

The Sovereign Spread Compressing Effect of Fiscal Rules During Global Crises

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July 30, 2023

Abstract

This paper studies whether fiscal rules can signal fiscal responsibility and compress borrowing costs for emerging economies during periods of global crisis. Using daily data on sovereign spreads for 58 emerging market economies from 2019-2022 and 26 countries from 2007-2009, this paper shows that the compressing effect of fiscal rules on sovereign spreads is stronger during global crises. We find that the existence of a fiscal rule reduces sovereign spreads with a high degree of statistical significance, regardless of the extent to which enforcement of the rule occurred during the global crisis. In our baseline test covering the COVID-19 timeframe, estimates of the average spread compressing effect of fiscal rules range from 319 to 378 basis points. We also find that for countries that deviated from a fiscal rule during a global crisis, the median duration to return to the baseline fiscal balance is 3.5 years. This fact explains why the spread compressing effect is independent of the enforcement of the rule during a global crisis, as lenders expect countries to return to compliance with the fiscal rule in the aftermath of a crisis. Our results suggest that second-generation rules have increased not only the flexibility but also the credibility of fiscal rules, even during crisis periods.

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1. Introduction

At the onset of the COVID-19 pandemic, sovereign governments were faced with the dilemma posed by the need to quickly deploy large-scale fiscal expansion without compromising debt sustainability. This dilemma was particularly challenging for emerging market economies paying significant sovereign spreads relative to advanced economies. The increase in sovereign spreads faced by emerging economies during crises can constrain governments' ability to mitigate the effect of negative shocks and potentially increase the inequality across countries due to unequal borrowing costs relative to advanced economies (Kose et.al., 2022). The pressing need for fiscal stimulus in the short run and the unequal borrowing opportunities faced by emerging economies highlight the importance of policies that signal fiscal responsibility and compress borrowing costs, especially during global crises such as the COVID-19 pandemic.¹ This paper provides empirical evidence that the adoption of fiscal rules is one such policy for emerging economies. We show that the existence of fiscal rules is associated with a reduction of sovereign spreads, regardless of the extent to which enforcement of the rule occurs during crisis periods such as the recent pandemic.²

To the best of our knowledge this is the first paper to evaluate the spread-compressing effect of the existence of fiscal rules for a broad sample of emerging market economies. We begin by documenting trends in fiscal rule adoption and implementation prior to and throughout the recent pandemic, using the IMF Fiscal Rule Dataset (IMF 2022). Then, using daily data on sovereign spreads spanning January 2019 through the first five months of 2022, we empirically investigate whether fiscal rules are associated with lower spreads and whether this relationship changed through the pandemic, while controlling for institutional quality using the World Bank Worldwide Governance Indicators (WGI) measurement of government effectiveness. Further, we assess whether a spread compressing effect of fiscal rules exists for periods of global crisis more broadly by performing the same empirical estimation applied to the global financial crisis (GFC) years, using data covering January 2007 through December 2009. For both analyses, we use daily data of emerging market sovereign spreads from countries included in the J.P. Morgan Emerging Markets Bond Index Global (EMBI Global). Our sample covering the COVID-19 years includes 58 countries, while the sample covering the GFC timeframe includes 26 countries.³

A growing body of literature has empirically examined the impact of fiscal rules on sovereign spreads, suggesting that fiscal rules may lower sovereign spreads under certain circumstances.⁴ Fiscal rules may therefore play a crucial role for sovereign governments faced with the concurrent shocks of rising borrowing costs and an

¹ Gaspar, Vitor, Paulo Medas, and Roberto Perrelli. "Global Debt Reaches a Record \$226 Trillion." IMF Blog (2022).

² We consider budget balance rules, debt rules, expenditure rules, and revenue rules in our empirical analysis. While the existence of any fiscal rule in general is predicted to compress spreads, budget balance rules and debt rules are the most prevalent in our sample.

³ Of these 26 countries, all except for one (Hungary) is also included in the broader COVID-19 sample.

⁴ See, for example, Iara and Wolff (2010), Havlik et al. (2022), Kalan et al. (2018).

unexpected need for fiscal expansion if the rules dampen the increase in borrowing costs enough so that long-term debt solvency is maintained. Intuitively, fiscal rules can signal fiscal responsibility and serve as a commitment device that reassures financial markets of the sovereign government's course of fiscal policy and creditworthiness (Eryaud et al., 2018). To date, however, the existing literature on this topic is mostly limited to studies narrowly focused on one nation or a subset of similar nations.⁵ In contrast to the existing literature, our analysis focuses broadly on emerging market sovereign spreads during periods of global crisis, with our baseline sample including daily spreads for 58 nations over the time period covering January 2, 2019 through May 27, 2022. This sample allows us to empirically examine the impact of the existence of fiscal rules on emerging market sovereign spreads through the recent pandemic.

We present four novel findings to the literature. First, we document that while countries with fiscal rules have historically experienced lower structural deficits than countries without rules, this trend reversed in 2020-2021. While it may be tempting to interpret this result as a breakdown of the disciplinary effect of fiscal rules, our findings that follow make it clear that such an interpretation would be incorrect, and that this trend instead highlights the flexibility afforded by modern fiscal rules during times in which borrowing needs are high. Second, we find evidence that the existence of fiscal rules compressed sovereign spreads before and after the onset of the COVID-19 pandemic, with a stronger spread-compressing effect estimated in the post-crisis period. We find that this spread-compressing effect is robust to tests controlling for government effectiveness, implying that the existence of fiscal rules creates a degree of market confidence beyond that generated by governmental reputation alone. Importantly, we show that the spread compressing effect of fiscal rules is robust to other global crisis periods such as the GFC of 2008-09.⁶ Third, we find that even when governments temporarily suspended their rules or activated an escape clause during the pandemic, the mere existence of a rule was enough of a signal to markets of the sovereign government's fiscal responsibility to compress spreads.

Finally, we provide suggestive evidence of the mechanism underlying our result that fiscal rules compress spreads even when temporarily abandoned, by performing an event study in which we empirically estimate the time it takes to return to compliance following such an abandonment of a budget balance rule. Using a sample including every instance of a sovereign government either suspending, revising upward, or activating an escape clause for a budget balance rule from 2000-2019, we show that following such a rule modification, a government

⁵ Iara and Wolff (2010) study the impact of national fiscal rules on sovereign spreads within the euro area, finding stronger fiscal rules in member states to have a compressing effect. Havlik et al. (2022) focus their event-based study of sovereign spreads on the euro area as well, finding the relaxation of fiscal rules to be associated with rising spreads during the pandemic. Similarly, Kalan et al. (2018) studies the impact of noncompliance with fiscal rules on sovereign spreads within the European Union from 1999-2016, finding spreads for countries who have been placed under an Excessive Deficit Procedure (EDP) to be on average 50-150bp higher than spreads for those who have not.

⁶ We do not whether the spread-compressing effect of fiscal rules held for countries that abandoned their rules during the GFC due to the fact that only one country in our sample (Argentina) suspended a fiscal rule during our sample timeframe.

is expected to return to compliance in approximately three years. This result, in conjunction with the empirical results of our analysis of spreads, suggest that during global crises, credit markets internalize the fact that temporary rule abandonments generally do not sacrifice long-term debt solvency, and therefore do not penalize sovereign governments for activating an escape clause or suspending a fiscal rule. Thus, our results provide evidence that credit markets functioned properly through the pandemic in the sense that sovereign governments possessing a reputation of fiscal responsibility were not punished when borrowing needs increased. The historical relationship between fiscal rules and fiscal responsibility was sufficient for the creation of fiscal space during the pandemic for countries with fiscal rules.

The studies most similar to ours are Davoodi et al. (2022), Daehler et al. (2020), and Zheng (2023). Regarding the former, Davoodi et al. (2022) analyze a panel of 90 countries from 1990-2021 and study the correlation between various macroeconomic variables and deviations from budget balance rules. The authors perform a panel regression showing that 5y CDS spreads for countries who have exceeded a budget balance rule limit are estimated to be higher than the unconditional average for all countries who adhere to a budget balance rule, for around 3-4 years after the initial breach. While this finding is suggestive of a spread-compressing effect associated with compliance to a fiscal rule over a long-time horizon, our findings presented in Section 4 suggest that during periods of global crisis compliance to a fiscal rule does not drive the spread-compressing effect, but rather the existence of the rule itself. To show this, we first compare countries with and without fiscal rules, and later compare countries that maintained their fiscal rules with those that either suspended rules or enacted an escape clause. Our sample therefore includes countries who do not adhere to a fiscal rule, whereas the sample used in Davoodi et al. (2022) does not. Our analysis is also focused specifically on periods of global crisis and is a more comprehensive study of the determinants of spreads, as we follow the existing literature by including controls such as a global factor, regional factor, corporate factor, country-specific measurements of economic activity, and various policy-related variables.⁷ Our analysis also expands the sample of emerging market economies from 30 to 58 and uses data extending through May 2022. This extended time frame allows us to estimate the determinants sovereign spreads through the course of multiple variant outbreaks, not just the initial outbreak in March 2020.

Zheng (2023) uses the COVID-19 timeframe to identify sovereign borrowing capacity in time of need and its determinants, finding credible fiscal rules to strengthen the sovereign debt response to pandemic shocks. Our analysis in Section 4 differs in that Zheng (2023) does not attempt to estimate sovereign spreads, but rather sovereign borrowing capacity as defined by the logarithm of the dollar amount of bond issuances. We consider

⁷ Daehler et al. (2020) tests a similar specification as ours in a study of the determinants of changes in sovereign CDS spreads of 30 emerging market economies through the first six months of 2020. The authors do not, however, consider the spread compressing effect of fiscal rules, as is the focus of our study.

our research to be complementary to Zheng (2023) in that our findings are suggestive of a role of fiscal rules in creating fiscal space, but our study considers a broader set of fiscal rules and is able to account for rule suspensions and escape clause activations through COVID-19 pandemic, whereas Zheng (2023) does not.⁸

Our study also ties more broadly into the literature pertaining to the functioning and effectiveness of fiscal rules in influencing fiscal outcomes. The mechanism through which we hypothesize that fiscal rules dampen sovereign spreads is the signaling effect to credit markets of fiscal responsibility and long-term debt solvency. Crucial to this signal is the belief that fiscal rules are effective in achieving their intended use. An extensive theoretical literature has found the impact of a fiscal rule to vary based on the specific type of rule in place. Azzimonti et al. (2016), for example, theoretically and quantitatively evaluate the impact of a budget balance rule under which legislators cannot run any deficit whatsoever, finding that such a rule leads to a gradual reduction in public debt. Bianchi et al. (2019) study optimal policy response to a recession in the presence of sovereign risk, showing theoretically that in the midst of a recession, a rule that promises lower government spending in the future can help reduce current spreads and make stimulus more desirable. Most recently, Hatchondo et al. (2022) introduce fiscal rules into a sovereign default model featuring long-term debt, showing that welfare gains can be achieved from the introduction of debt-brake and spread-brake rules, and that a common spread brake generates larger welfare gains for a union of heterogeneous countries. Finally, Esquivel and Samano (2023) develop a richer sovereign default model with production and capital accumulation to study how fiscal rules can be welfare improving because of a significant reduction in spreads due to expectations about future borrowing and investment.

On the empirical side, an extensive literature has provided evidence of the disciplinary effect of fiscal rules. Bergman and Hutchison (2014), for example, find that fiscal rules help to dampen the extent of policy procyclicality once a minimum threshold of government efficiency is reached. In a similar vein, we condition our analysis on the same measurement of government efficiency used by these authors, the World Bank “government effectiveness” index. This allows us to empirically disentangle the selection bias issue that is present when estimating causation between the existence of a rule and fiscal outcomes, which has been noted in numerous studies (see Eyraud et al., 2018; Heinemann, Moessinger, and Yeter, 2017).

The remainder of the paper is structured as follows: Section 2 details trends in fiscal rule adoption. Section 3 outlines the data employed in our paper and empirical methodology of our analysis. Section 4 presents our empirical results and discusses the policy implications that follow. Section 5 extends our analysis to the time frame surrounding the GFC. Section 6 concludes. In the appendix we report additional figures relating to movements in sovereign spreads through the GFC and COVID-19 pandemic, as well as the results for our robustness checks.

⁸ Zheng (2023) considers a narrower subset of fiscal rules (national rules that are determined to be credible following a specified set of criteria), and the rules flagged are only up to date as of 2015.

2. Facts on Fiscal Rules and Sovereign Spreads

2.1 Trends in Fiscal Rules

In the thirty years preceding the pandemic, fiscal rules, which are numerical limits on budgetary aggregates, had surged in popularity as policies implemented by sovereign governments to achieve fiscal discipline. Fiscal rules commonly take the form of budget balance rules, debt rules, expenditure rules, and revenue rules.⁹ Across all income levels, the number of countries with at least one fiscal rule in place has increased from 26 countries in 1997 to 103 countries in 2021.¹⁰ As can be seen in Figure 1a, whereas high-income economies were early adopters of fiscal rules, recent growth in fiscal rule adoption has been dominated by low- and middle-income economies. As recently as 1997, low- and middle-income economies accounted for only 12% of all countries adhering to a fiscal rule, but by 2021 this share had risen to 59%. Among low- and middle-income countries, the focus of this paper, fiscal rule adoption has been widespread geographically.¹¹ Regarding the types of rules adopted, budget balance rules and debt rules are by far the most commonly adopted rules (see Figure 1b).¹²

The widespread adoption of fiscal rules by low- and middle-income countries in recent years has been associated with enhanced fiscal discipline for sovereign governments adopting rules. As discussed in Section 1, a large literature exists documenting the disciplinary effect of fiscal rules on sovereign governments. Our descriptive statistics provide yet further evidence of the correlation that exists between fiscal rule adoption and fiscal responsibility. Table 1 shows that during the 15-year period spanning 2007-2021, the average structural deficit-to-GDP ratio of countries adhering to any type of fiscal rule was 0.63 percentage points lower than the structural deficit of countries without a fiscal rule, and a one-sided t-test for the difference in means shows this difference to be statistically significant. The two years that stand out, however, are 2020 and 2021, as in these two years the trend reverses as countries with fiscal rules have slightly larger structural deficit-to-GDP ratios (4.59%), on average, than those without (4.35%). Contrary to popular belief, this fact illustrates that fiscal rules do not constraint the government's capacity to respond to negative shocks. Moreover, as we will show in Section 4, the unprecedented spike in rule suspensions and escape clause usage that occurred through the COVID-19 pandemic did not dampen the effect of fiscal rules on spreads for countries temporarily abandoning their rules. Instead, our empirical results imply that fiscal rules still provide a spread-compressing effect even if abandoned. We interpret

⁹ Davoodi, Hamid, Paul Elger, Alexandra Fotiou, Daniel Garcia-Macia, Andresa Lagerborg, Raphael Lam, and Sharanya Pillai. 2022. "Fiscal Councils Dataset: The 2021 Update", International Monetary Fund, Washington, D.C.

¹⁰ Ibid.

¹¹ See Figure xx in Appendix

¹² Fiscal rule adoption has also differed according to whether the fiscal rules are nationally or supranationally enforced (see Figure xx in Appendix).

these results to reflect the expectation that rule abandonment will be temporary, and that countries will return to fiscal rule compliance after a short duration of time.

Figure 1. Trends in Fiscal Rule Adoption

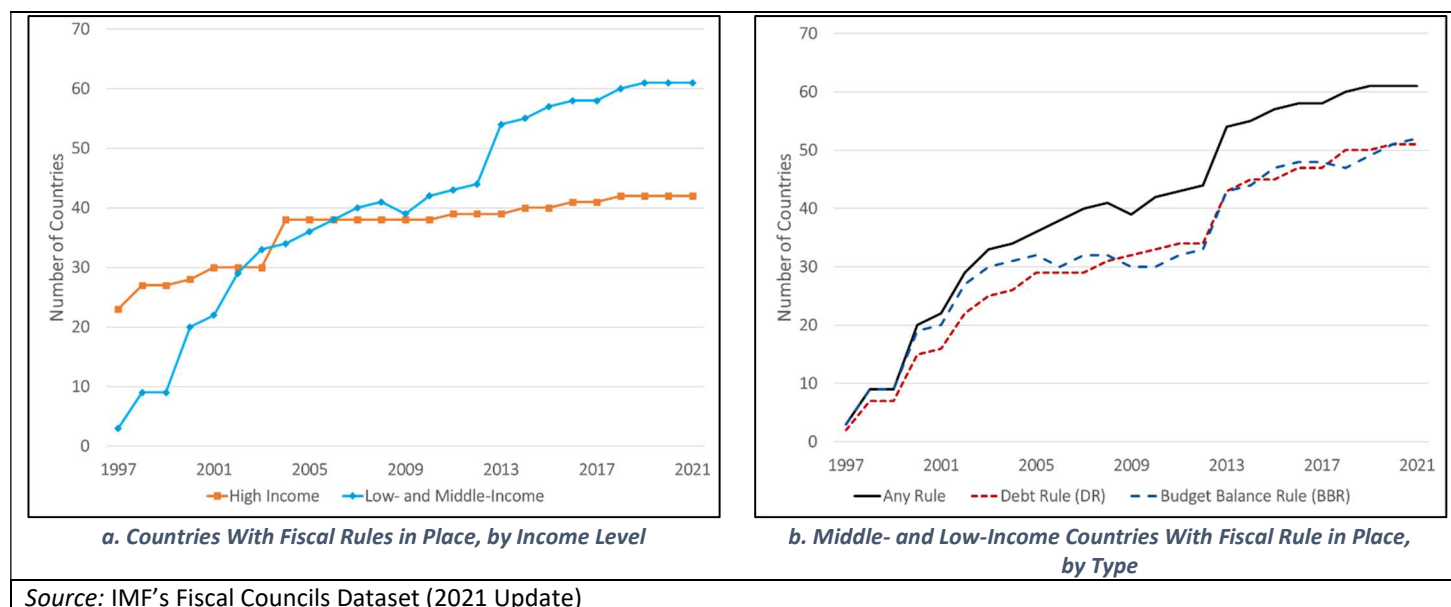


Table 1. Average Structural Deficit (% GDP) for Countries With and Without Fiscal Rules (2007-2021)

	Average	Standard Deviation
Countries With Fiscal Rule	2.78%	1.01%
Countries Without Fiscal Rule	3.41%	0.81%

Note(s):

1) Sample size of 41 middle and low-income countries.

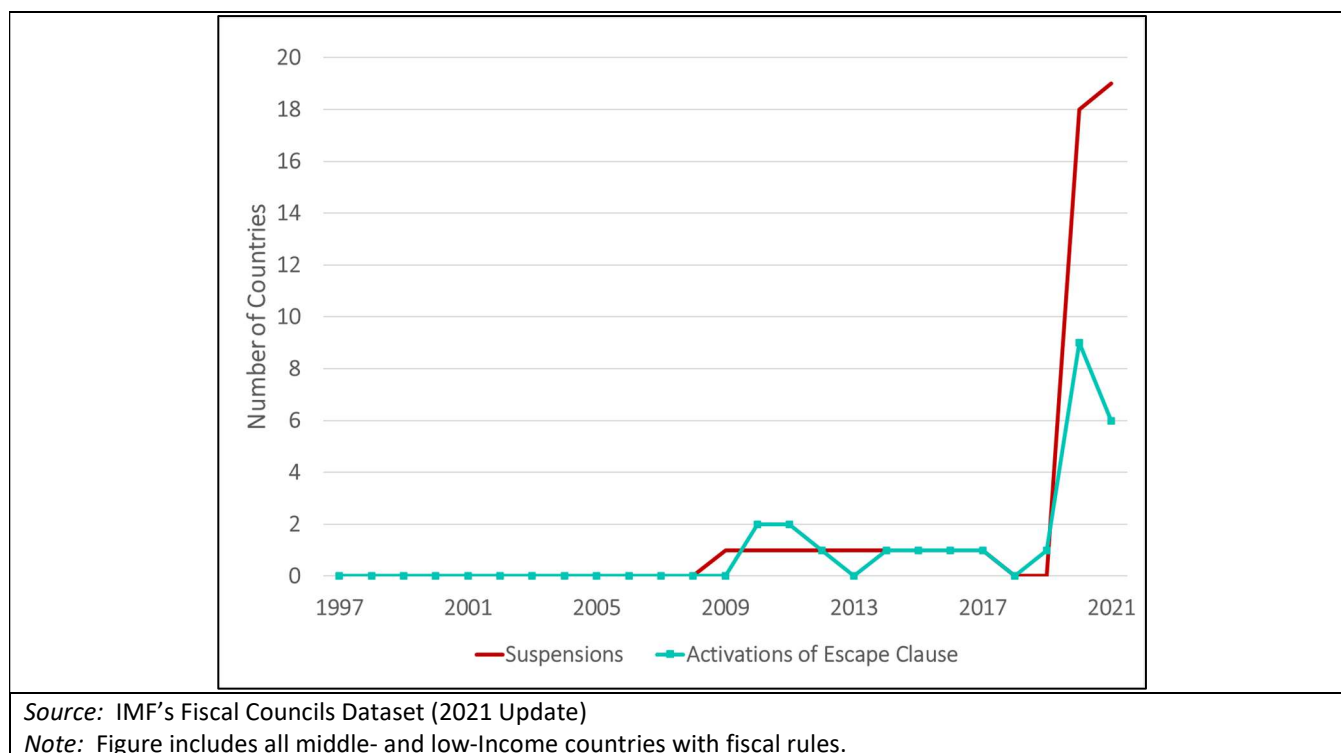
Source:

IMF's Fiscal Councils Dataset (2021 Update) and World Economic Outlook Database (April 2022 Vintage)

As mentioned above, perhaps the most notable development in fiscal rule usage recently has been the unprecedented spike in escape clause usage and fiscal rule suspension witnessed during the COVID-19 pandemic. In 2020 and 2021, 39% and 36% of low- and middle-income countries with fiscal rules, respectively, either temporarily suspended a rule or used an escape clause. The previous peak occurred in 2010, when suspensions and escape clause usage stood at a 7% rate, as only three countries abandoned their fiscal rules (see Figure 2). With the growing importance and relevance of fiscal rules in the years leading up to the pandemic, such a sudden breakdown in fiscal discipline raises the question of how long it will take for fiscal balances to return to their pre-pandemic trend, thus allowing countries to return to fiscal rule compliance. We address this question in Section 4 using the IMF Fiscal Rule Dataset (IMF 2022), which provides us with a sample including every instance in which a

budget balance rule was either suspended, revised upward, and/or an escape clause was used over the period 2000-2019.

Figure 2. Suspensions or Activations of Escape Clause by Year



A potential contributing factor to the increase in escape clause usage and temporary rule suspensions during the pandemic was the development of a “second-generation” of fiscal rules in the decade preceding the COVID-19 pandemic. As noted by Eyraud et al. (2018), an inherent tradeoff exists between the flexibility and enforceability of fiscal rules, and the GFC led to a broad recognition of the need to enhance existing rules along these dimensions and ultimately strike a better balance between the two. In the years following GFC, a “second-generation” of fiscal rules emerged which sought to construct and reform rules in such a way that allows for an appropriate degree of short-run flexibility when necessary while still promoting long-term fiscal responsibility. As noted in Eyraud et al. (2018), many reforms made post-GFC introduced new escape clauses covering a larger set of contingencies during crisis periods in which unexpectedly large fiscal expansion is necessary, while providing guidance on the path back to compliance. The trend shown in Figure 2 highlights the fact that these enhancements allowed for a high degree of flexibility in fiscal rule enforcement through COVID-19 pandemic. Our empirical results reported in Section 4 provide evidence that this second-generation of fiscal rules succeeded in continuing to serve as a signal of fiscal responsibility despite the widespread surge in escape clause usage and rule

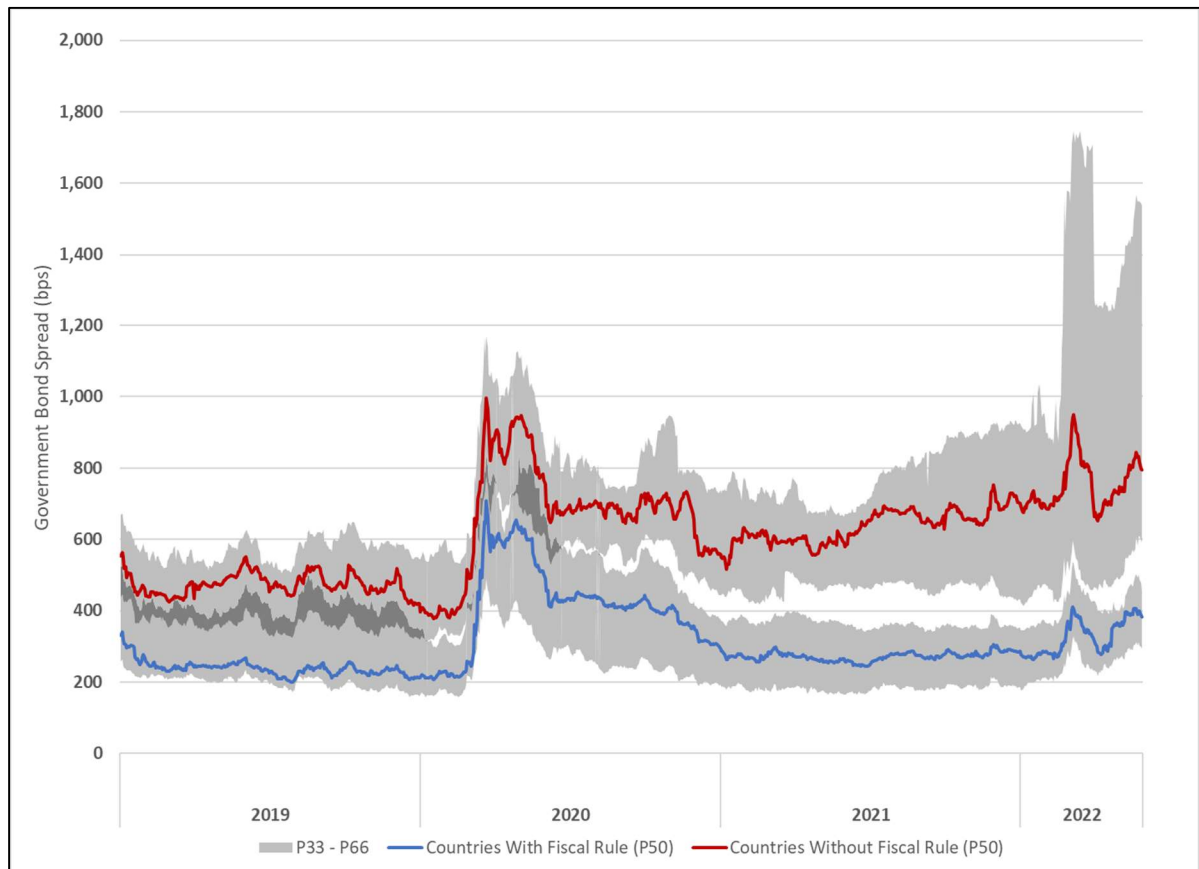
suspensions. We show that the existence of fiscal rules compressed spreads for all countries with a rule through the pandemic, regardless of whether enforcement continued during the time period.

In the years following the global financial crisis (GFC) and preceding the pandemic, increased attention was given to fiscal rules and institutions, specifically with regard to how they shape the effectiveness of fiscal policy. This discussion explored dimensions through which fiscal rules can shape fiscal outcomes, including the extent of policy procyclicality (Bergman and Hutchison, 2015) and fiscal balances (Caselli and Reynaud, 2020).

2.2 Sovereign Spreads During Global Crises

Through the first five months of 2020, the median sovereign spread on US dollar-denominated debt issued by emerging market economies increased by over 300 basis points. The trend of rising spreads was widespread geographically, yet some emerging market economies managed to navigate through the pandemic with a more subdued increase than others, providing these governments with much needed fiscal space through a period in which borrowing needs increased drastically. Interestingly, when partitioning the data on sovereign spreads into countries with and without fiscal rules, a clear pattern emerges. As can be seen in Figure 3, countries with fiscal rules tended to have lower spreads compared to countries without fiscal rules both prior to and after the onset of the pandemic. A similar pattern can be seen when comparing countries with and without fiscal rules during the GFC era from March 2008 onward (see Figure A1 in appendix). This trend is suggestive of a role played by fiscal rules in compressing sovereign spreads, yet it is important to acknowledge the issue of endogeneity involved in taking such a stand, as sovereign governments that are inherently more fiscally responsible and hence experience lower borrowing costs are also more likely to adopt fiscal rules in the first place. Thus, it is not obvious *ex ante* whether a sovereign government adopting a fiscal rule should be expected to experience lower spreads relative to a counterfactual in which no rule is adopted.

Figure 3. Sovereign Bond Spreads – By Existence of Fiscal Rule (COVID-19 Timeframe)



3. Data and Empirical Methodology

In our baseline analysis, we employ daily data of emerging market sovereign spreads over Treasuries on U.S. dollar-denominated debt for 58 countries included in the J.P. Morgan Emerging Markets Bond Index Global (EMBI Global). Table A1 presents our sample of countries, and the sample period covered is January 2, 2019 through May 27, 2022. The global factor used in our analysis is the EMBI Global index. Corporate spreads are captured by the J.P Morgan CEMBI IG+ index. To construct the regional factor, we adopt an approach similar to that used by Daehler et al. (2020). First, countries are grouped into geographic buckets according to the seven regional classifications defined by the World Bank's World Development Indicators database.¹³ The regional factor for a given country is then calculated as the daily average logged spread for the country's regional grouping, excluding the country itself.

The country-specific economic indicators used as controls include the total external debt stock, primary balance (% of GDP), GDP per capita growth, and annual changes in consumer prices, all lagged by one year. Data for the external debt stock and primary balance is sourced from the spring 2022 vintage of the cross-country database of fiscal space created by Kose, Kurlat, Ohnsorge, and Sugawara (2017). GDP per capita growth is sourced from the IMF WEO database, and annual inflation data comes from the IMF as well.

Our policy-related variables include dummy variables indicating dates of Federal Reserve and ECB announcements related to pandemic responses, and following Daehler, Aizenman, and Jinjark (2021), daily log changes in the Oxford COVID-19 Government Response Tracker Stringency Index. Use of the stringency index serves as a control for variation in governments' responses to the pandemic. The Federal Reserve and ECB actions flagged all occur in 2020 and include interest rate cuts and any other monetary policy-related measures taken to reassure markets through the early stages of the pandemic. A priori, it is ambiguous whether Federal Reserve or ECB action would increase or decrease spreads during a crisis period. On one hand, by easing global risk aversion, action taken could lower spreads by encouraging capital flows into emerging markets. On the other hand, if Fed or ECB action fails to soothe global risk aversion, spreads may increase as capital is redirected away from emerging markets (particularly those struggling to contain the pandemic) and into the United States. and EU.

Fiscal rules, suspensions, and escape clause usage are flagged using the IMF Fiscal Rule Dataset (IMF 2022). Finally, following Bergman and Hutchison (2015), we control for institutional quality using the World Bank Worldwide Governance Indicators (WGI) "government effectiveness" index.¹⁴ Specifically, we employ percentile rank pertaining to this index as reported out by the WGI data, ranging from 0 (lowest) to 100 (highest). Our baseline specification takes the following form:

$$spread_{i,t} = \beta_0 + \beta_1 FiscalRule_{i,t} + \beta_2 GE_{i,t} + \beta_3 CEMBI_t + \beta_4 EMBI_t + \beta_5 Region_{i,t} + \eta' X_{i,t}^{economy} + \theta' X_{i,t}^{policy} + \gamma_t + \nu_i + \epsilon_{i,t} \quad (1)$$

where $spread_{i,t}$ denotes the logged sovereign spread for country i on date t , with January 2, 2019 $\leq t \leq$ March 27, 2022. $FiscalRule_{i,t}$ is a dummy variable indicating whether or not a fiscal rule exists in country i at time t . The global factor is denoted $EMBI_t$, while $Region_{i,t}$ denotes the regional factor, $CEMBI_t$ is the corporate factor, $GE_{i,t}$ is the government effectiveness index, $X_{i,t}^{economy}$ denotes the country-specific vector of covariates relating to macroeconomic activity, and $X_{i,t}^{policy}$ is the country-specific vector of policy-related covariates. Month and country fixed effects, γ_t and ν_i , are included in all tests.

Further, to test whether the spread-compressing effect of fiscal rules found during the COVID-19 timeframe, if any, also applies to other periods of global crisis, we test a similar specification using daily data of

¹⁴ This variable captures "perceptions of the quality of public services, the quality of the civil service and the degree of its independence from political pressures, the quality of policy formulation and implementation, and the credibility of the government's commitment to such policies".

emerging market sovereign spreads for 26 countries during the GFC era. With this sample, we test a variation of the specification presented in equation (1) above which does not include the global, corporate, or regional factors, due to data limitations:

$$spread_{i,t} = \beta_0 + \beta_1 FiscalRule_{i,t} + \beta_2 GE_{i,t} + \eta' X_{i,t}^{economy} + \theta' X_{i,t}^{policy} + \gamma_t + \nu_i + \epsilon_{i,t} \quad (2)$$

where January 2, 2007 $\leq t \leq$ December 31, 2009.

4. Empirical Results

4.1 The Sovereign Spread Compressing Effect of Fiscal Rules

Table 2 shows the results from the specification outlined in Equation (1). The full set of estimates for all covariates are reported in Table A3, in the appendix. Column (1) displays the estimates when the fiscal rule flag, global factor, regional factor, corporate factor, variable controlling for government effectiveness, country fixed effects, and month fixed effects are included as regressors. Column (2) includes all of the variables mentioned above, in addition to our regressors relating to fiscal space. Column (3) includes the variables in Column (1), in addition to inflation and GDP per capita growth. Column (4) incorporates all of the variables included in the first three tests. Column (5) includes all of these as well as our policy variables. Notably, the existence of a fiscal rule is negatively associated with spreads across all tests, and the relationship is always found to be statistically significant at the 1 percent level, with coefficient estimates ranging from -.775 to -1.029. In other words, the existence of a fiscal rule is associated with 54%-64% lower sovereign spreads. Given that the median spread throughout the entire sample period for countries without a fiscal rule was 590 basis points, our estimates imply that the average spread-reducing effect of a fiscal rule is 319 to 378 basis points. As expected, March 2020 is the month associated with the highest spreads, and we estimate a negative and statistically significant relationship between government effectiveness and spreads.

Turning to the regressors related to fiscal space, real GDP growth, and inflation, the signs of most coefficient estimates are in line with our expectations.¹⁵ Higher inflation is found to be associated with higher spreads, GDP per capita growth is found to be associated with lower spreads, and both coefficients are estimated with statistical significance at the 1 percent level across all tests. A stronger primary balance is estimated to compress spreads across all tests, although these coefficients are not always estimated with a high degree of statistical significance. Regarding the policy-related regressors, we find statistically insignificant announcement

¹⁵ See Table A3 in appendix.

effects for both the Fed and ECB policy variables. Likewise, we find statistically insignificant policy stringency effects.

Similarly, the results for the GFC era shown in Table A1 in the appendix indicate that a statistically significant spread-compressing effect of fiscal rules existed during 2007-2009, albeit one of a smaller magnitude. The coefficient estimates for β_1 range from -.101 to -.195, implying that an average spread-reducing effect of 36 to 67 basis points, given that the median spread for countries without a fiscal rule during the sample period is 378 basis points. We again estimate a negative and statistically significant relationship between government effectiveness and spreads, and the coefficient estimates for the variables related to fiscal space, real GDP growth, and inflation are all statistically significant and are estimated with the expected sign. The full set of results for this test can be found in the appendix.

Table 2. Panel Regression Estimates of Fiscal Rule Impact on Sovereign Spreads

	<i>Dependent Variable</i> Log Spread (Daily)				
	(1)	(2)	(3)	(4)	(5)
Fiscal Rule	-1.029*** (-38.99)	-0.867*** (-34.36)	-0.835*** (-32.24)	-0.775*** (-29.21)	-0.775*** (-29.21)
Global/Regional/Corporate Factors	Yes	Yes	Yes	Yes	Yes
Policy-Related Controls	No	No	No	No	Yes
Total External Debt Stocks	No	Yes	No	Yes	Yes
Primary Balance	No	Yes	No	Yes	Yes
GDP Per Capita Growth	No	No	Yes	Yes	Yes
Inflation	No	No	Yes	Yes	Yes
Government Effectiveness	Yes	Yes	Yes	Yes	Yes
Country Fixed Effects	Yes	Yes	Yes	Yes	Yes
Month Fixed Effects	Yes	Yes	Yes	Yes	Yes
Observations	48956	46675	45887	44320	44320
R^2	0.9184	0.9264	0.9107	0.9135	0.9135

t statistics in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.010$

4.2 The Sovereign Spreads Compressing Effect During Global Crises

Beyond the effect of fiscal rules on sovereign spreads across the entire time frame captured in our baseline specification, we are also interested in estimating the differential impact of fiscal rules on spreads prior to and throughout the onset of a crisis period. In a second specification, we employ a difference-in-difference regression to achieve this aim. Specifically, we begin by estimating the following specification, applied to the COVID-19 timeframe:

$$spread_{i,t} = \beta_0 + \beta_1 FiscalRule_{i,t} + \beta_2 PostCrisis_t + \beta_3 FiscalRule_{i,t} * PostCrisis_t + \beta_4 GE_{i,t} + \beta_5 CEMBI_t + \beta_6 EMBI_t + \beta_7 Region_{i,t} + \eta' X_{i,t}^{economy} + \theta' X_{i,t}^{policy} + v_i + \epsilon_{i,t} \quad (3)$$

where $PostCrisis_t$ equals 1 from March 1, 2020 onward, and equals 0 in the preceding time period. Here, β_1 measures the effect of the existence of a fiscal rule on sovereign spreads in the pre-pandemic period, and $\beta_1 + \beta_3$ captures the effect of fiscal rules through the pandemic.

The estimates obtained from our second specification can be found in Table 3. The coefficient estimate for the COVID-19 time period, which is found to be highly statistically significant across all tests, implies a 98 to 147 basis point increase during the pandemic relative to the pre-pandemic average. The existence of a fiscal rule is again estimated to compress spreads across all tests, with significance at the 1 percent level. Importantly, the compressing effect of fiscal rules is estimated with a greater magnitude throughout the pandemic months relative to the preceding period. As discussed above, the effect of fiscal rules on sovereign spreads prior to the pandemic is estimated by the standalone fiscal rule coefficient – ranging from -.626 to -.745 – which implies an average spread-reducing effect of 274 to 310 basis points for countries with a fiscal rule compared to those without. The effect of fiscal rules on sovereign spreads through the pandemic is estimated by the sum of the standalone fiscal rule coefficient and coefficient on the interaction term. This estimate ranges from -0.8 to -0.973, implying an average spread-reducing effect of 373 to 422 basis points through the pandemic. Thus, while the COVID-19 time period is found to be associated with higher spreads for all countries in the sample, the existence of a fiscal rule is estimated to have a stronger spread compressing effect through these months than in the preceding period.

To measure how the impact of fiscal rules on sovereign spreads changed through the pandemic on a more granular level, we employ a third specification in which the time dummies are captured at the weekly level, and the fiscal rule flag is interacted with these weekly dummies:

$$spread_{i,t} = \beta_0 + \beta_1 FiscalRule_{i,t} + \beta_2 (FiscalRule_{i,t} * \gamma_t) + \beta_3 GE_{i,t} + \beta_4 CEMBI_t + \beta_5 EMBI_t + \beta_6 Region_{i,t} + \eta' X_{i,t}^{economy} + \Theta' X_{i,t}^{policy} + \gamma_t + \nu_i + \epsilon_{i,t} \quad (3)$$

The results obtained from our estimation of Equation (3) can be visualized in Figure 4. Specifically, the weekly fixed effect estimates are reported out alongside the sum of the weekly fixed effect estimate and weekly fixed effect-fiscal rule interaction term. Thus, the difference between the two trends reported out in Figure 4 represents the time-varying effect of fiscal rules on sovereign spreads through the entire sample period. The trends show that a spread-compressing effect is estimated prior to the onset of the pandemic in early 2020, that this effect largely disappears from March-May 2020, and that it reemerges from the end of May 2020 through the remainder of the sampling time frame. These estimates align with our estimation of Equation (2) shown above, in that the COVID-19 period is associated with rising spreads for countries with and without fiscal rules alike, yet fiscal rules are still found to significantly compress spreads.

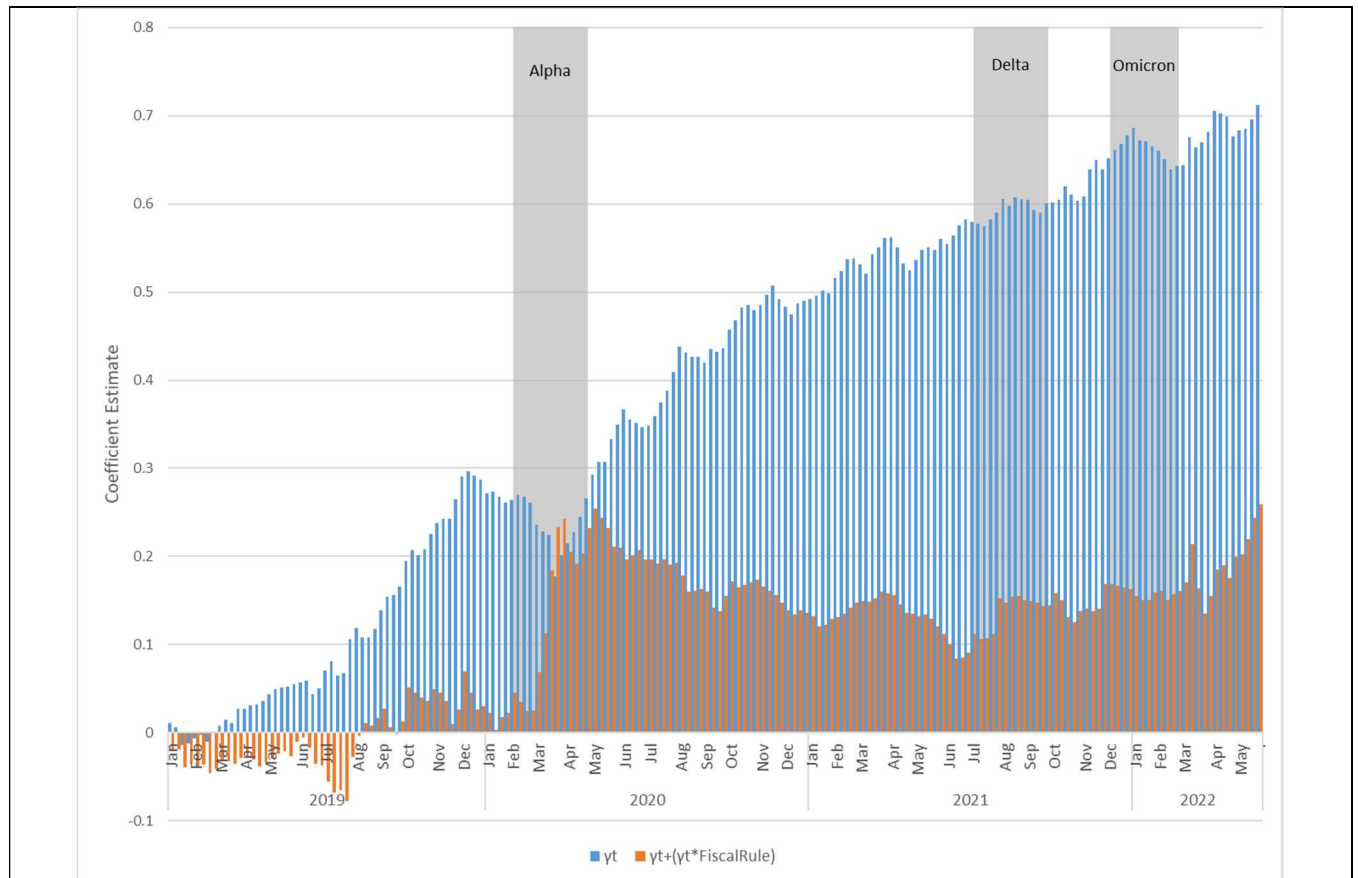
Table 3. Difference-in-Difference Estimates of Fiscal Rule Impact in Post-Covid Time Period

	<i>Dependent Variable</i> Log Spread (Daily)				
	(1)	(2)	(3)	(4)	(5)
Fiscal Rule	-0.745*** (-29.01)	-0.626*** (-25.22)	-0.711*** (-28.31)	-0.709*** (-27.26)	-0.709*** (-27.27)
Post Covid	0.337*** (61.88)	0.238*** (42.20)	0.261*** (48.16)	0.253*** (44.68)	0.254*** (44.72)
Fiscal Rule#Post Covid	-0.228*** (-42.38)	-0.174*** (-33.32)	-0.176*** (-35.33)	-0.174*** (-34.31)	-0.174*** (-34.30)
Global/Regional/Corporate Factors	Yes	Yes	Yes	Yes	Yes
Policy-Related Controls	No	No	No	No	Yes
Total External Debt Stocks	No	Yes	No	Yes	Yes
Primary Balance	No	Yes	No	Yes	Yes
GDP Per Capita Growth	No	No	Yes	Yes	Yes
Inflation	No	No	Yes	Yes	Yes
Government Effectiveness	Yes	Yes	Yes	Yes	Yes
Country Fixed Effects	Yes	Yes	Yes	Yes	Yes
Month Fixed Effects	No	No	No	No	No
Observations	48956	46675	45887	44320	44320
R ²	0.9195	0.9252	0.9115	0.9136	0.9136

t statistics in parentheses

* p<0.10, ** p<0.05, *** p<0.010

Figure 4. Coefficient Estimates for Weekly Fixed Effects and Interaction With Fiscal Rule



Notes: Results are obtained from estimation of Equation (3), with controls including the global, regional, and corporate factors, measurement of government effectiveness, existence of a fiscal rule, weekly fixed effects, and country fixed effects.

We then test for the differential impact of fiscal rules on sovereign spreads both before and throughout the GFC era, using the same specification as shown in (2) but excluding the global, regional, and corporate factors, again due to data limitations.¹⁶ The results of this test, which can be found in Table A5 in the appendix, imply that the spread-compressing effect of fiscal rules was stronger in the post-crisis period than pre-crisis period. In fact, while a negative and statistically significant coefficient estimate is found across all tests for the interaction term between the fiscal rule and post-crisis dummies, the standalone fiscal rule coefficient estimate is only statistically significant in two out of five tests. Therefore, while we do not find strong evidence of a spread-compressing effect of fiscal rules prior to the onset of the GFC, fiscal rules are estimated to compress spreads through the crisis period. Given that the median spread for countries without a fiscal rule was 420 basis points in the post-crisis period, our estimates of the spread-compressing effect of fiscal rules after March 2008 range from 16 to 42 basis points. Our results therefore imply that the spread compressing effect of fiscal rules during periods of global crisis has strengthened since the GFC. One possible explanation for this development is the development of second-generation rules, which as discussed earlier, have improved previously existing fiscal rules along numerous dimensions.

4.3 The Sovereign Spreads Compressing Effect of Fiscal Rule Suspensions and Escape Clause Usage

In our next set of empirical tests, we investigate the effect of fiscal rules on sovereign spreads during the COVID-19 pandemic while distinguishing between rules that are continually enforced throughout a given year, rules that are temporarily abandoned due to escape clause usage, and rules that are temporarily suspended due to discretionary fiscal policy. Recall that in our baseline specification, we did not distinguish between these three cases, and our estimates of Equations (1) – (4) therefore only captured the effect of fiscal rules on spreads through the COVID-19 pandemic at the broadest level. As mentioned in Section 2, an unprecedented spike in escape clause usage and rule suspensions occurred in 2020 and 2021. In the tests that follow, we investigate whether or not fiscal rules with escape clauses have a larger spread-compressing effect than fiscal rules suspended due to discretionary fiscal policy. Surprisingly, we find no evidence suggesting that usage of an escape clause or a fiscal rule suspension weakened the spread reduction associated with a fiscal rule through the pandemic. We believe this finding to be of particular interest given the trade-offs faced by policymakers seeking to balance the competing goals of simplicity, flexibility, and enforceability. While Debrun and Jonung (2018) shows that simplicity, flexibility, and enforceability are very difficult to attain simultaneously, our results suggest that complex rules attempting to achieve flexibility through the inclusion of complicated escape clauses covering many

¹⁶ The post-crisis period for tests applied to the GFC era is defined as starting in March 2008.

contingencies can be greatly simplified given that credit markets do not appear to perceive any difference between suspensions and escape clause usage.

We estimate the differential effect of fiscal rule suspensions and escape clause usage on spreads with the following modification of Equation (1):

$$spread_{i,t} = \beta_0 + \beta_1 FiscalRule_{i,t} + \beta_2 EscapeClause_{i,t} + \beta_3 Suspension_{i,t} + \beta_4 GE_{i,t} + \beta_5 CEMBI_t + \beta_6 EMBI_t + \beta_7 Region_{i,t} + \eta' X_{i,t}^{economy} + \theta' X_{i,t}^{policy} + \gamma_t + \nu_i + \epsilon_{i,t} \quad (5)$$

where now, $FiscalRule_{i,t}$ only takes on a value of 1 if a fiscal rule is enforced continually throughout a given year. In our sample, ten countries suspend a fiscal rule in 2020 and 2021. The number of countries enacting an escape clause are one in 2019, eight in 2020, and five in 2021. Of the countries suspending fiscal rules and using an escape clause in 2020 and 2021, three nations – India, Paraguay, and Russia – fall under both categories in both years. In the tests shown in this section, we exclude Russia due to the fact that it is an outlier nation in 2022, the reasons for which are largely influenced by sociopolitical developments rather than COVID-19 related factors. Additionally, we include India and Paraguay with the group of nations suspending fiscal rules rather than with nations using an escape clause. With this assumption, we implicitly assume that from the perspective of credit markets, the implications of a suspension on long-term debt solvency outweigh the implications of escape clause usage. In the appendix we report out the results of both specifications in this section reversing this assumption, by categorizing India and Paraguay as countries enacting an escape clause, rather than categorizing the two nations as rule suspenders. The results remain largely unchanged under this alternative assumption.

The results of our estimation of Equation (5) are shown in Table 4 below. Across all tests, the coefficient estimates are virtually identical for the dummy variables flagging escape clause usage and fiscal rules that are continually enforced. Crucially, the coefficient estimates for the dummy variable indicating a rule suspension do not show any evidence of a mitigation of the spread-reducing effect of fiscal rules. In fact, the coefficient estimates for the fiscal rule suspension dummy variable are slightly larger in magnitude than for the other two fiscal rule indicators. As we show in our event study analysis presented in Section 4.4, historical evidence points toward this conclusion, as we estimate that countries who temporarily abandon a budget balance rule will return to compliance in less than three years.

Table 4. Panel Regression Estimates of Escape Clause vs. Suspension Usage on Sovereign Spreads

	<i>Dependent Variable</i> Log Spread (Daily)				
	(1)	(2)	(3)	(4)	(5)
Fiscal Rule – No Suspension or Escape Clause	-1.022*** (-39.05)	-0.867*** (-34.57)	-0.845*** (-32.91)	-0.802*** (-30.49)	-0.802*** (-30.48)
Escape Clause	-1.021*** (-36.68)	-0.886*** (-33.26)	-0.841*** (-31.03)	-0.822*** (-29.43)	-0.822*** (-29.42)
Suspension	-1.232*** (-45.30)	-1.041*** (-39.94)	-1.043*** (-39.12)	-1.004*** (-36.57)	-1.004*** (-36.57)
Global/Regional/Corporate Factors	Yes	Yes	Yes	Yes	Yes
Policy-Related Controls	No	No	No	No	Yes
Total External Debt Stocks	No	Yes	No	Yes	Yes
Primary Balance	No	Yes	No	Yes	Yes
GDP Per Capita Growth	No	No	Yes	Yes	Yes
Inflation	No	No	Yes	Yes	Yes
Government Effectiveness	Yes	Yes	Yes	Yes	Yes
Country Fixed Effects	Yes	Yes	Yes	Yes	Yes
Month Fixed Effects	Yes	Yes	Yes	Yes	Yes
Observations	48956	46675	45887	44320	44320
R ²	0.9197	0.9274	0.9125	0.9152	0.9152

t statistics in parentheses

* p<0.10, ** p<0.05, *** p<0.010

4.4 Event Study – Path of Debt Following Suspension or Modification of Budget Balance Rule

The results of our empirical analysis outlined in Section 4.3 indicate that through the pandemic, the spread-compressing effect of fiscal rules was maintained, even for countries who temporarily abandoned their rules. In this section we provide suggestive evidence of the mechanism driving this result, namely the fact that countries who suspend their fiscal rules or enact an escape clause generally return to rule compliance in a short amount of time. Hence, credit markets do not perceive a material impact on a sovereign government's long-term debt solvency if a rule is temporarily abandoned. We show this empirically through an event study analysis in which the deviation of a country's fiscal balance from its prior average is estimated in the years following the relaxation of a budget balance rule.

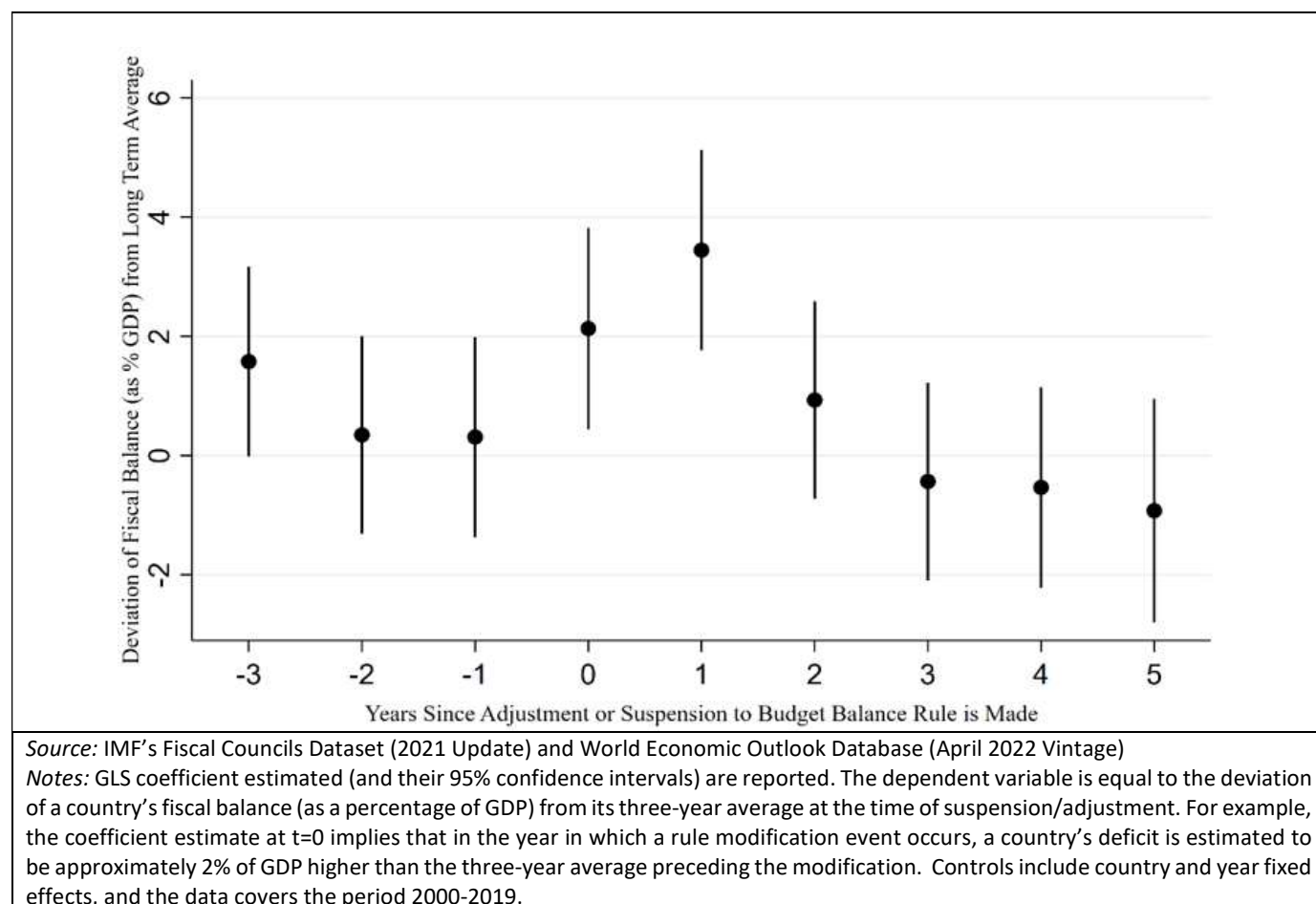
The IMF Fiscal Rule Dataset (IMF 2022) provides us with a sample including every instance in which a budget balance rule was either suspended, revised upward, and/or an escape clause was used over the time period 2000-2021. Limiting the sample time frame to 2000-2019, we identify fourteen instances of such events in the dataset, which we refer to as budget balance rule modification events and are reported out in the appendix, in Table A6. Following Davoodi et al. (2022), we measure a country's fiscal balance using the country's specified budget balance target, which can differ across countries. For example, Chile's budget balance rule pertains to its structural balance, whereas Israel's budget balance rule pertains to its overall balance, and Uruguay's rule pertains to its primary balance. Each of these variables are identifiable in the IMF's Fiscal Rules and World Economic

Outlook (WEO) datasets. A country's baseline (pre-suspension/revision) fiscal balance is calculated as the three-year average target balance prior to the suspension or revision of a fiscal rule. Our summary statistics (reported in Table A7) show that following a budget balance rule modification event, the median duration for a country to return to its baseline fiscal balance is 3.5 years. The median deviation of a country's fiscal balance from its baseline following a modification is 4.4% of GDP. In the sample analyzed, two countries, Argentina and Russia, who both suspended their budget balance rules in 2009 as a result of the global financial crisis, never returned to their pre-suspension baseline in the years following the suspensions, and ultimately abolished their rules.¹⁷

While the sample of countries who have previously suspended, revised, and/or enacted an escape clause for budget balance rules is not large, we employ an event study analysis as an initial step to empirically answer the question of how long a country should be expected to take to return to compliance. After controlling for year and country fixed effects, our estimates indicate that following a budget balance rule modification, a country is expected to take approximately three years to return to its baseline fiscal balance. This implies that for a country that suspended its budget balance rule in 2020, such as Indonesia, its target balance would be expected to return to its 2017-2019 average by the year 2023. Further, our estimates find the deterioration of the fiscal balance to reach its peak one year following the initial modification, with the deficit in this year estimated to be almost 4% of GDP higher than the three-year average preceding the modification. As mentioned at the beginning of this section, we believe that the short time duration for which it has historically taken for sovereign governments to return to compliance after abandoning fiscal rules is a key driver underlying the results reported out in Section 4.2. The full results of our analysis can be seen in Figure 5.

¹⁷ In the case of Argentina, the budget balance rule was suspended between 2009 and 2017, and then abolished thereafter. For Russia, its short-lived budget balance rule (targeting the non-oil balance) became effective in 2008, was suspended in April 2009, and was formally abolished in 2012.

Figure 5. Path of Fiscal Balance Following Suspension/Revision of Budget Balance Rule or Escape Clause Usage



5 Conclusion

We have provided empirical evidence supporting the notion that fiscal rules can signal fiscal responsibility and compress borrowing costs for emerging economies during periods of global crisis. Using the COVID-19 timeframe as our baseline sample period, we find that the existence of a fiscal rule reduces sovereign spreads, with estimates of the average spread-compressing effect ranging from 319 to 378 basis points. Crucially, we find this result to be robust to tests controlling for institutional quality, and to hold regardless of the extent to which enforcement of the rule occurred during the global crisis. We also provide suggestive evidence regarding the mechanism driving the latter result, by performing an event study empirically estimating the time it takes to return to compliance following such an abandonment of a budget balance rule.

Together, our results suggest that during global crises, credit markets internalize the fact that temporary rule abandonments generally do not sacrifice long-term debt solvency. Thus, our results provide evidence that credit markets functioned properly through the pandemic in the sense that sovereign governments possessing a

reputation of fiscal responsibility were not punished when borrowing needs increased. Finally, we show that the spread compressing effect of fiscal rules is robust to other global crisis periods such as the GFC of 2008-09. The spread compressing effect is estimated to be stronger during the COVID-19 pandemic than during the GFC, a result which we interpret to reflect the gradual improvement of fiscal rules and generation of “second-generation” rules in the decade preceding the pandemic. Our results have strong implications for policymakers in emerging market economies who seek policies that signal fiscal responsibility and compress borrowing costs, especially during global crises such as the COVID-19 pandemic. The results not only suggest that a spread-compressing effect of fiscal rules exists, but that complex rules attempting to achieve flexibility through the inclusion of complicated contingencies can be greatly simplified given that credit markets do not perceive any difference between suspensions and escape clause usage.

References

- Amador, Manuel, Iván Werning, and George-Marios Angeletos. "Commitment vs. flexibility." *Econometrica* 74.2 (2006): 365-396.
- Azzimonti, Marina, Marco Battaglini, and Stephen Coate. "The costs and benefits of balanced budget rules: Lessons from a political economy model of fiscal policy." *Journal of Public Economics* 136 (2016): 45-61.
- Bergman, U. Michael, Michael M. Hutchison, and Svend E. Hougaard Jensen. "Promoting sustainable public finances in the European Union: The role of fiscal rules and government efficiency." *European Journal of Political Economy* 44 (2016): 1-19.
- Bianchi, Javier, Pablo Ottonello, and Ignacio Presno. Fiscal stimulus under sovereign risk. No. w26307. National Bureau of Economic Research (2019).
- Caselli, Francesca, and Julien Reynaud. "Do fiscal rules cause better fiscal balances? A new instrumental variable strategy." *European Journal of Political Economy* 63 (2020): 101873.
- Cebotari, Aliona, et al. "Fiscal risks: sources, disclosure, and management." Departmental Papers 2009.001 (2009).
- Daehler, Timo, Joshua Aizenman, and Yothin Jinjark. Emerging markets sovereign spreads and country-specific fundamentals during COVID-19. National Bureau of Economic Research (2020).
- Davoodi, Hamid, Paul Elger, Alexandra Fotiou, Daniel Garcia-Macia, Andresa Lagerborg, Raphael Lam, and Sharanya Pillai. 2022. "Fiscal Councils Dataset: The 2021 Update", International Monetary Fund, Washington, D.C
- Davoodi, Hamid R., et al. "Fiscal Rules and Fiscal Councils: Recent Trends and Performance during the COVID-19 Pandemic." (2022).
- Dovis, Alessandro, and Rishabh Kirpalani. "Fiscal rules, bailouts, and reputation in federal governments." *American Economic Review* 110.3 (2020): 860-88.
- Esquivel, Carlos, and Agustin Samano. "Expansionary Fiscal Consolidation Under Sovereign Risk". Working paper (2023).
- Eyraud, Luc, et al. Second-generation fiscal rules: Balancing simplicity, flexibility, and enforceability. International Monetary Fund (2018).
- Feld, Lars P., et al. "Sovereign bond market reactions to no-bailout clauses and fiscal rules—The Swiss experience." *Journal of International Money and Finance* 70 (2017): 319-343.
- Halac, Marina, and Pierre Yared. "Fiscal rules and discretion under persistent shocks." *Econometrica* 82.5 (2014): 1557-1614.
- Halac, Marina, and Pierre Yared. "Fiscal rules and discretion in a world economy." *American Economic Review* 108.8 (2018): 2305-34.
- Halac, Marina, and Pierre Yared. Fiscal rules and discretion under limited enforcement. No. w25463. National Bureau of Economic Research (2019).
- Halac, Marina, and Pierre Yared. "Commitment versus flexibility with costly verification." *Journal of Political Economy* 128.12 (2020): 4523-4573.
- Hatchondo, Juan Carlos, Leonardo Martinez, and Francisco Roch. "Fiscal rules and the sovereign default premium." *American Economic Journal: Macroeconomics* 14.4 (2022): 244-273.

Havlik, Annika, et al. "Dispelling the shadow of fiscal dominance? Fiscal and monetary announcement effects for euro area sovereign spreads in the corona pandemic." *Journal of International Money and Finance* 122 (2022): 102578.

Heinemann, Friedrich, Marc-Daniel Moessinger, and Mustafa Yeter. "Do fiscal rules constrain fiscal policy? A meta-regression-analysis." *European Journal of Political Economy* 51 (2018): 69-92.

Iara, Anna, and Guntram B. Wolff. "Rules and risk in the euro area: does rules-based national fiscal governance contain sovereign bond spreads?." *Rules and Institutions for Sound Fiscal Policy after the Crisis* 277 (2010).

International Monetary Fund (IMF). 2016. *Analyzing and Managing Fiscal Risk: Best Practices*. Washington, DC: IMF.

Kalan, Federico Diaz, Ms Adina Popescu, and Julien Reynaud. *Thou Shalt Not Breach: The Impact on Sovereign Spreads of Noncomplying with the EU Fiscal Rules*. International Monetary Fund (2018).

Kose, M. Ayhan, et al. "A cross-country database of fiscal space." *Journal of International Money and Finance* 128 (2022).

Nerlich, Carolin, and Wolf Heinrich Reuter. "The design of national fiscal frameworks and their budgetary impact." (2013).

Panizza, Ugo. *Fiscal risk and its drivers: An empirical analysis*. No. 17-2020. Graduate Institute of International and Development Studies Working Paper (2020).

Zheng, Huanhuan. "Sovereign debt responses to the COVID-19 pandemic." *Journal of International Economics* 143 (2023).

Appendix

Figure A1. Sovereign Bond Spreads – By Existence of Fiscal Rule (GFC Timeframe)

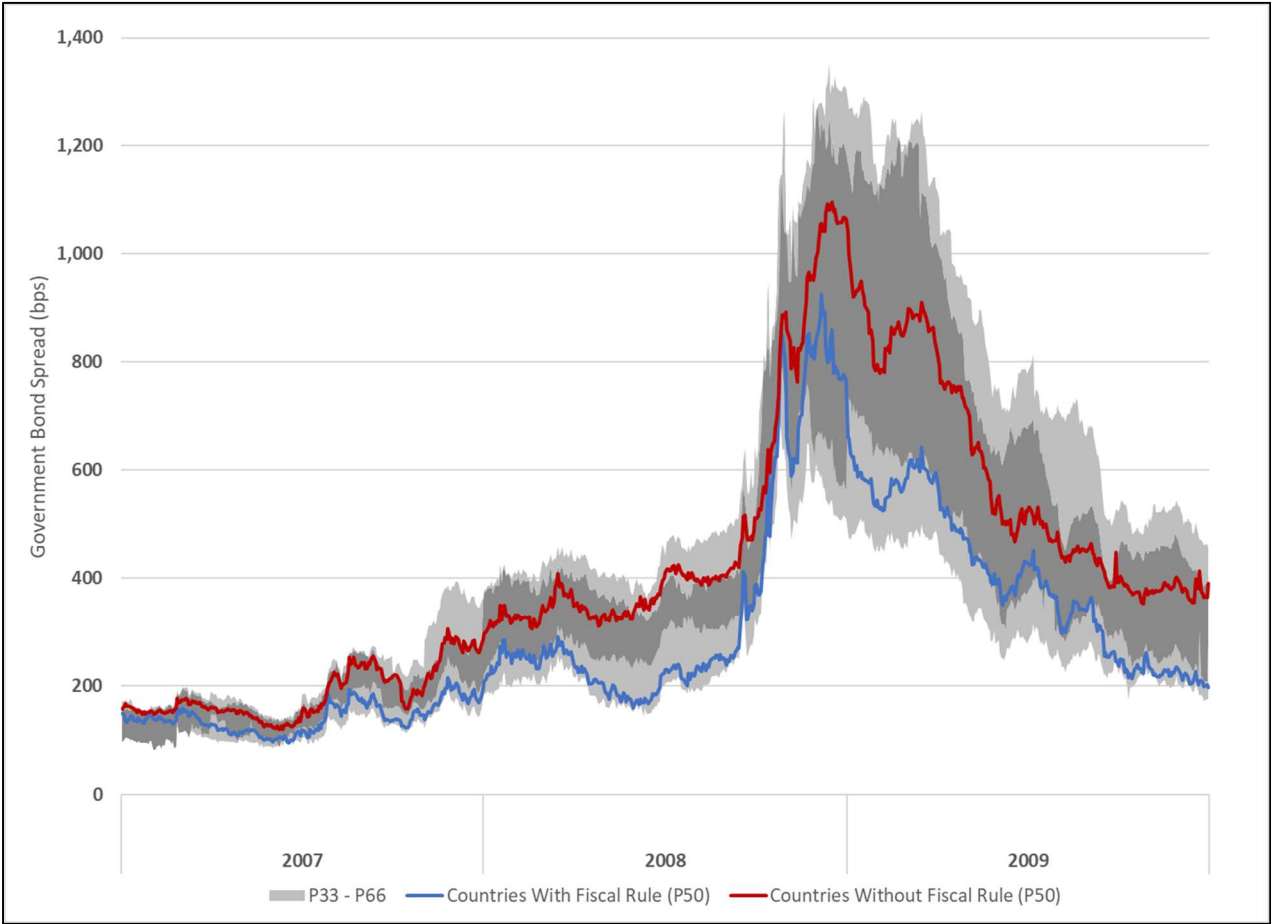


Table A1. Sample of Countries in Baseline Analysis (COVID-19 Timeframe)

Angola	Ghana	Papua New Guinea
Argentina	Guatemala	Paraguay
Armenia	Honduras	Peru
Azerbaijan	India	Philippines
Belarus	Indonesia	Romania
Belize	Iraq	Russian Federation
Bolivia	Jamaica	Senegal
Brazil	Jordan	Serbia
Cameroon	Kazakhstan	South Africa
China	Kenya	Sri Lanka
Colombia	Lebanon	Suriname
Costa Rica	Malaysia	Tajikistan
Cote d'Ivoire	Mexico	Tunisia
Dominican Republic	Mongolia	Turkey
Ecuador	Morocco	Ukraine
Egypt	Mozambique	Venezuela
El Salvador	Namibia	Vietnam
Ethiopia	Nigeria	Zambia
Gabon	Pakistan	
Georgia	Panama	

Table A2. Sample of Countries in Limited Sample (GFC Timeframe)

Argentina	Indonesia	Russian Federation
Brazil	Iraq	Serbia
Bulgaria	Lebanon	South Africa
China	Malaysia	Tunisia
Colombia	Mexico	Turkey
Dominican	Pakistan	Ukraine
Ecuador	Panama	Venezuela
Egypt	Peru	Vietnam
El Salvador	Philippines	

Table A3. Panel Regression Estimates of Fiscal Rule Impact on Sovereign Spreads (COVID-19 Timeframe)

	<i>Dependent Variable</i> Log Spread (Daily)				
	(1)	(2)	(3)	(4)	(5)
Fiscal Rule	-1.029*** (-38.99)	-0.867*** (-34.36)	-0.835*** (-32.24)	-0.775*** (-29.21)	-0.775*** (-29.21)
EMBI Global	0.742*** (10.39)	0.715*** (10.47)	0.739*** (11.27)	0.725*** (10.91)	0.717*** (10.67)
CEMBI	0.195*** (3.32)	0.221*** (3.89)	0.186*** (3.44)	0.196*** (3.55)	0.201*** (3.61)
Regional Factor	0.174*** (12.56)	0.165*** (12.13)	0.220*** (16.86)	0.210*** (15.42)	0.210*** (15.42)
Government Effectiveness	-0.0157*** (-39.20)	-0.0123*** (-32.47)	-0.0127*** (-33.38)	-0.0125*** (-32.90)	-0.0125*** (-32.90)
GDP Per Capita Growth			-0.00842*** (-18.20)	-0.00924*** (-17.46)	-0.00924*** (-17.46)
Inflation			0.0195*** (85.01)	0.0189*** (56.73)	0.0189*** (56.73)
Primary Balance		-0.0067*** (-10.82)		-0.000757 (-0.87)	-0.000760 (-0.87)
Total External Debt Stocks		0.00715*** (65.89)		0.000513** (2.38)	0.000512** (2.38)
Fed Policy Dummy					-0.00765 (-0.46)
ECB Policy Dummy					0.00925 (0.58)
Country Fixed Effects	Yes	Yes	Yes	Yes	Yes
Month Fixed Effects	Yes	Yes	Yes	Yes	Yes
Observations	48956	46675	45887	44320	44320
R^2	0.9184	0.9264	0.9107	0.9135	0.9135

t statistics in parentheses

* p<0.10, ** p<0.05, *** p<0.010

Table A4. Panel Regression Estimates of Fiscal Rule Impact on Sovereign Spreads During GFC

	<i>Dependent Variable</i> Log Spread (Daily)				
	(1)	(2)	(3)	(4)	(5)
Fiscal Rule	-0.195*** (-13.35)	-0.108*** (-5.26)	-0.173*** (-12.69)	-0.101*** (-5.12)	-0.101*** (-5.12)
Government Effectiveness	-0.0129*** (-18.72)	-0.00849*** (-11.49)	-0.00400*** (-6.09)	-0.00483*** (-6.73)	-0.00483*** (-6.73)
GDP Per Capita Growth			-0.0393*** (-33.55)	-0.0405*** (-30.75)	-0.0405*** (-30.75)
Inflation			1.542*** (48.00)	1.700*** (21.95)	1.700*** (21.95)
Primary Balance		-0.0581*** (-21.12)		-0.0484*** (-18.22)	-0.0484*** (-18.22)
Total External Debt Stocks		-0.00143*** (-6.85)		-0.00099*** (-4.89)	-0.00099*** (-4.89)
Fed Policy Dummy					0.0257* (1.68)
ECB Policy Dummy					-0.00686 (-0.39)
Country Fixed Effects	Yes	Yes	Yes	Yes	Yes
Month Fixed Effects	Yes	Yes	Yes	Yes	Yes
Observations	19521	18019	19521	18019	18019
R^2	0.8963	0.8995	0.9106	0.9072	0.9072

t statistics in parentheses

* p<0.10, ** p<0.05, *** p<0.010

Table A5. Difference-in-Difference Estimates of Fiscal Rule Impact During GFC

	<i>Dependent Variable</i> Log Spread (Daily)				
	(1)	(2)	(3)	(4)	(5)
Fiscal Rule	-0.156*** (-5.95)	0.00371 (0.10)	-0.148*** (-5.76)	0.00943 (0.26)	0.00604 (0.17)
Post GFC	0.863*** (103.91)	0.862*** (96.89)	0.825*** (100.00)	0.820*** (86.68)	0.816*** (86.69)
Fiscal Rule#Post GFC	-0.0561*** (-4.14)	-0.106*** (-7.53)	-0.0390*** (-2.95)	-0.0685*** (-4.79)	-0.0666*** (-4.68)
Government Effectiveness	-0.0127*** (-11.07)	-0.00889*** (-7.19)	-0.00648*** (-5.68)	-0.00782*** (-6.35)	-0.00766*** (-6.25)
GDP Per Capita Growth			-0.0313*** (-16.51)	-0.0275*** (-12.73)	-0.0281*** (-13.06)
Inflation			1.218*** (23.87)	0.927*** (8.12)	0.984*** (8.65)
Primary Balance		-0.0810*** (-18.65)		-0.0581*** (-12.84)	-0.0585*** (-13.00)
Total External Debt Stocks		-0.00193*** (-5.54)		-0.00198*** (-5.67)	-0.00195*** (-5.60)
Fed Policy Dummy					0.245*** (9.48)
ECB Policy Dummy					0.245*** (8.24)
Country Fixed Effects	Yes	Yes	Yes	Yes	Yes
Month Fixed Effects	Yes	Yes	Yes	Yes	Yes
Observations	19521	18019	19521	18019	18019
R^2	0.7155	0.7154	0.7277	0.7202	0.7228

t statistics in parentheses

* p<0.10, ** p<0.05, *** p<0.010

Table A6. Sample of Budget Balance Rule Modification Events, 2000-2019

Country	Year	Adjustment	Target Statistic
Argentina	2009	Suspension	Overall balance excluding investment
Armenia	2009	Revision	Overall balance
Chile	2009	Revision	Structural balance
Denmark	2011	Revision	Structural balance
India	2009	Suspension	Primary Balance
Israel	2009	Revision	Overall balance
Mexico	2010	Escape Clause Activation	Overall balance excluding investment
Mongolia	2015	Revision	Structural balance
Panama	2004	Suspension	Nonfinancial public sector deficit
Peru	2009	Suspension	Nonfinancial public sector deficit
Russia	2009	Suspension	Primary Balance
Spain	2008	Escape Clause Activation	Structural balance
United Kingdom	2009	Escape Clause Activation	Overall balance excluding investment
Uruguay	2009	Revision	Primary Balance

Table A7. High Deficit Periods Following Budget Balance Rule Modification Events

	Min	Median	Mean	Max
Duration (Years)	1	3.5	3.7	n/a
Amplitude (Deviation from Prior Average as % GDP)	1.4%	4.4%	5.6%	12.4%

Note(s):

- 1) Sample size of 14 countries, with revisions or suspensions identified spanning the years 2001-2015.
- 2) Two countries (Argentina and Russia) do not return to prior average deficit in the time period analyzed.