

IMF STAFF DISCUSSION NOTE

Second-Generation Fiscal Rules: Balancing Simplicity, Flexibility, and Enforceability

Francesca Caselli, Luc Eyraud, Andrew Hodge,
Federico Diaz Kalan, Young Kim, Victor Lledó,
Samba Mbaye, Adina Popescu, Wolf Heinrich Reuter,
Julien Reynaud, Elif Ture, and Philippe Wingender

**Technical Background Papers to
SDN/18/04**

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**Second-Generation Fiscal Rules: Balancing Simplicity, Flexibility, and Enforceability –
Technical Background Papers**

Prepared by Francesca Caselli, Luc Eyraud, Andrew Hodge, Federico Diaz Kalan, Young Kim, Victor Lledó, Samba Mbaye, Adina Popescu, Wolf Heinrich Reuter, Julien Reynaud, Elif Ture, and Philippe Wingender¹

Authorized for distribution by Abdelhak Senhadji and Jonathan D. Ostry

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Authors' E-mail Address: fcaselli@imf.org, leyraud@imf.org, ahodge@imf.org,
fdiazkalan@worldbank.org, ykim6@imf.org,
vlledo@imf.org, smbaye@imf.org, apopescu@imf.org,
wolf.reuter@svr-wirtschaft.de, jreynaud@imf.org,
hture@imf.org, pwingender@imf.org

¹ The background papers were prepared by a team led by Luc Eyraud under the guidance of Abdelhak Senhadji and Catherine Pattillo. The papers incorporate very helpful comments received from Xavier Debrun and other IMF Staff. Editorial and production support was provided by Erin Yiu.

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THE EMERGENCE OF A SECOND GENERATION OF FISCAL RULES¹

A. Introduction

1. During the past decade, countries have experienced several large macroeconomic shocks that put their fiscal rules to the test. In 2008-10, at the peak of the global financial crisis (GFC), almost a third of the countries with national rules modified them or put them into abeyance. With a few exceptions (e.g., Brazil, Switzerland), most pre-crisis fiscal rules did not explicitly foresee how to deal with exceptional economic circumstances. Thus, during the crisis, many rules were suspended to avoid the fiscal tightening required by the rule, but without adopting any plan to return to compliance. A raft of reforms to fiscal rules has followed the crisis, including the introduction of new rules, revamping of escape clauses, and enhancement of monitoring and enforcement mechanisms. In 2014 and 2015, the collapse in commodity prices prompted many commodity exporters to revise or recalibrate their fiscal rules to accommodate the durable loss of revenues.

2. The fiscal rules that have emerged following the GFC are referred to as “second-generation” rules in this paper. Second-generation or next-generation rules have been discussed elsewhere in the literature, although a standard definition of the term is yet to emerge (Schick, 2010; Dabán, 2011; Schaechter and others, 2012).² Rather than constituting a paradigm shift, these new rules are best viewed as having evolved out of their pre-crisis predecessors, to be more flexible, more relevant to budget management and containing enhanced monitoring and enforcement mechanisms.

3. This background paper takes a long-term view to analyze the emergence of second-generation rules. Section B discusses long term trends in the number, resilience, and characteristics of fiscal rules adopted across the world. Section C then elaborates on the key features of second-generation rules. Section D focuses on one important feature of second-generation rules: correction mechanisms. Section E summarizes the main findings and concludes by highlighting remaining challenges in rule design, monitoring, and enforcement.

¹ Prepared by Andrew Hodge, Young Kim, and Victor Lledó (all Fiscal Affairs Department).

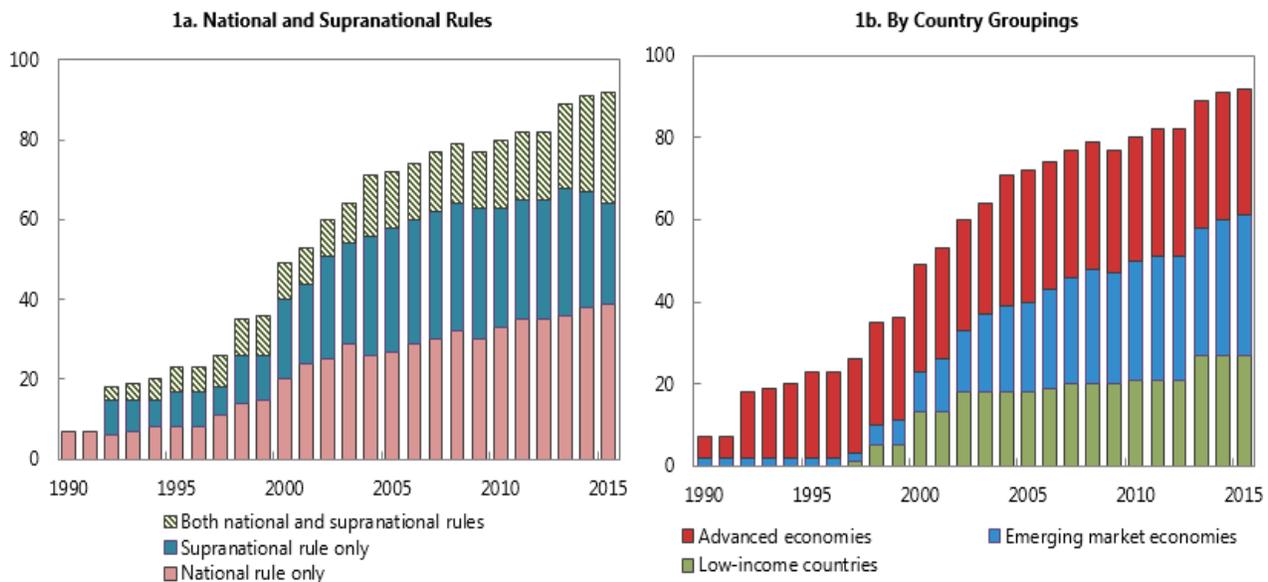
² In the literature, alternative definitions of “second-generation” rules are based partly on the time period during which the rules were adopted and also on the features of the rules. Schaechter (2012) defines “next generation” rules as those that have emerged following the GFC that allow more flexibility to accommodate shocks, as well as having one or more of the following features: (i) automatically correcting for deviations; and (ii) providing more operational guidance, such as by adding expenditure growth limits. Schick (2010) focuses more on rule characteristics and argues that a “second generation” of rules should incorporate both the objectives of fiscal sustainability and business cycle stabilization, potentially relying on expenditure growth ceilings. Daban (2011) adopts a similar definition, adding that escape clauses and monitoring arrangements can be part of “second-generation rules.”

B. Long-Term Trends in Fiscal Rules

Rule Adoption

4. Over the past three decades, fiscal rules have spread worldwide. A growing number of countries have adopted fiscal rules. The trend has not been linear but shows a succession of waves (Figure 1a). First, supranational rules surged in advanced economies during the early 1990s. The increase was related to the signature of the 1992 Maastricht Treaty, which established numerical entry criteria for participation in the European Economic and Monetary Union, including rules on deficits and debt. A second episode happened a decade later in the early 2000s, reflecting a boom of national rules in emerging markets as well as the introduction of supranational rules in some low-income countries.³ The most recent wave started after the GFC, with the creation of rules at the national level (mainly in Europe).

Figure 1. Number of Countries with Fiscal Rules, 1990–2015



Source: IMF fiscal rule dataset.

Note: The charts describe the number of countries with, at least, one rule.

5. Advanced economies were frontrunners but the rest of the world has caught up. There are currently twice as many emerging market and developing economies than advanced countries with fiscal rules (Figure 1b).⁴ Since the 2000s, most of the new fiscal rule adopters have been low or middle-income economies. Motivations behind rule adoption differ by country group. For advanced and low-income countries, the adoption of supranational fiscal rules has been primarily motivated

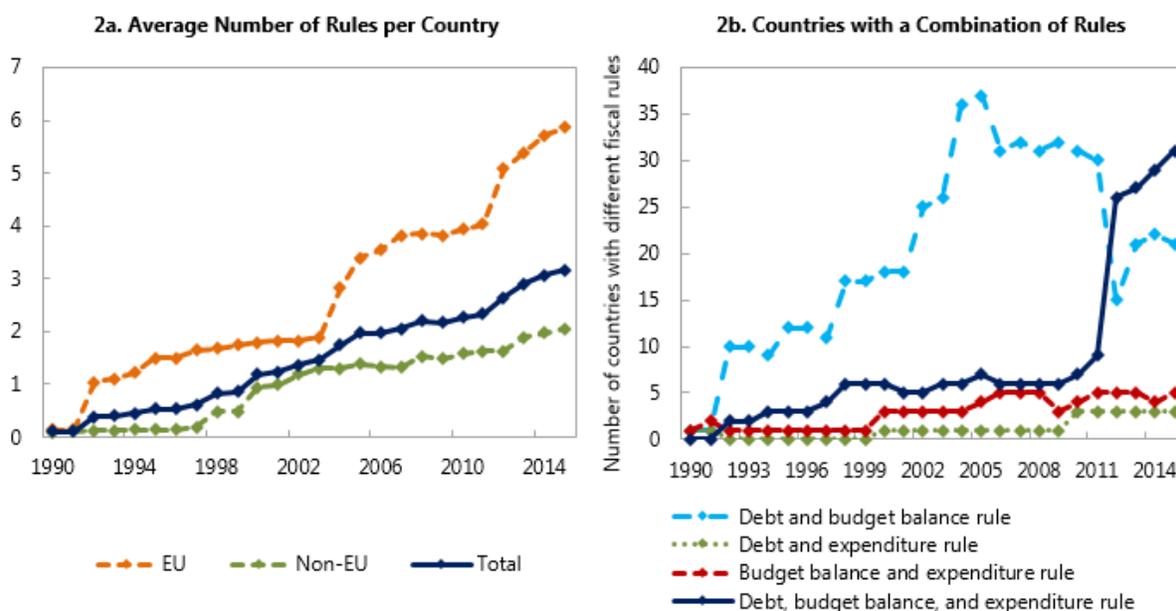
³ Supranational rules were introduced in the West African Economic and Monetary Union in 2000, and the Central African Economic and Monetary Community in 2002.

⁴ This trend is likely to continue given that there are almost four times as many emerging markets and developing economies than advanced countries globally (according to the *World Economic Outlook* database).

by the fiscal requirements of a currency union (including the greater need for fiscal prudence and policy coordination). By contrast, national rules in emerging markets have often been introduced to commit to fiscal adjustment in the wake of a fiscal crisis (e.g., in Argentina, Brazil, Colombia, India and Pakistan), or lock in gains from previous economic reforms and solidify fiscal discipline (e.g., in Chile, Mexico, Peru, Poland, and Russia).

6. There is also an international trend toward adopting multiple fiscal rules. Not only are there more countries with fiscal rules but also more rules per country, which has contributed to the growing complexity of the fiscal frameworks. At the national and supranational levels, most countries had no rule in the early 1990s, and those with rules generally had only two rules (a debt rule and a nominal budget balance rule). The average number of rules has increased steadily over time with some acceleration after the GFC (Figure 2a). The increase has been most pronounced in Europe, where the average number of rules has tripled from 2 to 6 in the past 15 years. However, the phenomenon is also observed outside the European Union, where the average number of rules has increased from zero to two during the same period. Many non-European countries had three or more rules by 2015, including 17 countries in Sub Saharan Africa, but also Australia, Grenada, Mongolia and Peru. In many cases, the multiplication of rules has been motivated by the need to achieve multiple fiscal objectives, which is more difficult with a single rule. To better anchor fiscal sustainability, budget balance rules and, more recently expenditure rules, have been increasingly used in combination with debt rules (Figure 2b). Other factors explaining this trend include the juxtaposition of supranational and national rules (with possible duplications) in currency unions, as well as political difficulties in eliminating existing rules when new rules were introduced.

Figure 2. The Multiplication of Fiscal Rules, 1990-2015

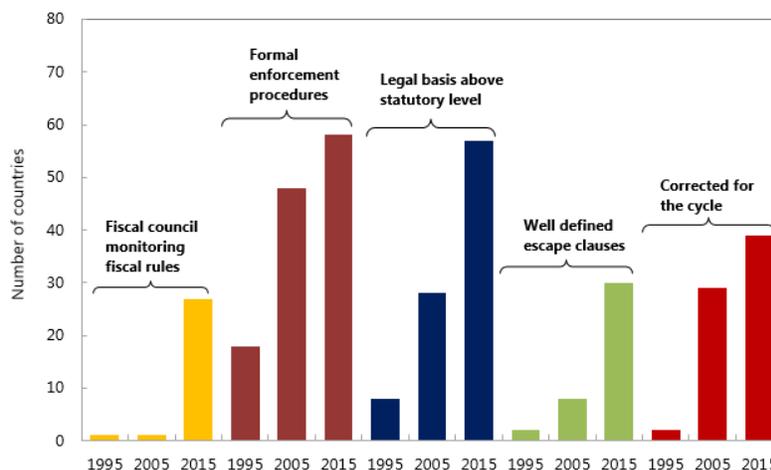


Source: IMF fiscal rule dataset.

Note: Figure 2a is based on a constant country sample (including countries with no rule at some point during the period). In Figure 2b, categories are mutually exclusive; for instance, "Debt and expenditure rule" denote countries having both types of rules but no other rule.

7. New features have been progressively introduced to enhance the flexibility, monitoring, and enforcement of the rules. A growing number of countries have now adopted rules adjusted for the economic cycle and with well-defined escape clauses (Figure 3). New mechanisms have also been created to strengthen monitoring and enforcement, such as formal sanctions, a stronger legal basis (making it more difficult to modify or suspend the rule), and independent fiscal councils tasked with monitoring the rules. All these features have not been adopted simultaneously. Some of them have been introduced or greatly expanded after the GFC, as explained in the next section.

Figure 3. Fiscal Rules Features, 1995–2015



Source: IMF fiscal rule dataset.

Note: All countries considered in this chart have, at least, one fiscal rule. Rules "corrected for the cycle" include cyclically-adjusted balance rules, structural balance rules, over-the-cycle balance rules, and expenditure rules excluding cyclical items.

Rule Resilience

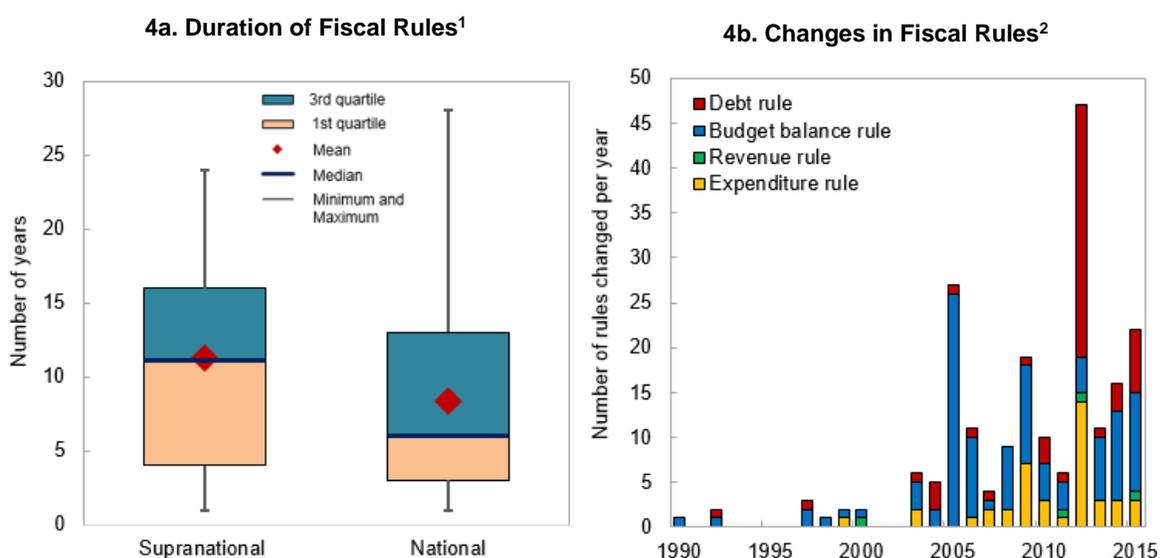
8. Fiscal rules have been relatively durable. Measuring the duration of a rule from the time of adoption to the time of being rescinded (or until the present if not rescinded), the median has been around 9 years. Re-calibrating a pre-existing rule (by changing a numerical target or threshold) or adding some characteristics (like a new monitoring mechanism) is not considered here as rescinding the pre-existing rule and does not affect the measured duration of the rule.⁵ Based on this definition of rule duration, supranational rules have been particularly resilient, with European rules established in the 1990's still remaining in place, along with some long-lasting rules adopted by some currency unions in low income countries (Figure 4a). *National* rules have a shorter life span, suggesting that rules have been more readily scrapped and sometimes replaced with a different design.

9. Many countries have added new rules over time, while leaving pre-existing rules in place. A stark example is the system of European supranational rules. The first wave of European supranational rules was established in 1992 under the Maastricht Treaty as convergence criteria for European monetary union: a 3 percent of GDP ceiling on the overall deficit and a 60 percent of GDP ceiling on gross debt. These rules were further enshrined in the SGP established in 1997. In a second

⁵ Some countries have re-calibrated their rules quite often, such as Denmark, Chile, and Israel. Budget balance rules in these countries have been in force for more than a decade, but their thresholds have been revised multiple times during this period.

wave of reform, country-specific structural balance rules were introduced into the supranational rule framework in 2005 (called Medium Term Objectives or MTO). A third wave of reform followed the GFC: a new rule about the required speed of debt reduction was added to the supranational system of rules in 2011⁶ along with a rule limiting expenditure growth (net of new revenue measures) to the medium term economic growth rate, which is used to assess compliance with the MTO (the “Six Pack” reforms). Many European nations have also transposed the MTOs into national legislation and established correction mechanisms as part of the “Fiscal Compact” of 2013.

Figure 4. Fiscal Rule Resilience



Source: IMF fiscal rule dataset.

Note:

¹ Excludes outliers with long duration of fiscal rules. These are Japan (69), Malaysia (57), Singapore (51), Indonesia (49), and Germany (42).

² Changes refer to either the elimination of a fiscal rule or changes in the definition of the rule governing a specific budget aggregate (for instance, a shift from the nominal to the cyclically-adjusted balance).

10. In the past decade, the resilience of fiscal rules was seriously challenged by the GFC and the collapse in commodity prices. Many fiscal rules were ill-suited to the exceptional circumstances surrounding the GFC. Between 2008-2010, around one third of national rules were modified or suspended, sometimes to avoid fiscal tightening required by the rule. There were often no plans put in place to return to rule compliance. The collapse of commodity prices in 2014-2015 also prompted some commodity exporters to revise their rules. Following the GFC, there have been a range of reforms across many countries, to improve flexibility and operational relevance, as well as enhance monitoring and enforcement. Figure 4b reports the number of changes made by countries to fiscal rules in recent years. Changes are defined as a modification in the definition of the budget aggregate constrained by the rule (e.g. a shift from nominal to structural balance rule). As described

⁶ Non-compliance with the debt rule is now understood as government debt greater than 60 percent of GDP and not diminishing at a satisfactory pace (meaning that debt is not being reduced annually by 1/20th of the amount by which the 60 percent limit is exceeded).

above, pure re-calibrations of targets within rules are not counted. The next part of this background paper discusses these changes in more detail.

C. The Emergence of a Second Generation of Fiscal Rules

11. In this paper, second-generation rules are defined as those introduced in the past decade. There is no established definition of “second-generation rules.” The term generally refers to changes in the type and/or characteristics of rules introduced in the wake of the GFC (Schaechter and others, 2012). Originating in Europe, second-generation fiscal rules have spread worldwide. Although the term “second generation” may suggest a paradigm shift, these rules are generally an evolution of existing rules, trying to address their shortcomings and strengthening some of their key features. As discussed below, second-generation rules can be characterized as being more (i) flexible, (ii) operational and (iii) enforceable than the first generation:⁷

12. Second-generation rules are more flexible. Some degree of flexibility to accommodate business and commodity cycle fluctuations was already embedded in first-generation rules.⁸ But second-generation rules have greatly expanded the flexibility provisions in two main directions.

- **Escape clauses for exceptional events.** While escape clauses preceded the GFC, most of them did not clearly specify the circumstances in which rules should be suspended, nor did they provide clear guidelines (including voting rules) on how to activate such clauses, and then establish a path back to the rule. Following the GFC, the use of escape clauses became more widespread and the list of events covered by the clauses became broader and more specific (IMF, 2013). In the European supranational framework, new escape clauses were created in 2011, including a general crisis clause that allows deviations in the event of a severe economic downturn in the euro area or the European Union as a whole. Outside Europe, well-defined and relevant escape clauses have been introduced in several countries such as Colombia (2011), Jamaica (2014), and Grenada (2015).
- **Provisions for sustainability-improving reforms.** Some second-generation rules allow temporary deviations from targets when countries adopt measures with a short-term budgetary cost but long-term beneficial effects on fiscal sustainability—for instance, because these reforms boost potential growth. In the European SGP, such provisions have existed since 2005 but they were initially only applied to pension reforms. In 2013-15, guidance was provided to apply the

⁷ Although second-generation rules contained features aimed at enhancing resilience and enforcement, compliance with fiscal rules was disappointing.

⁸ At the national level, Denmark (1992) and the United Kingdom (1997) allowed their budget balance rules to be adjusted for the business cycle, while Norway and Chile (both in 2001) introduced structural budget balance rules based on long-term commodity prices. At the supranational level, flexible rules surged after 2005 with the adoption in Europe of country-specific medium-term-objectives (MTO) measured in structural terms.

provisions to public investment and structural reforms (European Commission, 2015).⁹ Similar clauses have been adopted in Mauritius, where the debt rule implemented in 2008 allows temporary deviations to implement large public investment projects.

13. Second-generation rules are more operational. One of the objectives of recent reforms has been to develop rules that offer clearer policy guidance to policymakers and target fiscal aggregates directly under their control. The rationale is that implementation and compliance would be facilitated if fiscal rules are easily mapped into specific fiscal actions within the annual or multiannual budget process.

- **Expenditure rules.** The post-GFC period has seen a surge in the number of expenditure rules and the number of countries adopting them. An “expenditure benchmark” that sets a ceiling on annual growth of primary spending was introduced in the European supranational framework in 2011.¹⁰ Following the introduction of the expenditure benchmark, several EU countries, including Austria, Croatia, Czech Republic, Greece, Italy, and Spain adopted expenditure rules as part of their national fiscal frameworks. Outside Europe, caps on expenditure growth have also been adopted in Mongolia (2013), Paraguay (2015), and Brazil (2016).
- **Fiscal effort rules.** The past decade has also seen several attempts to design rules that better target the government “fiscal effort” that is the discretionary actions taken by the government during a fiscal year. A common indicator of fiscal effort is the cyclically-adjusted balance, which corrects the nominal budget balance for the effect of the business cycle. However, this adjustment may not capture all cyclical factors and may likely fail to extract the component of the fiscal balance that fluctuates with asset and commodity prices. Alternative techniques have been developed to overcome these difficulties. A first approach adjusts the fiscal balance formula beyond the output gap (Bornhorst and others, 2011; Liu, Mattina, and Poghosyan, 2015). For instance, the “adjusted fiscal effort” used in the corrective arm of the SGP since 2011 explicitly corrects for revenue windfalls or shortfalls unrelated to the business cycle. Outside Europe, Colombia and Mongolia adopted rules correcting for the commodity price cycle in 2011 and 2013 respectively. A second approach bases the computation of the fiscal effort on information collected from the budget. Instead of measuring discretionary revenue by removing the cyclical component from collected revenue, this approach relies on budget estimates of tax measures. Examples of this second approach include the indicator of “discretionary fiscal effort” proposed by Carnot and De Castro (2015) and the European “expenditure benchmark”.

⁹ The European Commission considers that the criterion related to the implementation of reforms is fulfilled ex ante when the Member State presents a medium-term structural reform plan which is comprehensive, detailed and includes well-specified measures and credible timelines for their adoption and delivery.

¹⁰ The “expenditure benchmark” limits the growth of primary expenditure net of discretionary revenue measures to the growth rate of potential GDP (European Commission, 2017). The rationale is that, to preserve debt sustainability, any plan to increase spending beyond potential GDP must be properly financed by additional revenue measures.

14. Second-generation rules are supported by enhanced monitoring and correction mechanisms. Efforts to improve enforcement started well before the GFC. But numerous innovations have been introduced in recent years. Two of the most important reforms include:

- **Monitoring by fiscal councils.** The post-GFC period has seen a surge in the number of countries, especially in Europe but also elsewhere, mandating the monitoring of fiscal rules by independent fiscal councils (Beetsma and others, 2017). Prior to the GFC, only Belgium had an independent fiscal council with this mandate. Currently, 31 countries have assigned independent fiscal institutions to monitor their fiscal rules, 26 of which are EU members. In 2015, the European Fiscal Board was established to monitor the implementation of supranational rules. Outside the EU, Brazil, Chile, Colombia, Peru, and Serbia have all created independent institutions to monitor their fiscal rules over the last five years.
- **Correction mechanisms.** As part of the 2012 Fiscal Compact, most European countries have introduced correction mechanisms to specify the actions and path back towards the structural balance rule following a deviation (e.g. Denmark, Germany, and Estonia in 2012; and Hungary, Slovak Republic, Sweden, and Slovenia in 2013, to name a few). Although these correction mechanisms follow common principles laid out by the European Commission, their design differs greatly across countries, exhibiting various degrees of automaticity, specificity, and coercion. Outside Europe, correction mechanisms are less common, although they have been introduced in a few countries like Jamaica in 2014 and Grenada in 2015. The next part of this paper discusses in more detail correction mechanisms, which are a key feature of second-generation rules.

D. A Spotlight on Correction Mechanisms

15. Correction mechanisms stipulate what policymakers should do if fiscal rules are breached or are at risk of being breached.¹¹ A wide variety of correction mechanisms have recently been added to national fiscal frameworks, although so far mostly in Europe. However, it remains too soon to evaluate their effectiveness comprehensively. Correction mechanisms differ along two dimensions: (i) *activation*: under what circumstances does the correction mechanism begin to operate; and (ii) *corrective action*: what the mechanism requires policymakers to do.¹²

Activation

16. Correction mechanisms can differ according to how and in what circumstances they are triggered. Correction mechanisms are sometimes described as “automatic”, as they are automatically triggered when some conditions are met (the automaticity principle refers to the

¹¹ This section focuses on correction mechanisms activated following the breach of a rule, meaning a deviation that is not allowed under the flexibility provisions of the rule, including escape clauses. In some countries like Switzerland, escape clauses can themselves contain a correction mechanism requiring authorized deviations to be subsequently corrected.

¹² See European Commission (2017) for a review of the correction mechanisms established in Europe at the national level.

activation of the mechanism, not to the correction actions, which are, most of the time, discretionary).

- **Actual deviation vs risk of deviation.** It is common for correction mechanisms to be triggered *ex post*, meaning after a fiscal rule is breached. This is the case of the correction mechanisms established under the European Fiscal Compact. Although most correction mechanisms operate this way, some fiscal frameworks contain mechanisms that trigger corrective actions *ex ante* when there is an elevated risk of a rule being breached. For example, the Polish fiscal framework contains a mechanism that is triggered preemptively as debt approaches its ceiling, to prevent breach of a debt rule.
- **Assessing deviations quantitatively or qualitatively.** Correction mechanisms can have precise quantitative triggers, like those in Slovakia which begin to operate when debt crosses particular thresholds. In other cases, deviations from rules are assessed in a more qualitative way, either by policymakers, fiscal councils, or supranational institutions. For instance, in Finland, Ireland and Italy, correction mechanisms are triggered by “significant deviations” from the Medium-Term Objective (MTO) — or the adjustment path towards it — as assessed according to the European Commission definition. In Belgium and France, the trigger occurs when the national fiscal council assesses a significant deviation.
- **One off vs cumulative deviations.** Some correction mechanisms are triggered by deviations occurring in a defined time period. In Finland, Ireland, and Italy, the assessment of a “significant deviation” from the MTO is based on fiscal performance either in the current year, previous year, or over the previous two years. Other countries have correction mechanisms triggered when cumulative deviations from rules over time reach a critical level, even if the deviation in any one year is relatively small. The “debt brakes” in Germany, Jamaica, Grenada, and Switzerland operate this way and are triggered when cumulative deviations from fiscal balance targets cross critical thresholds.

Corrective actions

17. Correction mechanisms stipulate a range of different types of corrective action that policymakers must take. They include:

- **Restoring rule compliance vs offsetting deviations.** Following a deviation from a rule, many correction mechanisms require corrective action that restores compliance with the rule. For example, in Belgium, France and Portugal, the correction mechanism requires deficit reduction to restore compliance with the structural balance targets that existed before the breach. Other correction mechanisms go further and require fiscal policy to offset the past deviations from the rule by “overachieving” the targets under a rule in subsequent years. This occurs under the German and Swiss “debt brakes” whereby cumulative deviations from structural balance rules must be offset by achieving structural balances better than required under the rule. This prevents the past deviations accumulating permanently in the debt stock and returns debt to its pre-deviation level, all else equal.

- **Timeframe for correction.** Many correction mechanisms require corrective action to be taken within a particular timeframe, usually over several years. In Belgium, Finland and France, the required corrective action must be taken within one and a half to two years, while in Grenada the required timeframe is three years. More stringent correction mechanisms can require that corrective action is immediate or included in the next budget. For example, under the Slovakian rule, the government must submit a balanced budget to Parliament in the next fiscal year if debt is within three percentage points of GDP of the ceiling.
- **Policy mix for corrective action.** Some correction mechanisms leave policy makers full discretion over the policy instruments used for corrective action. For example, under the German and Swiss “debt brakes”, policymakers can undertake fiscal consolidation using any combination of revenue and expenditure measures. Other correction mechanisms stipulate the kind of policies the government must adopt when taking corrective action. Under the Slovakian rule, an across the board expenditure cut (subject to some exceptions) is mandated if debt crosses a threshold.

E. Conclusions

18. Second-generation rules are still in their infancy and significant challenges remain. The introduction of these rules has significantly increased rule flexibility and operational guidance, while providing new mechanisms for monitoring and enforcement. However, several key challenges remain for policy makers and may need to be the subject of future reforms (see the final section of the Staff Discussion Note for further details):

- **Achieving flexibility without making the rules too complex.** While first generation rules have tried to strike a balance between simplicity and flexibility, second-generation rules are more focused on how to combine flexibility and enforceability—often at the expense of simplicity. Complex rules can produce additional policy errors beyond those that they were meant to fix. The next frontier is to design rules that better balance the trade-off between the three features of simplicity, flexibility and enforceability. The growing reliance on expenditure rules signals a move in this direction.
- **Taking a holistic approach to fiscal frameworks.** Many countries have added rules over time, producing systems of rules that may overlap or that are calibrated in an inconsistent way. Policymakers should take a holistic view when designing fiscal frameworks, adopting a fiscal anchor and a small number of operational rules. Rules should not be calibrated in isolation, but rather taking into account how different rules will interact.
- **Improving compliance.** The widespread introduction of fiscal councils has been viewed as compliance enhancing, improving transparency and raising the likelihood that breaches of rules carry a reputational and political cost. Further improvements will require political incentives to be better aligned with rule compliance.

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DO FISCAL RULES IMPROVE THE FISCAL BALANCE? A NEW INSTRUMENTAL VARIABLE STRATEGY¹

A. Introduction

1. Countries with fiscal rules have, on average, lower deficits compared to countries without rules. It is well documented that the use of fiscal rules is correlated with better fiscal performance (IMF, 2009). In a comprehensive sample of over 140 countries over the period 1985-2015, fiscal deficits averaged 2.1 percent of GDP in the absence of fiscal rules against 1.7 percent of GDP in the presence of fiscal rules.

2. However, this positive relationship between rules and performance does not mean that rules “cause” better fiscal outcomes. As pointed out by Heinemann and others (2018), the positive correlation between rule’s adoption and fiscal outcomes tends to lose its statistical significance with increasing refinement of the econometric methodologies, and, in particular, when the analysis addresses the problem of endogeneity. This problem, which affects most empirical studies assessing the effectiveness of rules, has three main origins. First, countries might adopt fiscal rules in periods of stress or crisis, or after consolidation episodes to lock-in gains. Thus, the reverse causality from fiscal performance to the adoption of rules can bias the estimates. Second, countries with fiscal rules may have certain observed or unobserved characteristics that foster good fiscal policy (in particular, a preference for fiscal prudence), whether or not a rule is in place. Omitting these variables may lead to overestimating the benefits of the rules. Finally, endogeneity can also be the result of measurement errors (e.g. by biasing the qualification of countries as having rules or not).

3. This paper addresses explicitly the problem of endogeneity with a new instrumental variable approach that captures the diffusion of fiscal rules across countries in a wide and long panel. The contribution of this paper is twofold: first, it assesses the validity of standard methods applied in the literature to correct for endogeneity. These methods involve finding instrumental variables that are correlated with the endogenous regressor, but uncorrelated with the error term. The results reveal issues of validity and weakness of the instrumental variables commonly used. Second, a new instrumental variable strategy is developed to provide stronger and causally interpretable empirical evidence. This strategy uses, as instrumental variable, the adoption of fiscal rules in neighboring countries. The intuition is that reforms in neighboring countries may affect the adoption of domestic reforms through peer pressure and imitational effects (Buera and others, 2011; Giuliano and others, 2013). Such approach has been applied in the growth, economic integration, and trade literatures, which use the spatial diffusion of institutional change as an instrument (see between others: Frankel and Romer, 1999; Frankel and Rose, 2002; and Acemoglu and others, 2016). From an econometric point of view, the presence of rules in neighboring countries captures an exogenous source of variation in domestic rules that does not directly impact the fiscal balance.

¹ Prepared by Francesca Caselli (Research Department) and Julien Reynaud (Fiscal Affairs Department), based on Caselli and Reynaud (forthcoming).

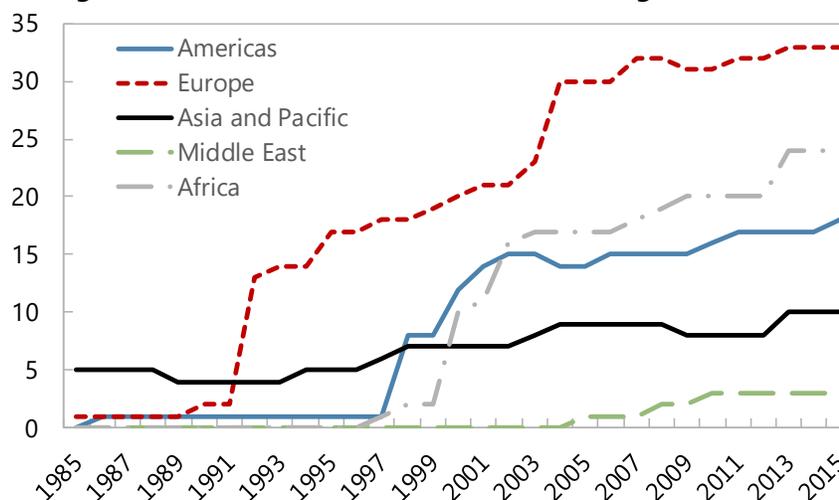
4. The main finding of this paper is that fiscal rules *per se* have no statistically significant impact on the fiscal balance, once endogeneity is adequately controlled for. The paper assesses the effect of the presence of a fiscal rule on the fiscal balance in a wide panel of countries (over 140) over a long period (1985–2015), and controlling for endogeneity using newly developed instrumental variables. Results confirm the insignificance of the causal link between fiscal rule and fiscal balance, supporting the findings of Heinemann and others (2018).

5. The paper also shows that *well-designed* rules have a statistically significant impact on the balance. Fiscal rules are not a “one-size-fits-all” product. This paper confirms that the effect of rules depends on their type and design. An analysis that considers an index of rules’ design, and controls adequately for endogeneity, finds that better designed rules have a significant and positive impact on the fiscal balance.

B. Data and Country Coverage

6. The analysis is based on a global sample of countries. The IMF database (IMF, 2017) provides country-specific information on fiscal rules in use in 96 countries from 1985 to 2015. The number of countries in the panel is increased over 140 countries when adding countries without rules. Figure 1 depicts the number of fiscal rules in place over time and by region. The number of fiscal rules increased significantly across the world over time, starting in the early 1990s in Europe, and late 1990s for the Western hemisphere and Africa.

Figure 1. Distribution of fiscal rules across regions and time

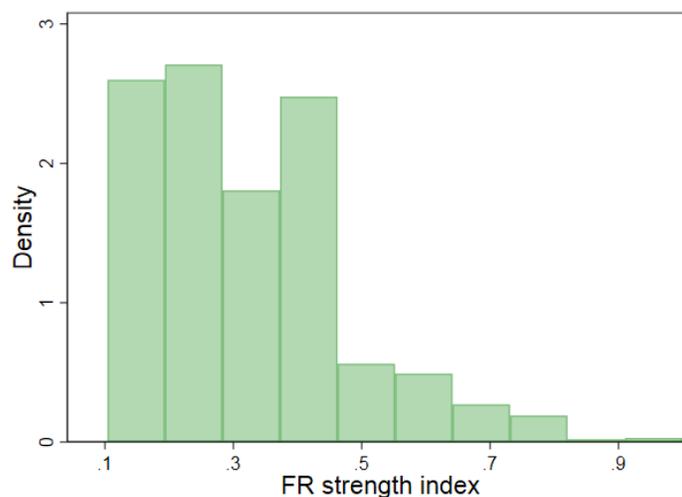


Source: Staff's calculation based on IMF Fiscal Rules database.

7. The analysis considers also the design of rules. For the presence of fiscal rules, the paper uses a dummy variable equal to one when countries have any type of rule in place. However, not all rules are designed in the same way, so their impact on fiscal balance must be differentiated. In this paper, the characteristics of fiscal rules are proxied by a strength index produced by the IMF (IMF, 2017) measuring the following dimensions: broad institutional coverage, independence of the monitoring and enforcement bodies, legal base, flexibility to respond to shocks, existence of

correction mechanisms and sanctions (for a description of the IMF fiscal rule index, see IMF, 2009). The index is equal to zero for countries without rules and ranks from 0.1 (poorly designed) to 1 (well designed) for countries with rules. Figure 2 shows significant skewness of the index, with an average strength index of 0.26 (Table 1), suggesting that there is still room for improvement in most countries.²

Figure 2. Distribution of the IMF’s fiscal rules strength index for countries with a rule



Source: Staff's calculation based on IMF Fiscal Rules database.

Table 1. Summary statistics of the IMF’s fiscal rules strength index³

Percentiles			
1%	0.107	Obs.	1,296
5%	0.116	Mean	0.294
10%	0.132	Std. Dev.	0.140
25%	0.181	Variance	0.020
50%	0.259	Skewness	1.076
75%	0.375		
90%	0.484		
95%	0.570		
99%	0.738		

Source: Staff's calculation based on IMF Fiscal Rules database.

² One caveat of the strength index is that it captures only characteristics related to rules' design and not their implementation.

³ Countries with values of the index above 0.8 include Lithuania, Latvia, Great Britain, the Netherlands and Romania.

C. Specification and Estimation Strategy

8. The baseline model augments a standard fiscal reaction function with several potential determinants of the government balance. Based on Debrun and others' (2008) fiscal reaction function, the specification takes the following form:

$$\begin{aligned} balance_{it} = & \beta_1 rule + \beta_2 \sum_{s=1}^3 L_s balance_{it} + \beta_3 L1.debt_{it} + \beta_4 gdpgrowth_{it} + \beta_5 loggdp_{it} + \\ & \beta_6 ogap_{it} + \beta_7 \Delta tot_{it} + \beta_8 imf_{it} + \beta_9 cunion_{it} + \alpha_i + \lambda_t + \varepsilon_{it} \end{aligned} \quad (1)$$

where the budget balance (*balance*) is a function of the fiscal rule (*rule*), a dummy equal to 1 if a country has a fiscal rule. The lags of the government balance (*balance*) control for the persistence of the dependent variable. The lagged debt (*debt*) controls for the relation between the budget balance and the debt. The GDP per capita (*loggdp*) controls for the level of development of the country. GDP growth (*gdpgrowth*) captures economic growth and output gap (*ogap*) captures the business cycle. Terms of trade movements (*Δtot*) are particularly important to explain the evolution of revenues for commodity exporters and low-income countries (LICs).⁴ Dummies to control for currency unions (*cunion*) and IMF programs (*imf*) are also added, as they are good proxies for institutional settings and for episodes of fiscal consolidation, respectively. Finally, α_i and λ_t are country and year fixed effects.

9. Our instrumental variable strategy relies on the diffusion of fiscal rule adoption in neighboring countries. The intuition is that fiscal reforms in neighboring countries may affect the adoption of domestic reforms through peer pressure and imitational effects (Buera et al., 2011; Giuliano et al. 2013). While capturing a completely exogenous source of variations in fiscal rules' adoption is difficult, this instrumental-variable strategy ensures that changes in a country's institutional set-up (the adoption of fiscal rules) are exogenous to the outcome (the budget balance), and therefore do not bias the estimates.⁵ A similar approach has been applied in the growth, economic integration, and trade literatures, which use the spatial diffusion of institutional change as an instrument (see between others: Frankel and Romer, 1999; Frankel and Rose, 2002; and Acemoglu and others, 2016). The instrument variable is the number of neighboring countries adopting a fiscal rule in the previous year.⁶

10. The diffusion of fiscal rules across countries seems to follow a regional pattern. In the political economy literature, Weyland (2008) argues that institutional changes happen in waves of contagion across time and countries. Acemoglu and others (2016) also argue that transitions to democracy often take place in regional waves (see also e.g., Huntington 1991, Markoff 1996). Figure

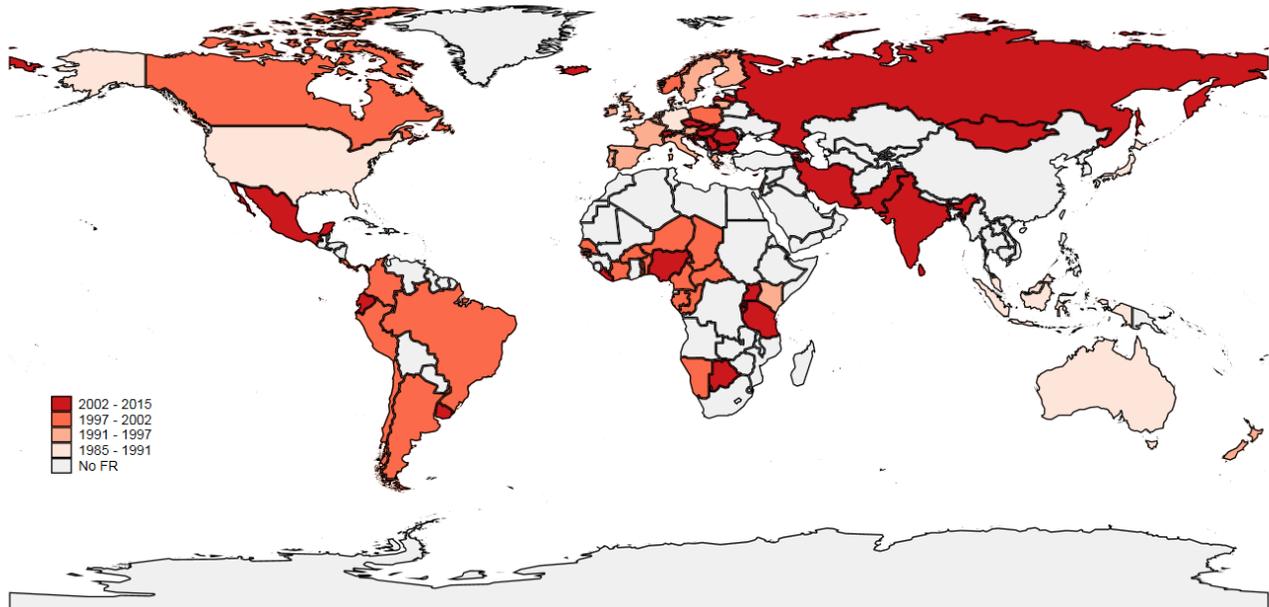
⁴ Econometric evidence suggests that the primary balance may not react to public debt and the output gap in low-income countries (Baum and others 2017).

⁵ The identification strategy relies on the assumption that the fiscal rule's adoption in neighboring countries impacts the domestic fiscal balance only through the adoption of a domestic fiscal rule. A violation of this assumption could occur if the neighbors' fiscal rule impacts the domestic fiscal balance directly (for instance, because it generates fiscal spillovers).

⁶ Alternative instruments could be based on geographical distance and cultural proximity. They are tested in Caselli and Reynaud (2018).

3 maps the diffusion of fiscal rules adoption across the globe over time. Starting in the 1980s, few countries in South East Asia, the United States and Germany first adopted fiscal rules. The map shows a gradual spread of rules' adoption throughout the early 1990s in Europe, followed by South America and Africa in the last 1990s, and in Eastern Europe and Central Asia in the 2000s.

Figure 3. Diffusion of Fiscal Rules Adoption Across Countries and Time



Source: Staff's calculation based on IMF Fiscal Rules database.

D. Results

Ordinary Least Squares (OLS) results

11. OLS results point to a positive correlation between fiscal rules and the budget balance. Based on an OLS estimation, overall balances are higher by 0.8 percent of GDP in countries with fiscal rules, on average (Table 2 Column 1). The correlation is slightly higher before the global financial crisis (Column 2). Looking across different country groups based on income, results suggest that low income countries (LICs) experience the highest correlation (Column 5), followed by Advanced Economies (AEs, Column 3), while there is no correlation in Emerging Markets (EMs, Column 4). The correlation is also stronger for European Union members, Western hemisphere and African countries (results not shown).

Table 2. OLS results by country groups

VARIABLES	(1) Balance	(2) Balance	(3) Balance	(4) Balance	(5) Balance
Fiscal Rule dummy	0.80*** (0.22)	0.83*** (0.28)	0.83*** (0.26)	0.08 (0.29)	1.16* (0.62)
L1 Balance	0.45*** (0.04)	0.43*** (0.08)	0.66*** (0.06)	0.53*** (0.04)	0.27*** (0.07)
L2 Balance	0.05* (0.03)	0.00 (0.05)	0.04 (0.06)	-0.05 (0.05)	0.08** (0.03)
L3 Balance	0.04** (0.02)	0.10*** (0.04)	-0.04 (0.04)	0.07** (0.03)	0.05* (0.03)
GDP growth	0.12*** (0.02)	0.12*** (0.02)	0.28*** (0.05)	0.06 (0.04)	0.07** (0.03)
Log GDP per capita	0.43 (0.67)	-1.77* (1.04)	-0.12 (1.20)	0.73 (0.98)	-0.06 (1.32)
L1 Debt	0.00* (0.00)	0.01 (0.00)	0.01 (0.01)	0.00 (0.01)	0.00 (0.00)
Output gap	0.04 (0.04)	0.09* (0.05)	-0.03 (0.09)	0.06 (0.07)	0.09 (0.06)
Delta ToT	0.04*** (0.01)	0.06*** (0.01)	0.06 (0.05)	0.05** (0.02)	0.02*** (0.01)
IMF program	0.29 (0.18)	0.41* (0.23)	-0.36 (0.86)	0.15 (0.20)	0.72** (0.34)
Currency union	-0.04 (0.31)	0.33 (0.46)	0.24 (0.30)	-0.28 (0.52)	-3.33*** (0.64)
Observations	2,823	1,823	789	1,205	829
R-squared	0.71	0.72	0.85	0.78	0.52
country FE	yes	yes	yes	yes	yes
year FE	yes	yes	yes	yes	yes
Sample	Full	Pre-GFC	AEs	EMs	LICs

Note: The table presents the results of OLS regressions for the full sample and different country groups. Standard errors are clustered at the country level. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Instrumental variable estimation using standard instruments

12. Common instrumental variables in the literature include indicators of political stability and monetary policy variables. For instance, a recent paper by Badinger and Reuter (2017) argues that government fragmentation, checks and balance and the adoption of inflation targeting are good instruments to fiscal rules. Debrun and others (2008) use the lag of the fiscal rule and a variable identifying countries having adopted the commitment approach to centralize the budget process, and do not find any difference between OLS and instrumental variables estimations focusing on a European sample.

13. These common instrumental variables perform poorly in a global sample. We use two criteria to assess the quality of instruments: they have to be relevant (i.e. correlated with the fiscal rules) and exogenous (i.e. excluded from the fiscal balance equation):

- **Relevance.** In a global sample, government fragmentation, checks and balance and inflation targeting are found to be weak, relying on the first stage Kleinbergen-Paap F-stat. For all the 4 specifications testing the instruments, the F-stat is well below the Staiger and Stock (1997) rule of thumb value of 10 (Table 3 Columns 1 to 4).
- **Exogeneity.** While exogeneity cannot be tested empirically, several arguments suggest that government fragmentation, checks and balance and inflation targeting directly affect the fiscal balance⁷: (i) Kontopoulos and Perotti (2002) show that government fragmentation can affect fiscal outcomes directly through coordination problems; (ii) Alesina and Perotti (1996) argue that checks and balance can impede fiscal discipline because they guarantee the rights of the minority, emphasize moderation and compromise, and may therefore delay the implementation of "tough" fiscal adjustments when needed; (iii) Combes and others (2017) show that inflation targeting has a direct effect on fiscal balances by mitigating fiscal dominance.

Table 3. Testing IVs in the literature – fiscal rule dummy⁸

VARIABLES	(1) Balance	(2) Balance	(3) Balance	(4) Balance
Rule (fiscal rule dummy)	0.380 (1.559)	-2.353 (7.476)	-9.602 (14.38)	-0.094 (1.697)
Observations	2,823	2,660	2,732	2,629
Number of id	144	140	141	140
IV	Inflation Targeting	Government Fragmentation	Checks and Balance	All IV together
Kleinberg-Paap rk test	7.65	0.51	0.65	2.07
Stock-Wright p-value	0.01	0.48	0.42	0.11

Note: The table reports the results based on Equation 1, where *Rule* is a dummy variable equal to 1 for country-year observations in which a fiscal rule is in place. The instruments are: inflation targeting, government fragmentation, and checks and balance. In Column (4), a specification with the 3 IVs used jointly is presented. Standard errors are clustered at the country level. The estimation includes all the variables in Equation (1). *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Instrumental variable estimation based on novel instruments

14. In general, the effect of the fiscal rule adoption on the fiscal balance is insignificant when controlling for endogeneity. With the new instrumental variable approach, the coefficient on the fiscal rule's adoption dummy loses significance, yet its magnitude is comparable to the coefficient estimated with OLS (Table 4 Column 1). This result is in line with the recent findings of Heinemann and others (2018). Indeed, the results of their meta-regression analysis point to a substantial bias if the potential endogeneity of fiscal rules is neglected, confirming that these concerns have to be taken seriously. Heinemann and others (2018) also find that the statistical significance of the impact of rules on fiscal balance is reduced below the usual levels when studies

⁷ Even in the context of multiple instruments, the test for the exclusion restriction assumes that one instrument is exogenous.

⁸ The IV estimation includes all the control variables presented in Table 2.

use more sophisticated econometric analysis to correct for endogeneity issues. This lack of statistical significance in our paper does not appear to be due to a weak instrument, since the Kleibergen-Paap F test yields a value of 11.23 (Column 1), above the Staiger and Stock (1997) rule of thumb value of 10. The first stage results show a positive and significant coefficient at the 90 percent level, which suggests that the IV is relevant.⁹

Table 4. Effect of Rule Adoption and Rule Strength on the Fiscal Balance with Instrument Variable Estimator¹⁰

VARIABLES	(1) Balance	(2) Balance
Fiscal Rule Dummy	1.376 (0.872)	
Fiscal Rule Strength Index		3.378** (1.671)
Observations	2,797	2,526
R-squared	0.302	0.298
Number of id	142	130
IV	Diffusion of fiscal rules	Diffusion of fiscal rule strength index
Kleinberg-Paap rk test	11.23	43.70
Stock-Wright p-value	0.00	0.00

Note: The table reports the results based on Equation 1, where Rule is a dummy variable equal to 1 for country-year observations in which a fiscal rule is in place. The fiscal rule strength index is the IMF Index. In Column (1), the instrument is the diffusion of fiscal rules (number of neighboring adopting a fiscal rule), and in Column (2) is the diffusion of fiscal rule strength (average fiscal rule strength in neighboring countries). Standard errors are clustered at the country level. The estimation includes all the variables in Equation (1). *** p<0.01, ** p<0.05, * p<0.1.

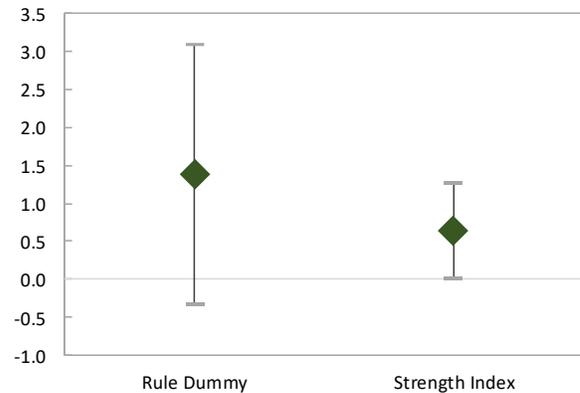
⁹ The critical values reported by ivreg2 for the Kleibergen-Paap statistic are the Stock-Yogo critical values for the Cragg-Donald i.i.d. case. Angrist and Pischke (2009) argue that the weak instrument bias tends to be small in exactly identifies models like this one. Additional series of tests for weak instruments were performed and confirmed that the new instruments are not weak.

¹⁰ The IV estimation includes all the control variables presented in Table 2.

15. However, there is evidence that improving the rule design can have a significant effect on fiscal performance.

When instrumental variables are applied to the fiscal rule strength index (rather than the rule dummy), the results point to a positive and significant relation between rule strength and fiscal balance (Table 4 Column 2).¹¹ In order to provide an interpretation of the size of the coefficient, it is important to take into account the distribution of the strength index. On average across all types of rules, moving from a badly designed rule (i.e. a fiscal rule strength index in the 25th percentile) to a better designed rule (i.e. a fiscal rule strength index in the 75th percentile) results in an improvement of the budget balance by 0.64 percent of GDP (Figure 4 second coefficient).¹²

Figure 4. Effect of Adopting and Strengthening a Fiscal Rule on the Balance (Percent of GDP)



Note: The second coefficient indicates the effect of moving from the 25th to the 75th percentile of the strength index.

16. In addition, the adoption of poorly designed rules does not seem to deteriorate the fiscal balance, but this result is subject to important caveats.

To explore further the issue of heterogeneity, we compare the effect on the fiscal balance of adopting poorly vs. better-designed rules. To do so, we build two dummy variables: i) a dummy for poorly-designed rules, which is equal to one for values of the strength index within the first quartile and 0 for countries without rules; and, ii) a dummy for better-designed rules, which is equal to one for values of the strength index corresponding to the remaining quartiles and, similarly, 0 for countries without rules.¹³ The results presented in Table 5 (Column 1) do not identify a systematic difference between the absence of rule and poorly-designed rules. On the contrary, the adoption of well-designed rules improves the budget balance by about 0.8 percent of GDP (Column 2). Nonetheless, these results should be interpreted with caution for the following reasons: i) the regressions are estimated without the instrumental variable, since regressions with IV are weak when applied to sub-samples; ii) the definition of poorly-designed rules is arbitrary, with an ad-hoc threshold at the first quartile of the sample; and iii) the index of rule strength is admittedly an imperfect indicator of the “quality” of rules since it only focuses on design, rather than implementation, leaving aside the key enabling factor of the public and political support to the rule.

¹¹ The fiscal rule strength index is constructed as described in paragraph 7: i) 0 corresponds to no-rule, ii) a positive number describes the quality of the design of the rule in a rule adopter, and iii) a higher number denotes better design, with 1 denoting the strongest rule.

¹² The calculation of the value depends on the distribution of the index – Cf. Table 1. We multiply the coefficient on the strength index (3.4) by the actual change in the index from the 25th to 75th percentile (0.19).

¹³ This approximates a one-standard deviation below the mean of the index (see Table1).

Table 5. Poorly vs better designed rules¹⁴

VARIABLES	(1) Balance	(2) Balance
Poorly designed rules (within first quartile of the index)	0.40 (0.46)	
Better designed rules (above first quartile of the index)		0.77*** (0.26)
Fiscal rule strength		
Observations	1,935	2,580
R-squared	0.77	0.71
country FE	yes	yes
year FE	yes	yes
SE	Cluster C	Cluster C
Sample	Full	Full

Note: The table presents the results for OLS regressions. Column (1) includes a dummy for poorly-designed rules, which is equal to one for values of the strength index within the first quartile and 0 for countries without rules. Column (2) includes a dummy for better-designed rules, which is equal to one for values of the strength index corresponding to the remaining quartiles, and 0 for countries without rules. Standard errors are clustered at the country level. The estimation includes all the variables in Equation (1). *** p<0.01, ** p<0.05, * p<0.1.

E. Conclusions

17. The main finding of this paper is that fiscal rules *per se* do not have a statistically significant impact on the fiscal balance, once endogeneity is adequately controlled for. The paper assesses the effect of having a fiscal rule on the fiscal balance in a wide panel of countries (over 140) over a long period (1985-2015), and controlling for endogeneity using newly developed instrumental variables capturing the diffusion of fiscal rules across countries. The insignificance of the average causal link between fiscal rule and fiscal balance supports the findings of Heinemann and others (2018).

18. However, design features can make rules effective. A more refined analysis that also considers the rule's design finds that better designed rules have a strong and significant positive impact on the fiscal balance. In contrast, we do not find a statistically significant effect of poorly-designed fiscal rules on the fiscal balance.

¹⁴ The estimation includes all the control variables. The estimation relies on OLS, since the data do not have enough variation to use IV for subgroups.

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THE IMPACT OF FISCAL RULES: FROM AVERAGE TO DISTRIBUTIONAL EFFECTS¹

A. Introduction

1. Empirical studies on the effectiveness of fiscal rules have mostly focused on the average impact on fiscal outcomes across countries (Bergman and others 2016; Heinemann, Moessinger, and Yeter 2018; Tapsoba 2012; Debrun and others 2008; Caselli and Reynaud 2018). In most cases, the focus is on estimating “average effects,” by which we mean the average relationship between a set of covariates and the government fiscal balance in the presence of a fiscal rule. For instance, traditional approaches have investigated the impact of the introduction of the Stability and Growth Pact among European Union (EU) countries by comparing *average* government deficits in 1991 prior to the introduction of the supranational rules, with *average* government deficits after the rule was adopted in 1992.

2. This paper extends the analysis of fiscal rules by looking at their impact on the entire distribution of government deficits among European countries.² The introduction of a rule may have an impact not only on the average, but also on the dispersion of deficits across countries. For instance, the introduction of the supranational deficit rule in Europe has focused the public debate on compliance with the 3 percent deficit ceiling. This has raised pressure on countries with large deficits to improve their fiscal balance in an effort to comply with the rule, but the introduction of the rule may also have led high balance countries to relax their efforts, given that there was little incentive to vastly overperform relative to the 3 percent deficit. As a result of these potential forces, deficits may have become more concentrated around the rule’s threshold, with the 3 percent ceiling acting as a “pulling force”. Such features would not be well captured by least squares models traditionally used in the literature that focus on average effects, but would nevertheless be very important for policy makers.

3. In addition, this paper addresses the selection bias into fiscal rule adoption. By selection bias, we mean that countries with and without fiscal rules are intrinsically different beyond merely the presence of the rule. Countries with fiscal rules may have certain characteristics that foster good fiscal policy—for instance a preference for fiscal prudence—whether or not a rule is in place (Poterba, 1996). Since the decision to adopt a rule depends on a range of factors that can correlate with fiscal performance, it is important to remove these confounding factors to recover the true causal impact of fiscal rules. For these reasons, a simple comparison of countries with and without rules will not yield a causal effect on fiscal outcomes. To overcome this problem, it is important to build a counterfactual. This means answering the question: “What would the deficits of the EU countries have been, had they not adopted the 3 percent deficit ceiling?” To do so we adopt

¹ Prepared by Francesca Caselli (Research Department) and Philippe Wingender (Fiscal Affairs Department).

² This background note is based on the forthcoming IMF Working Paper titled “The Impact of Fiscal Rules: From Average to Distributional Effects,” by Francesca Caselli and Philippe Wingender.

a treatment effects methodology to construct a counterfactual sample. Intuitively, this is done by giving more weight to observations in the “no fiscal-rule” group that have a higher probability of introducing the rule based on a set of predictors. This reweighing approach allows us to construct a counterfactual sample with properties that are very close to the treated group, except for the presence of the rule itself.

4. The main finding of the paper is that the introduction of the 3 percent general government deficit ceiling has narrowed the entire distribution of government balances across countries. The deficit rule has led countries with very high deficits to reduce them, while countries with low deficits (high balances) have responded to the rule by reducing the level of their government balance. This supports the idea that rules exert a “magnet effect” and countries are attracted towards the 3 percent deficit ceiling. We document that 20 percent of the sample “bunches” in the region around the 3 percent deficit ceiling in the treated group compared to the counterfactual group. Focusing on country-specific results, we find that most European countries have seen their fiscal position improve as a result of the deficit rule, meaning that they would have recorded higher deficits in the absence of the rule. This positive effect is observed for 22 countries out of the 28 countries that adopted the 3 percent deficit rule in our sample. Across these countries, government balances improved by 0.7 percent of GDP on average as a result of the rule. These results provide new evidence of the effectiveness of fiscal rules even when governments do not comply with the numerical limit.

B. Estimation Methodology

Empirical approach

5. The paper estimates the impact of fiscal rules (FR) on fiscal outcomes in a sample of 33 EU member and candidate countries from 1970 to 2016. The paper focuses on the 3 percent general government deficit ceiling in EU countries to study the full distributional effects of a numerical FR. The advantage of this particular sample is that the selected countries present some degree of homogeneity. Detailed data on fiscal, macroeconomic and other variables are also available over a long period both before and after FR adoption for most countries. A common numerical rule also makes the visual analysis of the distributions quite straightforward. In particular, it is possible to focus on the distributions around the 3 percent ceiling to detect any changes that could be attributable to the rule. Finally, since the adoption of the 3 percent deficit ceiling did not occur simultaneously in all countries, the empirical approach can distinguish between the impact of the FR and broader macroeconomic trends.

6. The analysis proceeds in four steps. First, we start by modelling the adoption of the FR and correcting for the selection bias in our sample. This is done by using the efficient inverse probability weighting procedure proposed by Hirano, Imbens, and Ridder (2003) to construct a counterfactual group for countries with the FR. In a second step, we recover the average treatment effect of the FR introduction comparing the means of the two group countries: countries that have adopted the FR and the counterfactual group. While this step is not needed to estimate the full

distributional effects of the rule, it allows us to compare our results with findings from previous literature, including the results of the second background paper. Third, we estimate the causal impact of the deficit rule on the entire distribution of fiscal outcomes to recover the full distributional impacts. This is done by comparing the empirical density functions for countries with FR and the counterfactual sample.³ Finally, once the full distributional impacts have been estimated, it is also possible (under further assumptions) to recover counterfactual observations for each individual country. We report those results in section C below.

7. The applied methodologies relate to the growing literature on heterogeneous and distributional effects in economics (see for example Chamberlain 1994; Stock 1989; Heckman and Vytlacil 2007; Koenker 2017 for a recent review). Studies using quantile or distribution regressions—the leading types of estimators—have looked at the drivers of income inequality, the effects of training programs on earnings, education and student performance, the impact of welfare reform on household labor supply, as well as various topics in empirical finance, among others (Koenker and Hallock 2001). For instance, in their seminal study of wage inequality among US workers, DiNardo, Fortin, and Lemieux (1996) decompose the changes in the distribution of wages over time into several components due to changes in labor market institutions, individual and macroeconomic factors. Estimation of the entire distributions also allows them to assess changes in terms of traditional inequality indicators such as the Gini coefficient and Theil index.

Correcting for self-selection

8. Countries with and without FR have different characteristics that influence both the probability of adopting a FR and subsequent fiscal policies. Therefore, a simple comparison across the two groups would not give a causal estimate of FR, since differences could be attributable to differences in the groups' characteristics. This is known as selection bias. To overcome this selection bias, we follow a two-step procedure: first, we model the probability of FR adoption with a logit model that accounts for relevant observed characteristics. Secondly, we generate a counterfactual group by using the efficient weighing scheme proposed by Hirano, Imbens, and Ridder (2003). This approach consists of giving greater weight to observations in the control group with a higher propensity score, i.e. with similar characteristics that predict adoption to those with FR, thus generating a counterfactual group comparable to rulers.⁴ Using this approach, we can recover an estimate of the distribution of government deficits among rulers that would have been observed

³ Firpo (2007) and Donald and Hsu (2014) use a similar weighing approach to estimate quantile and cumulative distribution functions.

⁴ The weights are defined as follows: $\hat{w}_{ct} = 1\{FR_{ct} = 1\}/\hat{P} - 1\{FR_{ct} = 0\}\hat{P}_{ct}/\hat{P}(1 - \hat{P}_{ct})$ where \hat{P} and \hat{P}_{ct} are the unconditional and conditional probabilities, respectively, of fiscal rule adoption. \hat{P} is the share of observation that adopted a fiscal rule in our sample and \hat{P}_{ct} is obtained from a logit model. Other approaches using propensity score or regression-based methods are also available to evaluate treatment effects. See Imbens and Wooldridge (2009) and Wooldridge (2010) for useful introductions. Chernozhukov et al. 2013 provide a general framework for counterfactual analysis using regression methods. Our control group includes observations prior to the adoption of the deficit ceiling, as well as observations for countries that never adopted the fiscal rule.

had these countries not adopted the FR. A causal interpretation from the comparison of the two groups relies on the *selection on observables* assumption.⁵

9. The literature on the determinants of FR adoption guide the choice of covariates used in the first-stage (selection) equation.⁶ We classify the predictors of FR adoption into four main categories:

- *Fiscal variables.* Past fiscal behavior can have a direct impact on the probability of adopting a rule. We expect that well-behaved governments adopt rules to signal to agents the nature of their unobserved preferences. At the same time, high-deficit countries could introduce a FR to impose some discipline on their public finances. Countries with high population dependency ratio will have a higher demand for social spending, making it more difficult to introduce fiscal discipline.
- *Macroeconomic variables.* They are also often used as predictors of FR adoption: richer countries will have better institutions and human capital and thus will be more inclined to set up the institutional framework needed for FR. Countries with low levels of inflation (and in some cases inflation targeting regimes) are more likely to have the necessary institutional framework to implement fiscal reforms. For instance, inflation targeting adoption sometimes went along with the introduction of fiscal reforms, including the establishment of FR, to support the inflation targeting framework (e.g. in Brazil, Norway, New Zealand or Sweden—see Combes et al. 2014).
- *Institutional factors.* The degree of political stability and government fragmentation might also impact the probability of adopting a FR. Countries where the political process undergoes regular checks and balances and where the government is stable are more likely to prefer fiscal discipline and therefore to adopt rules. Finally, federal governments have weaker fiscal sovereignty and might have an interest in introducing rules to strengthen their bargaining position with states or provinces.
- *Economic and monetary integration criteria.*⁷ Finally, since the adoption of the 3 percent deficit ceiling coincided in many cases with broader economic and monetary integration into the Euro area, we also control for factors that have been found to predict currency union membership. In other words, we need to isolate the selection process into the 3 percent deficit rule from the run-up to Euro adoption. We therefore follow Alesina, Barro and Tenreyro (2002), and we

⁵ This means that, after correcting for relevant country characteristics, the decision of adopting a rule is random. Other characteristics are therefore irrelevant, because by assumption they are not correlated with the rule's adoption. Therefore, they can be ignored in the third step of our approach. Such characteristics include the subsequent adoption of other fiscal rules, such as the Medium-Term Objective for EU countries or national rules for instance.

⁶ See for instance Debrun and Kumar (2007), Combes and others (2014), Elbadawi and others (2015), Badinger and Reuter (2017) and Guerguil and others (2017).

⁷ Since adoption of the FR was necessary for European Union membership, we cannot separate the effect of the 3 percent rule and the broader effects of EU membership.

augment the baseline model with variables that capture the intensity of the trade relationship with EU-11 member countries as well as relative output and price co-movement.

10. The first-stage estimation shows that fiscal and macroeconomic variables are most strongly correlated with the adoption of the FR. Table 1 presents the marginal effects obtained with the estimation of different first-stage logit models. The variables that appear to have the strongest predictive power for the adoption of rules are age dependency ratio, the log of GDP per capita, lags of the balance and the trade relationship with EU-11. In terms of the fiscal variables, our results indicate that the adoption of FR is motivated in part by the desire to address the increased spending demands from high age dependency ratios. Past fiscal deficits are also related to the adoption of FR, with the second and third lags showing up as particularly significant. Regarding levels of income, there is a strong indication that higher GDP per capita is associated with higher probability of adoption, in line with prior results in the literature. Finally, the negative coefficient on the trade variable is somewhat surprising given prior evidence that higher trade integration is associated with currency unions. However, this result seems due to the strong collinearity with the other covariates. Indeed, the estimated coefficient in the univariate case (unreported) is statistically significant and positive. Finally, the Bayesian Information Criteria (BIC) indicates that model (2) achieves the best balance between predictive power and “overfitting” of the model.⁸

⁸ The comparison of the raw and weighted series reveals a significant level of overlap for the four models, providing support for strategies relying on the propensity score. We also implement the test for covariates balance developed by Imai and Ratkovic (2014) to check whether the propensity score is correctly specified. For all the four models, we cannot reject the null that covariates are balanced, providing further evidence that our counterfactuals are appropriate.

Table 1. FR Determinants of FR adoption

	(1)	(2)	(3)	(4)
Fiscal variables				
Lag 1 balance	0.100 (0.303)	0.067 (0.320)	0.251 (0.324)	0.137 (0.341)
Lag 2 balance	-0.821 (0.428)	-1.020* (0.463)	-1.213** (0.445)	-1.094* (0.459)
Lag 3 balance	0.667 (0.391)	0.877* (0.348)	0.924* (0.387)	0.810* (0.396)
Lag 1 debt	0.036 (0.030)	0.063* (0.027)	0.072* (0.037)	0.065* (0.031)
Age dependency ratio	-0.775*** (0.215)	-0.561** (0.210)	-0.537* (0.210)	-0.667** (0.226)
Macro variables				
Log GDP per capita		8.924*** (2.223)	8.890** (2.892)	14.377*** (2.945)
GDP per capita growth		40.964 (33.710)	51.268 (35.810)	39.157 (30.565)
Inflation		-0.260 (0.186)	-0.365 (0.209)	-0.323 (0.199)
Political variables				
Federation			-1.342 (1.963)	
Constraints on executive			1.228 (1.705)	
Legislative fract.			-0.023 (0.098)	
Currency union				
Trade with EU-11				-0.163* (0.071)
Price co-movement res.				0.596 (0.370)
Output co-movement res.				-0.663 (0.886)
Pseudo R-squared	0.103	0.212	0.224	0.501
BIC	226.0	222.0	227.7	233.5
Obs.	552	552	492	541

Note: The table presents the marginal effects of the first stage logit estimation. Standard errors clustered at the country level in parentheses. Coefficients are multiplied by 100. * means $p < 10\%$, ** $p < 5\%$, *** $p < 1\%$.

C. Main Results on The Impact of the Rule on Fiscal Balances

Average effect of FR on fiscal balances

11. The introduction of the FR does not have a significant effect on the government balance average. We use the reweighted sample to estimate the causal impact of the FR on fiscal outcomes in the second stage. We focus first on the average treatment effect by comparing the means of the treated group (with FR) and the counterfactual group (reweighted observations without FR). This result is obtained by computing the means of the two groups: countries that have adopted the FR and our counterfactual group obtained in the previous step. Table 2 shows the average treatment for the four different models. In the first two columns, we estimate simple difference-in-differences estimators without re-weighting. The first column includes year fixed effects; the second column also includes country fixed effects. The second specification is less restrictive, since it relaxes the assumption that countries all have the same intercept. Adding country fixed-effects therefore controls for country-specific time invariant characteristics. The two difference-in-differences specifications however do not control for selection into FR adoption. We find in both cases large and statistically significant coefficients. Once we control for selection into FR, the coefficient becomes smaller and insignificant across all specifications (which correspond to the different models reported in the first stage Table 1). This is consistent with previous empirical evidence that the introduction of fiscal rules does not have a significant effect on countries' general government balance (Heinemann, Moessinger, and Yeter, 2017).

Table 2. Average treatment effect results

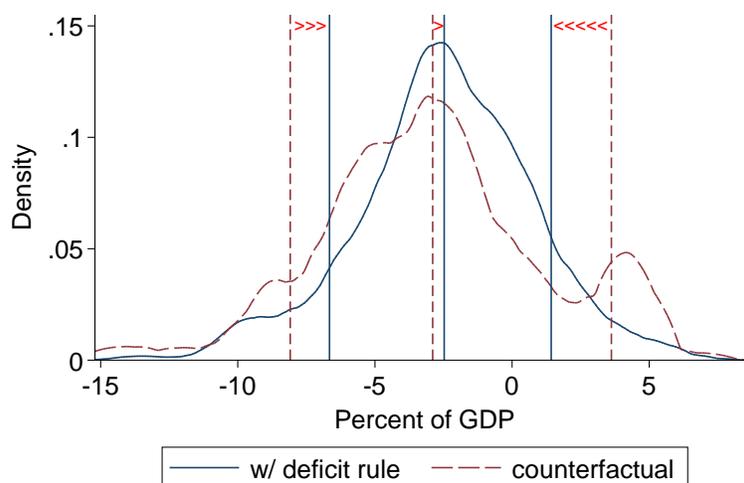
	Diff-in-diff 1	Diff-in-diff 2	IPW 1	IPW 2	IPW 3	IPW 4
ATET	1.17**	2.29***	0.99	0.56	0.07	0.42
Std. error	0.66	0.78	0.64	0.71	0.64	0.66
P-value	0.09	0.01	0.12	0.43	0.91	0.52
Min95	-0.18	0.71	-0.26	-0.83	-1.20	-0.88
Max95	2.51	3.88	2.25	1.96	1.34	1.72
Obs.	1156	1156	1019	1007	905	843

Note: ATET means "Average Treatment Effect on the Treated". Min95 and Max95 give the boundary values of the 95 percent confidence interval around the ATET estimate. Column 1 and 2 present results for difference-in-difference estimation. The IPW1-IPW4 models are estimated with the weights obtained with the corresponding 4 first stage logit models reported in Table 1. Standard errors clustered at the country level in parentheses. * means $p < 10\%$, ** $p < 5\%$, *** $p < 1\%$.

Effect on the entire distribution of fiscal balances

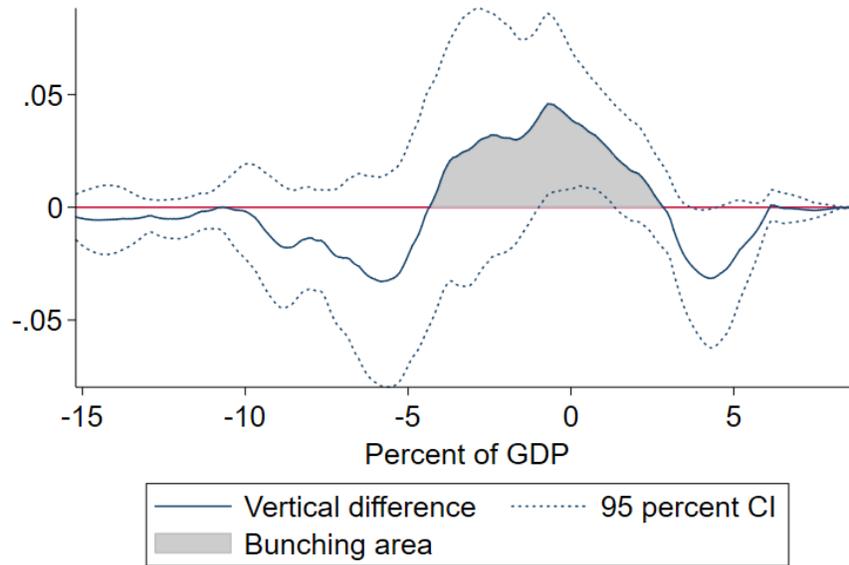
12. The introduction of the 3 percent deficit ceiling changed the entire shape of the deficit distribution across countries, although the average deficit was not much impacted. The distributional effects are obtained by comparing kernel density estimates for both treatment and counterfactual groups. Consistent with results presented in Table 2, we find that the average effect of the FR on the balance is positive (although not statistically significant when properly correcting for the selection bias), since the middle blue solid line in Figure 1 is located to the right of the middle dashed red line. However, further inspection of the figure indicates that the effects at the top and bottom of the distribution are quite large and of opposite signs. This indicates that the 3 percent deficit ceiling reduced the deficit among high deficit countries (those on the left-hand side of the deficit distribution) and increased it among low deficit (high balance) countries on the right-hand side of the distribution. The overall impact is one where observations are pulled towards the middle of the distribution. This crucially shows that while standard approaches estimating the “average” treatment effect correctly captures the impact on the “average” country, it nevertheless fails to describe the full extent of the impact of the FR on all countries’ deficit. Specifically, it overstates the impact on high balance countries, and more importantly, it underestimates the impact on countries with large deficits. Another important implication of these findings is that the FR had an impact on non-compliers even though deficit levels remained above the ceiling in many cases.

Figure 1. Counterfactual fiscal balance distributions correcting for selection bias



Source: Caselli and Wingender (2018).

Note: The figure plots kernel densities for the treated group with FR and the counterfactual group using estimates from equation (1). The dashed and solid vertical lines indicate (from left to right) the 10th percentiles, means and 90th percentiles of the respective distributions. See text for details.

Figure 2. Vertical distance in the treatment and counterfactual distributions

Source: Caselli and Wingender (2018).

Note: This figure plots the vertical difference in the densities shown in Figure 1. The dotted lines indicate the 95 percent point-wise confidence bands. The grey area indicates the region around the 3 percent deficit ceiling where the density of the treatment group strictly exceeds the counterfactual density.

13. The deficit rule has exerted a magnet effect. Figure 2 shows the vertical distance between the two distributions along with the 95 percent point-wise confidence bands.⁹ The figure also shows in grey the area where observations are “bunching”, i.e. the range of government balances where the density of the treatment group exceeds that of the counterfactual group. The range of this bunching area starts slightly below the deficit ceiling of -3 percent, extending from -4.2 percent of GDP to 2.8 percent of GDP. The size of the area in grey corresponds to the share of observations in the treatment group that is in excess of the share in the counterfactual group in the same deficit range. The result indicates that 20 percent of the treatment group is “closer” to the threshold than in the counterfactual group. Of the 20 percent excess density, 15 percent is located above the -3 percent ceiling, in compliance with the FR. Despite having a larger share of observation at the ceiling, the asymmetric bunching is consistent with the “close-to-balance” requirement that was part of the original Stability and Growth Pact. This requirement stipulated that, over the medium term, EU Member States should achieve a fiscal position close to balance or in surplus.¹⁰

⁹ Robust standard errors are clustered at the country level. Estimates are obtained by stacking moment conditions from the first and second stages. This corrects for the fact that the true probability weights are not observed in the data, but estimated through the first stage logit.

¹⁰ The requirement was replaced in 2005 by a country-specific medium-term objective (MTO). While the MTO varies by country, in most cases it states that countries should aim for a government balance of -0.5 percent of GDP in the medium term. Importantly, the MTO defined in structural terms, as opposed to the nominal balances for the analysis.

Country-specific results

14. To recover a counterfactual estimate for the deficit of each individual country, a rank invariance assumption is used.¹¹ This assumption states that the ordering of individual country-year observations in the treatment group over the entire sample remains the same in the counterfactual group without the deficit rule.¹² In other words, under this assumption, the introduction of a FR could affect the dispersion of deficits, but would not change the relative positions of individual observations within the distribution. After introduction, the countries with the highest balances would therefore remain at the top of the balance distribution, while countries with the lowest balances would remain at the bottom. For example, Italy in 1996 was at the 10th percentile of the treatment group with a deficit of 6.75 percent of GDP. Under the rank invariance assumption, Italy's (unobserved) rank in the counterfactual (no rule) group would be assumed to remain at the 10th percentile with a deficit of 7.8 percent of GDP. Similarly, Finland in 2000 had the largest balance in our treatment group with a surplus of 6.9 percent of GDP. Rank invariance maintains Finland's top ranking in the counterfactual group but now with a government balance of 7.1 percent. The assumption of rank invariance is quite strong but does not seem unrealistic in the context of fiscal behavior, which is persistent and slow moving for various reasons (including the operational and political difficulties to reduce the deficit drastically in a short period of time and of the stability of national preferences).¹³

15. Under this assumption, results suggest that most European countries have seen their fiscal position improve as a result of the deficit rule. Figure 3 presents average results over the sample period. Out of the 28 countries that adopted the 3 percent deficit rule in our sample, 22 countries (about three quarter of the sample) have seen an improvement on their average annual deficit level. This means that 22 countries would have recorded a higher deficit on average without the rule. Across these countries, government balances improved by 0.7 percent of GDP on average. We estimate that for the 6 remaining countries (Luxembourg, Estonia, Sweden, Ireland, Finland and Denmark), government balances decreased by 0.5 percent of GDP on average. These countries also have the highest average government balances in our sample. This is not a coincidence, but a direct consequence of the distributional results discussed above, namely that countries with high balances saw a reduction in their balances following the introduction of the rule.

16. The effect of the FR can be further decomposed by looking at the time path of fiscal deficits for each country. Some notable examples include Germany, where the effect of the FR on the balance is almost always positive through the 1990s and 2000s and becomes negative starting in 2012, when Germany starts running government surpluses (Figure 4). France is at the other end of the spectrum in terms of general government deficits. We find that France would have had

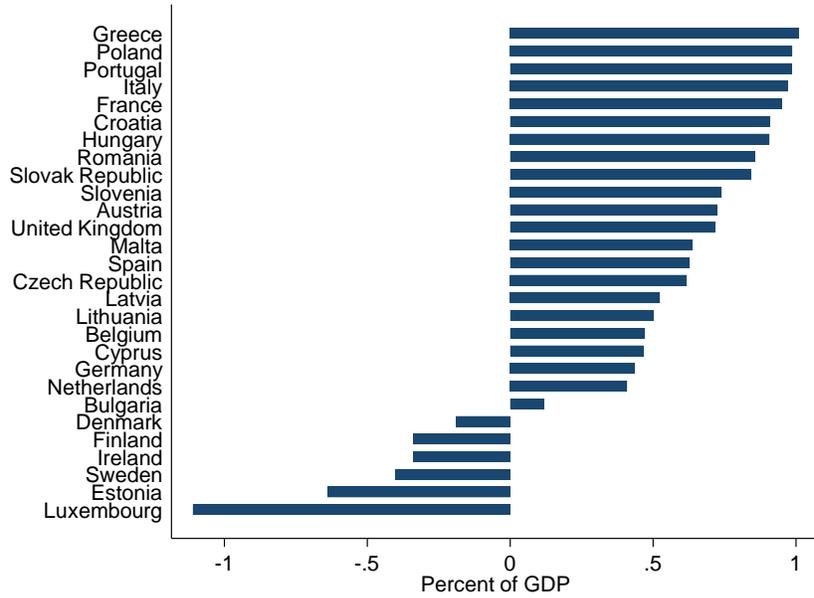
¹¹ This assumption is necessary to recover country-specific results since it is not possible to simultaneously observe a country with and without a FR. See Heckman, Smith, and Clements (1997).

¹² Bitler, Gelbach and Hoynes (2005) propose an informal test for this assumption. Abbring and Heckman (2007) discuss alternative methods to estimate the distribution of treatment effects from quantile treatment effects.

¹³ Country fixed effects explain 47 and 40 percent of total rank variance in the control and treatment groups respectively.

consistently larger general government deficits without the FR. On average, the effect of the FR on France’s deficits was a 0.95 percent of GDP improvement in the government balance.

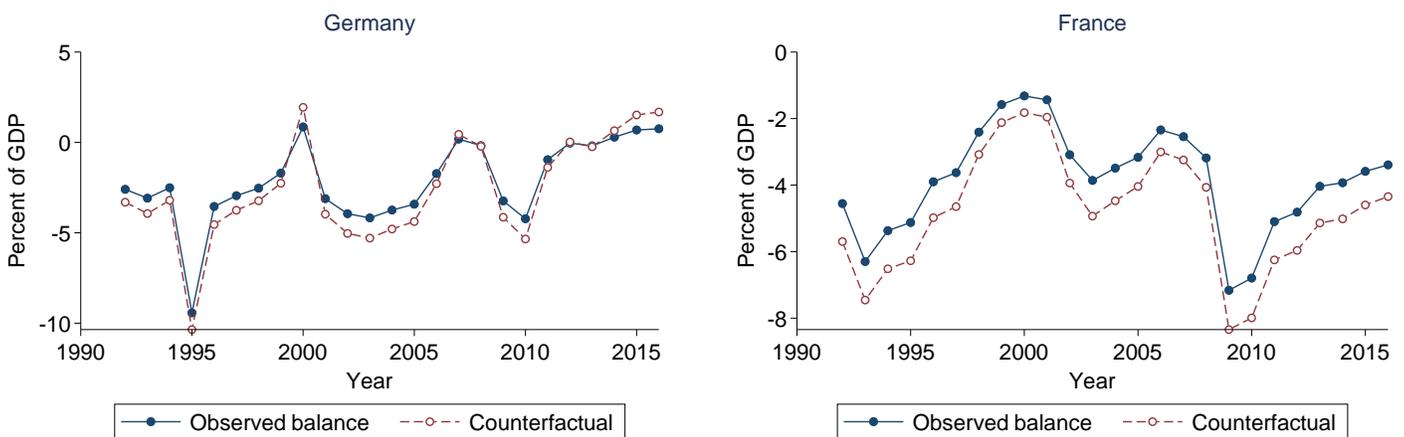
Figure 3. Average impact of the FR on fiscal balances by country



Source: Caselli and Wingender (2018).

Note: This figure plots the average difference between observed and counterfactual government balances by country that adopted the 3 percent deficit rule. Positive values indicate that fiscal balances increased as a result of the FR.

Figure 4. Time path of general government fiscal balance



Source: Caselli and Wingender (2018).

D. Conclusions

17. The impact of fiscal rules on fiscal performance goes beyond the average effect, impacting the whole distribution of fiscal balances. Looking at the impact of the 3 percent deficit rule in EU countries, this paper finds that the average treatment effect is small and statistically insignificant, but crucially that this average impact masks important variation across the distribution of deficits. Notably, we observe large effects at the bottom of the distribution on countries with the largest deficits. We find that most EU countries have seen their fiscal deficits decrease as a result of the FR.

18. This study also finds that rules have a magnet effect, impacting strong and weak performers in opposite ways. We find evidence that FR are effective in constraining fiscal policies in countries that do not comply with the threshold. On the other hand, the compliers (stronger performers) tend to reduce government balance and converge towards the 3 percent ceiling. In addition, our results suggest that the effect of the 3 percent deficit ceiling on individual countries has not been constant over time, but has varied with the level of deficits. In good times, when government balances were high, the rule tended to reduce their level. In years with large deficits, however, the FR reduced them. Consequently, policy makers should carefully consider the costs and benefits of introducing numerical targets since the impacts might be quite complex and interact in unexpected ways with countries' current fiscal position.

19. Rules can therefore have an effect on deficits even when they are not complied with. As the paper shows, the FR had an impact on deficits even in countries that did not comply with the 3 percent ceiling. This means that deficits among EU countries that did not comply with the 3 percent deficit ceiling would have been even larger absent the FR. By attracting countries' deficits towards the threshold, rules can therefore improve the fiscal performance of poor performers, even for those that do not comply with them.

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THE DYNAMICS OF FISCAL RULE COMPLIANCE¹

A. Introduction

1. There is a perception that rules are only effective in reducing deficits when they are strictly complied with. Many of the recent reforms of fiscal rules have been motivated by the willingness to improve compliance (European Council, 2010; European Central Bank, 2011). These reforms have primarily focused on strengthening the monitoring and enforcement of rules, including through sanctions and correction mechanisms that increase the costs of large, persistent, and recurrent deviations. In addition, some reforms have tried to ensure that the fiscal rule system remains credible if the rule is breached by establishing escape clauses for exceptional events.

2. This perceived link between compliance and effectiveness should be examined more thoroughly. The link lies on two beliefs widespread among policymakers. The first belief is that deviations from the rule, particularly large ones, tend to be persistent and, if not corrected on a timely basis, may result in unsustainable fiscal behavior.² The second belief is that the credibility of rules and thus their ability to serve as a signaling device of government's plans can be quickly eroded following noncompliance events. The logical prescription once these two beliefs are combined is that, for the rule to influence fiscal behavior, the magnitude and frequency of deviations from the rule should be minimized. In other words, a rule must be strictly complied with to have an effect.

3. The literature provides little evidence on the effect of rule compliance on fiscal performance. The bulk of the empirical literature has focused on attempting to establish some association (correlation or causation) between the adoption or "strengthening" of fiscal rules and fiscal outcomes.³ In contrast, the analysis of rule compliance is still in its early stages. The few studies have only gone so far as to provide a descriptive analysis of compliance rates across different types of rules (Andrle and others, 2015; Cordes and others, 2015) and examine the causes of noncompliance (Frankel and Schreger, 2013; Reuter, 2017; and Delgado-Téllez and others, 2017). Assessments of the impact of rule compliance are even rarer and, for the most part, the above-mentioned beliefs have not been empirically tested. Our paper looks at the persistence of deviations across national numerical rules in the European Union. It also performs a counterfactual analysis that contrast how deviations from numerical thresholds evolve over time with and without a rule.⁴ Contrary to the posed beliefs the paper finds evidence that rule noncompliance, while persistent,

¹ Prepared by Victor Lledó (Fiscal Affairs Department) and Wolf Heinrich Reuter (Staff of the German Council of Economic Experts).

² This is one of the arguments used for the introduction of correction mechanisms. See previous Background Paper by A. Hodge, Y. Kim, and V. Lledó.

³ See Heinemann, Moessinger, and Yeter (2017) for a recent survey and meta-analysis of the empirical literature.

⁴ Numerical thresholds can be defined as the numerical limits imposed on the budgetary aggregate constrained by the rule.

might not necessarily lead to unsustainable fiscal behavior. It finds evidence of a force that pulls fiscal variables towards thresholds constraining them. This *threshold-reversion effect* seems to be stronger when embedded in a rule-based framework, particularly among rule non-compliers. Using a different methodology, the previous Background Paper by F. Caselli and P. Wingender arrives at similar results for the supranational rule capping the general government deficit of EU countries to 3 percent of GDP. Both papers find that rules act as a magnet and can influence fiscal outcomes even when not complied with.⁵

4. This paper tries to close the gap through an empirical assessment of how (non)compliance with budget balance rules affect fiscal behaviors. It covers all types of budget balance rules. As in Reuter (2015), it looks at how the fiscal balance evolves over time in relation to the rule's numerical thresholds and whether these dynamics differ from those observed in countries without a budget balance rule. This paper extends Reuter (2015) in two areas. First, it uses a broader country sample that in addition to European national rules also covers both national and supranational rules in other advanced economies, emerging markets, and developing countries. Second, it assesses how compliance dynamics change depending on the size and recurrence of past deviations, as well as on the strength of a fiscal rule.

5. Six main empirical results come out from the analysis of this paper:

- We find evidence in a broad sample of countries of a force that pulls budget balances constrained by rules towards the rules' thresholds. Indeed, both positive and negative deviations between fiscal deficits and rule thresholds disappear over time as a result of what we define as a *threshold-reversion effect*.
- The threshold-reversion effect is stronger for negative than for positive deviations, which means that convergence to the threshold is faster for countries that are currently not complying with the threshold than for countries in compliance.
- The intensity of the threshold-reversion effect depends on the size and recurrence of deviations. The effect is stronger for large infrequent negative deviations, which are more likely to trigger corrective actions, but weaker for small recurrent ones, as such small and repeated deviations can be more easily accommodated without triggering corrective actions.
- Budget balance rules with better design features or supported by other types of rules such as debt or expenditure rules do not generally seem to exert a stronger pulling force.
- We also find budget balances to be stationary in most countries and, thus, to converge to their long-term mean, regardless of whether countries have or not a budget balance rule. Among

⁵ Earlier evidence that noncomplied rules can still be effective has been provided by Briotti and Lambertina (2004) in the European Union (EU) context. They find evidence that among EU countries the downturn in the early 1990s saw a much larger number of "extreme budgetary deteriorations" than the 2001-03 slowdown, when the number of countries subject to supranational rules under the Stability and Growth Pact was much larger.

countries with rules, we find that budget balance rules' thresholds are generally set close to the average of the fiscal balance prior to the introduction of the rule.

- We thus compare the speed of mean-reversion of the fiscal balance between countries with and without rules. We find that the speed not only vary across country groups but also depends on whether deviations from the mean are positive (budget deficit below average) or negative (budget deficit above average) as follows:
 - For *negative deviations*, countries with rules tend to have a faster mean-reversion than countries without rules. Mean-reversion is even faster if the rules' threshold is set close to the balance average prior to the rule adoption.
 - For *positive deviations*, countries with rules tend to display a slower mean-reversion than countries without rules. Mean-reversion is even slower if rule's threshold is near the fiscal balance average prior to the rule adoption.

6. The main policy implication is that rules do not need to be strictly complied with to influence deficits. Our analysis highlights three main policy results. First, rules influence deficits even if not complied with, as long as deviations are not too recurrent. Indeed, rules can attract deficits towards their thresholds even after large infrequent deviations take place. Second, by ensuring above-average fiscal deficits are more quickly eliminated and below-average deficits preserved for a longer period, countries with budget balance rules may be more effective in reducing excessive deficit biases than countries where such rules are not in place. Third, the puling effect of the rule's threshold reinforces the importance of calibrating rules adequately. When it comes to ensuring that rule deviations are quickly eliminated, the proper calibration of the rule threshold tend to matter more than other design features.⁶ Countries also tend to treat rules' thresholds as implicit targets rather than ceilings; calibration should take this behavior into account and err on the side of caution. The next section describes the data and provides some stylized facts on noncompliance in the selected sample. Section C summarizes the main econometric results. Section D concludes with some policy messages.

B. Stylized Facts

Data and Measurement

7. The assessment of rule compliance relies on a worldwide sample of budget balance rules. The dataset comprises 55 national and 6 supranational budget balance rules (BBRs) in force among 49 countries between 1985 and 2016. There are three reasons why this paper focuses on compliance with BBRs only. The first reason is the worldwide presence of BBRs, which helps maximize the sample size and country coverage. The second reason is that the analysis of

⁶ That said, as shown in previous background notes, rule design remains critical to ensure rules are strictly complied with and strictly compliance, assuming rule thresholds are well-calibrated, reinforces the credibility of the rule and, ultimately, their effectiveness in addressing deficit biases.

compliance is less relevant for other rules, like debt rules, which play a role of fiscal anchor and are less expected to bind short-term policies. Third, in focusing only on BBRs this assessment allows for a more homogenous measurement of noncompliance thus avoiding scaling issues present in cases, for instance, where BBRs and debt rules are jointly considered. In such samples, noncompliance measures have different orders of magnitude, which would need to be corrected for.

8. This paper examines five types of budget balance rules. They are: overall (nominal), primary (excludes interest rates), operational (excludes capital spending), structural (adjusts for business and commodity cycles and excludes one-off spending), and non-oil (excludes oil revenues). Information on BBR types and thresholds is obtained from the latest vintage of the IMF fiscal rule dataset (Lledó and others, 2017). Data on budget balance outturns comes from IMF's Government Finance Statistics and World Economic Outlook.

9. Compliance is assessed in economic rather than in legal terms. The focus of the paper is to look at how the choice of a threshold affects fiscal behavior over time. This paper uses the term “threshold” to describe either ceilings on budget deficits or floors on budget surpluses imposed by numerical fiscal rules. Compliance is thus defined in this strict economic sense rather than the more conventional legal sense that involves a more comprehensive observation of legal verdicts or independent fiscal council opinions. Assessments that consider escape clauses and other factors are not taken into account either. In line with the empirical literature, economic compliance is measured simply as the difference between the budget balance outturn and the threshold (in percent of GDP) set by BBR of type j (out of the five types described in the previous paragraph) in country i at time t — $dev_{i,j,t} = var_{i,j,t} - thrsd_{i,j,t}$. A negative value shows that the outturn was below the threshold, reflecting noncompliance. A zero or positive value means that the outturn is at or above the threshold, implying compliance.

Descriptive statistics

10. Rule compliance is close to 50 percent at the global level. Across all rules, countries and years, BBR deviations from their thresholds are on average positive half of the time (Table 1). Such figures are comparable to those obtained elsewhere in the literature (Reuter, 2015; Eyraud and Wu, 2015). Average and median deviations are both close to zero (Table 1). Supranational rules among non-EU countries (CEMAC and WAEMU) are breached more frequently and by larger margins than the rest of the sample. Because they are outliers and due to data limitations, they are excluded from the following econometric analysis.

Table 1. Frequency and Magnitude of Rule Deviations: Summary Statistics

	Frequency of positive deviations (percent of years)				Magnitude of deviations (percent of GDP)			
	Mean	Median	Std Dev	No Obs.	Mean	Median	Std Dev	No Obs.
Total	50.4	58.3	32.6	109	-0.8	0.1	8.4	1,126
National rules	54.3	62.5	37.5	34	0.9	0.8	4.2	319
Supranational rules: non-EU	23.1	9.8	29.9	20	-7.1	-2.3	17.5	188
Supranational rules: EU	58.0	60.0	24.7	55	0.2	0.3	3.3	619

11. Deviations are persistent, but not permanent. The evolution of rule compliance over time can be illustrated with the support of a transition probability matrix (Table 2). This matrix shows the probability of the deviation from the rule reaching a given size in period t (columns) given the size of the deviation observed in period $t-1$ (rows). For instance, the probability that the threshold is missed by a margin greater than 5 percent of GDP this year given that it was breached by a similar margin last year — $Prob(dev_t < -5 | dev_{t-1} < -5)$ — is 68 percent. The fact that deviations are persistent appears clearly in the table: the rule is more likely to be breached next year by about the same margin it was breached the previous year than by a larger or smaller margin — e.g. $Prob(dev_t < -5 | dev_{t-1} < -5) > Prob(-5 < dev_t < -2 | dev_{t-1} < -5) = 19$ percent. Interestingly, while persistent, such deviations are not necessarily permanent. In fact, they are more likely to disappear (move to zero) in any given year relative to the previous year than to increase further—an indication that constrained budget balance outturns are more likely to converge towards their thresholds than to diverge away from them. For instance, the probability that a positive deviation decreases from a range between 2 and 5 percent of GDP (second row from the bottom) to a range between 0 and 2 percent of GDP (close to zero) – 23 percent — is larger than the probability that the positive deviation increases above 5 percent of GDP (9 percent) or turns into a negative deviation greater than 5 percent of GDP (0 percent). This pattern seems to be the same regardless of whether initial deviations are positive or negative (i.e. the rule is initially complied with or not).

**Table 2. Conditional transition probability matrix:
rule deviations
(Percent of years across rules and countries)**

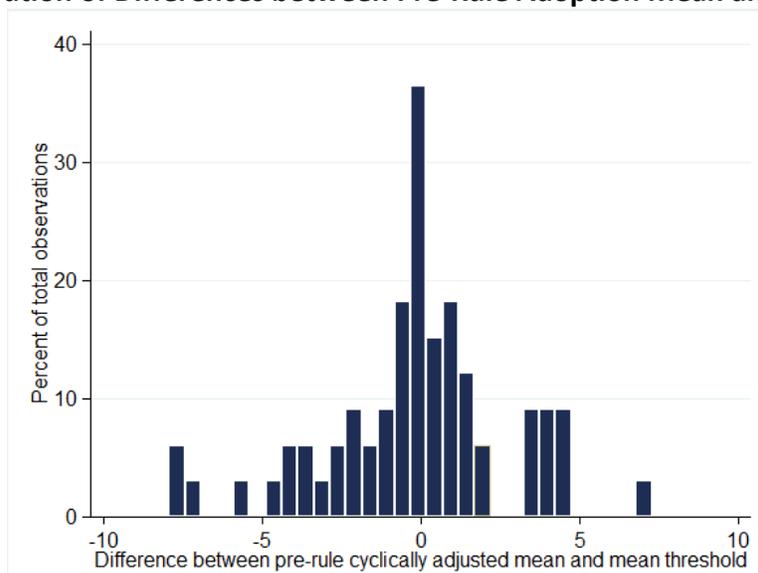
from / to	< -5	-5 -- -2	-2 - 0	0 - 2	2 - 5	> 5
< -5	68	19	8	2	1	1
-5 -- -2	11	41	36	7	0	2
-2 - 0	6	13	44	31	3	0
0 - 2	0	5	21	51	19	1
2 - 5	0	4	6	23	53	9
> 5	0	4	3	6	20	67

Rule thresholds vs budget balance means

12. Rules' thresholds are generally set close to pre-rule adoption means. We find budget deficits, even when not directly constrained by a rule, to be stationary for most countries and periods in the sample used in this analysis, and, as such, to converge to their long-term averages.⁷ Moreover, about two-thirds of the BBR thresholds in our sample are set within one standard deviation of the average of the fiscal balances constrained by the BBR prior to its introduction (Figure 1, Table 3).⁸ This pre-rule adoption mean is computed by adjusting for the cycle — i.e. setting the output gap ($og_{i,t}$) to zero — and accounting for the persistence of the constrained fiscal balance (see note in Table 3).

⁷ We perform unit-root tests for all the fiscal balances series in our sample. Unit-roots are rejected in about three-quarter of the series, indicating these series are stationary. See Lledó and Reuter (2018) for a summary of the results. These results must be interpreted with caution given that a vast literature shows that the stationarity of budget deficits is far from consensual and may depend on the country, period, and methodological approach (Mauro and others 2013; Berti and others, 2016).

⁸ One exception is the thresholds set by the supranational rules in the WAEMU and CEMAC, which are set further away from the long-term average of the constrained variables.

Figure 1. Distribution of Differences between Pre-Rule Adoption Mean and Rule Threshold

Source: Authors' calculations.

Table 3. Pre-Rule Adoption Means and Rule Thresholds

	Median pre-rule adoption mean	Median threshold after rule adoption	Mean pre-rule adoption mean	Mean threshold after rule adoption
All	-2.4	-3.0	-2.5	-2.3
National rules	-2.0	-0.3	-2.8	-1.0
Supranational rules: EU	-2.6	-3.0	-2.5	-2.7
Supranational rules: non-EU	-0.8	-3.0	-1.7	-3.0
Budget balance (National)	-3.6	-0.5	-3.2	-1.1
Primary balance (National)	0.0	0.0	0.0	0.0
Budget balance (Supranational non-EU)	-0.8	-3.0	-1.7	-3.0
Budget balance (Supranational EU)	-2.9	-3.0	-2.8	-3.0
Structural balance (Supranational EU)	-2.4	-1.9	-2.0	-2.1

Note : The pre-rule adoption mean is the cyclically-adjusted mean before the introduction of the rule (*cyc_mean*) of rule *j* in country *i* is estimated by filtering out the influence of the business cycle and accounting for the persistence of the constrained fiscal balance as follows.

$$var_{i,j,t} = l_{i,j} + \alpha_{i,j} var_{i,j,t-1} + \beta_{i,j} og_{i,t} + \epsilon, \text{ where } cyc_mean_{i,j} = \frac{l_{i,j}}{1-\alpha_{i,j}}$$

C. The Dynamics of Rule Compliance

Econometric Model

13. This paper analyzes how deviations from rules evolve over time in an econometric framework. The main goal is to estimate how policymakers react to past deviations from rule thresholds. The framework estimates whether and how policymakers' fiscal compliance behavior in the current year depends on deviations in the previous year. Different aspects of compliance are considered, including the size, sign, and recurrence of the deviations. The framework also assesses whether the reaction to deviations differs between countries with and without rules with similar characteristics.

14. A two-stage Heckman selection model is used to investigate the dynamics of rule compliance. A sample selection bias is likely to arise, because deviations from fiscal rules can only be observed among countries that introduced a fiscal rule. Thus, the sample of countries for our analysis is non-randomly selected. To overcome this problem, we estimate a two-stage Heckman selection model. In the first stage the likelihood of having a BBR of type j (among the five types described above) in force in country i at the time t , which is denoted by an indicator variable $f_{i,j,t}$, is estimated using a probit regression model for an unbalanced panel of 99 countries from 1991 to 2016 using a vector X of determinants according to equation 1.⁹ In the second stage, as depicted in equation 2, the observed deviation from BBRs of type j in country i and year t ($dev_{i,j,t-1}$) is regressed on its lagged variable, a set of alternative factors affecting rule deviations (Z), and latent (unobserved) factors driving the existence of a fiscal rule estimated in the first stage ($u_{i,j,t}$).¹⁰

$$P(f_{i,j,t} = 1 | X) = \Phi(X\gamma) \quad (1)$$

$$dev_{i,j,t} = \beta dev_{i,j,t-1} + Z'_{i,t} \delta + u_{i,j,t} \quad (2)$$

Fiscal Rules as a Magnet: The "Threshold-Reversion Effect"

15. Fiscal rules exert a magnet effect towards the threshold. In line with Reuter (2015), the paper finds that BBRs attract countries' deficits towards the threshold. Table 4 illustrates this "threshold-reversion" effect. Deviations between fiscal deficits and their thresholds are found to be highly persistent over time (column 1). Of 1 percentage point deviation in the previous period around 0.7 percentage points remain in the following period. This means that both compliers and noncomplier in period t will likely remain compliant or noncompliant in $t+1$ respectively, but will move closer to the threshold. That is, the deviation between the fiscal deficit and the threshold tends to diminish over time, with the estimated regression coefficient of 0.7 denoting the speed of

⁹ Following Badinger and Reuter (2017a), the vector X of explanatory variables includes measures of government fragmentation, political regime, government stability, and whether the country has an inflation targeting regime or is part of a currency union. See Lledó and Reuter (2018) for details.

¹⁰ The country-specific vector of control variables (Z) includes debt ratio, output gap, forecast errors of growth and government revenues, government fragmentation, government stability, a dummy for election years, as well as country fixed effects.

convergence. The smaller this coefficient is, the stronger is the threshold-reversion effect, and the faster is the convergence.

16. The threshold-reversion effect is stronger for noncompliers than compliers. The magnet effect towards the rule threshold is observed in a statistically significant way for both positive and negative lagged deviations (Table 4, column 2). Estimated coefficients for negative deviations are smaller than for positive ones, indicating that the threshold effect is stronger (convergence to the threshold is faster) among noncompliers than compliers. This is expected as noncompliers face greater fiscal sustainability risks than compliers and are thus under greater scrutiny and pressure to adjust towards the threshold than compliers. The presence of a threshold-reversion effect among compliers, on the other hand, is less intuitive, at least if the objective is to preserve debt sustainability. One possible explanation is that the presence of the rule, even if not perfectly enforced, may reassure the public regarding the government’s commitment to fiscal discipline. This in turn allows policymakers to reduce existing fiscal buffers, otherwise needed to safeguard fiscal sustainability, to finance other policy objectives.

Table 4. Estimation Results for Sign, Size and Frequency of Deviations

Dependent Variable: Rule Deviations	(1)	(2)	(3)	(4)	(5)
Lagged Deviation	0.72*** (0.07)				
Lagged Deviation (Positive)		0.91*** (0.06)	0.88*** (0.12)	0.83*** (0.09)	0.80*** (0.06)
Lagged Deviation (Negative)		0.61*** (0.11)	0.82*** (0.12)	0.76*** (0.09)	0.34*** (0.11)
Lagged Deviation (Positive) Squared			-0.016 (0.002)		
Lagged Deviation (Negative) Squared			-0.017*** (0.003)		
Lagged Deviation (Positive) x Deviation > p(75)				-0.12 (0.15)	
Lagged Deviation (Negative) x Deviation < p(25)				-0.39** (0.18)	
Lagged Deviation (Positive) x Above Threshold < 75%					-0.20* (0.11)
Lagged Deviation (Negative) x Above Threshold < 75%					0.26* (0.15)
Controls	Yes	Yes	Yes	Yes	Yes
Country fixed effects	Yes	Yes	Yes	Yes	Yes
N (1st stage)	2,436	2,436	2,436	2,436	2,436
N (2nd stage)	761	761	761	761	761

17. An important implication is that rules can have an effect on the fiscal deficit even when they are not complied with. Contrary to common perceptions, deviations from fiscal rules do not necessarily accumulate over time leading to unsustainable fiscal policies, but are rather “self-correcting.” This may be due to the fact that, even if not strictly complied with, fiscal rules provide a benchmark for sound fiscal behaviour easily monitored and punishable by voters and markets, thus helping prevent gross policy errors. This idea, originally proposed in Schuknecht (2004) in the context of the EU supranational fiscal rules, is analogous to the benefits of “soft laws” identified in the international relations literature (Abbott and Snidal, 2000). These are laws that, albeit not strictly enforced, help contain international conflict by serving as easily observed guidelines over which international peer pressure could be exerted. That said, as shown in the background papers 2 and 6, the effect of fiscal rules can be even stronger in reducing deficit if they are well-designed, well-calibrated, and strictly complied with.

Size and Frequency of Deviations

18. There are reasons to believe that the threshold-reversion effect depends on the size of the deviations from rules. The size of the deviations from the rule threshold might matter for various reasons, but its effect is theoretically ambiguous. On one hand, large negative deviations might be more likely to trigger corrective actions demanded by the public or markets, whereas small breaches get less attention. On the other hand, large deviations might undermine the credibility of rules such that they are not adhered to anymore.

19. The empirical analysis shows that the threshold-reversion effect is stronger for large instances of noncompliance. Two alternative approaches are used to assess whether the threshold-reversion effect is size-dependent. The first is to add a quadratic term for the lagged deviation (positive or negative) and estimate its impact. The second is to measure the empirical distribution of deviations for all observations in the sample, identify for each deviation whether it stands either at the top or bottom of this distribution, and estimate the interaction between the sign and position of the deviations in this distribution. Adding a quadratic term for the lagged deviation shows that the speed of convergence increases with the size of the deviation, but only for *negative* deviations (Table 4, column 3). The evidence that the threshold-reversion effect is stronger only for large negative deviations, that is for large noncompliers, is also corroborated by stronger and statistically significant threshold-reversion effect for negative deviations that are below the 25th percentile of the empirical distribution of the deviations than for less negative deviations (Table 4, column 4). The same cannot be said for large *positive* deviations given that the interaction term between positive deviations and whether they are among the top 75th percentile are not statistically significant different from zero.

20. The frequency of deviations also affects the intensity of the threshold-effect (but differently for compliers and noncompliers). We test the following hypotheses. First, the more often negative deviations can be observed, the less credible the rule threshold becomes, and the weaker the threshold-effect is. This is likely to take place when deviations are small, as they can be easily accommodated without triggering corrective actions. Second, the more frequently the rule is complied with, the more reassured the public and markets are that the threshold will be met, the

smaller are the buffers they will demand to ensure the rule is not breached. Econometric exercises corroborate both hypotheses. The threshold-reversion effect is weaker among serial non-compliers, but stronger among serial compliers (Table 4, column 5).

Design of Fiscal Rules

21. The threshold-reversion effect does not seem to be affected by the design of the rule.

Recent fiscal governance reforms have focused on enhancing the design of individual fiscal rules and of the rules-based framework. Reforms of individual fiscal rules have mainly aimed at enhancing their enforcement by delegating their monitoring to independent bodies, enshrining them to high-order legislation and subjecting deviations to formal sanctions and pre-established correction mechanisms. The quality of the overall framework has also been enhanced through the adoption of a formal fiscal anchor and multiple operational rules to ensure compliance with alternative fiscal policy objectives. One important question is whether better designed rules and rules-based frameworks accelerate convergence to rule thresholds. Another is whether convergence depends more broadly on other factors, like the public perception or credibility of rules. Through various estimations, we test whether improvements in rule design measured by various *rule-strength indices* (IMF 2012; Badinger and Reuter, 2017b) change the convergence speed significantly. We also look at whether threshold-reversion effects depend on the number and types of rules in place. Overall, neither the strength nor the combination of fiscal rules seem to affect how fast deviations are closed either from above or below (Table 5, columns 1 and 2).¹¹ This is not to say that rules or rules-based framework with a strong design do not matter. As shown in the other background papers, rule design remains critical to ensure that rules are strictly complied with; strict compliance, assuming rule thresholds are well-calibrated, reinforces the credibility of fiscal policy and, ultimately, their effectiveness in addressing deficit biases.

22. However, the speed of convergence seems to depend on how close rule thresholds are to the pre-rule adoption average. Estimations show that convergence of noncompliers is faster for rules where the threshold is within one standard deviation of the fiscal balance average prior to the adoption of the rule (Table 5, column 3). In the context of our sample, this could indicate that the identified magnet effect of the rule's threshold could be simply reflecting the expected mean-reversion observed among the stationary fiscal balance series in our sample. We will explore this hypothesis below.

¹¹ See Lledó and Reuter (2018) for additional results.

Table 5. Estimation Results for Rule Design, Types, and Calibration

Dependent Variable: Deviation	(1)	(2)	(3)
Lagged Deviation (Positive)	1.10*** (0.20)	0.91*** (0.06)	0.98*** (0.09)
Lagged Deviation (Negative)	0.47*** (0.30)	0.62*** (0.11)	0.69*** (0.16)
Lagged Deviation (Positive) X IMF Strength Index	-0.07 (0.08)		
Lagged Deviation (Negative) X IMF Strength Index	0.05 (0.12)		
Lagged Deviation (Positive) X (Debt Rule and Expenditure Rule)		-0.08 (0.11)	
Lagged Deviation (Negative) X (Debt Rule and Expenditure Rule)		-0.28 (0.23)	
Lagged Deviation (Positive) X Threshold set within 1 S.D. of pre-rule adoption mean			-0.08 (0.12)
Lagged Deviation (Negative) X Threshold set within 1 S.D. of pre-rule adoption mean			-0.28* (0.17)
Controls	Yes	Yes	Yes
Country fixed effects	Yes	Yes	Yes
N (1st stage)	2,436	2,436	2,304
N (2nd stage)	761	761	629

Country Groups and Time Periods

23. The threshold-reversion effect varies by country group and period. A final exercise is conducted to check for the robustness of threshold-reversion effects considering different sample splits. Results could be summarized as follows:

- Country Groups.** Greater economic integration puts a premium on well-coordinated fiscal policies and, as a result, on effective fiscal rules among currency union members. One could expect, therefore, threshold-reversion effects to be stronger in currency unions than elsewhere for noncompliers and weaker for compliers. Interestingly, they are not distinguishable (Table 6, column 1). With larger tax bases, better established fiscal responsibility records, and more stable sources of financing, compliers as well as noncompliers in advanced economies can afford to deviate from their budget balance thresholds for longer periods of time than their emerging market and developing country counterparts (Table 6, column 2).
- Time-periods.** Several countries have discontinued or put their rules on hold in the aftermath of the global financial crisis (GFC) to support fiscal stimuli. In the absence of credible and flexible fiscal rules, threshold-reversion effects should weaken or disappear. At the same time, several countries, particularly those with strong noncompliance records, reformed and recalibrated their rules to support fiscal consolidation programs. The threshold-reversion effect in such cases should arguably strengthen. Such factors acting in opposite directions for different countries and years help explain why on average there is no discernable effect in case of negative deviations before and after the GFC. On the other hand, the need to use any available fiscal

buffers to support countercyclical fiscal policies in the post-GFC may help explain the more accelerated pace of convergence to the rule-threshold among compliers (positive deviations) during this period (Table 6, column 3).

Table 6. Estimation Results for Country Groups and Time Periods

Dependent Variable: Deviation	(1)	(2)	(3)
Lagged Deviation (Positive)	0.84*** (0.08)	0.63*** (0.18)	0.96*** (0.07)
Lagged Deviation (Negative)	0.61*** (0.09)	0.27*** (0.16)	0.55*** (0.10)
Lagged Deviation (Positive) X Currency Union	0.11 (0.10)		
Lagged Deviation (Negative) X Currency Union	-0.00 (0.15)		
Lagged Deviation (Positive) X Advanced Economies		0.30* (0.18)	
Lagged Deviation (Negative) X Advanced Economies		0.37* (0.19)	
Lagged Deviation (Positive) X 2007-16			-0.26* (0.11)
Lagged Deviation (Negative) X 2007-16			0.06 (0.15)
Controls	Yes	Yes	Yes
Country fixed effects	Yes	Yes	Yes
N (1st stage)	2,436	2,436	2,436
N (2nd stage)	761	761	761

Dynamics with and without Rules

24. Fiscal balances are found to revert to the mean regardless of whether a rule is in place or not. As discussed in paragraph 12, most budget balance series used in this analysis are stationary. Under such circumstances, it may be difficult to disentangle the threshold-reversion effect identified above from the more widespread mean-reversion process observed among stationary budget balance aggregates regardless of whether they are constrained by a rule or not.

25. A separate econometric analysis is thus needed to assess whether the rule has a separate effect on the convergence process. The previous exercise could not allow for this analysis given that pulling forces were only estimated in the subsample of countries with rules. A proper assessment would require the estimation of pulling forces in both countries with and without rules. To do a proper comparison of the convergence processes in the two country groups, it is important to (i) use similar thresholds in the two country groups; and (ii) compare countries with similar characteristics. This is what the proposed econometric strategy tries to address.

26. This paper proposes a simple econometric strategy to assess dynamics in countries with and without rules in a comparable way. The approach consists in estimating and comparing the mean-reversion effects in the two groups. The analysis is based on the sample of countries that have adopted rules at some point between 1991 and 2016. By restricting the sample this way and using an encompassing framework including a range of economic variables, we (partly) correct for the fact that rule adopters and non-adopters have different characteristics, which may otherwise distort the results. In addition, using the mean as a common threshold for both groups ensures that the analysis is comparable.¹² We then check whether the reversion to the mean differs in a statistically significant way in the restricted sample. We implement this strategy in two steps. The first step consists in computing deviations of budget balances from their long-term average, as defined in Table 3, but now computed over the entire period.¹³ This is done in each country for each budget balance aggregate that will eventually be constrained by a rule. The second step consists in estimating the speed of mean-reversion using a regression model like the one used in (2), but extended to the larger country sample. The revised model (2)' regresses the deviation of budget balances from their long-term averages (*devm*) on their lag and the interaction of this lag with a dummy that equals 1 when at least one BBR is in force in country *i* at any given time ($I_{j,t}$). Differences in mean-reversing speeds among countries with and without rules are identified when this interaction term is statistically significant from zero. Different country characteristics are controlled for directly in the regression model (vector *Z*).

$$devm_{i,j,t} = \beta devm_{i,j,t-1} + \theta devm_{i,j,t-1} I_{i,t} + Z'_{i,t} \delta + u_{i,j,t} \quad (2')$$

27. The speed of mean reversion differs between countries with and without rules. Table 7 reports the results. Columns (1) and (2) report the results for our baseline sample of countries that at one point over the overall period introduced a BBR. The interaction term compares the convergence of the fiscal balance constrained by the BBR in years when the BBR was in force to those when it was not.¹⁴ Columns (3) and (4) perform some robustness checks using a broader sample, which also includes countries that have never adopted a rule during the sample period.¹⁵ For this broader

¹² For further comparability, we also consider only the rule adopters whose rule threshold is close to the long-term average. We expect differences between this group and the group without rules to be entirely driven by the decision of rule adopters to cap fiscal deficits and not by differences that may exist between the size of the rule threshold and the long-term average of the budget variable constrained by the rule.

¹³ Averages are adjusted for the cycle. However, what distinguishes this exercise from the one carried out in paragraph 12, is that averages are computed over the entire period, whereas they were computed over the pre-rule adoption period in paragraph 12.

¹⁴ One caveat of the exercise is that to ensure comparability of convergence speeds with non-rule adopters, rule adopters deviations are computed relative to their long-term mean over the entire sample period and not to their actual threshold set by their BBR. This may reduce the statistical and economic significance of some of the estimated convergence coefficients.

¹⁵ This larger sample includes 57 countries from 1991 to 2016. Lledó and Reuter (2018) provide more details on the sample of countries and their characteristics.

sample, we use the general government overall budget balance as the constrained variable¹⁶ and compare the speed of convergence in countries/years that do not have a BBR in force with countries/years that do. The table shows that budget deficits converge to the mean at different speeds depending on whether a rule is in place or not and on whether deviations from the mean in the previous period were negative (budget deficit above the mean) or positive (budget deficit below the mean). Specifically,

- (i) Budget balances converge to their long-term averages, regardless of whether the country has a fiscal rule or not.¹⁷
- (ii) In countries and years without rules, mean-reversion is faster — regression coefficients are smaller— for positive than for negative deviations. This means that above-average deficit episodes are more persistent than below-average episodes, leading such countries to exhibit a “deficit bias”.
- (iii) The adoption of rules slows down the mean-reversion process for positive deviations. This means that, countries with rules set long-term budget deficit averages as thresholds and implicitly treat them as targets. This result holds regardless of whether rule thresholds are set close to the long-term average or not (columns 1 and 2).
- (iv) The adoption of rules accelerates mean-reversion for negative deviations. This result holds for countries setting rule thresholds close to their long-term average. Similar results are obtained in the alternative samples outlined above.
- (v) Given (iii) and (iv), rule adoption leads mean-reversion to be slower for positive than for negative deviations. This is similar to the reversion process observed after the rule introduction. By making above-average deficits less persistent than below-average ones, rule adoption can help reduce the deficit bias observed in countries without rules.

28. Our results suggest that rules, even when not complied with, may be better than no rules. Figure 2 summarizes the dynamics of deviations with and without rules that our econometric results seem to suggest in a situation where the rule threshold is set at the long-term budget deficit average. Countries with rules, by ensuring above-average deficits converge faster to their long-term mean and below-average deficits take longer to disappear, may be more effective than countries without rules at reducing excessive deficits, even if they have not always been able to prevent such deficits from occurring in the past.¹⁸

¹⁶ This means that, in columns (3) and (4) of Table 7, the exercise is conducted, for all countries, using an overall balance aggregate, regardless of whether a rule exists and possibly applies to a different aggregate (such as a primary balance or cyclically-adjusted balance) than that constrained by the rule among rule adopters.

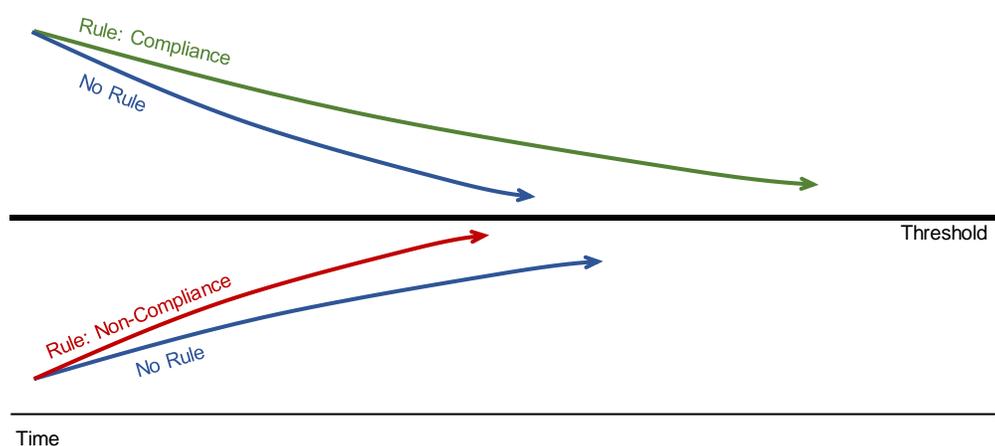
¹⁷ $\beta + \theta I$ is statistically significant and between zero and 1 regardless of whether rules are in force or not.

¹⁸ This result may imply that, while remaining stationary, budget balance series are subject to structural breaks following the introduction of fiscal rules. Therefore, countries with fiscal rules would be expected to have lower long-term budget deficit averages than countries without rules. However, given the short time dimension of our sample, we were not able to reliably test this hypothesis.

Table 7. Estimation Results for Mean-Reversion

Dependent Variable: Deviations from Mean	(1)	(2)	(3)	(4)
Lagged Deviation (Positive)	0.51*** (0.11)	0.58*** (0.16)	0.70*** (0.08)	0.73*** (0.07)
Lagged Deviation (Negative)	0.91*** (0.07)	0.75*** (0.09)	0.75*** (0.09)	0.75*** (0.08)
Lagged Deviation (Positive) x Rule in Force	0.21* (0.12)	0.33* (0.12)	0.16 (0.13)	0.13 (0.12)
Lagged Deviation (Negative) x Rule in Force	0.01 (0.03)	-0.25** (0.12)	-0.16** (0.09)	-0.17** (0.08)
Sample	Countries with rules	Countries with rules	All Countries	All Countries
Cross-Section Unit	Country/Rule	Country/Rule	Country	Country
Deviations from Mean	Budget Balance	Budget Balance	Nominal Budget	Nominal Budget
Constrained Fiscal Variable	constrained by rule	constrained by rule	Balance	Balance
Mean	Full sample	Full sample	Full sample	Full sample
Rules	Any	Threshold one std from pre-rule adoption mean	Any	Threshold one std from pre-rule adoption mean
Controls	Yes	Yes	Yes	Yes
Country fixed effects	Yes	Yes	Yes	Yes
N	1,421	652	1,048	1,048

Figure 2. The Dynamics of Rule Compliance



D. Conclusions

29. Contrary to common perceptions, rules can still be effective in curbing excessive deficits even if their thresholds are breached. This paper corroborates earlier empirical findings that a rules-based framework prevents the fiscal variables it constrains from permanently deviating from the thresholds imposed on them by the rule. It does so through a threshold-reversion effect, whereby positive or negative deviations relative to this threshold are reduced over time. The paper provides evidence of this threshold-reversion effect for national and supranational budget balance rules in a broad sample of countries. It also finds the intensity of the magnet effect of the rule's threshold to depend on the size and recurrence of the deviations from the rules. Contrary to common perceptions, rules can reduce excessive deficits, especially when large and infrequent deviations have been observed in the past. On the other hand, they lose their effectiveness following frequent deviations, even if small, probably because such deviations damage the credibility of the rule and its signaling value.

30. Rules that are not complied with are still better than no rules when it comes to curbing excessive deficits. The paper also finds mean-reversion to be stronger among rule adopters than rule non-adopters. By ensuring above-average deficits converge faster to the mean and below-average deficits take longer to disappear, countries with budget balance rules may be more effective at curbing above-average deficits than countries without rules even if they have not always prevented such deficits from occurring in the past.

31. The magnet effect of the rule's threshold reinforces the importance of calibrating rules adequately. The pulling effect is a somewhat surprising result, as rules should, in principle, work as ceilings, not targets. This means that the calibration of budget balances rules should also allow for buffers with respect to budget balance levels consistent with fiscal sustainability. This would help ensure rule adopters do not fully exhaust all fiscal space they may need to provide further fiscal support during downturns.

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COST OF NOT COMPLYING WITH FISCAL RULES: A EUROPEAN PERSPECTIVE¹

A. Introduction

1. The adoption of rules seems to be associated with lower sovereign spreads, in particular if the rules are well designed.² A large literature shows that rules tend to lower sovereign spreads and increase the response of spreads to fiscal variables—accounting for fiscal and macroeconomic characteristics (Bayoumi and others, 1995; Poterba and Rueben, 1999; Johnson and Kriz, 2005; IMF, 2009; Iara and Wolff, 2011; Heinemann and others, 2018; Feld and others, 2017). Financial markets seem to reward the adoption of rules, in particular well-designed ones, although it is difficult to assert whether markets reward the ability of rules to change *current* fiscal behavior or their ability to convey useful information about *future* fiscal policy.

2. However, the impact of rule compliance on spreads has not been examined in the literature. Most of the fiscal rule literature analyzes the effects of rule adoption. Only a few papers focus on compliance with the rules. They have only gone so far as to provide a descriptive analysis of compliance rates across different types of rules (e.g., Andrieu and others, 2015; Cordes and others, 2015) and examine the causes of noncompliance (Frankel, 2011; Frankel and Schreger, 2013; Reuter, 2017; and Delgado-Téllez and others, 2017). However, the effect of rules on the fiscal performance and spreads of compliers versus noncompliers has generally not been examined.

3. This paper estimates the effect of the Excessive Deficit Procedure (EDP) on sovereign spreads of EU states. In the context of the European supranational fiscal rules, the Excessive Deficit Procedure (EDP) is activated when countries are assessed to be in noncompliance with supranational rules, following an assessment by the European Commission (Cf. Appendix). The effects of the EDP on spreads is not fully straightforward to predict, as different channels may be at play, with possibly opposite effects. Several hypotheses could be considered:

- *Spreads may not be affected* if the EDP procedure is not credible, and, in particular, if markets believe that the correction mechanisms associated to the EDP are ineffective. In this case, placing a country under EDP would not impact future fiscal policy, justifying the absence of response of spreads.
- *Spreads may be reduced* in three main cases. First, provided that the EDP increases the predictability of fiscal policy, it may reduce the country risk premium and lower spreads. Second,

¹ Prepared by Federico Diaz Kalan and Adina Popescu (Strategy, Policy, and Review Department) and Julien Reynaud (Fiscal Affairs Department), based on Diaz Kalan, Popescu, and Reynaud (forthcoming).

² In this literature, the strength of fiscal rules is generally proxied by a composite index measuring various dimensions of the rule's design: broad institutional coverage, independence of the monitoring and enforcement bodies, legal base, flexibility to respond to shocks, existence of correction mechanisms and sanctions, media visibility, whether the rule applies *ex ante* or *ex post*, etc. See IMF (2009) for a description of the IMF fiscal rule strength index.

if the correction actions under the EDP are deemed credible and effective, fiscal sustainability prospects may improve. Third, if supranational rules are badly-designed (for instance, foster procyclicality, which may undermine debt dynamics), markets could see non-compliance as a positive development.

- *Spreads may increase* for a number of reasons. First, the EDP may carry a signaling effect by conveying information to markets on future fiscal policy (going beyond the current state of fundamentals) and the attachment of the country to fiscal prudence. If the EDP reveals a problem of fiscal discipline, spreads may increase. Another argument is that the correction mechanisms under the EDP could be pro-cyclical so that the negative effect of the fiscal consolidation on economic growth may undermine fiscal sustainability. Finally, the complexity of the EDP and the facts that decisions are taken in a discretionary and sometimes nontransparent way may create greater uncertainty about future fiscal outcomes.

4. **This paper finds that countries under EDP tend to have higher sovereign spreads.**

Based on a sample of 28 European Union countries over the period 1999 to 2016, results indicate that the sovereign spreads of countries non-complying with the EU fiscal frameworks, i.e. when countries are placed under EDP, are on average higher by 50 to 150 basis points compared to countries in compliance, i.e. countries that are not under EDP. Interpretation of the result is not straight-forward as different channels may be at play, in particular those related with the credibility and the design of the EU fiscal framework. The specification accounts for typical macroeconomic, fiscal, and financial determinants of spreads, and the Generalized Method of Moments (GMM) estimator is used to control for endogeneity. Sovereign spreads are higher for Euro area countries under EDP and for recurrent noncompliers. Results are robust to a range of robustness checks on variables and estimators.

B. Literature Review

5. **There is some evidence that the *adoption of well-designed fiscal rules has a positive effect on the risk premia of sovereign bonds.*** The most conclusive evidence concerning the impact of fiscal rules on the financial markets' risk assessment comes from studies on the US states and Switzerland, where such rules have been regarded as strong and credible by market participants. There is also evidence that having better-designed rules can significantly lower spreads across the European Union.

- **United States.** Poterba and Rueben (1999), using an indicator reflecting the strength of fiscal rules in the states, show that states with tighter deficit rules, and more restrictive provisions on the authority of state legislatures to issue debt, paid lower interest rates on their bonds. In a related study, Poterba and Rueben (2001) also analyze the reaction of risk premia to unexpected deficit shocks. They find that tighter deficit rules almost completely offset the effect of unexpected deficits on the yields of state governments bonds. Lowry and Alt (2001) show that investors are more forgiving of one-time deficits in states with strict fiscal rules (i.e., the bond yields increase significantly less after a deficit), but respond more sharply to consecutive deficits.

- **European Union.** Iara and Wolff (2011) analyze the relationship between numerical fiscal rules and government bond spreads for a panel of Euro area countries and find that yield spreads against Germany of countries with relatively weak fiscal rules could be up to 100 basis points lower if they upgraded their numerical fiscal rules.
- **Switzerland.** Feld and others (2017) look at the effect of fiscal rules adopted by Swiss cantons on their sovereign bonds, and find that stronger rules and a credible no-bailout regime lower spreads.
- **International.** IMF (2009) found that during 1990-2008, OECD countries with public debt ratios below 70 percent of GDP enjoyed a substantial credibility effect from rules: a reduction in 10-year bond spreads by 20 basis points in the long run, depending on the overall strength of their fiscal rule, as measured by its statutory rank and the quality of monitoring and enforcement mechanisms.

6. Very few studies consider the effects on spreads of non-compliance with rules. One of the few closely related studies is Afonso and Strauch (2004), who consider the impact of the first EDP episodes on interest rate swap spreads. Using daily and weekly data, they find only a small significant reaction of interest rate swap spreads around those EDP episodes.

C. Identification Strategy, Specification, and Data

Identification strategy: The Excessive Deficit Procedure (EDP)

7. The EDP provides a unique way to identify noncompliance with EU fiscal rules. Our paper bases the identification of noncompliance on EDP episodes rather than the breach of the three percent supranational deficit rule. The corrective arm is a complex procedure with several exit clauses and involving judgement. The breach of the three percent deficit is only one of the criteria taken into account and is not necessary nor sufficient for the European Commission to activate the EDP. Therefore, the EDP provides a better approach to noncompliance than the three percent deficit criterion. Over the period 1999-2016, there were 174 episodes of EDPs in our sample³, of which 57 percent were episodes with real time⁴ deficits above the 3 percent ceiling. Additionally, the launch of an EDP procedure offers market participants information that goes beyond simple noncompliance with the deficit criterion. The procedure has an important forward-looking component, in that is also based on an assessment of whether the fiscal deficit is likely to exceed three percent in-year and in the near future, though multi-year forecasts of fiscal variables entail substantial political negotiations which may themselves affect market expectations or increase uncertainty.

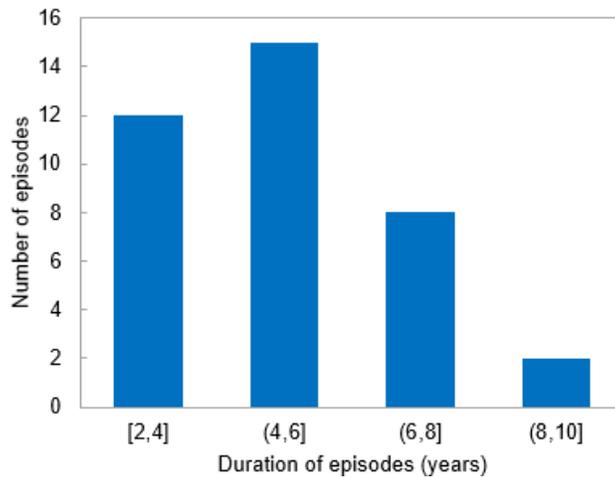
8. In Europe, non-compliance has been the norm rather than the exception. Most countries have been under EDP and some for significant periods of time (Figure 1). The average

³ Each episode is defined as a country-year data point in which the country is under EDP.

⁴ Given that this paper gauges in-year reactions of sovereign spreads, real-time (in-year) data on fiscal balance and debt from Stability and convergence programs is used.

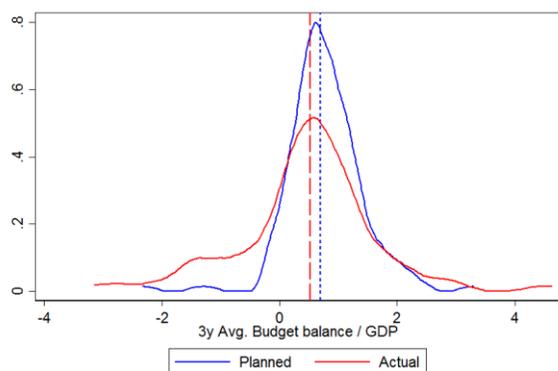
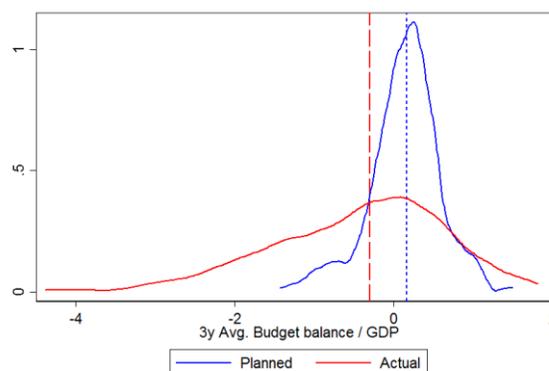
duration of EDP is also relatively long, around 5 years. There are only three countries (Estonia, Luxembourg and Sweden), which have never been placed under EDP.

Figure 1. EDP duration



Source: Diaz Kalan, Popescu, and Reynaud (forthcoming).
 Note: An episode is defined as a single EDP. Countries may have gone through more than one EDP during our sample period.

9. Simple descriptive statistics tend to support the view that the EDP has been effective at constraining fiscal policy, although it has delivered less adjustment than planned. When countries are placed under EDP, they are constrained by EU law to adjust their fiscal policy to more sustainable levels. Figures 2 and 3 plot the average annual planned and actual fiscal adjustments (change in the budget balance ratio over the subsequent 3 years) in countries under EDP and countries outside the EDP. Over the period 1999–2016, the planned median adjustment for countries under EDP was 0.70 percent of GDP per year; however, the actual delivered adjustment was somewhat lower (0.52 percent of GDP). In contrast, for countries outside EDP, the median average planned consolidation was 0.17 percent of GDP, while the actual outcome was a deterioration of the fiscal balance by an average of 0.29 percent of GDP. This suggests that the EDP served as a mechanism to constrain fiscal policy although it delivered less adjustment than planned or necessary.

Figure 2. Planned and actual fiscal adjustment: Countries under EDP**Figure 3. Planned and actual fiscal adjustment: Countries not under EDP**

Source: Diaz Kalan, Popescu, and Reynaud (forthcoming).
 Note: The charts plot Kernel densities of 3-year average budget balance to GDP. Dashed lines represent medians for each sub-samples.

Specification and data

10. The empirical analysis builds on the literature on the determinants of government bond yields spreads (see Afonso and others, 2015; Heinemann and others, 2018; Iara and Wolff, 2011). The objective of the empirical analysis is to compare levels of sovereign spreads for countries under EDP to countries not under EDP, controlling for macroeconomic, fiscal, and financial fundamentals. The benchmark specification is a single linear equation model linking the yield spread on long-term government bonds to a set of relevant determinants, including a dummy variable denoting when countries are placed under EDP (EDP_dummy):

$$Spread_{i,t} = \alpha + \beta Spread_{i,t-1} + \sum_{j=1}^K \beta_j X_{j,i,t} + \beta^{EDP} EDP_dummy_{i,t} + \gamma_i + \epsilon_{i,t}$$

where $Spread_{i,t}$ is the country i 's sovereign spread to the US 10-year sovereign yield. $X_{j,i,t}$ is a set of standard explanatory determinants of sovereign spreads to be detailed below. $EDP_dummy_{i,t}$ represents a dummy variable that takes the value one for the year when country i is under an excessive deficit procedure (EDP) and the value zero otherwise. EDP procedures are launched by the European Commission (EC) and posted on the EC website (<https://ec.europa.eu/info/node/4287/>). γ_i are country fixed effects and $\epsilon_{i,t}$ represent measurement errors and random shocks. Drawing from the literature on determinants of sovereign spreads, the following macroeconomic, fiscal, and financial variables are included in $X_{j,i,t}$:

- **Macroeconomic variables:** real GDP growth rate, inflation and the short-term interest rate. GDP growth is expected to have a negative sign as sovereign risk typically decrease with high levels of GDP growth. Inflation and short-term interest rates are expected to have a positive coefficient as higher inflation signals overheating of the economy which is expected to increase sovereign

risk, and the short-term interest rate and long-term (sovereign) rates are expected to be correlated along the yield curve.

- *Fiscal variables*: net lending and public debt, both as a share of GDP. Net lending is expected to have a negative coefficient since higher deficit signals higher sovereign risk. Debt is expected to have a negative sign, as higher debt levels are typically signaling unsustainability issues and therefore higher sovereign risk.
- *Financial market risk aversion*: the EU VIX (volatility of put and call options on the EURO STOXX 50), to proxy for changes in European risk-aversion, it is expected to have a positive impact on spreads.
- *Competitiveness*: the real-effective exchange rate is used to capture external competitiveness. A real appreciation worsens competitiveness and should increase spreads.

11. The analysis covers 28 European Union countries over the period 1999–2016.

Macroeconomic and competitiveness variables are taken from the IMF's WEO database. Fiscal variables are taken from the European Commission real-time database; this means that the fiscal balance (net lending/borrowing) and debt variables correspond to official in-year projections from Stability and Convergence Programs. Using real-time data is essential since markets react to contemporaneous available information. The EU VIX index is taken from Bloomberg (ticker VSTOXX) and averaged annually. The use of fiscal variables constrains the analysis to annual frequency. However, one of the advantages of yearly frequency is that it filters some of the noise present in the short-term reaction of financial markets. In addition, the use of yearly frequency may partially address another potential criticism, namely, that some of these EDP events and their consequences are anticipated maybe up to several months in advance.

12. The Generalized Method of Moments (GMM) estimator is used to control for endogeneity. Endogeneity may have several sources. First, higher sovereign spreads can raise countries' fiscal deficits and result in countries being placed under EDP. Second, endogeneity can also be the result of unobservable fiscal preferences, such as the attachment to fiscal prudence. Third, in a dynamic specification, the presence of the lag of the dependent variable also introduces an endogeneity bias. Given that endogeneity could bias the estimates, a system GMM estimator is preferred. Indeed, it has been demonstrated that the system GMM estimator has a lower bias and higher efficiency than all the other GMM estimators when the number of individuals is small and there is some persistency present in the series (see Soto, 2009). In addition, system GMM can also be augmented by using additional instrumental variables. Therefore, the instruments used are the lags of the exogenous variables as well as traditional exogenous instrument variables relevant to the literature on fiscal rules (e.g. government fragmentation, checks and balance, inflation targeting, etc., see, between others, Badinger and Reuter, 2017).

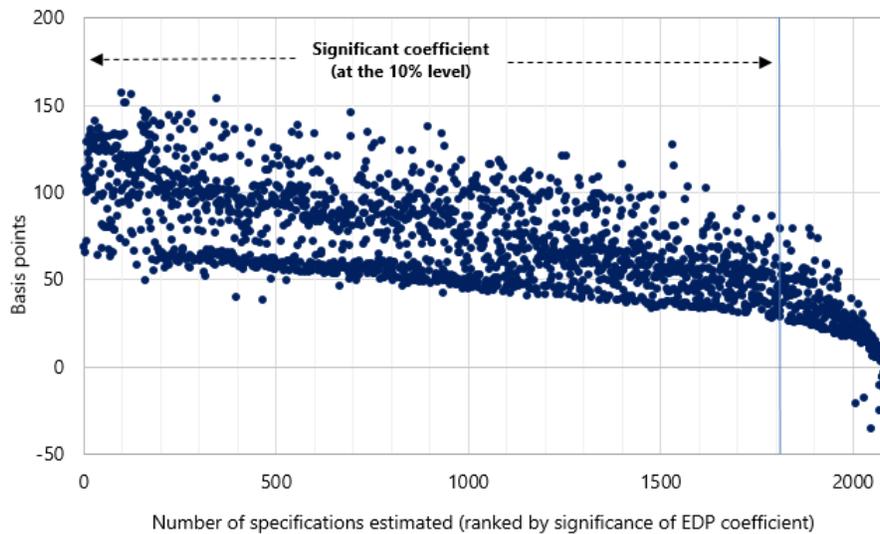
D. Estimation Results and Robustness Checks

13. Countries under EDP have sovereign spreads on average higher by 50 to 150 basis points, compared to countries complying with rules. Table 1 summarizes the main results.

Column 1 presents the result without the EDP dummy for the estimation over the period 1999–2016. All variables have the expected signs. The short-term interest rate and the VIX are the main determinants of the sovereign spread, a result in line with the literature on the global financial cycle (e.g. Passari and Rey, 2015). Column 2 presents the results of the estimation over the period 1999–2008, i.e. before the 2009–11 sovereign crisis in Europe, to assess whether the results are not driven by the sovereign crisis and subsequent reforms of the European fiscal framework. The main result is that the estimated EDP coefficient is significant and positive, and the magnitude is relatively large, since the spreads of countries under EDP exceed those of countries outside EDP by about 50 basis points. Column 3 presents the results of the estimation over the entire sample period of 1999–2016 and corroborate the results of Column 2. The EDP coefficient is slightly higher (0.62) indicating that the effect is even stronger after the sovereign crisis. Finally, a robustness check is performed based on the specification in Column 3 in which over 2,000 regressions are run with all possible permutations of the macroeconomic and financial variables, the lag structure, and the instrumental variables. Robustness checks based on a large number of possible specifications, reported in Figure 4, show that the EDP coefficients are significant in over 80 percent of the cases and the size of the coefficient varies between 0.5 to 1.5, meaning that countries under EDP have sovereign spreads on average by 50 to 150 basis points higher than countries complying with rules.

Table 1. Main results

	(1)	(2)	(3)
Lag of the LT spread over the US	0.40***	0.90***	0.36***
GDP growth	-0.08**	-0.04**	-0.09***
Inflation	0.17**	0.08*	0.16**
Short-term interest rate	0.28***	0.14***	0.27***
Gov't debt	0.03**	0.00	0.03*
Net lending	-0.13**	0.05	-0.07*
VIX	0.82***	1.23***	0.94***
REER (CPI)	0.05**	0.01	0.04*
EDP		0.53**	0.62**
Constant	-10.40***	-5.65***	-9.17***
Number of observations	366	184	364
Number of countries	28	27	28
Number of instruments	25	25	25
Arellano-Bond test for AR(1) in first differences (Pr > z)	0.06	0.03	0.05
Arellano-Bond test for AR(2) in first differences (Pr > z)	0.05	0.29	0.16
Hansen test of overid. restrictions (Pr > z)	0.21	0.08	0.43
Hansen test of exogeneity of instruments (GMM)	0.11	0.08	0.20
Hansen test of exogeneity of instruments (IV)	0.48	0.13	0.48
Period	1999–2016	1999–2008	1999–2016
Lag structure		(2 4)	
Estimator		System GMM two-step robust	

Figure 4. Robustness checks: 2,088 regressions

Note: The chart shows the estimated effect on spreads of being placed under Excessive Deficit Procedures (EDP) from a range of possible specifications.

14. The cost of being placed under EDP is higher for Euro Area countries and for recurrent noncompliers. In order to support and provide some refinements to the findings, a series of estimations are run with alternative specifications, presented in Table 2. Column 1 shows the results of a specification in which an interaction term with EDP for the period 2009 onward is added. The result supports the evidence presented in Column 2 of Table 1 that the cost of noncompliance is higher, by about 40 basis points, in the aftermath of the 2009-11 sovereign crisis. To control for different country groupings, the model is estimated on the subset of Euro area countries, excluding Greece, in Column 2. Euro area countries under EDP have sovereign spreads on average higher by 85 basis points, compared to other countries in compliance. Finally, a specification to control for recurrent noncompliers, defined as a variable cumulating how many times a country has been under an EDP over the 1999-2016 period, is estimated in Column 3 and shows that recurrent noncompliers have spreads on average higher by 114 basis points, compared to other countries in compliance. Further robustness checks are presented in Diaz Kalan, Popescu and Reynaud (2018).

Table 2. Further results

	(1)	(2)	(3)
Lag of the LT spread over the US	0.41***	0.51***	0.51***
GDP growth	-0.08***	-0.13*	-0.09**
Inflation	0.19***	0.28***	0.13**
Short-term interest rate	0.34***	0.12	0.31***
Gov't debt	0.02	0.01	0.01
Net lending	-0.02	0.08	0.01
VIX	0.95***	0.27	0.94***
REER (CPI)	0.03**	0.02	0.02
EDP before 2009	0.78*		
EDP after 2009	1.19***		
EDP		0.85***	
Recurrent noncompliers			1.14***
Constant	-9.08***	-4.26	-6.48**
Number of observations	364	215	364
Number of countries	28	18	28
Number of instruments	26	25	37
Arellano-Bond test for AR(1) in first differences (Pr > z)	0.08	0.07	0.07
Arellano-Bond test for AR(2) in first differences (Pr > z)	0.07	0.11	0.10
Hansen test of overid. restrictions (Pr > z)	0.27	0.95	0.08
Hansen test of exogeneity of instruments (GMM)	0.12	0.84	0.21
Hansen test of exogeneity of instruments (IV)	0.20	0.32	0.08
Period	1999-2016	1999-2016	1999-2016
Lag structure		(2 4)	
Estimator	System GMM two-step robust		

E. Conclusions

15. This paper finds that that sovereign spreads are higher when European countries are under Excessive Deficit Procedures (EDP). Based on a sample of 28 European Union countries over the period 1999 to 2016, and controlling for endogeneity, macroeconomic, fiscal, and financial fundamentals; this paper finds that sovereign spreads of countries placed under Excessive Deficit Procedures (EDP) are on average 50 to 150 basis points higher than countries in compliance, i.e. countries not under EDP. In addition, the cost associated with the EDP is higher for Euro area countries and for recurrent noncompliers. The results hold to extensive robustness checks.

16. The result that sovereign spreads are higher for countries under EDP can be interpreted in various ways. A (benign) interpretation of the result is that the EDP provides valuable information. EDP may signal to markets fiscal plans and preferences of countries, above and beyond the information carried by current fundamentals. However, the positive effect on spreads may also be interpreted in a less optimistic way, it may signal that markets discount the ability of the EDP to correct fiscal imbalances, or that its complexity and non-transparency create uncertainty about future fiscal policies and outcomes.

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Appendix. The Excessive Deficit Procedure

The EU's Stability and Growth Pact (SGP) is a body of rules governing the coordination of EU countries' fiscal policies. It aims to safeguard sound public finances and has two arms: The preventive arm ensures EU countries' fiscal policy is conducted in a sustainable manner. The corrective arm lays down how countries should take action in the event that their public debt or budget deficit is considered excessive.

The excessive deficit procedure (EDP) is governed by Article 126 of the Treaty on the Functioning of the European Union and underpins the corrective arm of the EU's SGP. EU countries must demonstrate sound public finances and meet two criteria: their budget deficit must not exceed 3% of gross domestic product (GDP) and their public debt (government debt & that of public agencies) must not exceed 60% of GDP.

Every April, euro area countries submit stability programs to the Commission and Council, while non-euro area countries submit convergence programs to the same institutions. A stability or convergence program must include the country's medium-term budgetary objective (MTO), and information as to how this will be achieved. It also contains an analysis of the effects of changes in the main underlying economic assumptions on the country's fiscal position. The programs are examined by the Commission. If the criteria are not met, an EDP is launched by the Council based on recommendations by the Commission.

The EDP requires the country in question to provide a plan of the corrective action and policies it will follow, as well as deadlines for their achievement. Euro area countries that do not follow up on the recommendations may be fined.

Source: EUR-Lex (as of November 1, 2017).

WHAT MAKES FISCAL RULES EFFECTIVE: LESSONS FROM CASE STUDIES¹

1. The literature overwhelmingly indicates that rule design is important for effectiveness but remains vague about what “good design” means in practice. Various cross-country panel studies show that “stronger” rules are more effective in ensuring fiscal discipline and stabilizing the economy (Poterba, 1994; Debrun and others, 2008; Badinger and Reuter, 2017; Guerguil and others, 2017). One limitation of these studies is that they usually summarize various rule features in a single index of rule strength², or focus on broad design elements, such as the rule type. As such, they often lack granularity on the specific features that enhance rule effectiveness. Case studies, on the other hand, can provide valuable, detailed analysis.

2. This paper examines what design features make fiscal rules effective based on eight case studies. The country sample includes Botswana, Brazil, Chile, India, the Netherlands, Norway, Sweden, and Switzerland—all these countries have experienced some success with their national rule system over specific periods of time, or are in the process of overcoming existing challenges. In this paper, “success” is characterized by the rules’ effectiveness in achieving their policy objectives, including debt sustainability and economic stabilization, rather than by strict legal compliance.

3. The eight cases cover a wide variety of country characteristics and fiscal rule design features (Table 1). The countries differ across various dimensions: geographic location, income level, resource wealth, degree of decentralization, and currency union membership. The rules present a wide range of characteristics in terms of type, legal basis, and institutional and economic coverage. They are supported by various mechanisms and institutions, including escape clauses, correction mechanisms, sanctions, and independent monitoring bodies, which represent well the great diversity of fiscal rule frameworks currently in use.

4. To assess the experience of countries with rules, the paper relies on two main approaches: a descriptive analysis and a counterfactual analysis using the Synthetic Control Method. In particular, each case study i) describes the fiscal rule framework adopted in the country and major amendments to the framework,³ ii) assesses fiscal performance following rule adoption, including by applying the Synthetic Control Method (SCM)⁴ when feasible to estimate the effect of the rule on the debt and spending trajectories, and iii) draws lessons for effectiveness in terms of rule design, implementation, and supporting institutions.

¹ Prepared by Samba Mbaye and Elif Ture (Fiscal Affairs Department) based on Mbaye and Ture (forthcoming).

² “Rule strength” is usually proxied by a composite index measuring various design elements of the rule: broad institutional coverage, independence of the monitoring and enforcement bodies, higher legal basis, flexibility to respond to shocks, existence of correction mechanisms and sanctions, and media visibility contribute to a higher index of rule strength. See IMF (2009) for a description of the IMF fiscal rule strength index.

³ A fiscal rule framework includes numerical and procedural fiscal rules, targets, and supporting fiscal institutions.

⁴ See Annex for a description of the synthetic control method, pros and cons, variables used, and data sources.

5. Country studies point to five key lessons for effectiveness summarized in the SDN (paragraphs 31-38). The main factors that have contributed to rule effectiveness include: i) a broad institutional and economic coverage to monitor and control a large part of government fiscal activity, ii) a design that incentivizes building buffers during upturns and allows for adequate fiscal support during downturns, iii) a calibration that is in line with sustainability and stabilization objectives, iv) well-defined escape clauses to deal with tail events, and v) enhanced monitoring and enforcement mechanisms (e.g., fiscal councils, credible sanctions, and corrective actions), stronger PFM practices (embedded in fiscal responsibility laws), and most importantly political buy-in.

Table 1. A Bird's Eye View of the National Fiscal Rule Frameworks in the Country Sample

Country:	Botswana	Brazil	Chile	India	Netherlands	Norway	Sweden	Switzerland
Country Characteristics								
Advanced					✓	✓	✓	✓
Emerging/Developing	✓	✓	✓	✓				
European Union					✓		✓	
Resource rich	✓		✓			✓		
Currency union member					✓			
Federal		✓		✓				✓
Design Features								
Debt Rule	✓	✓						
Expenditure Rule	✓	✓			✓		✓	
Budget Balance Rule	✓		✓	✓	✓	✓	✓	✓
Revenue Rule					✓			
Coverage larger than Central Gov't		✓			✓		✓	
Excludes investment/other spending				✓	✓			
Cyclical/Structural adjustment			✓			✓	✓	✓
Escape clause		✓						✓
Non-gov't monitoring of compliance		✓					✓	
Formal enforcement procedure	✓	✓			✓			✓
Corrective mechanisms		✓			✓			✓
Sanctions		✓						
Supporting Institutions								
Medium Term Expenditure Framework					✓		✓	✓
Independent forecasting body			✓		✓			
Independent monitoring body		✓	✓		✓		✓	
Fiscal Responsibility Law		✓	✓	✓				
Highest Legal Basis								
Constitutional		✓						✓
Statutory	✓		✓	✓			✓	
Coalition agreement					✓			
Political commitment						✓		

Source: FAD Fiscal Rules Database (2017) <http://www.imf.org/external/datamapper/fiscalrules/map/map.htm>. Note: Red check marks indicate adoption of a feature after the Global Financial Crisis (2008-09).

A. Botswana

*Fiscal Rule Framework*⁵

6. Botswana’s fiscal rule framework consists of a formal (statutory) debt limit and two informal targets embedded in past National Development Plans (NDPs).⁶ The debt limit was introduced in 2005, and imposes separate ceilings of 20 percent of GDP to each of total domestic and foreign debt. The informal targets include (i) a spending limit of 40 percent of GDP for the central government introduced in 2006 (in NDP9), and a target of 30 percent of GDP to be achieved by 2016 (end-NDP10), and ii) a balanced budget target (in cash terms) over the NDP planning period. In addition, a “sustainable budget index” (SBI) was introduced in 1994 as a framework for managing mineral (diamond) wealth. The SBI is a type of golden rule, where non-investment (recurrent) spending must be financed from non-mineral (recurrent) revenues.⁷ Mineral revenues are either used to finance physical or human capital investment, or saved in the Pula Fund, a stabilization and intergenerational savings fund established in 1993.

Fiscal Performance Under the Rule Framework

7. Medium-term planning and the framework for managing mineral wealth have helped Botswana achieve large fiscal surpluses and accumulate substantial financial assets in the 1990s (AfDB, 2016). Net financial savings reached 115 percent of GDP in the late 1990s, but were partially depleted in the first half of 2000s due to the establishment of a new pension fund for government employees, following the recognition of contingent liabilities under the previous unfunded government pension plan. The SBI has been adhered to since its introduction except during the early 2000s, but its role in guiding budget policy has diminished lately.

8. The global financial crisis (GFC) has hampered the diamond trade and, in turn, public finances. The 40 percent limit on the expenditure-to-GDP ratio has been too loose in good times and breached during the GFC; and the 30 percent target was also missed in 2016. While the debt limits have been respected, Botswana’s net financial assets have fallen significantly from about 60 percent in 2008 to below 20 percent by 2011 to finance the large deficits that emerged during the GFC. Thus, the limit on gross debt has not been sufficient to guide fiscal policy, and has not prevented large deficits financed by drawing down assets (IMF, 2014a).

9. Our counterfactual analysis shows a small impact of the fiscal rule framework on fiscal discipline (Figure 1). While SCM simulations of the debt path suggest that debt would have grown at a higher pace without the rule framework, spending simulations provide a more ambiguous

⁵ The description of the rule framework is based on IMF (2014a, 2016a) and AfDB (2016).

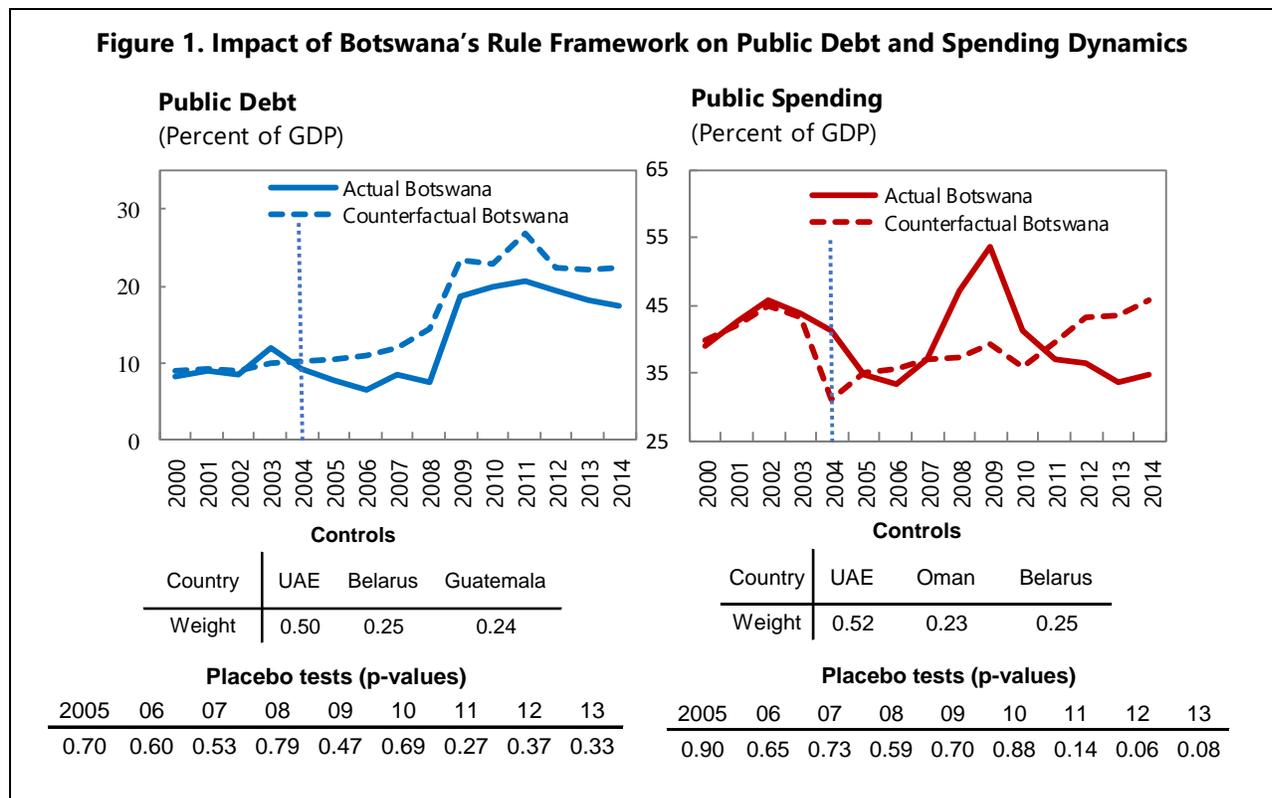
⁶ NDPs have been in place since Botswana’s independence in 1966, and lay out government development policies and plans over the next six years. The current plan, NDP11, runs from April 2017 to March 2023.

⁷ The SBI is computed as the ratio of recurrent spending to recurrent revenues. An SBI of below 1 is used as a rule of thumb for sustainability, meaning that recurrent spending is more than financed by recurrent revenues. When computing the SBI, recurrent spending on education and health are treated as investment in human capital.

outcome. In both cases, however, the estimated effects fail to meet common statistical significance standards, as evidenced by the placebo test p-values.

Lessons

10. Botswana has overall been successful in managing its resource wealth, but there is room for making its fiscal rule framework more binding. Botswana’s success in managing its resource wealth was mainly driven by its strong institutions and political commitment to prudent fiscal policies despite the lack of formal rules for resource management (Ossowski and others, 2008). On the other hand, the formal debt limit and guiding principles have not provided effective operational guidance to fiscal policy. The latest NDP envisages a return to fiscal surpluses from 2019 onwards and proposes a formal operational fiscal rule to be implemented in the next NDP period (IMF, 2017a). The proposed rule (appropriately targeting the non-mining recurrent primary balance) envisages that the recurrent budget should only be financed from non-mineral revenues (like the SBI), and that explicit targets be introduced for allocating mineral revenues between (i) investment in physical and human capital (60 percent) and (ii) saving for future generations (40 percent).



B. Brazil

*Fiscal Rule Framework*⁸

11. Brazil adopted a fiscal responsibility law (FRL) in 2000, following the subnational debt restructuring and the financial crisis experienced in the late 1990s. The FRL has established numerical rules, targets, and budgetary procedures to guide fiscal policy and promote fiscal discipline at all levels of government. The numerical rules include i) a limit on personnel expenditure of 50 (60) percent of net current revenue⁹ for the federal government (states and municipalities), and ii) debt limits for all levels of government to be set by the senate. The senate has limited the state (municipal) debt at 2 (1.2) times the net current revenue, but has never reached an agreement on the federal debt limit. The FRL has also introduced the use of multi-year primary balance targets for the nonfinancial public sector (NFPS)¹⁰, binding for the current year (though they can be changed by the parliament) and indicative for the next two years.

12. The FRL also includes procedures to report and monitor rule implementation, corrective actions in case of breaches, sanctions for noncompliance, and escape clauses. Breaches in the federal and subnational expenditure ceilings need to be corrected within the next 8 months. Compliance with subnational rules is enforced through institutional sanctions (such as limits on subnational transfers and borrowing conditional on rule compliance). The FRL includes well-defined escape clauses for meeting the expenditure and debt limits that can be invoked by Congress, and triggered by an economic slowdown, a national catastrophe, or a state of siege.

Fiscal Performance under the Rule Framework

13. The public debt maintained a downward path following the adoption of the FRL, but this trend has been reversed since the GFC. The expenditure ceilings have been a true constraint only for subnational governments, and the adherence to the subnational expenditure and debt limits has weakened since the GFC (IMF 2016b). At the NFPS level, persistently high primary surpluses, achieved mainly through increased revenues along with high growth, helped reduce gross debt from its peak of 80 percent of GDP in 2002 to 64 percent in 2008 (IMF 2010). Since the onset of the GFC, however, NFPS surpluses have declined, and the government introduced frequent changes to the fiscal framework, often to create flexibility to provide more stimulus while meeting the targets (Celasun and others 2015). These include i) reducing the targets, ii) providing off-budget stimulus through policy lending to public banks, iii) increasing the “investment adjustor”, which allows for excluding part of investment spending from the targets, and iv) excluding from the NFPS coverage state oil and electricity companies, Petrobras and Electrobras, which allowed for pushing fiscal activities outside the coverage of targets.

⁸ The description of the rule framework is based on IMF (2002, 2010).

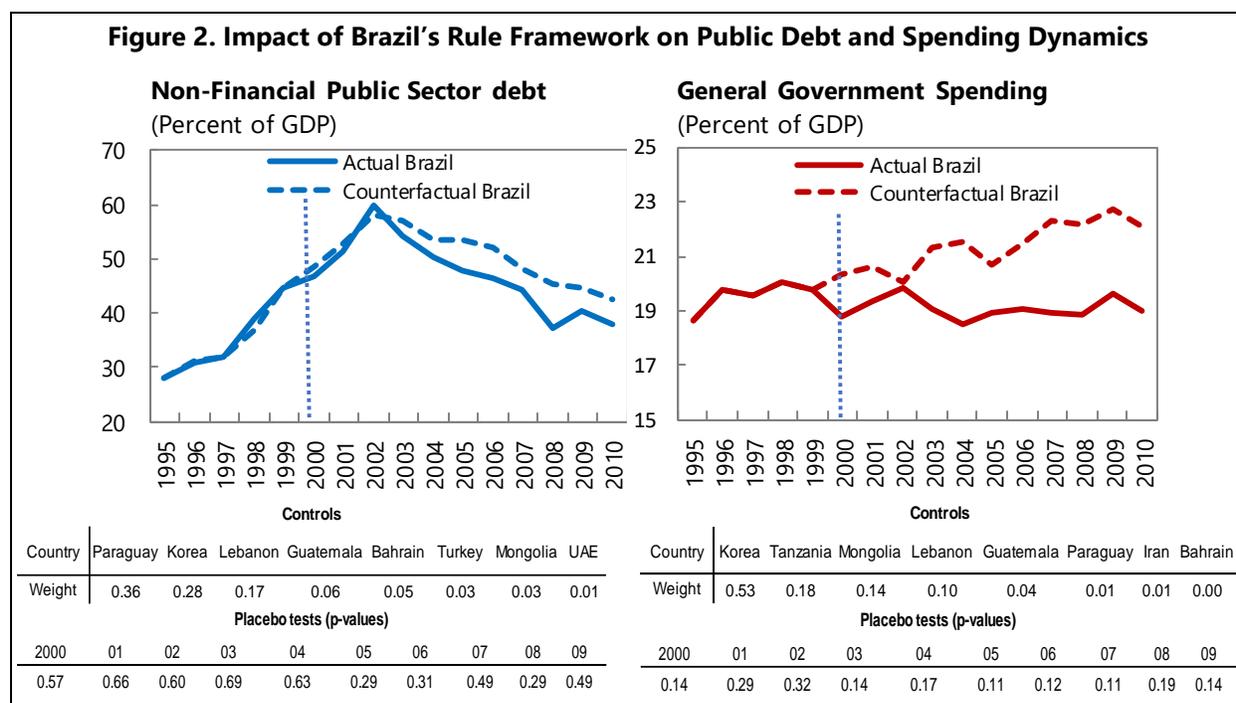
⁹ Current revenue net of transfers to other levels of government.

¹⁰ The NFPS includes the federal government, the social security, the states and municipalities, federal as well as state and local enterprises, and the Central Bank.

14. Our counterfactual simulations point to a positive, though statistically insignificant, impact of the FRL rules on fiscal discipline. The FRL rules are believed to have helped enhance fiscal discipline at the state level before the GFC; but this could not be tested due to data limitations. SCM simulations, in Figure 2, suggest that both general government spending and non-financial public sector debt would have been higher absent the FRL, although in both cases the estimated impacts do not meet common statistical significance standards.¹¹

Lessons

15. Brazil’s FRL has helped strengthen fiscal policy guidance, but has not been sufficient to enforce fiscal discipline. Though gaps remain, procedural rules embedded in the FRL have improved budget reporting, accounting, and transparency (IMF 2017b). Institutional sanctions have facilitated rule enforcement at the subnational level. A broad coverage of the rules and targets, including subnational governments and SOEs, has helped monitor major sources of fiscal vulnerability. Nevertheless, circumventions of the targets have undermined fiscal discipline since the GFC. The use of nominal targets for primary balance at the central level has also contributed to a procyclical fiscal policy (Figure 9, panel a). To restore fiscal discipline, a constitutional amendment was approved in 2016, which introduced a cap limiting the growth of central government expenditures to the previous year’s inflation rate for the next 20 years. Any increase in budgetary allocations, for instance in education and healthcare, will need to be matched by other cuts, such as in personnel or administrative costs. An independent fiscal institution was also created in 2016 to monitor fiscal and budgetary performance, in addition to the monitoring by the accounting courts.



¹¹ Available data on Brazil’s general government debt and non-financial public sector spending are insufficiently long to support the SCM simulations.

C. Chile

*Fiscal Rule Framework*¹²

16. Chile adopted a structural balance rule for the central government in 2001, after decades of prudent fiscal management backed by the Copper Stabilization Fund. Under the rule, revenues are budgeted at their structural values –i.e., net of cyclical changes in output and copper prices– and spending is adjusted to fit trends in said structural revenues. Two independent expert committees provide estimates of long-term output and copper prices used to compute structural revenues. The resulting savings in good times are then stored into a sovereign wealth fund –initially the Copper Stabilization Fund (CSF)– to finance future government liabilities and countercyclical policy in bad times. This simple setup has been repeatedly adjusted (and in many ways complexified) over time, including through the inclusion of molybdenum prices in the calculation of structural revenues in 2005; the creation of the Pension Reserve Fund and the Economic and Social Stabilization Fund in lieu of the CSF in 2006; and methodological refinements to the cyclical adjustment of revenues in 2009 and 2011. After operating for half a decade as a political commitment, the rule was inscribed into law in 2006 with the enactment of the fiscal responsibility law. In 2013, a fiscal council was created with mission to advise the government on matters related to the rule.

Fiscal Performance under the Rule Framework

17. Chile’s fiscal position markedly improved following the adoption of the rule, helped by a commodity boom, but repeated shocks in recent years have exposed gaps in the framework. A decade after the rule adoption, the government’s net asset position grew from 3¼ percent of GDP in 2000 to 19½ percent in 2008, supported by rising copper prices. The fiscal discipline enforced by the rule helped shield public spending from the copper boom, generating large savings that proved crucial when the crisis hit (IMF, 2012). The rule has also been found to have reduced economic volatility (Larrain and Parrado, 2008) and led to lower borrowing costs (Lefort, 2006). But the combined effects of the crisis, collapse in copper prices, and 2010 earthquake have tested the limits of the framework. Indeed, since 2008, the rule has been subject to repeated revisions of the initial surplus target of 1 percent of GDP, in the face of the shocks, before being eventually suspended in 2010. The rule was reinstated afterwards and the authorities have expressed their intention to return to structural surpluses but this is not expected to happen before 2020 (Solimano and Guajardo, 2017).

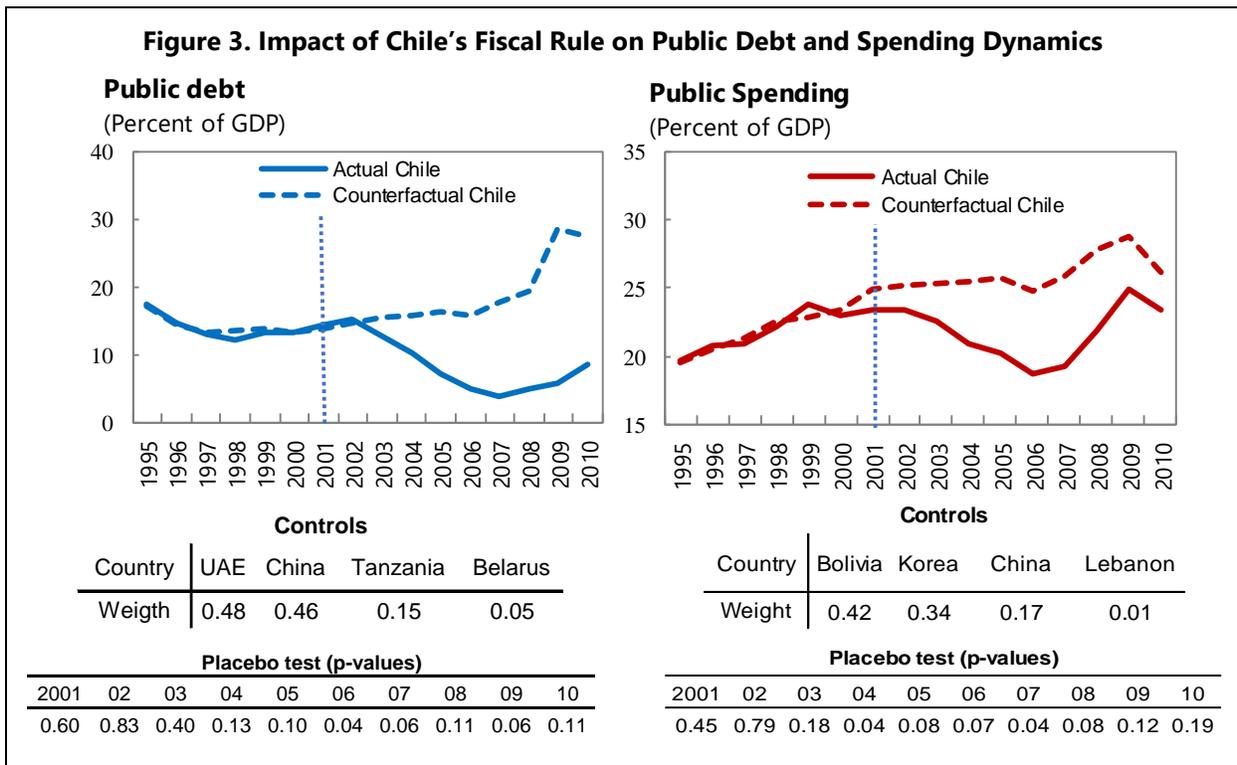
18. Our counterfactual simulations credit most of the improvement in government finances in the 2000s to the rule (Figure 3). The results suggest that both public debt and spending would have remained on their pre-2001 trends, absent the fiscal rule. In addition, the simulations suggest that the rule helped contain the increase in public debt during the crisis (2008–

¹² The description of the rule framework is based on Dabán (2011), IMF (2012) and Solimano and Guajardo (2017).

09), although the impact of the rule has somewhat declined afterwards. Overall, close to 15 percent of GDP in lower debt could be attributed to the rule, cumulatively over 2001-11.

Lessons

19. Besides its structural nature, Chile’s rule came with unique design and institutional features that contributed to its success. First among these is the full delegation of the forecasting of trend output and copper prices to independent committees of experts –a decade before the emergence of independent fiscal councils. This helped depoliticize the rule and has been instrumental to its perceived credibility, despite an increasingly complex methodology. Another source of credibility is the government’s transparency and proactive communication about the rational, methodology, and revisions of the rule (Marcel et al, 2001 for example). Chile’s experience shows that, depoliticization and transparency can overcome complexity, when combined with the adequate institutions. On the other hand, the lack of a well-defined escape clause has proven detrimental to the credibility of the rule and led to its suspension in 2010, in the face of repeated shocks. The absence of formal enforcement mechanisms also resulted in weak compliance since the GFC. Another challenge was that the structural balance rule had to be recalibrated multiple times since 2008 due to repeated shocks that made it difficult to disentangle structural and cyclical developments.



D. India

*Fiscal Rule Framework*¹³

20. India adopted a rules-based fiscal framework in 2003—the Fiscal Responsibility and Budget Management Act (FRBMA)—in response to a decade of persistently large deficits and surging debt. The FRBMA specifies various budget targets for the central government starting from FY 2004/05, including i) an overall (current) deficit target of 3 (0) percent of GDP to be achieved by end-FY 2008/09, with an annual adjustment of at least 0.3 (0.5) percentage points of GDP, ii) an initial annual debt accumulation limit of 9 percent of GDP, to be reduced by 1 percentage point of GDP per year, and iii) a limit of 0.5 percent of GDP on the annual rise in guarantees.¹⁴ The FRBMA requires the finance minister to explain to parliament, and take corrective actions in case of “substantial” budget slippages within any given year. However, there is no specific timeframe for corrections, and no sanctions for noncompliance. Fiscal targets could be breached under circumstances of national security or calamity, and other exceptional circumstances “as the Central Government may specify”. Finally, the FRBMA established procedural rules to ensure transparency and accountability in designing, implementing, and assessing fiscal policy; these rules require government to set and commit to multi-year fiscal policy plans, and to report and publish fiscal outcomes and strategy changes on a regular basis.

Fiscal Performance under the Rule Framework

21. The central government finances improved significantly from the introduction of the FRBMA until the GFC. However, the improvement was largely attributed to increased revenues driven by strong economic growth, with limited adjustment on the expenditure side (Simone and Topalova 2009).¹⁵ In addition, to comply with the rules, some subsidy payments to oil, food, and fertilizer companies were provided through issuing special bonds (2005-10), which were excluded from the rule coverage. At the onset of the GFC, growth declined, and the FRBMA was suspended in FY 2008/09 to provide countercyclical fiscal support to the economy. With the lack of a clearly defined timetable and corrective actions to return to compliance with the rules, the suspension continued for five years (FRBM Review Committee 2017). In FY 2012/13, the FRBMA was amended to re-establish a fiscal adjustment path that pushed the deadline for meeting the 3 percent deficit target to FY 2014/15. This deadline has been further pushed to beyond FY 2018/19.

22. The SCM simulations suggest that the FRBMA has not had a significant impact on India’s debt and spending paths (Figure 4). While simulations of India’s debt path without the

¹³ The description of the rule framework is based on Simone and Topalova (2009), IMF (2015a), and ADB (2017).

¹⁴ Following the FRBMA, the states adopted their own fiscal responsibility laws (FRLs) in exchange for debt restructuring and relief by the central government. Most state FRLs also set a target for eliminating the current deficit and reducing the overall deficit to 3 percent of the state’s GDP over the medium term.

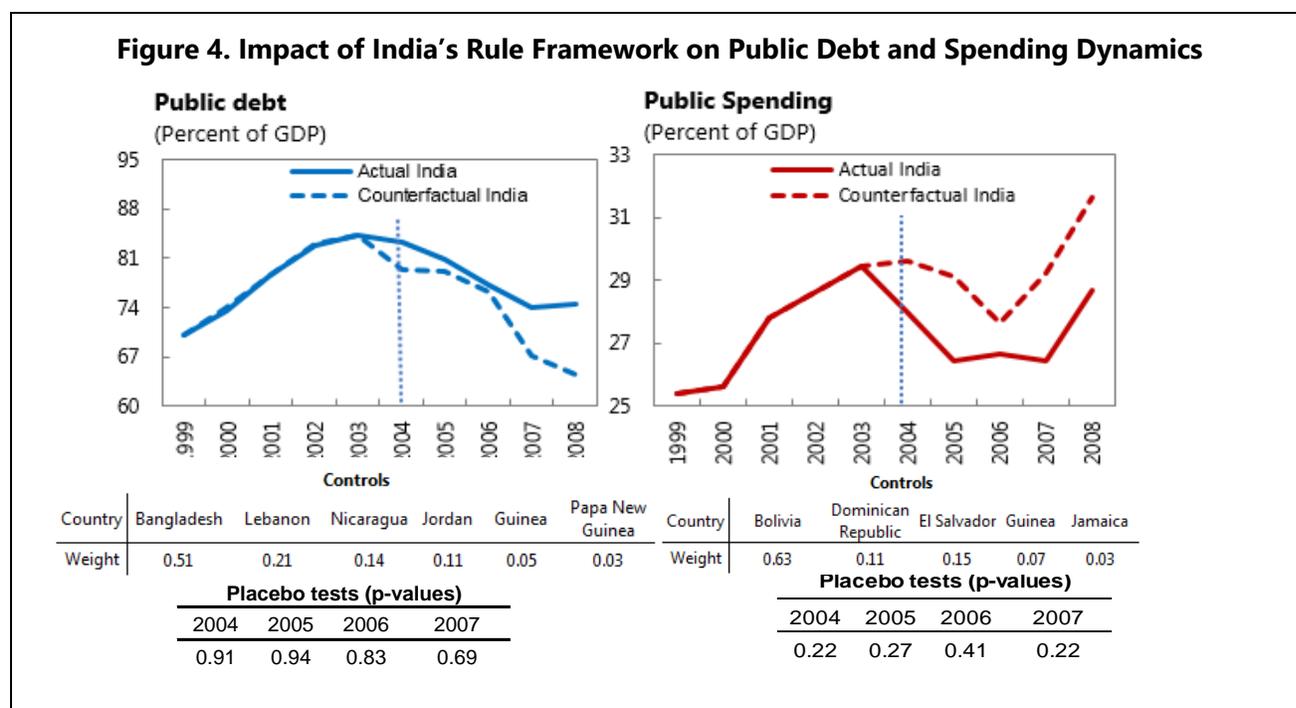
¹⁵ The experience of states with their FRLs largely mirrored that of the federal government, with the pre-crisis public finances improving mainly due to growth-driven strong revenues (including federal transfers) and cuts in interest bill (due to restructured debt); expenditures were barely cut, and post-crisis fiscal outlook was paltry.

FRBMA over 2004-08 suggest that debt would have been higher without the rule, simulated spending path points to the opposite result. Nevertheless, in both cases, the estimated impacts are statistically insignificant.

Lessons

23. Despite some positive effects on budget management practices, design problems with the FRBMA have recently prompted the authorities to consider a fundamental revamp.

The procedural rules embedded in the FRBMA have promoted stronger budget planning, execution, accounting, and reporting practices, although there remains room for further improvement (IMF 2014b, ADB 2017). But the FRBM presents a number of serious shortcomings, including the inability of the nominal balance rules to generate adequate fiscal buffers in good times; a lack of clarity in the rule coverage and the escape clause that led to the rules being circumvented; and an absence of a clear fiscal anchor. To address these gaps, the committee in charge of reviewing the FRBMA has proposed recommendations in 2017, including: i) anchoring fiscal policy with a medium-term general government debt ceiling of 60 percent of GDP (recently adopted by the government) ii) setting overall and current deficit targets consistent with the debt anchor, complemented with a “buoyancy” clause requiring a larger fiscal effort in boom years, iii) adopting more specific escape clause triggers that allow for limited deviations from the targets and require returning to the original targets in a year, iv) establishing a fiscal council tasked with providing independent fiscal forecasts, policy and performance assessments, including on rule compliance, and advice on the triggering of buoyancy and escape clauses (FRBM Review Committee 2017).¹⁶



¹⁶ The Committee also recommended that state-level fiscal policy be consistent with general government debt targets. The recently formed 15th Finance Commission has been tasked with assigning debt limits across states.

E. Netherlands

*Fiscal Rule Framework*¹⁷

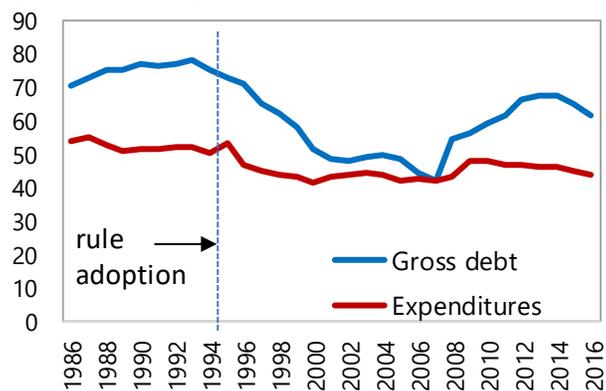
24. The Dutch national fiscal rule framework was established in 1994 to supplement the European supranational fiscal rules. At the core of the framework is a coalition agreement among political parties, which sets, for the duration of the government's 4-year term: i) multiannual expenditure ceilings in real terms for the central government, social security, and healthcare, and ii) the desired change in the tax base and tax rates. Thus, while revenues can fluctuate over the cycle, expenditure ceilings are fixed. If spending overruns are forecast, the ministries are required to propose corrective actions; and any additional tax relief needs to be compensated by tax hikes, or vice versa. There are also procedural rules on how to deal with non-cyclical budgetary shortfalls and windfalls. In 2011, a so-called "signaling margin" of 1 percent of GDP deviation from the planned general government deficit path was adopted, which triggers additional consolidation measures. A structural balance rule was also adopted in 2014 in line with the provisions in the Fiscal Compact, subject to monitoring by the independent fiscal council (CPB).

25. Institutions play a key role in the Dutch fiscal rule framework. Before general elections, the CPB provides medium-term macroeconomic projections and evaluates budgetary implications of political party programs. A non-partisan national advisory group (SBR) provides (nonbinding but influential) recommendations on budgetary policy, including changes to the fiscal framework and rules. After the general election, the new government bases its coalition agreement and annual budgets on the CPB's medium-term macroeconomic forecasts. The annual budgeting follows a top-down process, with line ministries responsible for budgetary control within the agreed ceilings.

*Fiscal Performance under the Rule Framework*¹⁸

26. The introduction of the Dutch fiscal rule framework was followed by a significant reduction in spending and debt ratios, until the GFC (Figure 5). The debt ratio was almost halved between 1993 and 2007 to 42 percent of GDP, and spending also declined by 10 percentage points to 42 percent of GDP. Nevertheless, expenditure ceilings were breached in the early 2000s, and right before the GFC (Vierke and Masselink 2017). Following the GFC and the Eurozone crisis, the debt ratio rose by over 25 percentage points of GDP between 2007 and 2014, in part due to financial sector interventions.

Figure 5. Netherlands: General Government Finances following Rule Adoption, 1994-2016
(Percent of GDP)



Source: World Economic Outlook.

¹⁷ The description of the rule framework is based on Bos (2008) and Vierke and Masselink (2017).

¹⁸ As discussed in Annex 1, SCM estimates were not possible for advanced countries, due to the limited number of comparable advanced countries without a fiscal rule.

Lessons

27. The Dutch framework is credited for its peculiar design features and institutions, well adapted to the country’s macroeconomic and political context (Wyplosz 2012). These include i) a broad coverage of the expenditure ceilings, which has helped monitor and control a large part of the general government activity, ii) independent macro-fiscal forecasts by the CPB that have improved budget transparency and credibility, and iii) coalition agreements on the ceilings, which have enhanced political buy-in and adherence to the rules. Nevertheless, the calibration of the expenditure ceilings has not always ensured sufficient build-up of fiscal buffers in good times (Vierke and Masselink 2017), and often led to procyclicality (Figure 9, panel b). To allow for a stronger countercyclical response, unemployment and social assistance benefits were excluded from the coverage of expenditures during the GFC (2009-10).¹⁹

F. Norway

*Fiscal Rule Framework*²⁰

28. Norway adopted a rule-based fiscal framework in 2001 to establish a clear, sustainable strategy for spending oil-related revenue. The three pillars of the framework are that i) the state’s net cash flow from the oil industry (public and private) is entirely transferred to the Government Pension Fund Global (GPFG), a sovereign wealth fund created in 1996; ii) annual transfers from GPFG to the central government budget are targeted at the expected long-term real return on the GPFG assets, which was estimated at 4 percent at the inception of the fiscal rule; and iii) a fiscal rule, according to which the central government structural *non-oil* deficit (adjusted for the economic cycle and one-off factors) is financed by oil-related revenue transferred from the GPFG (targeted at 4 percent of GPFG assets). The fiscal guidelines allow for deviations from the 4 percent transfer rule over the business cycle in both directions to provide countercyclical fiscal policy. In addition, in the case of major changes in the value of the GPFG, the change in the transfers from the fund can be smoothed over several years to avoid excessive spending volatility.

*Fiscal Performance under the Rule Framework*²¹

29. The framework has effectively insulated the budget from short-term fluctuations in oil revenue and ensured significant redistribution toward future generations (IMF 2015b). Since government spending is not directly dependent on current oil revenue, but instead the entire history of oil revenue flows into the GPFG, the impact on the budget of short-term fluctuations in oil revenue is automatically smoothed. At the same time, the framework is designed to preserve the real value of the fund for the benefit of future generations, to the extent that the long-term real

¹⁹ The current coalition agreement (October 2017) also excludes unemployment and social assistance benefits from the fixed expenditure ceilings to promote a countercyclical fiscal policy.

²⁰ The description of the rule framework is based on Schmidt-Hebbel (2012), and MoF Norway (2017).

²¹ As discussed in Annex 1, SCM estimates were not possible for advanced countries, due to the limited number of comparable advanced countries without a fiscal rule.

return assumption is realized. The GPFG assets have grown fivefold between 2001 to 2015 to over 250 percent of mainland GDP.

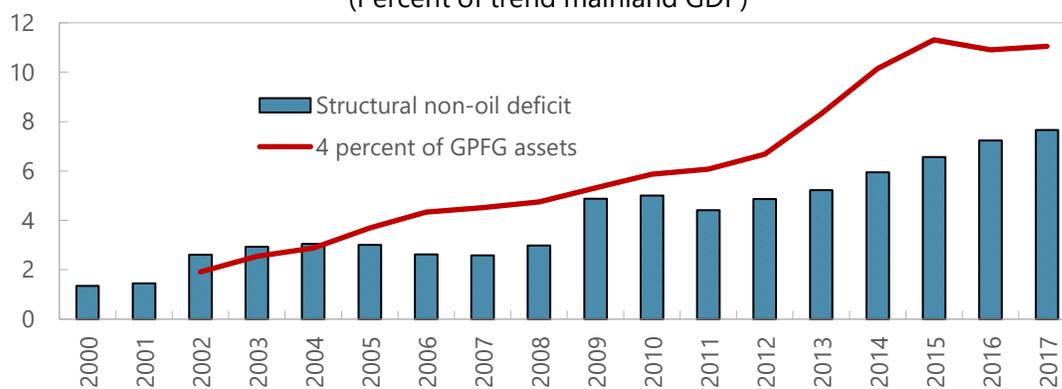
30. The framework has allowed for countercyclical policy during downturns, but it has become less effective in preventing an overly expansionary stance in recent years (IMF 2015b).

The structural non-oil deficit (i.e., oil-revenue spending) was raised during the financial crisis of the early 2000s (above the 4 percent return threshold) and the GFC, and lowered well below the 4 percent return threshold in the aftermath of the crises (Figure 6). The framework also allowed for a sufficiently countercyclical fiscal policy during the oil price collapse from 2014-16. Nevertheless, there has been a steady increase in the structural non-oil deficit since 2011 as a share of mainland GDP, although its level remained significantly below the 4 percent target. Higher than expected oil production and prices until 2014, and the exponential increase in the GPFG assets have led to real returns significantly exceeding the resources needed and used for the budget, and the 4 percent return threshold has ceased to provide effective operational guidance for government fiscal policy. In light of this trend, and the recent decline in actual and long-term expected oil prices, the expected real rate of return of GPFG assets has been reduced to 3 percent in 2017, a level more constraining for current fiscal policy (MoF Norway 2017).

Lessons

31. The effectiveness of the framework mainly stems from its simplicity, flexibility, and the political commitment to comply with the rule within this flexibility. While estimating the value of GPFG assets²² and measuring the structural balance have been challenging, and both have been revised significantly over time, the rule is considered simple and easy to communicate, in part because of its parsimony (MoF Norway 2015). The 4 percent transfer rule has been applied flexibly to smooth out macroeconomic fluctuations and asset revaluations. The political commitment to follow the non-statutory guidelines, in the absence of formal monitoring and enforcement mechanisms, has been a key driver of successful implementation of the rule.

Figure 6. Norway: Central Government Structural Non-Oil Deficit
(Percent of trend mainland GDP)



Source: Norwegian Ministry of Finance and IMF staff calculations.

²² These assets include government, corporate, and securitized bonds, equities, and real estate all around the world.

G. Sweden

*Fiscal Rule Framework*²³

32. The Swedish fiscal rule framework was established in 1997, in response to the fiscal and economic crisis of the early 1990s. It has four core elements: 1) an expenditure ceiling for the central government (including pensions) set in nominal terms for the current and next three years, which includes a budget buffer to deal with unforeseen cyclical expenditures, 2) a budget surplus target for the general government of 1 percent of GDP to be achieved on average over the business cycle, 3) a balanced budget requirement (with possibility to set rainy day funds) for local governments, which undertake half of the general government spending, 4) a pension system that is designed to be self-financed and sustainable (through automatic adjustments). Compliance with the surplus target is monitored via several indicators, including backward and forward looking averages of the actual balance and the current structural balance. There are no formal sanctions or correction mechanisms in place for past deviations.²⁴ An independent fiscal council, established in 2007, assesses ex-post whether public finances are sustainable in the long-term, and are consistent with the surplus target, the expenditure ceiling, and the cyclical position of the economy. In 2016, the parliament introduced a benchmark for public debt of 35 percent of GDP, revised down the surplus target for the general government from one to one-third percent of GDP effective 2019, and agreed that the framework would be reviewed every 8 years (IMF 2016c).

*Fiscal Performance under the Rule Framework*²⁵

33. Overall, the Swedish fiscal rule framework has been successful in its objective to maintain fiscal discipline and macroeconomic stability. The expenditure ceilings have been met regularly (Andersen 2013). The budget achieved surpluses above 1 percent of GDP in good times, compensating for the lower balances in bad times, for instance in the early 2000s and during the GFC (Calmfors 2015). Thus, the framework has helped avoid procyclicality (Figure 9, panel c). The general government debt was also almost halved between 1996 and 2012 to 38 percent of GDP (Figure 7). Although deficits and debt rose in 2013-14, and the fiscal council assessed a breach of the surplus target in 2015, surpluses have been recorded since then, reversing the increase in debt during this period.

Lessons

34. The combination of well-designed rules and supporting institutions, as well as political buy-in, have been key to the success of the Swedish framework. The features contributing to the success of the Swedish framework include: i) a broad coverage of rules beyond the central

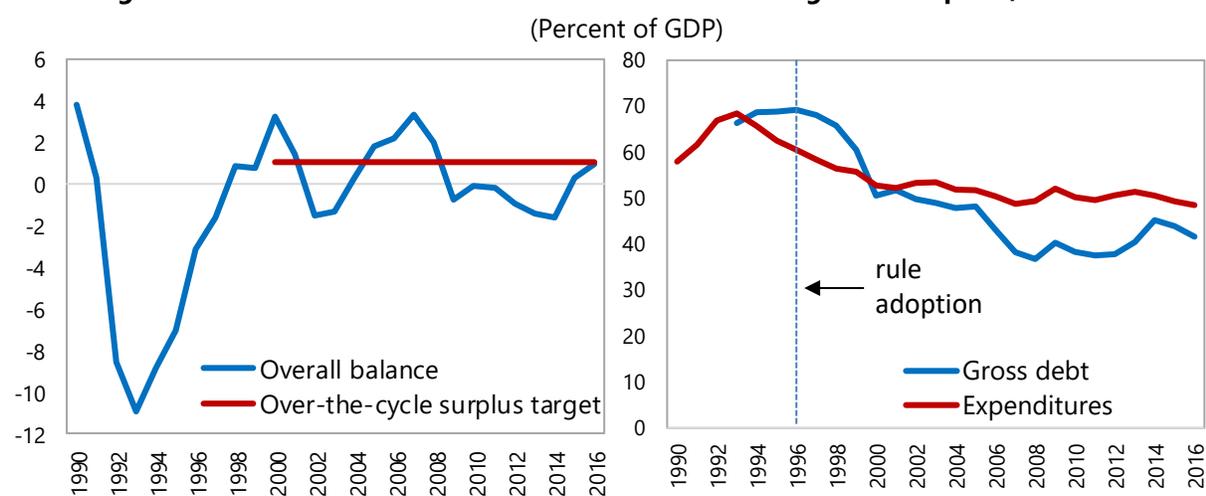
²³ The description of the rule framework is based on Andersen (2013) and Calmfors (2015).

²⁴ The Budget Act requires the government to take or propose actions to avoid breaches of the expenditure ceilings at the central government level, but not the surplus target at the general government level.

²⁵ As discussed in Annex 1, SCM estimates were not possible for advanced countries, due to the limited number of comparable advanced countries without a fiscal rule.

government, complemented by sub-central rules (on local governments and pensions), that has reinforced fiscal discipline, ii) a well-designed expenditure rule consistent with an over-the-cycle surplus target that has allowed full operation of automatic stabilizers and flexibility for discretionary actions, which helped Sweden navigate well the GFC, iii) an independent fiscal council that monitors public finances and evaluates public policy, which has enhanced political accountability and policy credibility, and most importantly iv) broad political and public consensus to avoid a fiscal crisis episode similar to the early 1990s, which has cemented the respect of the rules even in the absence of formal enforcement mechanisms.

Figure 7. Sweden: General Government Finances following Rule Adoption, 1997-2016



Source: World Economic Outlook.

H. Switzerland

*Fiscal Rule Framework*²⁶

35. The Swiss fiscal rule framework (also known as “debt brake”) was adopted by popular vote in response to a sharp increase in the federal debt ratio during the 1990s, and took effect in 2003. Enshrined in the constitution, the debt brake rule targets a central government structural budget balance. Operationally, targeting a structural balance implies setting ex-ante central government expenditure ceilings equal to predicted “structural” revenues, adjusted by a factor reflecting the cyclical position of the economy. The cyclical factor is computed as the ratio of trend real GDP, estimated by an HP filter, to predicted real GDP. Ex-post, the expenditure ceiling is recomputed using actual rather than predicted revenues. Any deviation of actual spending from the ex-post expenditure ceiling, independent of its origin (such as a forecast error in GDP), is accumulated in a notional compensation account. If the negative balance in this account (due to cumulative slippages) exceed 6 percent of expenditures, corrective measures are required by law to reduce the balance below this level within three years. No mechanism is specified for positive balances. An escape clause, approved by parliamentary supermajority under “exceptional

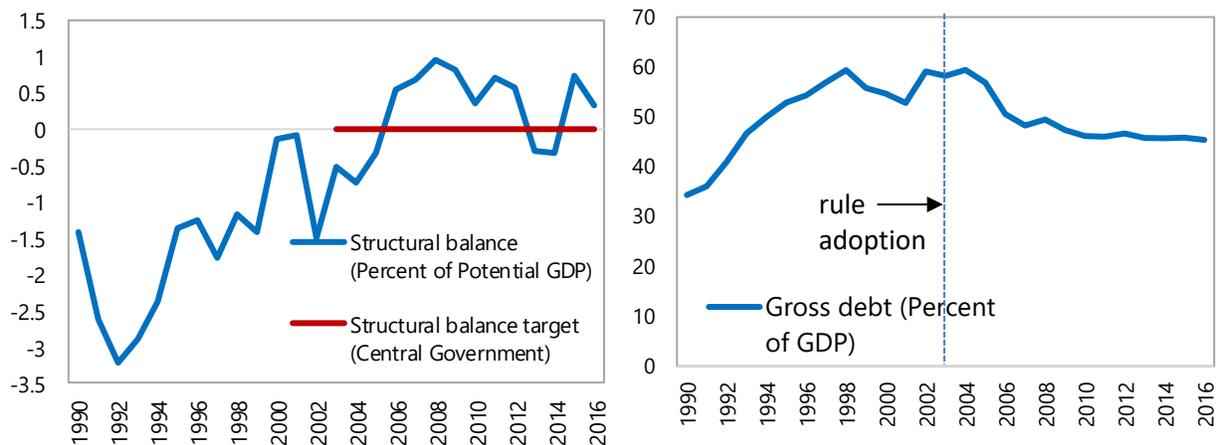
²⁶ The description of the rule framework is based on IMF (2009) and Pfeil and Feld (2016).

circumstances”, allows for “extraordinary expenditures” through supplementary budgets. Since 2010, deficits arising from extraordinary expenditures are accumulated in an amortization account, and need to be redeemed over the next six years by running structural surpluses through expenditure cuts, once the compensation account balance becomes non-negative.

Fiscal Performance under the Rule Framework²⁷

36. The Swiss fiscal rule framework has helped reduce debt and avoid structural deficits even during the GFC. Despite initial implementation challenges that resulted in undesired structural deficits, partly driven by measurement errors with the use of HP filter, the Swiss framework has mostly led to structural surpluses (overshooting the balance target), and thus budgetary savings, which have been used to further reduce debt (Figure 8). Thus, there has never been a need for corrective actions. The framework has also prevented procyclical fiscal policy (Figure 9, panel d).

Figure 8. Switzerland: General Government Finances following Rule Adoption, 2003-2016



Source: World Economic Outlook.

Lessons

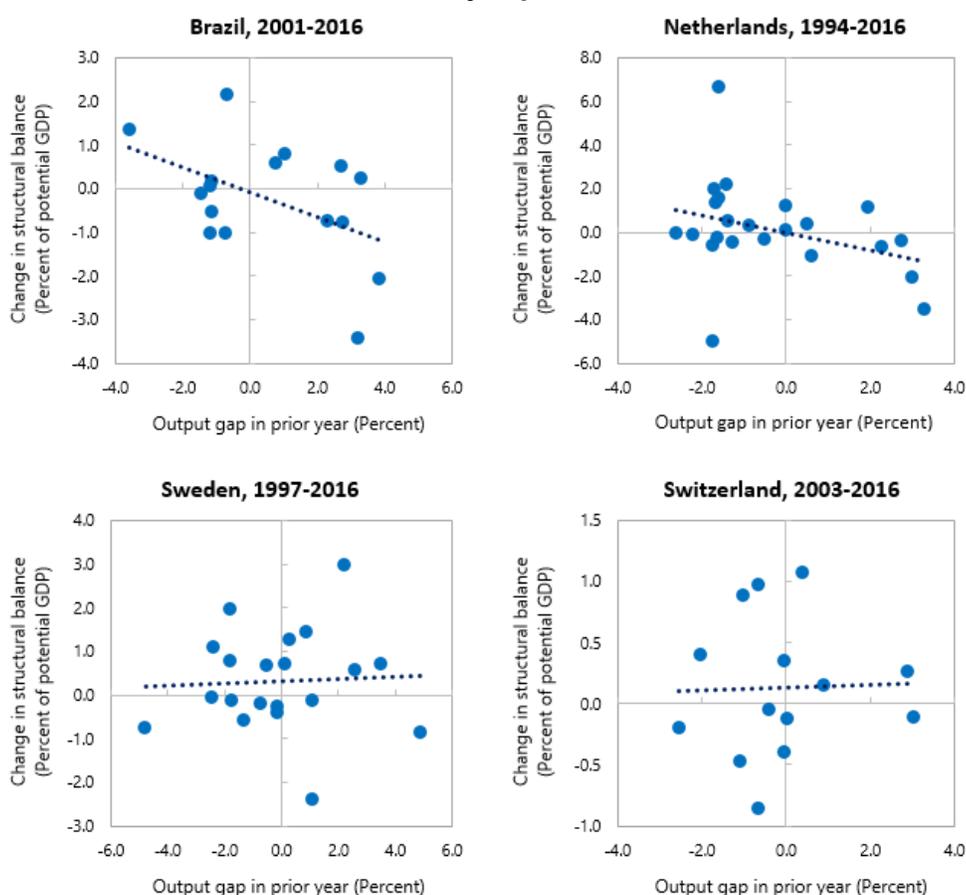
37. The success of the Swiss debt brake can be attributed to its clever design, reconciling the objectives of flexibility and sustainability (Wyplosz 2012). In particular, the parsimony of the framework with a single numerical target, although set in structural terms, has enhanced its transparency. The cyclical adjustment of budget targets has facilitated automatic stabilizers to operate over the business cycle, and a well-defined escape clause has allowed for discretionary spending under exceptional circumstances, for instance to accommodate migration-related spending in 2017. The automatic correction of past budget slippages, though not operationalized yet (thanks to budget surpluses), enhances the rule’s credibility in ensuring fiscal sustainability. In addition, although the debt brake covers only the central government (excluding social security), most cantons have their own budget balance rules, which have helped enhance fiscal discipline at

²⁷ As discussed in Annex 1, SCM estimates were not possible for advanced countries, due to the limited number of comparable advanced countries without a fiscal rule.

the general government level. However, these nominal balance rules have often led to procyclicality at the cantonal level, making it difficult to conduct a consistent stabilization policy between the federal government and cantons (Soguel, 2014).

38. Nevertheless, there has been some concerns that the rule may be too strict, unduly constraining debt financing for investment spending (IMF 2009) and overburdening monetary policy by providing less fiscal support than envisaged under the rule (IMF 2016d). An expert committee appointed by the government in 2017 examined whether savings under the structural surpluses could be used in the future to increase expenditures rather than to reduce debt. The committee recommended maintaining debt reduction in view of the anticipated normalization of inflation and interest rates (previously underestimated), and a decline in budget underruns. But they added that there could be room for using the savings to also reduce the tax burden (FDF 2017).

Figure 9. The Fiscal Stance in Non-Commodity Exporters since National Fiscal Rule Adoption



Source: World Economic Outlook.

Note: The charts plot the change in the general government structural balance in year t against the output gap in year $t-1$, both as a share of potential GDP. A negative (positive) correlation points to an overall procyclical (countercyclical) fiscal stance since the adoption of national fiscal rules. Data is unavailable for India.

Annex. Counterfactual Analyses with the Synthetic Control Method

1. **The method.** The SCM is a data-driven procedure to build counterfactual outcomes for individuals (in this case, a country) subject to a specific treatment (in this case, the introduction of a rule). It consists in building a “synthetic country” that reproduces most of the relevant features of the country of interest, prior to the adoption of the rule. This “synthetic control” then serve as a counterfactual for assessing the impact of the fiscal rule, by telling us what would have happened had the rule not been adopted. The crux of the methodology is therefore the creation of the “synthetic control”. This is done by calculating a weighted average of countries in the “control group” (here countries with no fiscal rules) that minimizes the distance with the country of interest along a number of pre-defined criteria.
2. **Matching criteria.** In our case, we chose as matching criteria for the synthetic control: (i) the level of debt and spending (6,5, and 1 year) before the adoption of the rule, (ii) the age dependency ratio, (iii) real GDP per capita, the interest rate-growth differential, and the output gap, (iv) a political fractionalization index and the number of years left in the current term of the executive from the Database of Political Institutions (DPI), and (v) the share of natural resource exports in total exports. These cover a large spectrum of potential drivers of fiscal performance.
3. **Pros and cons.** Besides addressing the selection bias, the SCM offers a large menu of benefits that make it particularly suitable for the present study. Unlike other approaches—such as diff-and-diff and matching techniques—the SCM is applicable to individual countries, provides a time-varying assessment of performance, and is asymptotically robust to time-varying unobserved determinants (Abadie et al., 2010). But, as the above approaches in a panel setting, SCM results could be affected by structural changes in the control group (independent from the treatment) during the post-treatment period, which is 10 years after rule adoption. For example, the estimated impact of the treatment would be biased if one or several countries in the control groups were to be hit by a significant idiosyncratic shock that affected their fiscal paths during the post treatment period. Thus, one needs to systematically check that the estimated impact of the treatment is not driven by other confounding factors, by means of randomized placebo tests on the control sample (see Abadie et al. 2010). Another challenge relates to the proliferation of fiscal rules around the world, which considerably reduces the control pool in recent years. This is especially the case in advanced countries, where SCM simulations could not be conducted in the absence of suitable controls for the Netherlands, Norway, Sweden and Switzerland. Finally, one should be cautious in attributing the decline in gross debt entirely to the adoption of fiscal rules (or attributing the absence of decline to the ineffectiveness of the rules), because stock-flow adjustments, driven for instance by off-budget operations, changes in financial assets, exchange rate movements, or other factors, could also affect debt dynamics.
4. **Data sources.** Most of the data were collected from the IMF’s World Economic Outlook (WEO) database (debt, spending, real GDP growth, interest rate payments, output gap) and various World Bank databases (age dependency ratio, political economy variables, GDP per capita in USD). When missing, WEO debt series were completed with data from the IMF’s Global Debt Database (Mbaye et al., forthcoming). In the case of Brazil, the non-financial public sector debt and general government spending series were respectively collected from the Brazilian Ministry of Finance and the World Development Indicators.

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