0.02<br>(0.01)* | 0.03<br>(0.01)** |
| Systemic banking crisis | −0.01<br>(0.02) | 0.01<br>(0.02) |
| Log of GDP per capita | 0.00<br>(0.01) | 0.02<br>(0.02) |
| Democracy | −0.00<br>(0.01) | −0.01<br>(0.01) |
| Leftwing chief executive | −0.00<br>(0.01) | −0.01<br>(0.02) |
| Country-fixed effects | Yes | Yes |
| Year-fixed effects | Yes | Yes |
| Number of countries | 163 | 163 |
| Number of observations | 3,166 | 3,154 |
| Within R-squared | 0.01 | 0.02 |

The fiscal rules index is first difference. The government debt, IMF program and election variables are lagged one year. Country-clustered standard errors in parentheses

$^{*}p<0.10$, $^{**}p<0.05$, $^{***}p<0.01$

## Appendix 6: Including a lagged dependent variable

See Table 20

**Table 20** Including a lagged dependent variable

| | Fiscal rule enactment | Fiscal rules index |
|---|---|---|
| Lagged dependent variable | −0.08<br>(0.02)*** | −0.02<br>(0.03) |
| Log of general government gross debt | 0.01<br>(0.01)** | 0.02<br>(0.01)*** |
| Under IMF program | 0.00<br>(0.01) | 0.02<br>(0.01) |
| Election | 0.02<br>(0.01)* | 0.03<br>(0.01)** |
| Systemic banking crisis | 0.01<br>(0.02) | 0.01<br>(0.02) |
| Log of GDP per capita | 0.01<br>(0.01) | 0.02<br>(0.02) |
| Democracy | 0.01<br>(0.01) | 0.00<br>(0.01) |
| Leftwing chief executive | −0.00<br>(0.01) | −0.01<br>(0.02) |
| Country-fixed effects | Yes | Yes |
| Year-fixed effects | Yes | Yes |
| Number of countries | 163 | 163 |
| Number of observations | 3,158 | 3,145 |
| Within R-squared | 0.02 | 0.02 |

The fiscal rules index is first difference. All independent variables are lagged one year. Country-clustered standard errors in parentheses

$^{*}p < 0.10$, $^{**}p < 0.05$, $^{***}p < 0.01$

## Appendix 7: Controlling for and analyzing levels

See Table 21

**Table 21** Controlling for and analyzing levels

| | Fiscal rules index (first difference) | Fiscal rules index (level) |
|---|---|---|
| Log of general government gross debt | 0.03<br>(0.01)*** | 0.08<br>(0.04)** |
| Under IMF program | 0.03<br>(0.02)* | 0.10<br>(0.04)** |
| Election | 0.02<br>(0.01)* | 0.01<br>(0.01) |
| Systemic banking crisis | 0.02<br>(0.02) | 0.03<br>(0.06) |
| Log of GDP per capita | 0.02<br>(0.02) | 0.00<br>(0.09) |
| Democracy | −0.00<br>(0.02) | −0.05<br>(0.05) |
| Leftwing chief executive | −0.01<br>(0.02) | −0.00<br>(0.04) |
| Fiscal rules index (level) | −0.14<br>(0.02)*** | – |
| Country-fixed effects | Yes | Yes |
| Year-fixed effects | Yes | Yes |
| Number of countries | 163 | 163 |
| Number of observations | 3,158 | 3,170 |
| Within R-squared | 0.07 | 0.22 |

All independent variables are lagged one year. Country-clustered standard errors in parentheses

$^{*}p<0.10$, $^{**}p<0.05$, $^{***}p<0.01$

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