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THE MEDIUM-TERM EFFECTS OF FISCAL POLICY RULES

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ABSTRACT

Using a panel of 86 advanced and emerging market economies over the period 1985-2020, we investigate the short-to-medium term effects of fiscal policy rules on primary balances. We examine various types of rules (expenditure, revenue, debt, and budget balance rules) and various strict and flexible characteristics of fiscal rules. We find that the adoption of fiscal rules leads to a fiscal easing in the medium term, with the effects being more pronounced in emerging market versus advanced economies. We find an asymmetry in the workings of the fiscal rule over the business cycle. In times of expansion, the adoption of a rule leads to an a-cyclical or even procyclical response of the primary balance, while in times of recession fiscal rules induce a countercyclical impact response. Contrary to the baseline evidence, fiscal rules lead to a prudent fiscal policy response over the medium term when the debt ratio is high, the primary balance does not put the debt ratio on a declining path and the interest-growth rate differential is positive, as well as when the tax revenues generated by the tax system and tax administration are quite low relative to the stock of debt.

JEL-classifications: E61, E62, H6

Keywords: Fiscal policy, Fiscal rules, Fiscal rules' characteristics, Primary balance

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1. Introduction

In response to the COVID-19 pandemic, the energy crisis and rising inflation, all countries around the globe have implemented numerous fiscal support measures to sustain economic activity and to boost economic recovery. However, this extraordinary fiscal expansion has led to the accumulation of public debt and consequently government debt ratios have reached unprecedented levels. Therefore, in the post-pandemic era many countries are planning to tighten fiscal policy in order to correct their fiscal positions. In this context, governments are expected to re-activate fiscal rules. However, there are concerns that a strict application of pre-pandemic fiscal rules could lead to excess fiscal tightening delaying economic recovery (D'Amico et al., 2021). This is the case in the EU, where the general escape clause of the Stability and Growth Pact (SGP) has been extended through 2023.

Critics of the SGP claim that the EU fiscal rules have failed both to ensure debt sustainability and to reduce fiscal procyclicality in the run-up to the 2008-2009 global financial crisis (see e.g. De Jong and Gilbert, 2020; Gootjes and de Haan, 2022a). It has been argued that fiscal policy has been expansionary in good times and contractionary in bad times (see e.g. Fritsche et al., 2021; McManus et al., 2021), failing to stabilize economic activity. This was also evident in the post-2009 era, when most countries initiated fiscal consolidations at the time of the euro area sovereign debt crisis, which delayed the euro area economic recovery (see Darvas et al., 2018). However, another strand of the literature has shown that fiscal rules promote sound fiscal policies (De Jong and Gilbert, 2020; Gootjes and de Haan, 2022a).

This paper, building on the existing literature (see e.g. Caselli et al., 2022), investigates the effect of the introduction of fiscal policy rules on primary balances in a group of 86 advanced and emerging market economies. This is the first paper that examines the short-to-medium-term effect of various types of fiscal rules (expenditure, revenue, debt and balanced budget rules) on primary balances, by means of the Jorda (2005) local projections method and by the augmented inverse propensity-score weighted (AIPW) regression adjustment method as in Jorda and Taylor (2016), thus addressing any endogeneity concerns. In addition, we expand the existing literature by examining the role of various strict and flexible characteristics of fiscal policy rules in fiscal policy outcomes. A further innovation of the paper is the use of an extended dataset that includes both advanced and emerging market economies. Finally, we enrich

the existing literature by examining the effects of fiscal rules on fiscal outcomes under various states of nature (e.g. recessions and expansions, level of financial development and current account openness) and under various fiscal policy conditions that relate to the level of the debt ratio, the fiscal effort needed to stabilize the debt ratio, the interest-growth rate differential and the ability of the government to collect the revenue needed to repay the public debt.

We find that the adoption of an expenditure rule, a budget balance rule and a debt rule is associated with smaller primary balances in the medium term relative to a case where there is no fiscal rule in place. This is because the introduction of a fiscal rule improves credibility, leading to lower long-term interest rates. The decline in primary balance after the adoption of a fiscal rule is due to significantly slower revenue growth and significantly higher growth in primary expenditures than in countries without a fiscal rule. Moreover, we find that fiscal rules with high coverage, strict enforcement and a sound legal basis, as well as fiscal rules which exclude public investment, have support procedures and an escape clause, lead to lower primary balances in the medium term. However, fiscal rules with more flexible design features induce a larger reduction in the primary balance relative to those with stricter design features.

Furthermore, we find that in times of expansion there is an a-cyclical or even procyclical fiscal policy response of fiscal rules, while in times of recession the fiscal rules induce a countercyclical impact response. The adoption of fiscal rules leads to a reduction in the primary balance over the medium term in both advanced and emerging economies, with the effect being slightly more pronounced in emerging market economies and particularly in the case of strict fiscal rules.

Nonetheless, contrary to the baseline evidence, the introduction of fiscal rules induces countries to adopt a more prudent fiscal policy stance over the medium term in cases where government effectiveness is high, the debt ratio is high and cannot be put on a declining path by the primary balance, the debt dynamics, i.e., the interest-growth rate differential, are unsustainable, and where the government does not generate enough revenue relative to the stock of public debt.

The rest of this paper is organized as follows. Section 2 reviews the relevant literature, Section 3 presents the data and methodology. In Section 4, we report the main

findings, while in Section 5 we present various robustness checks. Finally, Section 6 concludes.

2. Literature review

There has been an extensive debate in the literature on the effect of fiscal policy rules on fiscal positions. Various studies have examined whether fiscal rules cause or reduce the procyclicality of fiscal policy, as well as whether or not they increase compliance with fiscal policy targets.

In more detail, according to Debrun et al. (2008), fiscal experts frequently perceive nominal forms of numerical fiscal rules (i.e. budget balance and debt rules, as opposed to expenditure or revenue rules) as a source of procyclicality. Darvas et al. (2018) report that the EU fiscal rules were to blame for the significant fiscal contraction that occurred during the global financial crisis. However, as Darvas et al. (2018) point out, governments do not follow the rules in good times (or the rules are not sufficiently binding) and this leads to a procyclical response in bad times. By contrast, Caselli et al. (2022) demonstrate that fiscal rules do not induce more procyclical fiscal policies during downturns. Moreover, they find that countries with more fiscal space and more flexible rules tend to have a more countercyclical policy.

However, there are various difficulties in assessing procyclicality, as well as in isolating the impact of fiscal rules. Golinelli and Momigliano (2009) demonstrate the significance of modelling choices, particularly the selection of dependent and explanatory variables and the use of real-time or ex post data. Several empirical studies associate fiscal rules with greater fiscal discipline (see Martin et al., 2020; Gomez-Gonzalez et al., 2022; Blanchard et al., 2021; Gootjes et al., 2021; Carnazza et al., 2023). Moreover, a lower deficit bias is associated with stronger fiscal rules (see Manasse, 2006; Beetsma et al., 2009; Tapsoba, 2012; Marneffe et al., 2011; Badinger and Reuter, 2017; Burret and Feld, 2018; Beetsma et al., 2019). Nevertheless, as pointed out by various studies (e.g., Debrun et al., 2008; Heinemann et al., 2018; Caselli and Reynaud, 2020) the sense of causality between rules and outcomes is still debatable. According to Caselli and Reynaud (2020), well designed fiscal rules have a positive and significant impact on the fiscal balance, while Krogstrup and Wälti (2008), using Swiss cantonal data, report that fiscal rules continue to have a significant, positive effect on budgetary outcomes after controlling for voter preferences. Gootjes and de Haan

(2022b) show that fiscal rules improve fiscal policy outcomes but only under a minimum level of budget transparency. Moreover, they show that fiscal rules induce fiscal adjustments and increase the likelihood that these adjustments are successful only if the degree of budget transparency is sufficiently high. Căpraru et al. (2023) show, for a panel of 27 EU Member States, that countries' compliance with fiscal rules is positively associated with the number of numerical fiscal targets. However, they also show that this association only holds up to a specific threshold, beyond which the relationship becomes negative.

Galí and Perotti, (2003), examining the period 1980-2002, find that discretionary fiscal policy in EMU countries has become more countercyclical over time. On the other hand, Candelon et al. (2010) show that discretionary fiscal policy has remained procyclical since the establishment of the Maastricht Treaty rules in 1992, with large countries, in particular, following a procyclical discretionary policy. Furthermore, Candelon et al. (2010) show that procyclical discretionary policy is followed mainly during upswings, when supply constraints are prevalent.

Golinelli and Momigliano (2006) find that EU fiscal rules have a significant impact only for countries subject to an excessive deficit procedure (EDP). Nevertheless, as pointed out by De Jong and Gilbert (2020), EDP recommendations in the context of the SGP have had a significant effect on fiscal policy in EMU Member States in particular in the post-2009 period, contributing to fiscal consolidation.

However, as the authors argue, this had procyclical effects. According to Reuter (2015), fiscal rules, despite the fact that are not always followed, still force fiscal policy aggregates towards their numerical constraint in times of non-compliance.

The empirical findings regarding the impact of fiscal rules on procyclicality differ depending on the rule type. Previous studies investigating the role of EU fiscal rules found little evidence of a procyclical effect during downturns, but they did recognize that there were few episodes of recession during the time period under study (Galí and Perotti, 2003). According to Debrun et al. (2008), budget balance rules and debt rules were found to be more procyclical, while expenditure rules and revenue rules were found to work in the reverse direction. Jalles (2018) demonstrates that debt rules reduce the degree of procyclicality for advanced economies. Expenditure rules can reduce government spending's procyclical responsiveness to output gap surprises (see Holm-

Hadulla et al., 2012). As reported by Larch et al. (2021), procyclicality tends to be an issue when debt is very high and/or fiscal rules are not followed. Hence, compliance with EU fiscal rules reduces the likelihood of running procyclical policies. According to Benetrix and Lane (2013) and Candelon et al. (2010), the Maastricht Treaty is linked to more procyclical policies after the creation of European and Monetary Union. D'Amico et al. (2021) claim that the reactivation of the currently suspended EU fiscal rules on account of the Covid-19 pandemic would lead to painful fiscal adjustment in already struggling countries.

Bergman and Hutchison (2015) use the World Bank's "government efficiency index" to compile an index that measures the strength of fiscal rules. They find that government efficiency cannot reduce procyclicality, but the combination of fiscal rules and high government efficiency fosters countercyclical policies. The role of government efficiency and fiscal rules in reducing procyclicality is confirmed by Gootjes and de Haan (2022a).

3. Data and methodology

3.1 Data

We use a yearly unbalanced panel data set (1985-2020) of 86 countries[1]; 33 advanced and 53 emerging market and developing economies. The macroeconomic variables are taken from the IMF World Economic Outlook (vintage April 2023), while data for the primary balance, total government spending and the debt-to-GDP ratio are taken from the IMF's "Public Finances in Modern History" database (see Appendix A).

Our main explanatory variable is the primary balance as a percentage of GDP, which captures the fiscal position of each country in a given year. As regards the variable of interest, i.e. the fiscal rules dummy variable, we rely on the most recent IMF dataset (Davoodi et al., 2022)[2] on fiscal rules. Based on the IMF dataset, we

[1] Antigua and Barbuda, Argentina, Australia, Austria, Azerbaijan, Belgium, Benin, Brazil, Bulgaria, Burkina Faso, Burundi, Cabo Verde, Cambodia, Canada, Central African Republic, Chad, Chile, Colombia, Costa Rica, Côte d'Ivoire, Croatia, Cyprus, Czech Republic, Denmark, Dominica, Ecuador, Equatorial Guinea, Estonia, Finland, France, Gabon, Georgia, Germany, Greece, Guinea-Bissau, Hong Kong SAR, Hungary, Iceland, India, Indonesia, Iran, Ireland, Israel, Italy, Jamaica, Japan, Kenya, Latvia, Lithuania, Luxembourg, Malaysia, Maldives, Malta, Mexico, Mongolia, Namibia, Netherlands, New Zealand, Niger, Nigeria, Norway, Pakistan, Panama, Paraguay, Peru, Poland, Portugal, Republic of Congo, Romania, Russia, Rwanda, Senegal, Slovak Republic, Slovenia, Spain, Sri Lanka, Sweden, Switzerland, Tanzania, Thailand, The Bahamas, Togo, Uganda, United Kingdom, United States and Uruguay.

[2] The fiscal rules dataset Davoodi et al. (2022) builds on previous vintages developed by Schaechter et al. (2012) and IMF (2016).

differentiate the fiscal rules into expenditure rules, revenue rules, debt rules and budget balance rules. Fiscal rules are mechanisms that governments use to limit fiscal policy discretion. In addition, fiscal rules help governments manage their finances responsibly, promote transparency, contribute to overall economic stability and fiscal sustainability. The choice and design of fiscal rules depend on a country's specific economic conditions and policy objectives. Taking this into account, we create an additional set of seven dummy variables that reflect the distinctive features of the respective fiscal rules as formulated by the IMF (see Davoodi et al., 2022) and, based on these features, we construct seven dummy variables as in Chrysanthakopoulos and Tagkalakis (2023):

1. **Enforcement** is divided into two subcategories: (i) compliance monitoring outside of government and (ii) formal enforcement procedures. When both subcategories are included in the fiscal rule's characteristics, the dummy variable has a value of 1.
2. **Coverage** is a binary variable that takes the value of 1 when the fiscal rule applies to general government and 0 otherwise.
3. **Legal Basis** is a dummy variable equal to 1, when the fiscal rule is based on constitutional, international treaty, and statutory commitment, and when it is based on coalition agreement and political commitment, it has the value of 0.
4. When a fiscal rule includes **multi-year expenditure ceilings**, the dummy variable has the value of 1 and otherwise has the value of 0.
5. The binary variable **escape clause** takes the value of 1 when a fiscal rule has a well specified escape clause to allow for temporary exceptions to the rules.
6. When a fiscal rule includes a **cyclically adjusted/structural budget balance target**, the dummy variable has the value of 1 and otherwise has the value of 0.
7. When the fiscal rule **removes public investment or other priority items** from the ceiling, the dummy variable has the value of 1.

Building on the above and following Caselli et al. (2022), we construct two more dummy variables in order to distinguish the fiscal rules' characteristics into strict and flexible.

1. When the fiscal rule has at least one out of three characteristics (i.e. it includes a cyclically adjusted budget balance target, removes public investment and provides for an escape clause), the dummy variable "**flexible**" has the value of 1.

2. When the fiscal rule includes at least two out of four characteristics (i.e. enforcement, coverage, legal basis and multi-annual spending limits), the dummy variable "**strict**" has the value of 1.

Turning to the remaining independent variables, we use real GDP growth to control for economic activity. Following previous studies, such as Celasun and Kang (2006), Afonso and Hauptmeier (2009), we use as control variables: the government debt-to-GDP ratio; the inflation rate based on the GDP deflator; and trade openness (the sum of imports and exports as a percent of GDP).

3.2 Methodology

Building on Cacelli et al. (2022), we apply panel local projections, as proposed by Jorda (2005), to examine the short-to-medium term effect of fiscal policy rules on fiscal outcomes. Thus, we estimate a specification of the form:

$$pb_{it+h} - pb_{it-1} = a^h + \alpha_1^h pb_{it-1} + \alpha_2^h X_{it-1} + \alpha_3^h FR_{it} + \varepsilon_{it+h} \quad (1)$$

where $pb_{it+h} - pb_{it-1}$ denotes the cumulative change in the primary budget balance for forecast horizons *h* taking values 0 up to 5 years ahead (*h=0* is the year of adoption of the fiscal rule). This regression model includes the first lag of the dependent variable and a vector of control variables, i.e. X_{it-1}, which includes the lagged values of real GDP growth, debt-to-GDP ratio, trade openness, and inflation rate. FR_{it} is an institutional dummy variable, which takes the value 1 in the presence of a fiscal rule (or a specific fiscal rule characteristic) and 0 otherwise.[3] ε_{it+h} is the error term and a^h is a vector of constants. We cluster standard errors at the country level.

To address any likely endogeneity between the primary balance and the adoption of fiscal rules, we employ a "doubly robust" estimator, i.e. the augmented inverse propensity-score weighted (AIPW) regression adjustment method as in Jorda and Taylor (2016). In the first stage,[4] the joint treatment probability of having a fiscal rule is modeled as a function of the lagged values of GDP growth, total government expenditure, debt ratio, primary balance, and trade openness. In the second stage, we

[3] Since most of the variation in fiscal rules adoption comes through time, this feature is exploited by comparing countries with fiscal rules and countries without fiscal rules in the years ahead. The basic premise is that, in the absence of the treatment effect, outcomes in treated and untreated countries would progress along a similar path over time.

[4] In this stage, we use a logit model to estimate the probability of each treatment level as a function of all relevant observable covariates. The estimated probabilities are then used to reweight the observations to the control group in the second stage.

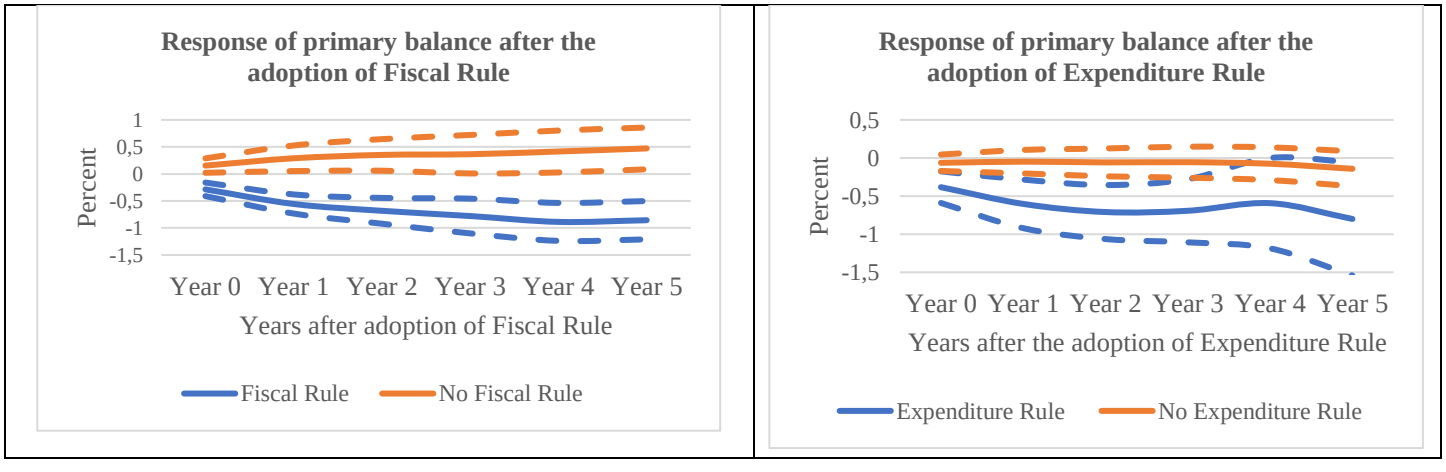
estimate the average treatment effect by considering the reweighted observations. This is then used simultaneously with local projections to study the dynamic responses of fiscal rules, as in Jorda and Taylor (2016) and Caselli et al. (2022).

Next, as a robustness check, we examine the validity of the baseline model in various states of nature that are particularly relevant for the conduct of fiscal policy. Therefore, we examine periods of recession and expansion, cases of high and low public debt, high and low financial development, high and low capital account openness, high and low government effectiveness, and advanced versus emerging market economies. Moreover, we perform additional robustness checks taking into account the role of the debt stabilization fiscal effort, the interest-growth rate differential and the ability of a government to generate the tax revenue needed to repay the public debt. These three factors, alongside with the public debt ratio, are particularly relevant for financial market participants, because they are indicative of a prudent or a lax fiscal policy stance.

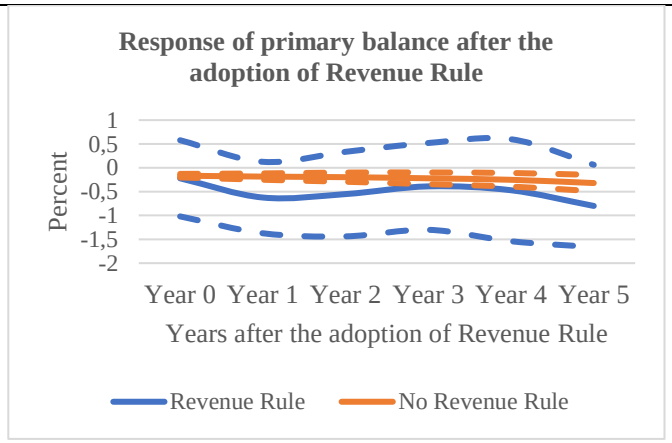
4. Empirical findings: baseline specification

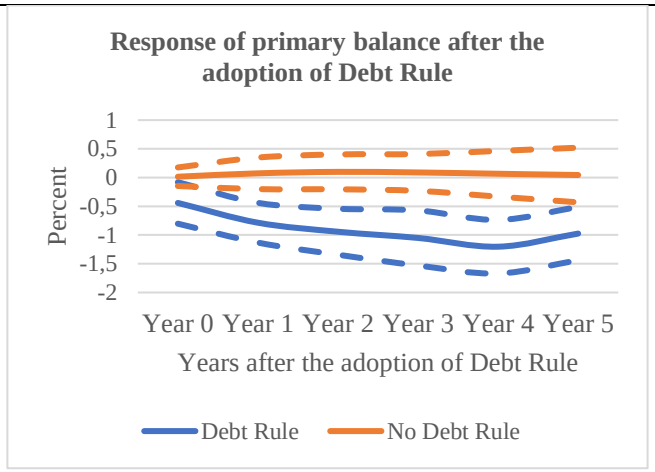
The introduction of a fiscal policy rule (i.e. an expenditure rule, budget balance rule and debt rule) is associated with smaller primary budget balances in the medium term relative to a case where there is no fiscal rule in place (except in the case of a revenue rule, see Figure 1).[5] This could imply that fiscal policy credibility increases after the adoption of a fiscal rule (as in Gomez-Gonzalez et al., 2022; and Sawadogo, 2020), making it easier to maintain lower primary balances in the medium-term.

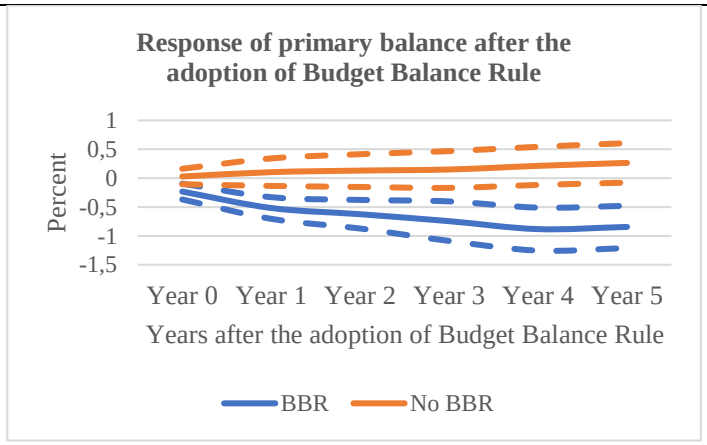
Figure 1. The medium-term effect of fiscal policy rules on the primary balance – baseline specification.



[5] The full set of estimates are reported in the supplementary material appendix.



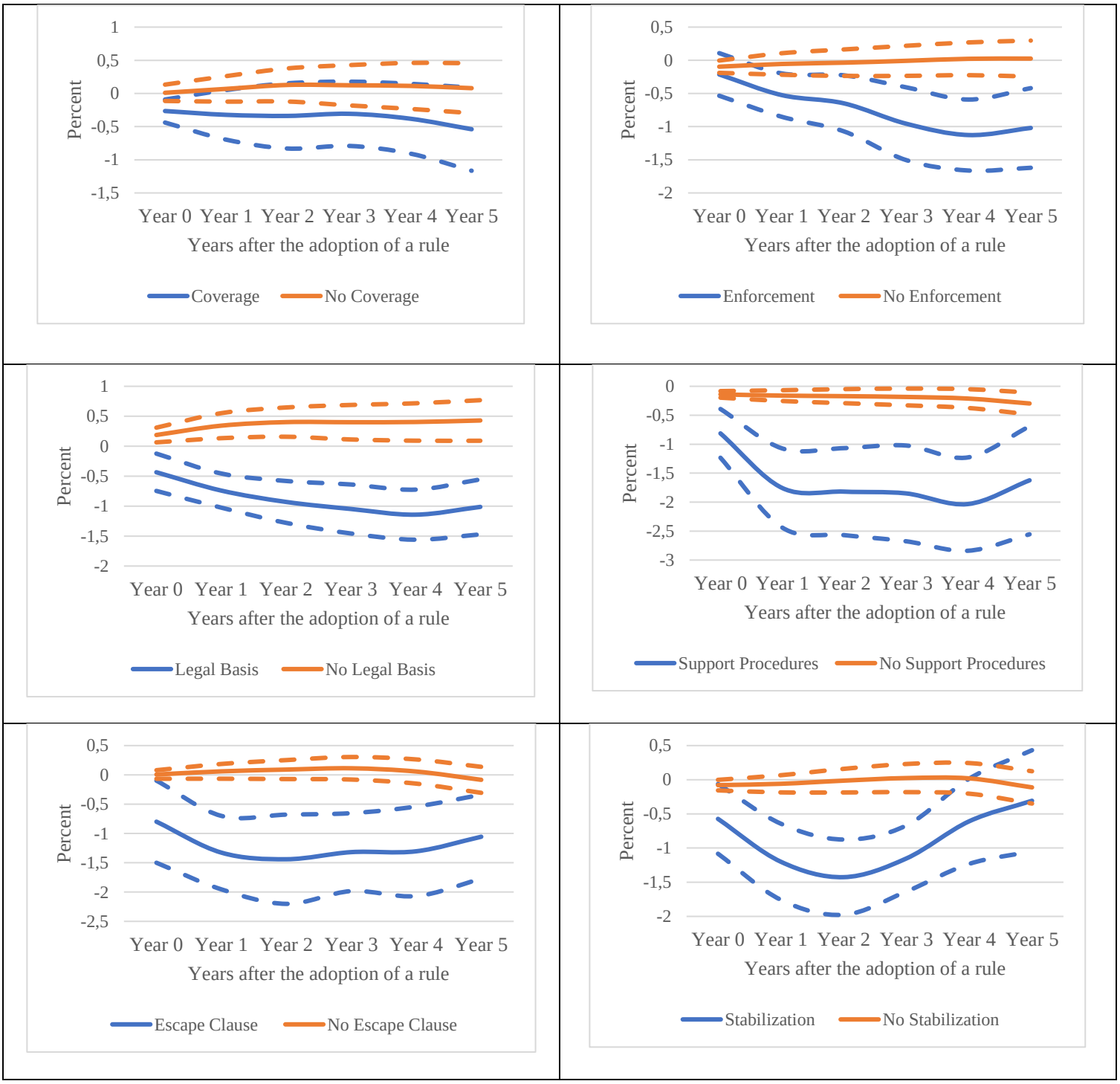


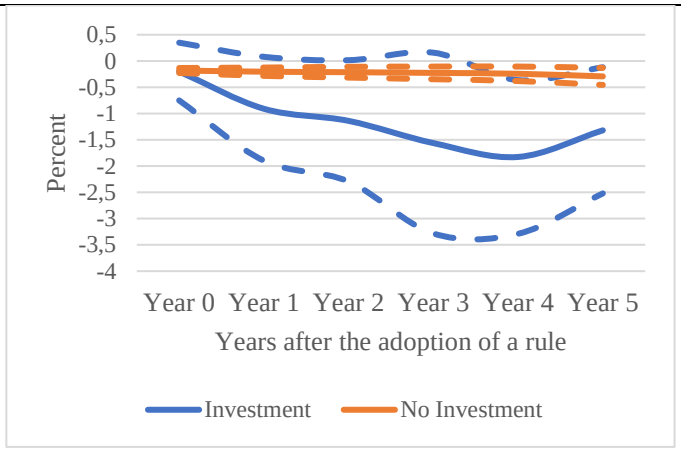


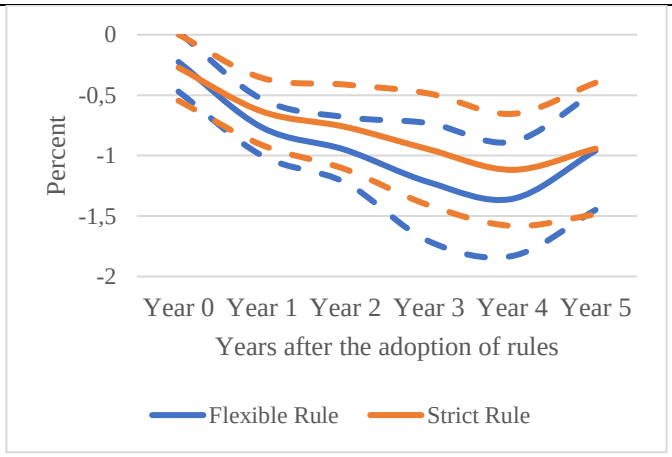
Notes: Figure 1 reports the cumulative effect of adopting a fiscal rule on the primary balance relative to the case with no fiscal rule. The error bands correspond to 90% confidence intervals.

Turning to the specific design features of fiscal rules, we find that the adoption of fiscal rules with high coverage, strong enforcement and legal basis, as well as fiscal rules which exclude public investment, have support procedures and an escape clause reduce primary balances in the medium term (Figure 2). Hence, it is both flexible and strict design features of fiscal rules that reduce primary balances in the medium term (Figure 2).

Figure 2. The medium-term effect of fiscal policy rules' characteristics on the primary balance – baseline specification.







Notes: Figure 2 reports the cumulative effect of fiscal rules characteristics on the primary balance. The error bands correspond to 90% confidence intervals.

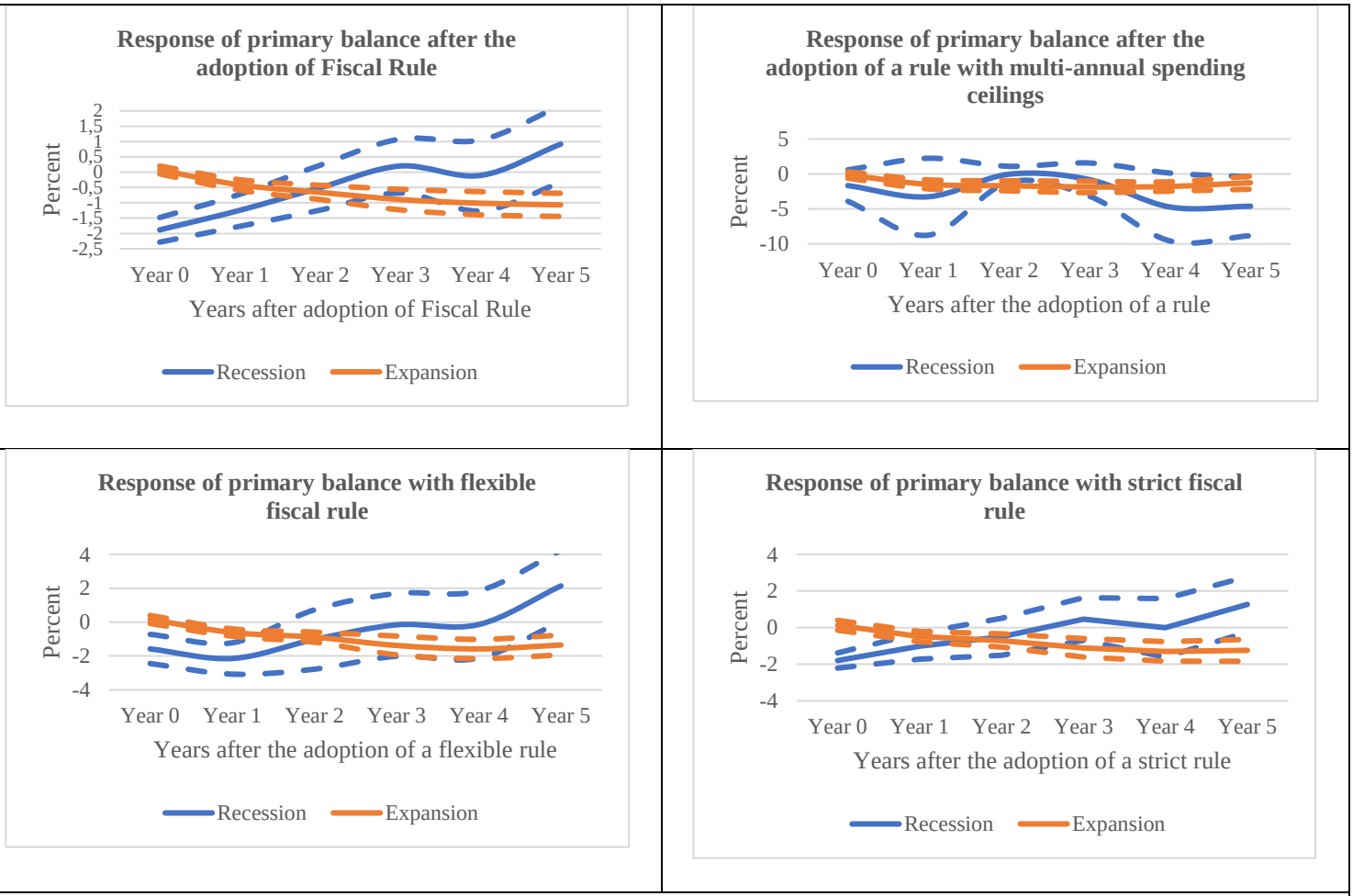
However, fiscal rules with more flexible design features induce a larger reduction in the primary balance relative to those with more strict design features (see Figure 2). In more detail, we find that fiscal rules with multi-annual spending limits, a well specified escape clause, which also exclude government investment lead to a more sizeable reduction in the primary balance in the medium-term. On the contrary, in the case of fiscal rules with high coverage, strict enforcement and a strong legal basis the reduction in the primary balance is slightly smaller (Figure 2).

5. Robustness checks

Various studies have shown that the conduct and the effect of fiscal policy depend on the state of the business cycle (see e.g. Gavin and Perotti, 1997; Lane, 2003; Kaminsky et al., 2004; Talvi and Vegh, 2005; Tagkalakis, 2008, Fritsche et al., 2021; McManus et al., 2021; Gootjes and de Haan, 2022a). Taking this into account, we investigate the presence of any asymmetry in the workings of fiscal rules over the business cycle. The years with negative real GDP growth are classified as recession years, while those with positive GDP growth are classified as expansion years. In times of expansion, the impact response of the primary balance after the introduction of the fiscal rules is close to zero (or even negative) and turns negative by the end of the forecast horizon. This points to an a-cyclical or even procyclical fiscal policy response on impact (see Figure 3). On the contrary, in times of recession the impact response of the primary balance is negative and gradually turns positive by the end of the forecast horizon. Hence, fiscal rules induce a countercyclical impact response in recessions (as

in Caselli, 2022) and, as economic conditions improve, fiscal rules allow for the rebuilding of fiscal buffers (see Figure 3).[6] This evidence points to an asymmetric response of fiscal policy rules, i.e., as in Candelon et al. (2010), the fiscal rules pursued in good times are primarily responsible for the fiscal policy rules' procyclicality which could eventually lead to a debt and deficit bias.

Figure 3. The medium-term effect of fiscal policy rules on the primary balances in times of recession and expansion



Notes: Figure 3 reports the cumulative effect of fiscal rules on the primary balances in times of recession and expansion. The error bands correspond to 90% confidence intervals.

Examining the specific characteristics of fiscal policy rules, we find that the response profile of the primary balance in recessions and expansions resembles the one reported before. That is, we obtain an a-cyclical or procyclical impact response of the

[6]The quantitative response of the primary balance to the introduction of each discrete fiscal rule—that is, the expenditure, revenue, debt, and fiscal balance rules—is in line with the one in Figure 3 and is presented in the supplementary material appendix (see Section C, Figure 1).

primary balance in good times, which subsequently turns negative, and a counter-cyclical impact response of the primary balance in bad times, which subsequently turns positive (see supplementary material, Section C, Figure 2). The only exception to this response profile is found in the case of fiscal rules with multi-annual spending ceilings; in this case the primary balance remains negative in the medium term in both recessions and expansions (see Figure 3). In addition, the characteristics that correspond to a flexible fiscal rule are usually associated with a more sizeable reduction in the primary balance in recessions, followed by a more forceful return to positive primary balances over the medium term (see Figure 3).

Subsequently, we examine the effects of fiscal policy rules on primary balances in advanced versus emerging market economies. Several studies have shown that there are significant differences between advanced and emerging market economies as regards the conduct of fiscal policy. For example, Gavin and Perotti (1997) showed that fiscal policy is procyclical in Latin America primarily in bad times, while Talvi and Vegh (2005) extended this study and found that there is a procyclical bias in most developing economies. According to Lane (2003) and Kaminsky et al. (2004), fiscal policy was less procyclical or a-cyclical in advanced economies.

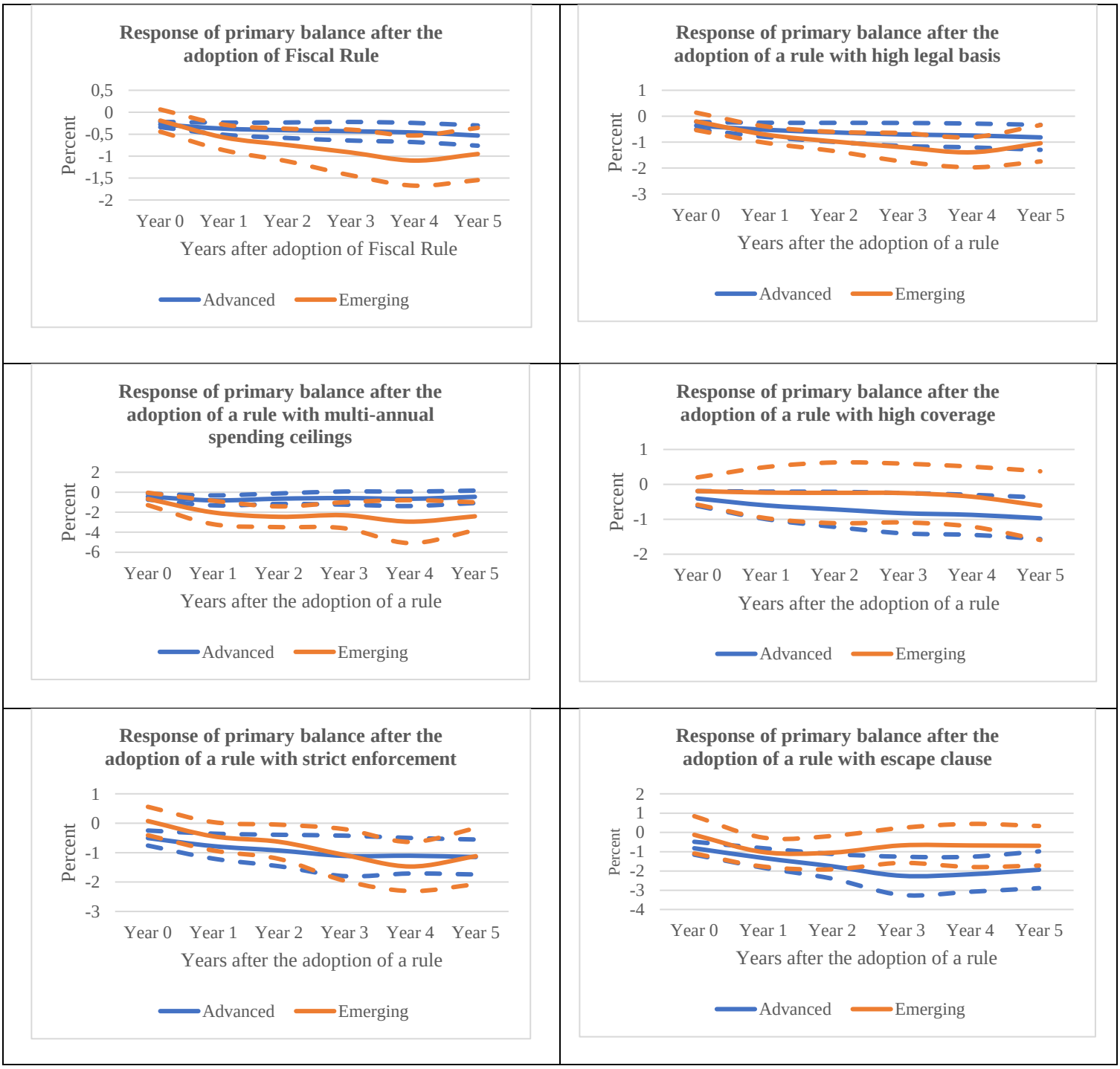
Building on the abovementioned studies, we find that, in the presence of a fiscal policy rule, the primary balance declines in the medium term, with the effect being slightly more pronounced in emerging market economies (see Figure 4)[7].

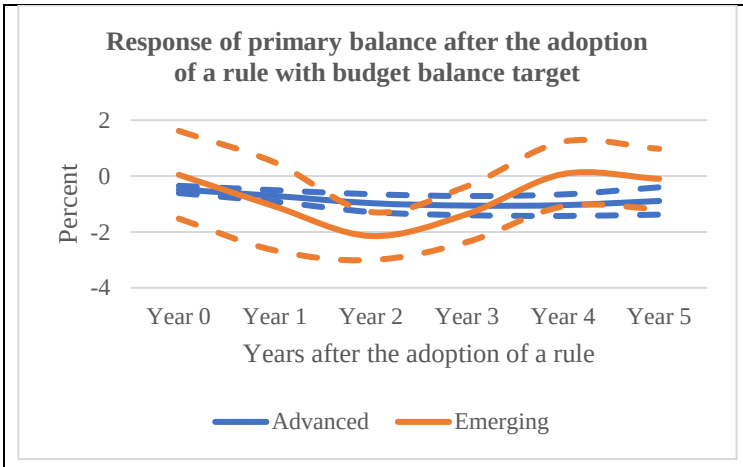
Turning to the specific characteristics of fiscal rules, as shown in Figure 4, the response profile of the primary balance in advanced and emerging market economies is in line with the overall fiscal rule index as presented in Figure 4.[8] For example, the medium-term reduction in the primary balance is more sizeable in the case of strict fiscal rules in emerging market economies, primarily because of a stronger legal basis. The same applies in the case of fiscal rules with multi-annual expenditure ceilings. The reduction in the primary balance is more pronounced in advanced economies in the case of rules that have high coverage, an escape clause and a balanced budget target in cyclically adjusted terms. Overall, there is no clear pattern, but it appears that fiscal

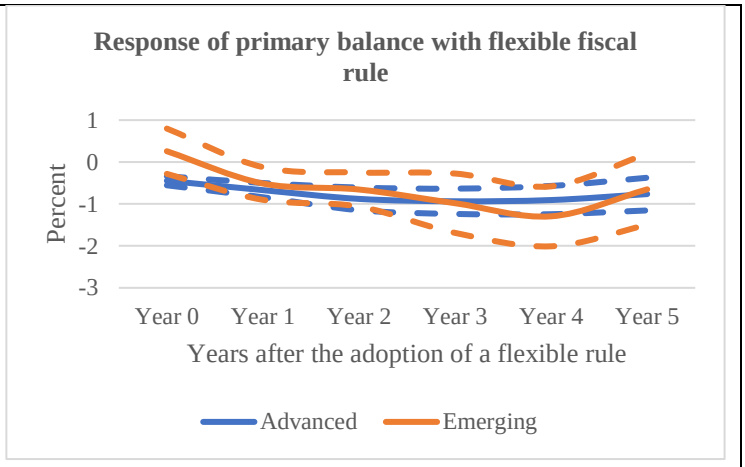
[7] The quantitative response of the primary balance to the introduction of each discrete fiscal rule—that is, the expenditure, revenue, debt, and fiscal balance rules—is in line with the one in Figure 4 and is presented in the supplementary material appendix (see Section C, Figure 3).
[8] The impulse response of the primary balance after the introduction of a fiscal rule that excludes public investment is not reported because of insufficient observations.

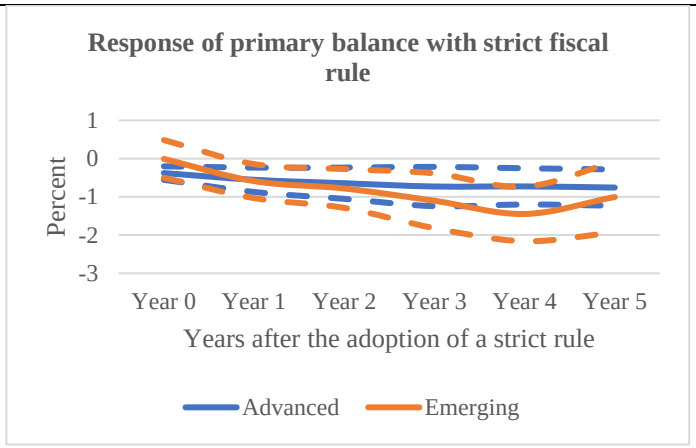
rules enshrined in the constitution and also equipped with multi-annual spending limits can provide more credibility to emerging market economies, thus allowing for the build-up of smaller primary balances over the medium term.

Figure 4. The medium-term effect of fiscal policy rules on the primary balance in advanced and emerging market economies.









Notes: Figure 4 reports the cumulative effect of fiscal rules on the primary balance in advanced versus developing countries. The error bands correspond to 90% confidence intervals.

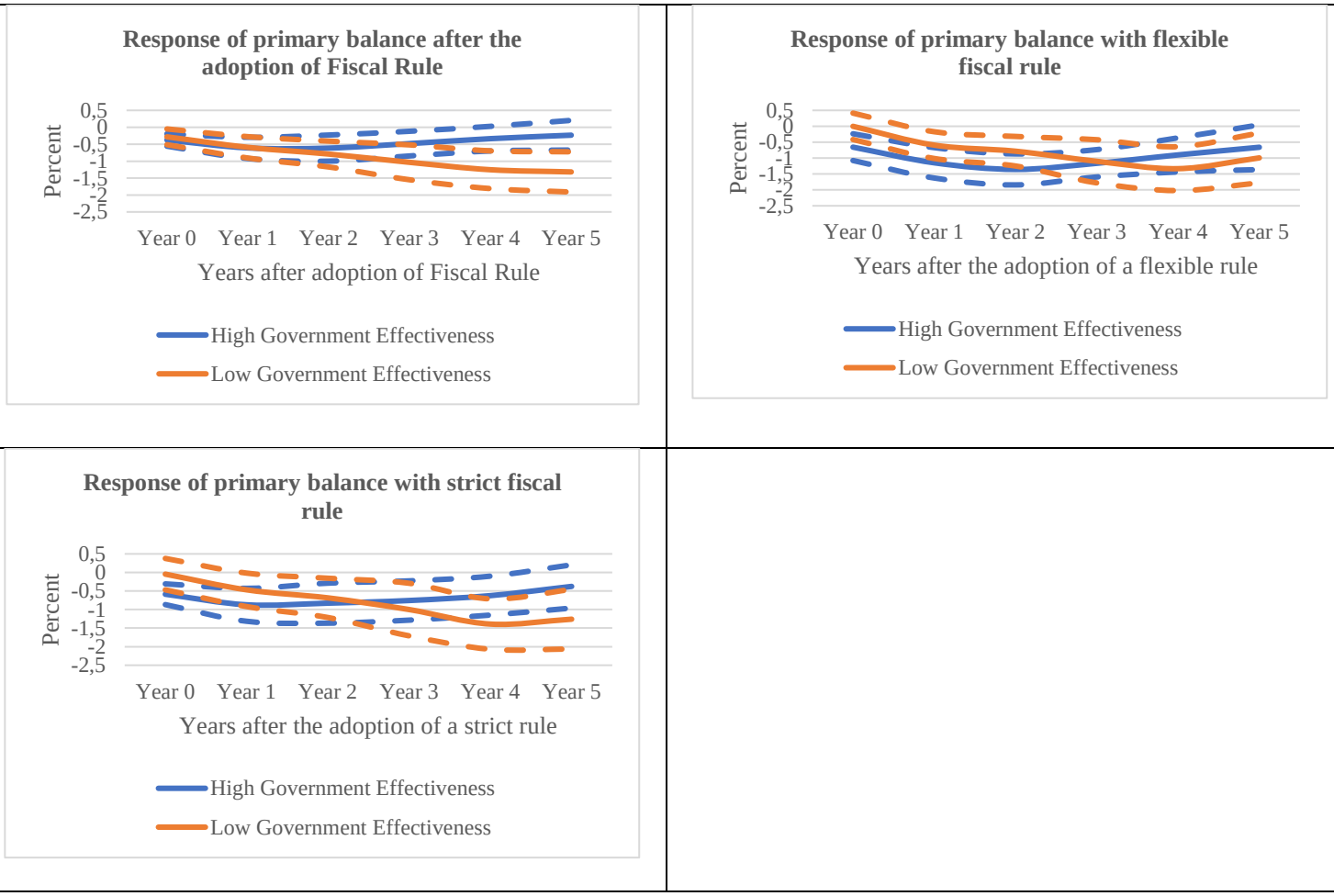
As a further robustness check, we re-estimate equation (1) by splitting the country-year observations into high and low government effectiveness based on the World Bank's government effectiveness index. This exercise is driven by the evidence presented in Gootjes and de Haan (2022a), who find that government effectiveness and fiscal rules reduce fiscal procyclicality.[9] We find that the adoption of fiscal rules induces a negative impact response on the primary balance in both high and low government effectiveness countries.[10] However, in the medium term, the response of the primary balance remains negative only in the case of low government effectiveness countries, a result that applies for both flexible and strict fiscal rules (see Figure 5).

[9] The split of country-year observations into high and low government effectiveness is based on the median value (which is 0.31).

[10] The same conclusions apply for the individual fiscal rules (see supplementary material, Section C, Figure 4) and the fiscal rules' characteristics. The results are not reported due to space limitation but are available upon request.

Hence, the adoption of fiscal rules can lead to a more prudent fiscal stance in the medium term, but only when government effectiveness is high.[11]

Figure 5. The medium-term effect of fiscal policy rules on the primary balance based on high versus low government effectiveness countries



Notes: Figure 5 reports the cumulative effect of fiscal rules on the primary balances on high versus low government effectiveness countries. The error bands correspond to 90% confidence intervals.

[11] Building on the evidence of Ma and Lv (2023), who show that a large and stable financial system reduces fiscal policy volatility and is conducive to the smooth conduct of fiscal policy, we examine whether financial development, proxied by the IMF financial development index, and capital account openness, proxied by the Chinn-Ito index, are factors that should be taken into account when examining the effect of fiscal rules on primary balances. The split of country-year observations into high and low values is based on the median value of each index. The median of capital openness is 0.63 and the median of financial development index is 0.30. A less financially developed economy provides fewer options in terms of private risk-sharing. This implies that public risk-sharing in terms of higher deficits (or lower primary balances) is more frequently used. In this case, adopting a fiscal rule in a less financially developed economy could imply that fiscal policy will become less expansionary in the medium term. Similarly, an economy with higher capital account openness can easily obtain funding from abroad to finance its own fiscal deficits, whereas a country with limited access to external finance will have to rely more on domestic funding sources. In this case, introducing a fiscal policy rule in an economy with high capital account openness could imply that fiscal policy will become less expansionary over the medium term. However, we find that the response of the primary balance after the adoption of fiscal rules is negative for both high and low capital account openness, and high and low financially developed countries. The results are not presented here due to space limitations but are included in the supplementary material appendix.

5.1 Do fiscal rules always lead to fiscal easing?

5.1.1 The role of the public debt ratio

Next, building on Banerjee and Zampolli, (2019) and Georgantas et al. (2023), who show that the public debt ratio is a factor that should be taken into account when investigating the effectiveness of fiscal policy, we examine whether the level of the public debt ratio[12] is a relevant determinant of the effect of fiscal rules on fiscal policy outcomes. The adoption of fiscal rules is found to induce a positive medium-term effect on the primary balance in high-debt countries (see Figure 6). On the contrary, putting in place a fiscal policy rule allows a loosening of the fiscal policy stance in low-debt countries, in line with the baseline evidence (see Figure 6).[13] Hence, fiscal rules can induce a stricter fiscal policy stance, when debt sustainability is put into question (see e.g. Reuter, 2015).

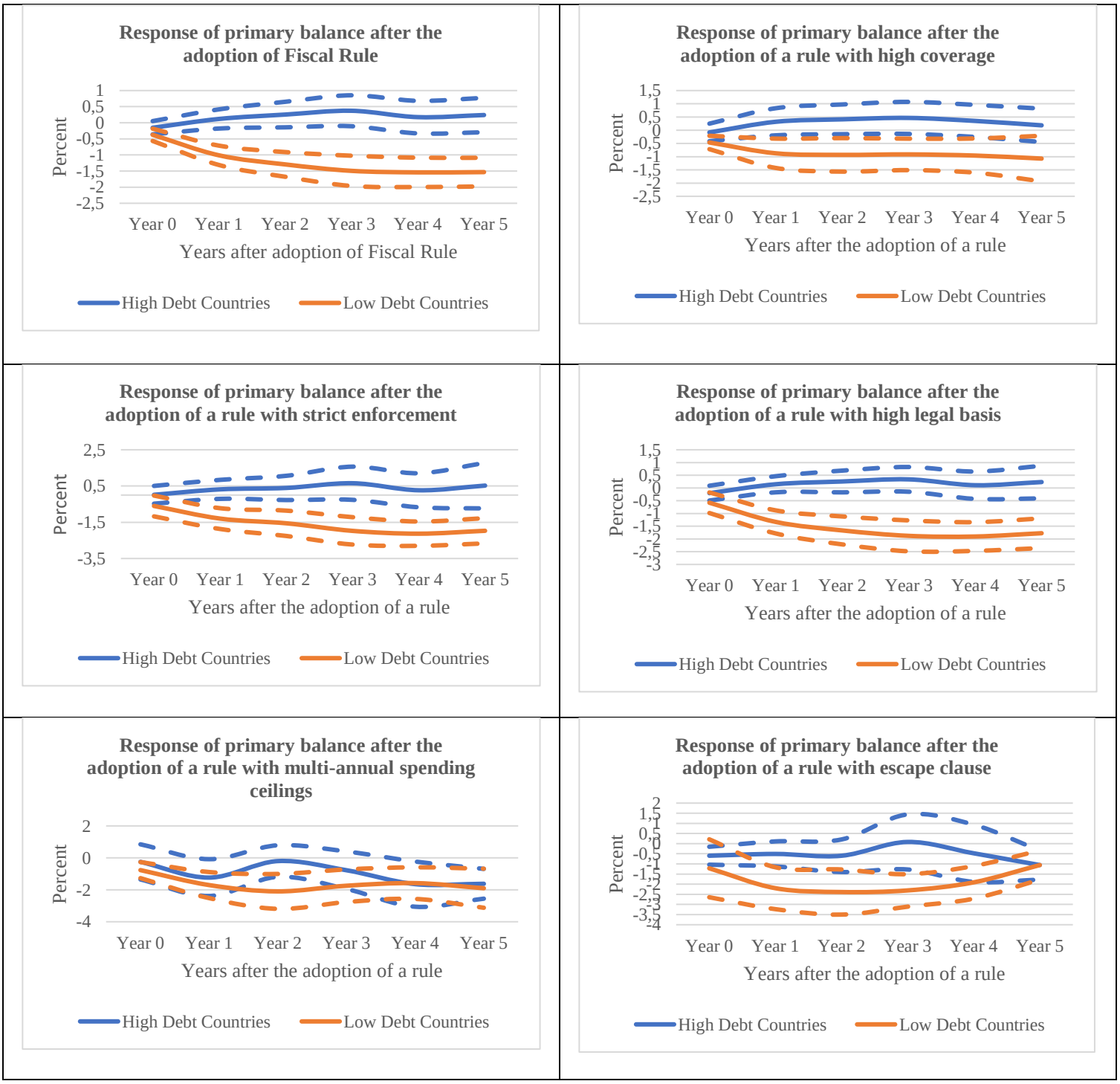
Turning to the individual fiscal rule characteristics, we obtain a similar response profile (as the overall fiscal rule index) for the primary balance in high- and low-debt countries when we examine the fiscal rules that are characterized as strict, i.e. when they have high coverage, strict enforcement, and high legal basis (see Figure 6). On the contrary, in the case of flexible[14] fiscal rules or fiscal rules that have multi-annual spending limits, an escape clause and a cyclically adjusted primary balance target, the primary balance response is negative over the forecast horizon in both high- and low-debt countries (see Figure 6). Hence, the presence of strict fiscal rules is a prerequisite in high-debt countries in order for them to run primary surpluses over the medium term and to address debt sustainability concerns (as in De Jong and Gilbert, 2020). In low-debt countries, both flexible and strict fiscal rules reduce the primary balance over the medium term.

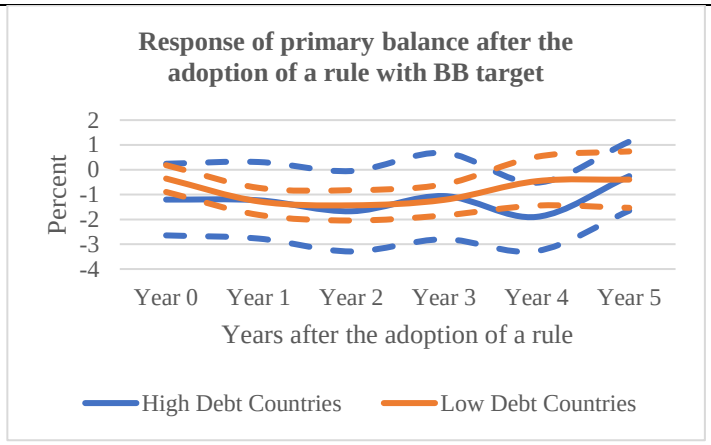
[12] The effects of fiscal policy rules and their characteristics could depend on the debt level of each country. To address this concern, we split the country-year observations into high- and low-debt states using the sample average (which is 56%).

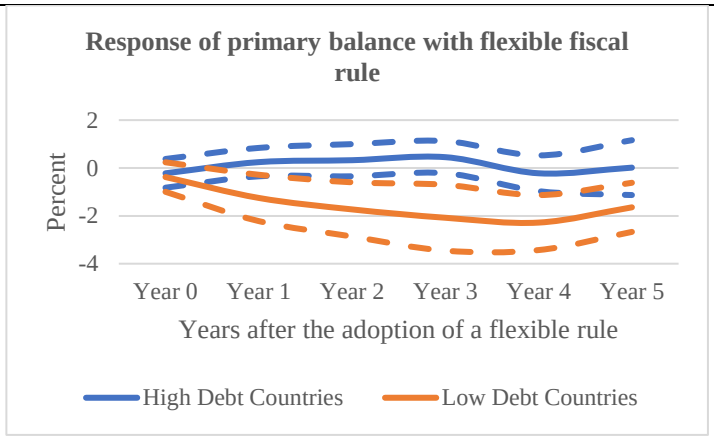
[13] We find the same response profile for the individual fiscal rules (see supplementary material appendix, Section C, Figure 5).

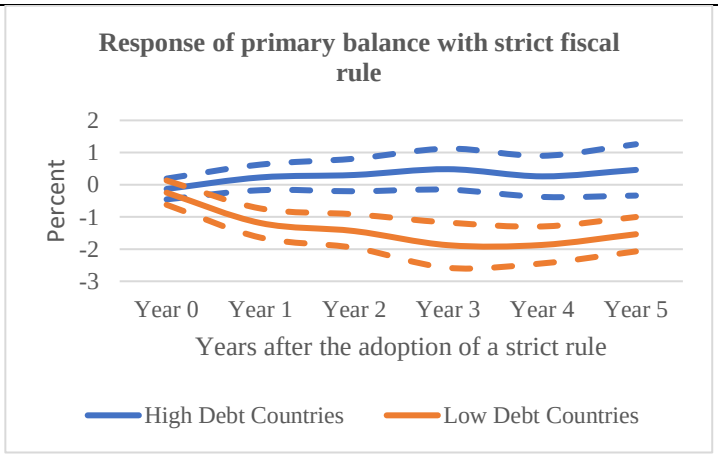
[14] The impulse response of the primary balance after the introduction of a fiscal rule that excludes public investment is not reported because of insufficient observations.

Figure 6. The medium-term effect of fiscal policy rules on the primary balance based on high- versus low-debt countries









Notes: Figure 6 reports the cumulative effect of fiscal rules on the primary balances on high- versus low-debt countries. The error bands correspond to 90% confidence intervals.

5.1.2 The role of the debt stabilization fiscal effort

We have seen in the baseline specification that the adoption of fiscal rules leads to smaller primary surpluses over the medium term. A possible explanation is that the introduction of fiscal rules improves financial markets' confidence in a country's fiscal management and hence allows for sustaining smaller primary surpluses. As a next step, we examine how the introduction of fiscal rules impacts on primary balances in the medium term in cases where primary balances are above or below the level required for the stabilization of the debt ratio.

In more detail, starting from equation (2) which describes debt dynamics[15]:

$$\Delta b_t = (g_t - t_t) + (r_t - y_t) * b_{t-1} \qquad (2)$$

[15] For the sake of simplicity, we assume that the stock-flow adjustment is zero.

where Δb_t stands for the change in the debt ratio, g_t is the government primary expenditure-to-GDP ratio, t_t is the total revenue-to-GDP ratio, $(g_t - t_t)$ equals minus the primary balance-to-GDP ratio $(-pb_t)$, y_t is nominal growth, r_t is the long-term nominal interest rate and b_{t-1} is the debt-to-GDP ratio at time *t-1*, we can write:

$$\Delta b_t = -pb_t + (r_t - y_t) * b_{t-1} \quad (3)$$

The debt ratio stabilizes when $\Delta b_t = 0$, hence, we can calculate the primary balance-to-GDP ratio which stabilizes the public debt between two consecutive years:

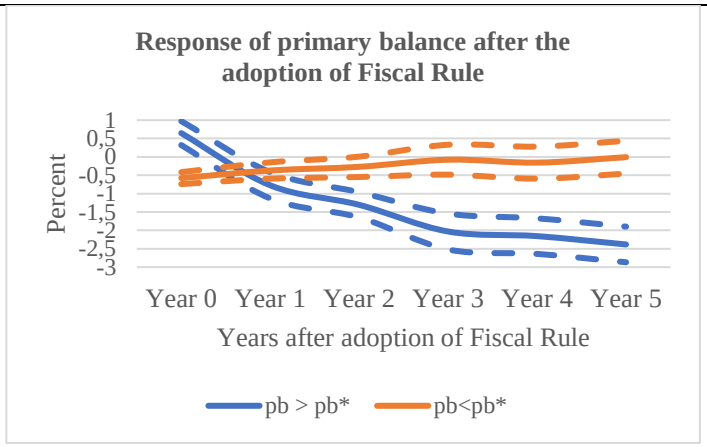
$$pb^*_{it} = (r_{it} - y_{it}) * b_{it-1} \quad (4)$$

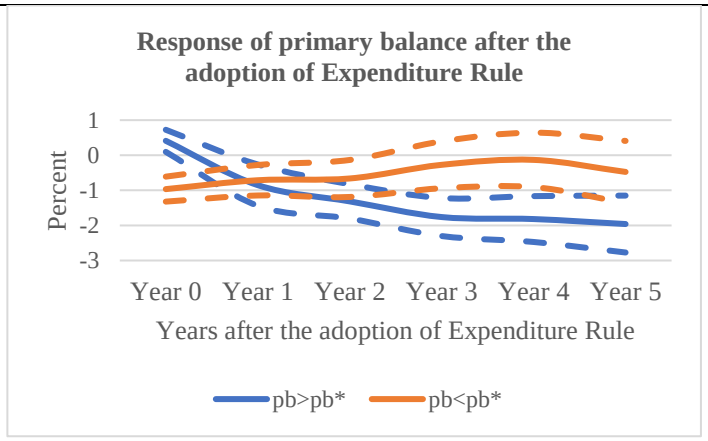
When pb>pb*, a country's fiscal position complies with the debt sustainability and stabilization principle and the public debt ratio is set on a declining path, whereas when pb<pb*, the fiscal effort is insufficient and cannot lead to debt stabilization.

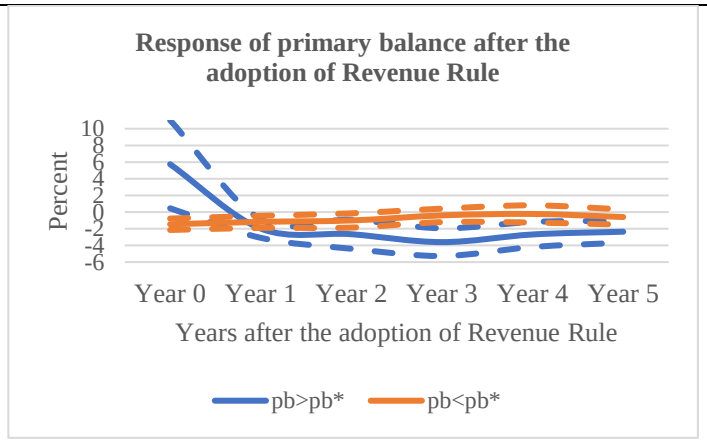
We then construct a dummy variable that is equal to one when the primary balance ratio is positive and greater than pb*. The dummy takes the value 0 when the primary balance ratio is positive and smaller than pb* or when the primary balance ratio is negative. Then we re-estimate equation (1) by splitting the country-year observations based on this new dummy variable, in order to investigate the medium-term effects of fiscal policy rules on primary balances in the two cases.

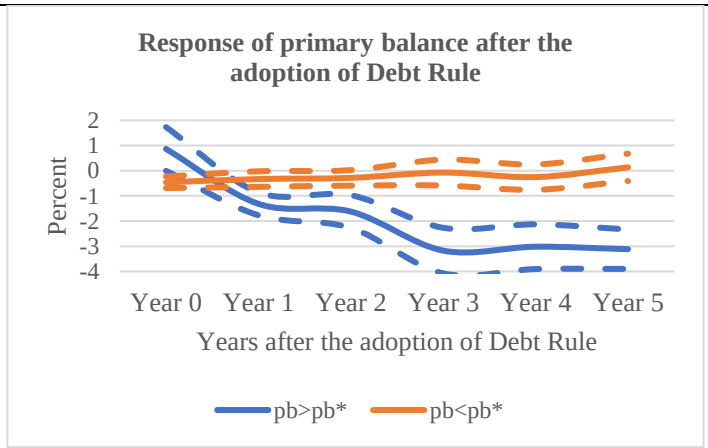
When the debt stabilization principle applies (blue line), the adoption of fiscal rules leads to a looser fiscal policy stance in the medium term (see Figure 7). On the contrary, when the debt stabilization principle is violated (orange line), the adoption of fiscal rules does not lead to a looser fiscal stance in the medium term. The same conclusion applies when we examine the individual fiscal rule characteristics (see supplementary material, Section C, Figure 6). Hence, fiscal rules are associated with higher primary balances over the medium term in cases where the debt stabilization principle is violated vis-à-vis cases where the debt stabilization principle applies.

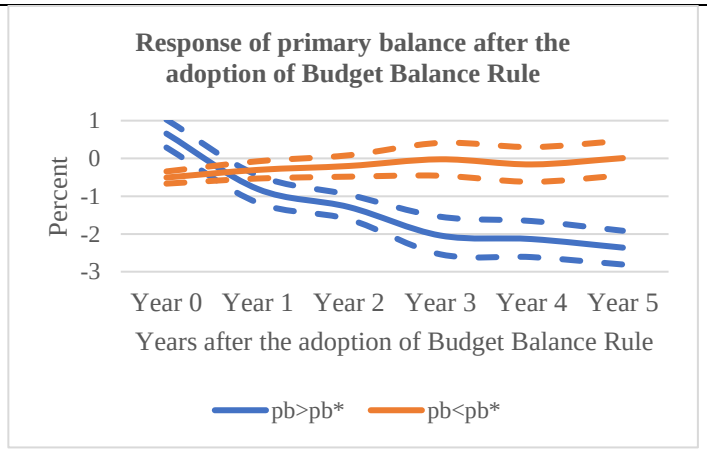
Figure 7. The medium-term effect of fiscal policy rules on the primary balance based on debt dynamics.











Notes: Figure 7 reports the cumulative effect of fiscal rules on primary balances when the debt stabilization principle applies (blue line) and when it is violated (orange line). The error bands correspond to 90% confidence intervals.

5.1.3 The role of the interest-growth rate differential

Equation (2) is a first-order linear difference equation, which shows how *b*, the public debt as a percentage of GDP, evolves over time. The initial primary balance is a

crucial factor which, coupled with the sign of the slope of equation (2), i.e. $[r_t - y_t]$ can determine whether a country will end up in a creditor or a debtor equilibrium. However, the slope of equation (2) will also determine whether this equilibrium is stable or not. For example, with a balanced primary budget and income growth that exceeds the interest rate, the debt ratio converges to zero, whereas in the opposite case the equilibrium is unstable and debt dynamics can be explosive. Hence, we next examine the medium-term effects of fiscal rules on primary balances under the following two scenarios about debt dynamics:

$$\begin{cases} r_t - y_t < 0 : sustainable\ debt\ dynamics \\ r_t - y_t > 0 : unsustainable\ debt\ dynamics \end{cases}$$

Then we re-estimate equation (1) by splitting the country-year observations based on the above two cases.

As in subsection 5.1.1 (see Figure 6), in cases of sustainable debt dynamics (where $r<y$), the introduction of fiscal rules can lead to a looser fiscal policy stance in the medium term (see supplementary material, Section C, Figures 7-8). On the contrary, when the interest-growth rate differential is positive and there are concerns of debt sustainability, the introduction of fiscal rules does not lead to a fiscal easing over the medium term. Therefore, fiscal rules are associated with higher primary balances over the medium term in cases where the interest-growth rate differential is positive, indicating the need for fiscal discipline.

5.1.4 The role of the tax system

We have seen so far that, in countries with a higher public debt ratio, insufficient fiscal effort (i.e. pb<pb*) and unsustainable debt dynamics (i.e. $r>y$), the adoption of fiscal rules will not lead to fiscal easing in the medium term, contrary to the benchmark specification. However, another aspect that should be taken into account when assessing the effect of fiscal rules relates to the ability of tax administration to collect the resources needed to repay the public debt. For example, a country with a high debt-to-GDP ratio would face doubts from the international financial markets about its ability to repay the debt, in which case the adoption of fiscal rules would induce fiscal prudence. Nevertheless, if this country is characterized by a high tax revenue to public debt ratio, financial markets can be assured that tax administration is working efficiently and that the tax system can generate the amount of revenue that is necessary

for the repayment of the high – relative to GDP – debt. In such a case, the adoption of fiscal rules,[16] which further boosts financial markets' confidence in the country's tax administration can lead to fiscal easing, i.e. smaller primary balances over the medium term.

To this end, first we calculate the ratio of total government revenue to the stock of public debt as a variable that captures the ability of tax administration to collect the required revenue in order to repay the public debt. Second, we create a dummy variable based on the median value of this new variable[17]. Third, we re-estimate equation (1) by splitting the country-year observations based on this new dummy variable.

When the ratio of government revenue to the stock of debt is high, the adoption of fiscal rules can lead to a looser fiscal policy stance in the medium term (see supplementary material, Section C, Figures 9-10). On the contrary, when the government revenue to debt ratio is low, the adoption of fiscal rules will lead to fiscal tightening in the medium-term.

5.2. Do fiscal rules increase fiscal policy credibility?

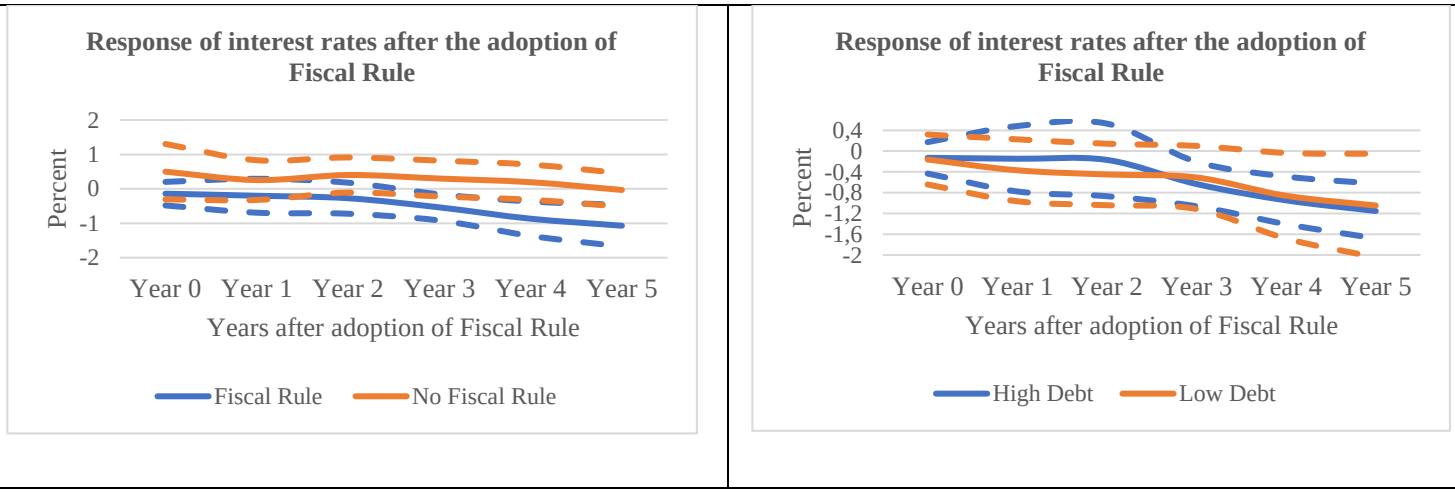
In our baseline model, we posit that fiscal rules, particularly those of spending, debt, and budget balance, exhibit a positive correlation with higher fiscal credibility, as evidenced by the attainment of smaller primary balances in the medium term, compared to countries without fiscal rules. To further investigate the conjecture that the introduction of fiscal rules improves fiscal credibility, we re-estimate equation (1) using long-term interest rates as the dependent variable instead of the primary balance. Long-term interest rates affect the cost of servicing public debt and reflect the market's assessment of public debt sustainability.

We find that the introduction of a fiscal policy rule leads to a decrease in the long-term interest rates over the forecast horizon (see Figure 8).[18] Therefore, the decline in borrowing costs after the introduction of fiscal rules indicates increased market confidence in the new fiscal framework that ensures public debt sustainability, in line

[16] The impulse response of the primary balance after the introduction of a fiscal rule with multi-annual expenditure ceilings is not reported because of insufficient data points that do not allow for the estimation of impulse responses.
[17] The median value is 0.55.
[18] The results for the individual fiscal rule types (i.e. expenditure, revenue, debt and budget balance rules) are similar to the one reported in Figure 8. The whole set of results is presented in the supplementary material appendix, Section C, Figures 11-12.

with Agnello et. al. (2023), Gomez-Gonzalez et al. (2022) and Sawadogo (2020). The main results hold for both high- and low-debt countries (see Figure 8), implying that the adoption of fiscal rules improves fiscal credibility and limits public debt servicing costs regardless of the level of public debt.

Figure 8. The medium-term effect of fiscal policy rules on the long-term interest rates - full sample and high- versus low-debt countries



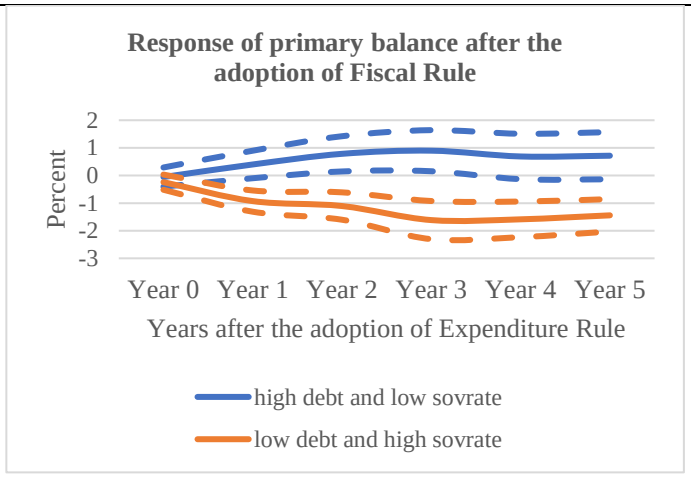
Notes: Figure 8 reports the cumulative effect of fiscal rules on long-term interest rates for the whole sample (left panel) and for high- versus low-public debt countries (right panel). The error bands correspond to 90% confidence intervals.

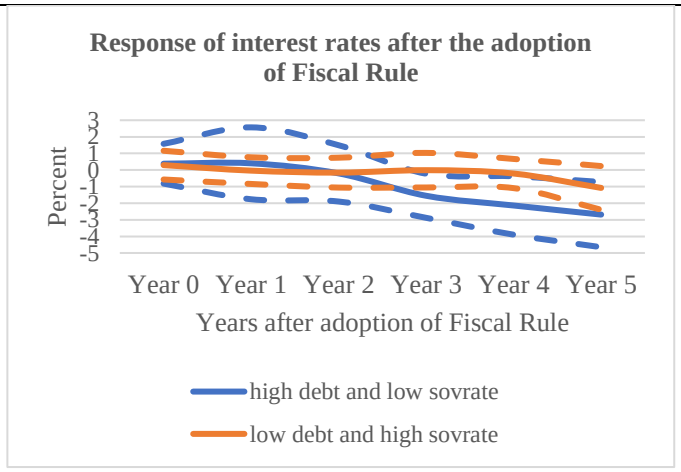
Next, we examine whether the results differ if we take into account the credit rating of each country. To this end, we use the credit rating variable constructed by Kose et al. (2022). This variable is an annual average of the long-term sovereign debt ratings by Moody's, Standard & Poor's, and Fitch Ratings and ranges from 1 to 21 (1 is the worst and 21 the best rating). We then split the country-year observations into high and low sovereign debt rating based on the sample median.[19] Next, we re-estimate the baseline specification and the long-term interest rate specification of equation (1) for two groups: (a) a high-debt and low-sovereign debt rating group and b) a low-debt and high sovereign debt rating group. The results are reported in Figure 9. Both groups of countries benefit from lower long-term interest rates after the introduction of fiscal rules. However, the decline in long-term interest rates is greater in countries with high public debt and low credit rating. Nevertheless, this group of countries which has fiscal

[19] The sample median is 14.11.

problems should simultaneously maintain higher primary surpluses over the medium term after the introduction of fiscal rules.

Figure 9. The medium-term effect of fiscal policy rules on the primary balance and the long-term interest rate – high debt and low sovereign rating versus low debt and high sovereign rating countries.





Notes: Figure 9 reports the cumulative effect of fiscal rules on the primary balance (left panel) and the long-term interest rate (right panel) for countries with high debt and low sovereign debt rating versus countries with low debt ratio and high sovereign debt rating. The error bands correspond to 90% confidence intervals.

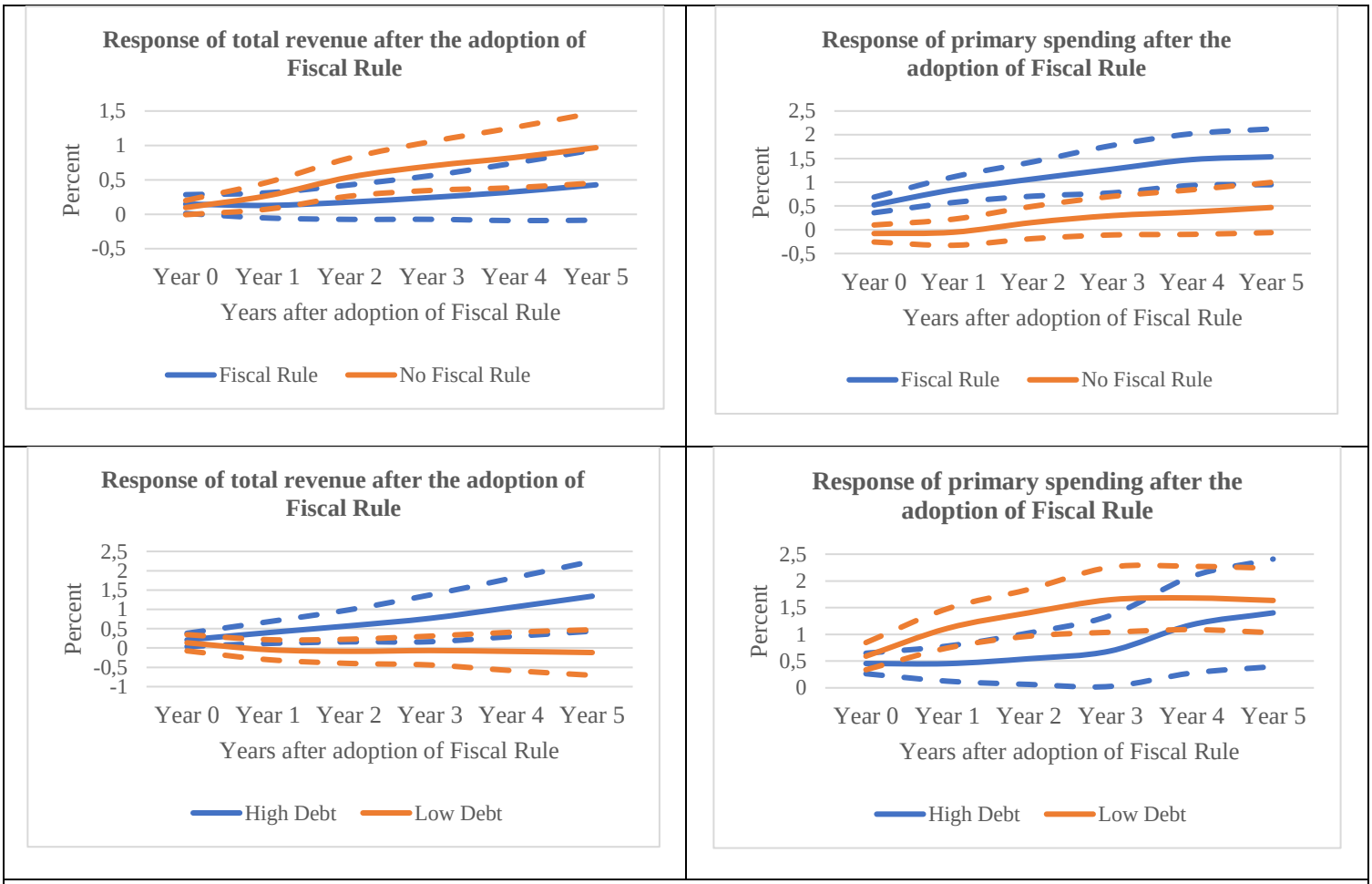
5.3 The compositional effects of the primary balance response to the introduction of fiscal rules

Having observed that the introduction of fiscal rules leads to lower primary surpluses in the medium term, the question arises as to whether this is due to a fall in revenue, an increase in primary expenditure, or both. Therefore, we re-estimate equation (1) using (a) total revenue as a percentage of GDP and (b) primary expenditure as a percentage of GDP as the dependent variable. As we observe in Figure 10,[20] the adoption of a fiscal rule leads to a milder increase in revenue and a larger increase in public spending than in countries without a fiscal rule.

But how are our findings affected by the level of public debt? We already know that the observed fiscal easing after the introduction of a fiscal rule occurs only in countries with low public debt. As can be seen from the findings presented in Figure 10, the introduction of a fiscal rule leads to a faster increase in public revenues and a smaller increase in primary expenditure than in countries without a fiscal rule.

[20] The results for the individual fiscal rules (i.e. expenditure, revenue, debt, and budget balance rules) are not reported here because of space limitation. However, they are similar to those reported in Figure 10. The full set of results is presented in the supplementary material appendix, Section C, Figures 13-14.

Figure 10. The medium-term effect of fiscal policy rules on the total revenue and primary spending for the full sample and for high- versus low-debt countries.



Notes: Figure 10 reports the cumulative effect of fiscal rules on total revenue and primary spending for the full sample and for high- versus low-debt countries. The error bands correspond to 90% confidence intervals.

7. Conclusions

This paper examines the short-to-medium-term effects of fiscal policy rules on primary budget balances, for a panel of 86 advanced and emerging market economies during the period 1985-2020. Even though numerous studies have examined the effects of fiscal rules after the global financial crisis, there is now growing interest in the subject, on account of the ongoing discussion about the revision of the Stability and Growth Pact (SGP) in the European Union. The debate that has begun at the EU level on the revision of the EU fiscal framework (European Commission, 2023) reflects the fact that the SGP has in the past led to procyclical fiscal policies (Blanchard et al., 2021) and that the application of the existing EU fiscal rules will lead to sizeable fiscal adjustment, i.e. delaying the post-pandemic economic recovery (Bofinger, 2020).

Following Caselli et al. (2022), we compute the short-to-medium-term effects of fiscal rules on primary balances, based on the local projection method pioneered by Jorda (2005), with augmented inverse propensity-score weighted estimator pioneered by Jorda and Taylor (2016).

We show that the adoption of fiscal policy rules, in particular, expenditure, debt and budget balance rules, reduces primary balances over the medium term. A possible explanation is that the introduction of fiscal rules improves financial markets' confidence in a country's fiscal management (leading to lower long-term interest rates) and hence allows for sustaining smaller primary surpluses. The decline in the primary budget balance after the adoption of a fiscal rule is due to significantly slower revenue growth and significantly higher growth in primary expenditure than in countries without a fiscal rule.

Turning to the specific design features of fiscal rules, we find that more flexible rules and in particular those rules with multi-annual spending limits, a well specified escape clause, a balanced budget target and which also exclude government investment lead to a larger reduction in primary balances over the medium term relative to stricter fiscal rules. On the contrary, in the case of fiscal rules with high coverage, strict enforcement and high legal basis, the reduction in the primary balance is slightly smaller.

Subsequently, we find an a-cyclical or even procyclical fiscal policy response after the introduction of fiscal rules in expansions, while, in times of recession, the impact response of the primary balance is negative (countercyclical) and gradually turns positive by the end of the forecast horizon.

After the adoption of a fiscal policy rule, the primary balance declines in the medium term in both advanced and emerging market economies, with the effect being slightly more pronounced in emerging market economies. Moreover, fiscal rules that are enshrined in the constitution and are also equipped with multi-annual spending limits can provide more credibility to emerging market economies and could lead to an easier fiscal policy stance over the medium term.

However, fiscal rules are not always associated with lower primary balances. In more detail, the adoption of fiscal rules leads to a prudent fiscal policy stance in the medium term, contrary to the baseline specification, in countries with high government effectiveness, high public debt ratio, insufficient fiscal effort to bring down the debt ratio, positive interest-growth rate differential, and with a low tax revenue-to-debt ratio.

Overall, our work adds both to the existing literature and to the ongoing debate on the revision of EU fiscal framework, by examining various types of rules, the specific characteristics of each and their effect under various states of nature.

Appendix A

Table A1. Summary statistics

VARIABLES	(1) N	(2) Mean	(3) St. Dev.	(4) Min	(5) Max
Total government spending	2,747	32.92	21.34	8.137	594.8
Primary balance	2,706	-0.573	17.19	-549.8	31.24
Long-term sovereign debt rating	1,912	14.27	5.18	1.33	21
Debt	2,723	0.564	0.363	0.00488	2.594
Real GDP growth	2,980	3.243	6.047	-44.90	148.0
Trade openness	2,918	0.804	0.544	0.0914	4.426
Inflation	2,895	0.0796	0.234	-0.388	3.945
Government Effectiveness	2,144	0.366	1.014	-1.887	2.346
Capital account openness	2,896	0.574	0.368	0	1
Financial Development Index	3,096	0.350	0.248	0	1
Nominal growth (y)	2,900	19.98	147.75	-99.20	4782.56
Nominal interest rate (r)	1,865	4.366	8.389	-66.790	140.740
Tax/Debt	2,692	0.893	2.025	0.018	70.697
Fiscal rule	3,096	0.541	0.498	0	1
Expenditure rule	3,096	0.202	0.401	0	1
Revenue rule	3,096	0.0859	0.280	0	1
Budget balance rule	3,096	0.495	0.500	0	1
Debt rule	3,096	0.402	0.490	0	1
Enforcement	3,096	0.316	0.465	0	1
Coverage	3,096	0.290	0.454	0	1
Legal basis	3,096	0.483	0.500	0	1
Support procedures	3,096	0.122	0.327	0	1
Escape clause	3,096	0.255	0.436	0	1
Stabilization	3,096	0.191	0.393	0	1
Investment	3,096	0.104	0.306	0	1
Strict fiscal rule	3,096	0.399	0.490	0	1
Flexible fiscal rule	3,096	0.358	0.479	0	1

Notes: This table reports the summary statistics for the full sample.

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