Dynamic effects of fiscal rules: Do initial conditions matter?

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Abstract: Fiscal rules have been shown to support fiscal discipline by improving government budget balances and restraining debt growth. However, questions remain about what enhances their effectiveness and how certain conditions help build the credibility needed for their survival and success. Using data from 108 countries between 1984 and 2012, we study the dynamic effects of fiscal rule adoption. We show that while fiscal rules generally improve the primary balance, their effects depend on the time horizon under consideration and the context of adoption. In advanced economies and countries with strong political institutions, the effects strengthen over time. Conversely, in emerging market and developing economies—especially those with weaker institutions—their impact tends to fade as time passes. Our findings highlight the critical role of economic conditions and consensus building at the time of adoption. Specifically, fiscal rules introduced in times of economic hardship or under highly concentrated political power are often less effective in the medium term.

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1. Introduction

Over the last decades, fiscal sustainability concerns have intensified across the globe because of increasing government debt levels in both advanced and developing economies (Kose et al. 2021). At the same time, fiscal policy has gained prominence as a tool for macroeconomic stabilization, particularly in response to large global shocks, when monetary policy alone proves insufficient to counter recessions. However, to deploy fiscal policy effectively during downturns, governments must maintain adequate fiscal space to respond without compromising the long-term sustainability of public finances.

To promote fiscal policies that ensure sustainability while allowing their stabilization role, numerous countries have implemented fiscal rules. These rules impose constraints on fiscal policy by setting specific limits on budgetary aggregates (Schaechter et al. 2012). Early rules primarily focused on either the government's fiscal balance or the extent of its debt accumulation. In recent times, a growing number of countries have also adopted expenditure rules.[1] While fiscal rules were first adopted predominantly by advanced economies, developing countries have rapidly followed suit in the past few decades (Caselli et al. 2022; Davoodi et al. 2022). Today, fiscal rules have become the de facto benchmark for fiscal policy worldwide.

There is ample evidence in the academic literature highlighting the benefits of fiscal rules. Earlier studies have shown that fiscal rules can lower fiscal deficits (Debrun et al. 2008; Caselli and Reynaud 2020), curtail the accumulation of public debt (Azzimonti, Battaglini, and Coate 2016; Strong 2023), diminish sovereign bond spreads (Iara and Wolff 2014), and constrain political budget cycles (Gootjes, de Haan, and Jong-A-Pin 2021). However, the impact of fiscal rules is not uniformly positive as it varies among different objectives and across countries (Bova et al. 2014; Ardanaz and Izquierdo 2022). For instance, the effectiveness of fiscal rules is often shaped by country-specific factors, including the amount of budget transparency provided by the government and quality of political and financial institutions (Beetsma et al. 2019; Gootjes and De Haan 2022a). At the same time, design features such as the flexibility embedded within the rules or a strong statutory basis have been shown to be more conducive to fostering fiscal discipline (Guerguil, Mandon, and Tapsoba 2017; Asatryan, Castellón, and Stratmann 2018). Therefore, well-

[1] While some countries have also adopted revenue rules, this trend is less pronounced.

designed fiscal rules, supported by strong governance and institutions, are essential for ensuring effective fiscal discipline.

While the literature on fiscal rules is vast, certain aspects key to their effectiveness have not received sufficient attention. In particular, we have limited understanding of how the effects of fiscal rules develop over time.[2] Most studies estimate the average effects of fiscal rules, sometimes accounting for specific conditions. However, this approach implicitly assumes that these effects remain constant in both the short and medium-to-long term—an assumption that is unlikely to hold. Credibility, a cornerstone for fiscal rule's success, takes time to develop. Furthermore, over time, the conditions that led to the adoption of the rule may have changed, potentially weakening the motivation of governments to stick to the rule's constraint(s). The evolution of fiscal rule effectiveness likely depends on country-specific characteristics, offering valuable insights into how these factors shape medium-to-long term outcomes. For example, better governance structures and higher-quality institutions may enhance the effectiveness of fiscal rules by helping to build the credibility necessary to ensure their long-term survival. In contrast, the absence of such institutional support may yield only short-to-medium term effects.

Studying the dynamic effects of fiscal rule adoption also helps us understand whether initial conditions—the environment in which these rules are introduced—matter. The notion that initial conditions might influence the long-term success of fiscal rules can be inferred from the literature on economic reform. Several studies show that the origin of economic reforms, along with the political and economic conditions at the time of adoption, play a crucial role for their success (Rodrik 1996; Duval, Furceri, and Miethe 2020; Alesina et al. 2024; IMF 2024). The same logic can be applied to the environment in which fiscal rules are implemented. For instance, the effect of rules introduced during economic downturns may evolve differently compared to those implemented in more stable times. Likewise, fiscal rules adopted in a political climate of strong consensus may yield different effects than those established with limited political support. In their early survey of fiscal rules, Kopits and Symansky (1998) emphasized the importance of

[2] There are some studies that have looked at the dynamic effects of fiscal rules on fiscal policy, but they typically have a narrow focus. Afonso and Jalles (2019) study how the effects of fiscal rules on sovereign yield spreads evolve over the years. Apeti et al. (2024) examine the effect of fiscal rule adoption on the share of borrowing in foreign currency. Chrysanthakopoulos and Tagkalakis 2024 also examine the dynamic effects of fiscal rules. However, due to their model specification, their focus is primarily on the level-shift effects of fiscal rules (i.e., the difference between having a rule and not having one) over the medium term, rather than on the adoption process itself.

commitment and linked the effectiveness of these rules to the context in which they are introduced. However, empirical research has largely overlooked this aspect in subsequent studies.[3]

In this paper, we examine the dynamic effects of fiscal rule adoption on fiscal policy in a large sample that includes both advanced and emerging market and developing economies (EMDEs). We address two key questions: First, how does the primary balance evolve following the adoption of fiscal rules? Second, do initial conditions influence the subsequent effectiveness of fiscal rules?

Our primary contribution to the literature lies in the careful examination of the dynamic effects of the adoption of fiscal rules. We complement existing research—which recognizes the positive effects of fiscal rules and the importance of the economic and political contexts—by refining its findings and uncovering patterns that become only visible when the dynamics of rule implementation are considered. We offer novel insights into the importance of conditions at the time of adoption, such as the state of the economy or the concentration of political power, demonstrating that fiscal rules succeed when adopted in some circumstances while struggling in others.

Specifically, our results show that the adoption of fiscal rules has a positive effect on the primary balance that gradually builds over time. Over a ten-year horizon, the primary balance has improved by about 1% of GDP. The dynamic effects are stronger in advanced economies and countries that are less dependent on commodity exports. For emerging markets and developing economies (EMDEs) and commodity exporters, we find evidence of positive short- to medium-term effects, but these effects tend to die out over time. Further analysis shows that stronger institutions support the effectiveness of fiscal rules across all country types, while in countries with weaker institutions, fiscal rules only lead to short-term improvements in the primary balance.

In addition, we find that the effects of fiscal rules adopted during periods of economic weakness tend to dissipate over time. This suggests that fiscal rule adoption is more likely to install long-term fiscal discipline when it is motivated by choice, and not distress or compulsion. Moreover, fiscal rules adoption is more effective when the distribution of

[3] Our approach is linked to a strand of the literature that has shown that certain economic and political conditions lead to fiscal rule adoption (Debrun and Kumar 2007; Elbadawi, Schmidt-Hebbel, and Soto 2015; Altunbaş and Thornton 2017; Badinger and Reuter 2017).

seats between government and opposition parties is more balanced. This signals the importance of achieving broad consensus for effective implementation, a goal that is less necessary achieve when the government holds greater political power. These results remain robust when we condition the model on situations where fiscal rule effectiveness is more likely, notably the presence of strong institutions. In sum, our findings suggest that while strong institutions are an important factor, they are not the only condition necessary for the successful adoption and sustainable effects of fiscal rules.

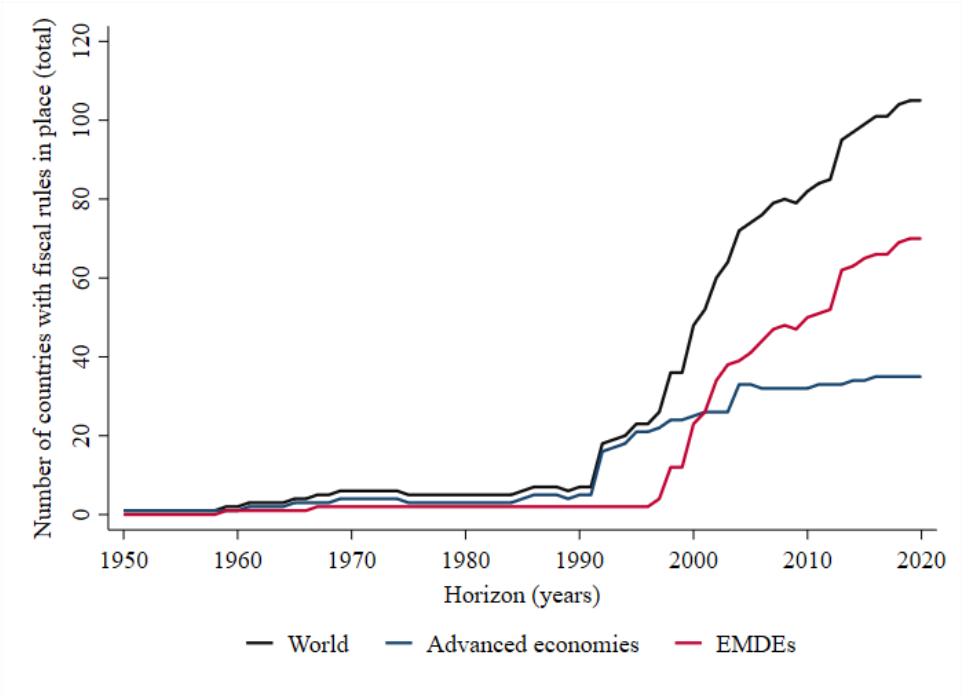
Our results are robust to a range of alternative model specifications that formally account for the Nickell Bias, heterogenous treatment effects, and endogeneity. The results are also robust when an alternative measure that purges cyclical effects from the primary balance is used. Further sensitivity analyses show that the design of fiscal rules does not drive our findings.

The paper is structured as follows. Section 2 provides a detailed review of the academic literature. Section 3 introduces the econometric methodology. Section 4 presents the baseline estimates of the dynamic responses of the primary balance to the introduction of fiscal rules and how they vary across different contexts. Section 5 focuses on how initial conditions matter for these dynamic responses. Section 6 presents a battery of robustness tests. Section 7 concludes.

2. Literature review

Fiscal rules have been in place for decades, but their widespread adoption occurred in an era where many countries had witnessed a worsening of fiscal sustainability. Japan was the first country (on record) to adopt a fiscal rule at the federal level, doing so in 1947. Over the following decades, other countries such as Malaysia (1959), the Netherlands (1961), Singapore (1965), Indonesia (1967), and Germany (1969) took similar action. There is no doubt, however, that the numerical constraints enshrined in the *Maastricht Treaty* of 1992, which laid the foundation for the creation of the Economic and Monetary Union (EMU), served as a catalyst for the global adoption of such rules (Figure 1). Given that the European Union (EU) comprises a group of advanced economies accounting for a large share of the global GDP, their adoption of fiscal rules represented both an experiment and a potential model for other countries to follow. It also generated a vigorous academic debate, yielding valuable insights on the effectiveness and optimal design of fiscal rules (Debrun et al. 2008; Hallerberg, Strauch, and Von Hagen 2007).

Figure 1: Adoption timeline of fiscal rules



Source: International Monetary Fund; Kopits and Symansky (1998).

The academic literature posits the origin of fiscal rules on the need to foster fiscal discipline and ensure debt remains on a sustainable path (Wyplosz 2013; Kopits and Symansky 1998). Accordingly, most fiscal rules take the form of numerical constraints on debt, fiscal balances, or budget components (Caselli et al. 2022). Beyond debt sustainability, fiscal discipline can also be understood more broadly. For example, fiscal rules may require governments to build buffers during times of economic expansion to be used for fiscal stimulus efforts during recessions. This type of discipline supports fiscal policies that optimize macroeconomic stabilization and helps reduce excessive fiscal policy volatility and procyclicality, both of which have been widely documented across many countries (Fatás and Mihov, 2003). The literature also tackles the issue of potential negative side effects of fiscal rules, such as how the same constraints that promote savings in good times could limit fiscal stimulus during periods of slow growth (Fatás and Mihov, 2010).

With a focus on U.S states, much of the earlier empirical literature on the effect of budgetary constraints found that fiscal rules provide discipline, reduce volatility, and improve the countercyclicality of fiscal policy (Alesina and Bayoumi 1996; Bohn and Inman 1996; Fatás and Mihov 2006). As more countries began adopting fiscal rules—in

particular, EU countries in the run up to the launch of the Euro and the creation of the EMU—similar studies were conducted at the country level.[4] For instance, research demonstrates strong evidence that fiscal rules across EU member states has successfully reduced fiscal procyclicality (Debrun et al. 2008; Larch, Orseau, and Van Der Wielen 2021; Gootjes and De Haan 2022b).[5]

In the EMU context, Debrun and Kumar (2009) make use of both case-study methodologies and panel regressions to show the disciplining effects of fiscal rules on the primary balance and public debt. However, they caution that some of these effects may be influenced by endogeneity: for example, rules may have been adopted by fiscally conservative governments that would have been disciplined even in the absence of a rule. Endogeneity can also work in the opposite direction, where fiscal rules are adopted by governments struggling to implement sound fiscal policy, making them more likely to fail in enforcing the rules effectively.

As more countries adopted fiscal rules in the past few decades, research has increasingly provided evidence supporting their disciplining effect across a broad range of countries. Heinemann, Moessinger, and Yeter (2018) present a meta-regression analysis of 30 studies from the preceding decade. Their findings largely support the view that fiscal rules have a restraining effect on excessive policies, with a more significant impact on deficits than on debt or expenditures. Like in many studies in this field of literature, the authors acknowledge the possibility of endogeneity bias. This issue is sometimes addressed using instrumental variable (IV) analysis. For example, Caselli and Reynaud (2020), tackle causality by using an instrument based on the logic that the adoption of fiscal rules is influenced by their diffusion among neighboring countries. Their paper focuses on the budget balance and presents evidence of the effects of fiscal rules once the design of specific rules is considered.

[4] Caselli et al. (2022) provide a good summary of recent trends in adoption of fiscal rules.

[5] Others have a different view, arguing that while, in theory, the EU fiscal rules (with cyclically adjusted targets, flexibility clauses, and the option to enter an excessive deficit procedure) permit large-scale fiscal stabilization during recessions, in practice, these rules resulted in pro-cyclical tightening in most EU countries during the euro crisis of 2010–2013 (Claeys, Darvas, and Leandro 2016). Additionally, while fiscal procyclicality in advanced economies, such as the EU countries, has diminished over time, research has identified an asymmetry between good and bad times. Specifically, fiscal rules tend to be more effective in promoting countercyclicality during downturns (Eyraud et al. 2018; Gootjes and de Haan 2022b).

The improvements in fiscal policy across a wide sample of countries can partly be attributed to the dual role of fiscal rules.[6] Beyond serving as a commitment device that constrains government actions and curtails discretionary fiscal measures, fiscal rules also act as a signaling mechanism. By explicitly communicating the government's fiscal intentions and strategies to the public and financial markets, fiscal rules bolster transparency and credibility in fiscal policy (Debrun and Kumar, 2007). This signaling effect has tangible benefits: fiscal rules have been demonstrated to improve market access for both advanced and developing economies by reducing sovereign risk premia and borrowing costs (Sawadogo 2020; Iara and Wolff 2014).[7]

With a larger sample of countries, recent empirical studies have also been able to explore a broader set of issues related to fiscal rules, extending their analysis beyond direct measures of fiscal sustainability. For instance, fiscal rules have been shown to influence the patterns and composition of government spending by, for example, protecting investment and increasing the ratio of public investment to government consumption (Vinturis 2023).8 There is also evidence that fiscal rules can improve government efficiency (Barbier-Gauchard, Baret, and Debrun 2023). Additionally, fiscal rules can reduce the vulnerability to sudden stops (Buda 2024), and also impact private domestic investment (Sawadogo 2024), with stronger effects in developing economies.

While fiscal rules are generally regarded as effective, their impact in EMDEs remains mixed. Much of the discussion here has centered on fiscal procyclicality, a notable challenge in the developing world (Gavin and Perotti 1997; Kaminsky, Reinhart and Végh 2004). On the one hand, studies have shown that fiscal rules help reduce fiscal procyclicality in the case of developing, low-income, and resource-rich countries (Céspedes and Velasco 2014; Bergman and Hutchison 2020; Mawejje and Odhiambo 2024). However, several other studies have found weaker to no evidence of this. For

[6] Compliance to the numerical constraints of the rules has also been identified as a crucial factor for effectiveness, as demonstrated by Cordes et al. (2015) for the case of expenditures rules. However, as a counterpoint, Reuter (2015) suggests that fiscal rules, even with limited compliance, are effective because they act as "benchmarks".

[7] Of course, beyond their signaling effects, fiscal rules also enhance the corrective role of financial markets in shaping fiscal policy. Kelemen and Teo (2014) argue that fiscal rules serve as a lens through which financial markets can discern sound fiscal policies from fiscal profligacy. This transparency enables markets to coordinate their responses, such as imposing discipline on governments by demanding higher interest rates when fiscal policies stray from prudent benchmarks.

[8] There is, however, evidence that they might also reduce the ratio of social transfers to government consumption (Dahan and Strawczynski 2013).

instance, Ardanaz and Izquierdo (2022) observe that fiscal rules have little impact on mitigating procyclical fiscal policy behavior in in developing countries. Similarly, Bova, Carcenac, and Guerguil (2014) report limited effects of fiscal rules on procyclicality in emerging markets, and Bova, Medas, and Poghosyan (2016) find no evidence that the adoption of fiscal rules in resource-rich countries reduced the procyclicality bias in a significant way. Rather, the quality of political institutions emerges as a crucial factor in alleviating the procyclical nature of fiscal policy across these studies.

Studies comparing different types of rules, such as deficit, expenditure, or debt rules, have found mixed results. Other important dimensions, such as the flexibility of fiscal rules, have also been studied. For example, Guerguil, Mandon, and Tapsoba (2017) show that rules are linked to a small reduction in fiscal procyclicality, though not all rules produce the same results. In particular, deficit rules appear to have a strong effect, while flexible rules—especially those designed to shield investment—seem to be most successful. Ardanaz et al. (2021) find similar results, showing that flexibility in fiscal rules can create a growth-friendly environment by protecting investment from falling during episodes of fiscal consolidation. Likewise, the literature finds that some features of second-generation rules, such as cyclically adjusted targets and stronger enforcement arrangements, help with the procyclicality bias (Bova, Carcenac, and Guerguil 2014; Eyraud et al. 2018).

Despite the vast empirical literature on the effects of fiscal rules, an area that remains understudied is the dynamic effects of these rules and how initial conditions shape their effectiveness. Only a few studies have looked at how the effects of fiscal rules develop over time. Afonso and Jalles (2019) explore the dynamic effects of fiscal rule adoption, focusing on sovereign bond spreads. Their findings indicate that, in the initial years following the implementation of a rule, sovereign spreads decrease by approximately 1.2–1.8 percentage points, indicating lower government borrowing costs. However, this improvement is mainly driven by advanced economies, with no statistically significant impacts in the case of EMDEs. Apeti et al. (2024) offer another examination of the dynamic effects of fiscal rules, highlighting their impact on reducing borrowing in foreign

currency. Specifically, they show that fiscal rule adoption is associated with a reduction in foreign currency borrowing of between 1 and 1.9 percentage points.[9]

A related strand of the literature has studied the factors influencing the adoption of fiscal rules (IMF 2009; Hallerberg and Scartascini 2015; Elbadawi, Schmidt-Hebbel, and Soto 2015, Altunbaş and Thornton 2017; Badinger and Reuter 2017). These studies have found that the political landscape can be an important factor for adopting fiscal rules. Similarly, economic conditions may play a key role: higher levels of debt or an economic crisis might affect the likelihood that a fiscal rule is adopted. However, these studies do not examine how these factors influence the subsequent impact of the rules. In this paper, we analyze how the economic and political environments prevailing at the time of fiscal rule adoption shape their medium-term effectiveness. We consider some of the conditions that can be seen as determinants influencing the adoption of fiscal rules, while others are more incidental (i.e. reflecting the specific environment at the time of adoption).

3. Data and methodology

To investigate the dynamic effects of fiscal rule adoption, we focus on the response of the primary balance. The primary balance excludes interest payments from the budget, which are largely outside the control of the incumbent government and do not reflect fiscal policies implemented in the current period. This measure, therefore, effectively summarizes how fiscal policy responds to debt sustainability concerns (Bohn 1998).

We study the response of the primary balance over a ten-year period following the introduction of fiscal rules. This timeframe allows us to observe both the immediate and medium-term effects of introducing fiscal rules. Differences could arise, among other things, due to changing conditions that initially supported the adoption of the rules, potentially weakening commitment over time.

Our sample includes 108 countries, also including countries that never adopted fiscal rules. With fiscal rules data available up to 2021, we study their adoption until 2012. This allows us to analyze the evolution of the primary balance over period of ten years. The

[9] Chrysanthakopoulos and Tagkalakis (2024) present another recent study on the dynamic effects of fiscal rules, but their analysis uses a methodology that restricts the type of effects that can be measured (see Section 4). Surprisingly, their findings show that fiscal rules lead to lower primary balances in the medium term, and they associate this counterintuitive result to possible lower interest payments associated with the increased credibility of governments.

starting year is 1984, reflecting the earliest availability of all relevant data. Data on fiscal rules comes from the IMF's Fiscal Rules dataset (Davoodi et al. 2022). Data on primary balances, as well as other data on macroeconomic variables is sourced from the IMF's October 2024 World Economic Outlook (WEO) database.

To estimate the response of the primary balance after the adoption of fiscal rules, we employ the local projections approach following Jordà (2005). Local projections are commonly used in the literature to estimate the dynamic effects of macroeconomic shocks and policy reforms to relevant economic variables.[10] We use the following specification:

$$\Delta_h f_{i,t+h} = \varphi^h FR_{it} + \sum_{j=-s, j\neq 0}^{h} \omega_j^h FR_{it+j} + \sum_{k=1}^{K} \beta_k^h \boldsymbol{X}_{k,it} + \mu_i + \tau_t^h + \varepsilon_{it+h}; \quad h = 0, 1, \ldots, H, \quad (1)$$

where $\Delta_h f_{i,t+h} \equiv f_{i,t+h} - f_{i,t-1}$ represents the cumulative change in the primary balance (as a % of GDP) from time *t-1* to *t+h*. As we track the response of the primary balance for the first ten years after fiscal rule adoption, H is set to 9. We only include countries with at least ten observations per projection horizon h, ensuring a theoretical rolling window of at least twenty observations of the primary balance.[11] μ_i and τ_t control for country- and time-fixed effects (for each projection of the primary balance, time-fixed effects are included with leads equal to h), respectively, and ε_{it+h} is the error term.

Following Afonso and Jalles (2019), we set our fiscal rules indicator (FR_{it}) equal to one in the year a fiscal rule is introduced and zero otherwise, modeling rule adoption as a

[10] Jordà and Taylor (2024) provide a review of the methodology and examples of its use in the literature. In the literature on fiscal rules, local projections have been used to estimate the effect of *fiscal rule adoption* on sovereign spreads (Afonso and Jalles 2019) and government borrowing in foreign currency (Apeti et al. 2024). Moreover, research has used local projections to estimate the medium-term effects of the *presence of fiscal rules* on the government budget balance (Chrysanthakopoulos and Tagkalakis 2024), the response of budgets to recessions (Caselli et al 2022), and how fiscal consolidation episodes impact public investment growth in countries with fiscal rules (Ardanaz et al. 2021).

[11] The actual window may be smaller in some cases, as we exclude countries that exhibit highly volatile fiscal policy and filter out episodes of primary balance booms and busts. We omit countries with a standard deviation of the primary balance of 10 or higher, resulting in the exclusion of Kuwait and Saudi Arabia from the sample. We also identify years of extreme fluctuations— 'booms' and 'busts'—as those in which the change in the primary balance falls beyond the lower (1st) and upper (99th) tails of the distribution. We remove observations for the three years after if the boom (bust) in the primary balance relative to the year before stays above (below) the outlier threshold. In total, this leads to the omission of 43 observations of the primary balance across 22 countries. Results that include extreme fiscal volatility and episodes of primary balance booms and busts are consistent with the baseline but appear more volatile.

treatment effect akin to that in difference-in-difference event studies. If, alternatively, the rule indicator was set to one for all years that a fiscal rule was in place, as in Chrysanthakopoulos and Tagkalakis (2024), the local projections would capture the level effects of the *presence of fiscal rules* over the medium-term. This would then be capturing how having a rule today influences the government budget over the next h years—and not the dynamic effects of *fiscal rule adoption* on medium-term fiscal policy.

We assume that the effect of fiscal rule adoption stabilizes after ten years, such that the established impact of fiscal rules influences the level but not the dynamics of the primary balance. This rationale is also applied by Dube et al. (2023) in examining the effect of democratization on output. To control for the initial impact of rule adoption on the primary balance, we include four lags of the fiscal rule indicator, aligning with the average duration of electoral cycles in most countries. We follow Teulings and Zubanov (2014) and include nine leads to mitigate the bias from overlapping forecast horizons. These leads account for future fiscal rule adoptions (i.e., between year $t+1$ and $t+h$).[12]

Due to data availability constraints in the control variables, some instances of fiscal rule adoption that occurred between 1984 and 2012 do not enter the econometric analysis. The sample used in the analysis comprises 52 cases of fiscal rule adoption across 50 countries. Each case represents the implementation of one or more fiscal rules in a context where no such rule existed in the previous year. Our analysis thus focuses on cases of newly (re-) installed fiscal rules, excluding subsequent adoptions or amendments. Later adoptions are instead treated as secondary treatment effects within the control set.[13]

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[12] Without these leads, part of the impact of fiscal rule adoption on the primary balance would be absorbed by the fixed effects, leading to a downward bias in the coefficient estimates of the fiscal rule indicator. In the leads-and-lags structure of the rule indicator, we consider all instances of rule adoption, not only the initial set of rules. Moreover, we include a separate variable to capture the effects of subsequent rule adoptions. Including a variable that captures the presence of fiscal rules—but setting it to zero in the first year of adoption—yields similar results as to including second time adoptions in the leads-and-lags structure. Moreover, differentiating between rule frameworks that remained unchanged within their first ten years and those that were amended yields similar outcomes (results are available on request).

[13] We assume that the primary balance does not respond the same to later changes to the fiscal rule framework, as the response is conditional on the initial adoption of the rule(s). Therefore, investigating the impact of later rule adoptions (or subsequent rule modifications) would require focusing on countries with an existing rule, while also controlling for the time since the rule was first adopted. Accounting for fiscal rule intensity—such as the number or design of the initial rules—adds further complexity to the analysis. As such, we exclude later changes from the shock indicator to achieve a clearer understanding of the implications of rule adoption for countries. For an in-depth discussion of second treatment effects and their empirical implications, see de Chaisemartin and D'Haultfœuille (2023).

To account for other factors that might influence the primary balance, the vector $\boldsymbol{X}_{k,it}$ contains several control variables. First, we include two lags of the primary balance. Following Montiel Olea and Plagborg-Møller (2021), we add an additional lag to address serial correlation in the regression residuals. Specifically, their findings demonstrate that lag-augmented local projections are asymptotically valid across both stationary and non-stationary data and at long horizons (i.e., horizons that are a non-negligible fraction of the sample size). Furthermore, lag augmentation eliminates the need to correct standard errors for serial correlation in the regression residuals.[14]

Second, we account for the broader macroeconomic environment. We include the lagged public debt-to-GDP ratio to capture the responsiveness of fiscal policy to debt sustainability challenges. Additionally, we control for real GDP growth, inflation, and the current account balance (all lagged by one period to address endogeneity concerns).

Third, we control for the institutional environment. Amongst others, we incorporate a variable that considers the presence of an election year to account for the potential existence of political budget cycles. Moreover, we control for the strength of political institutions. However, since no single variable fully captures this concept, we employ Principal Component Analysis (PCA) and take first principal component to construct a summary measure. We use data from the International Country Risk Guide (ICRG) database, incorporating variables on the regulatory quality of the government, the preservation of the rule of law, the level of democratic accountability, and the control of corruption. Appendix 2 describes the PCA and the outcomes in detail.

In addition to the quality of political institutions, we include variables that control for the effect other macroeconomic policies on the primary balance. Specifically, we incorporate measures that capture the presence of independent fiscal councils and sovereign wealth funds. Furthermore, we account for the presence of an inflation targeting regime, the prevailing exchange rate regime, and the extent of capital account openness. Detailed definitions and data sources for all variables are provided in Table A1 in Appendix 1.

[14] We opt for clustered standard errors to deal with potential heteroskedasticity in our analysis over Driscoll-Kraay standard errors (Driscoll and Kraay, 1998) for two main reasons. First, the global wave of fiscal rule adoption occurred gradually over time (see Figure 1), mitigating concerns about cross-sectional dependence in the response of the primary balance to fiscal rule adoption. Second, Driscoll-Kraay standard errors require large T, which is not the case in our dataset. Nonetheless, our results—which are available upon request—remain robust when using Driscoll-Kraay standard errors.

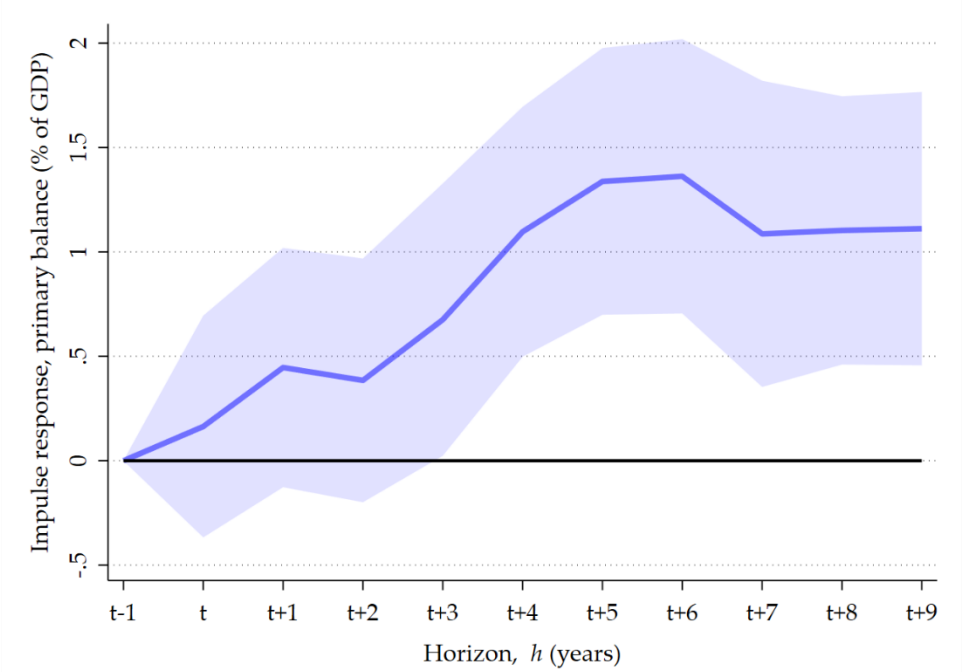
4. The dynamic effects of fiscal rule adoption

In this section, we examine the evolution of the primary balance following the introduction of one or more fiscal rules. We begin by analyzing how quickly the effects of fiscal rules on the primary balance emerge and the extent to which they persist over time. After establishing the time profile of these effects, we study how different country characteristics and the context in which fiscal rules were adopted influence the outcomes.

4.1. Baseline results

Figure 2 shows the response of the primary balance following the adoption of fiscal rules, along with a 90% confidence interval. The results show that fiscal rule adoption promotes fiscal discipline. The impact on the primary balance builds gradually, with no significant change observed in the first three years relative to the counterfactual of no rule adoption. By the fourth year, fiscal rules lead to an improvement of 0.7% of GDP in the primary balance, peaking after seven years before experiencing a slight decline. The effects are persistent, and a decade after adoption, the primary balance remains 1.1% of GDP higher compared to the year before adoption. These results are consistent with findings from panel estimations typically reported in the literature (cf. Caselli and Reynaud 2020).

Figure 2: Dynamic effects of fiscal rule adoption



Notes: The figure presents the impulse response function of the primary balance to the adoption of a fiscal rule, with the rule(s) adopted at year $h = 0$. The blue line shows the cumulative improvement in the primary balance h years after fiscal rule adoption, compared to the counterfactual scenario of no adoption. The shaded blue area represents the 90% confidence interval. The analysis is based on 108 countries; the number of observations included in each regression ranges between 1,807 and 1,817.

4.2. Country characteristics

Past studies have shown that the effectiveness of fiscal rules depends on specific country characteristics. Fiscal rules tend to be less effective in developing countries (Bova, Carcenac, and Guerguil 2014; Ardanaz and Izquierdo 2022) and in commodity-exporting countries (Bova, Medas, and Poghosyan 2016). Building on the baseline results, we break down the reaction of the primary balance to the adoption of fiscal rules based on these country characteristics.[15]

We follow the approach of Jordà and Taylor (2024) and estimate the model across a set of data bins, allowing for state-dependent responses. Let D_{t-r} represent a binary indicator capturing the state variable at time $t - r$, where $r > 0$ denotes the period prior to the adoption of fiscal rules. We can then estimate the local projections as follows:

$$\Delta_h f_{i,t} = \varphi^{hz} FR_{it} + \sum_{j=-s, j\neq 0}^{h} \omega_j^{hz} FR_{it+j} + \sum_{k=1}^{K} \beta_k^{hz} \boldsymbol{X}_{k,it} + \mu_i + \tau_t^{hz} + \varepsilon_{it+h};$$

$$D_{t-r} = z \in \{0,1\}, \;\; r > 0, \;\; h = 0, 1, \ldots, H. \quad (2)$$

Here, φ^{hz} captures the response of the primary balance to the adoption of fiscal rules in regime $z = 0,1$ for different values of h. Hence, we capture the average response to fiscal rules adoption, conditional on the current regime and controlling for relevant factors, while accounting for all possible future trajectories, including any future shifts in the state variable (Jordà and Taylor 2024).

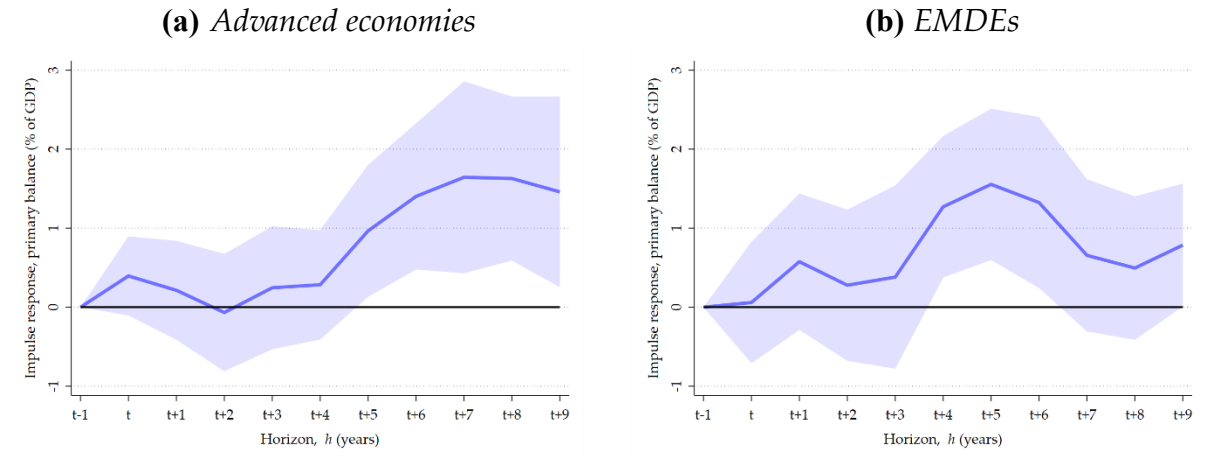
Figure 3 presents the results when distinguishing between advanced economies and EMDEs. In line with the existing literature, we find that fiscal rules in advanced economies have a significant and lasting impact on the primary balance (Debrun and

[15] We apply the classification criteria used in World Bank (2024) to distinguish between advanced economies (AEs) and emerging market and developing economies (EMDEs), as well as to classify countries as either 'commodity exporters' or 'commodity importers'.

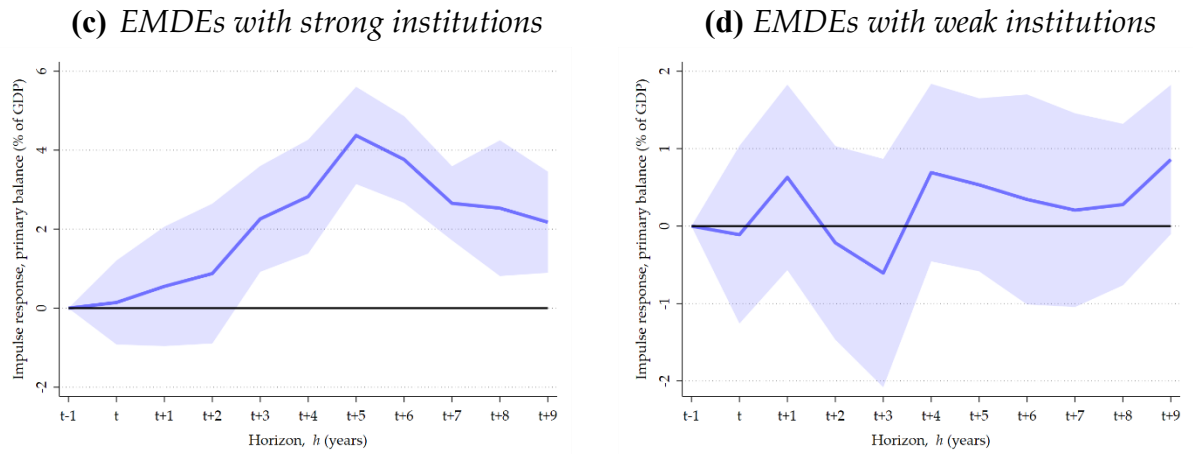
Kumar 2009). In these economies, fiscal rules become effective after five years on average. However, once they do, their impact persists: By the end of the ten-year horizon, the rules have improved the primary balance by 1.5% of GDP.

Why do we observe a delayed effect of fiscal rules in advanced economies? A likely reason is the significant presence of EU countries within this group. In many EU countries, fiscal rules were introduced as part of the creation of the EMU in 1992. For countries that joined the EU later (and thereby the EMU), adopting these rules was a prerequisite for their accession.[16] In general, the full implementation of fiscal rules within a supranational framework often happens gradually, allowing their impact to develop progressively over time. For instance, for the EU countries that signed the Maastricht Treaty in 1992, the preventive arm of the Stability and Growth Pact came into effect in 1998, followed by the corrective arm in 1999. Indeed, when we distinguish between national and supranational rules, we find that supranational rules take more than six years to show effects after adoption, while national ones improve the budget by the fourth year, similar to the baseline (results are presented in Figure A1, Appendix 1).

Figure 3: Impulse responses: advanced economies vs. EMDEs



[16] Fiscal rules adoption among some EMDEs is also closely linked to the creation of supranational frameworks aligned with regional economic blocs. Examples include supranational fiscal frameworks in the Central African Economic and Monetary Community (CEMAC), East African Community (EAC), East Caribbean Currency Union (ECCU), and Western African Economic and Monetary Union (WAEMU).



Notes: See notes Figure 2. The analysis is based on 108 countries; the number of observations included in each regression ranges between 1,807 and 1,817.

Figure 3, panel (b), shows a different response of the primary balance in EMDEs. Similar to advanced economies, it takes a number of years for the rules to impact the primary balance in these countries relative to the counterfactual of no rule adoption. The effect becomes significant after five years, with a meaningful increase of the primary balance of more than 1% of GDP, peaking in the following year. However, unlike in advanced economies, the effect of the rules diminishes substantially in subsequent years within EMDEs, becoming insignificant after eight years.

Why do fiscal rules in EMDEs tend to lose traction over the medium term? A likely reason is that in these countries, fiscal rules are often introduced without the necessary support of a well-established fiscal governance framework, a history of fiscal discipline, or strong political commitment to full implementation (Brändle and Elsener 2024; IMF 2009). Moreover, the literature highlights the critical role of political institutions in shaping both a country's ability and willingness to adopt sound fiscal policies (Frankel et al. 2013; Calderón et al. 2016) and supporting the effect of fiscal rules (Bergman and Hutchison 2015).[17] While the factors that led to the adoption of fiscal rules may drive initial improvements, weaker political institutions and governance structures—combined with

[17] Bergman et al. (2016) and Gootjes and de Haan (2022b) find that political institutions and fiscal rules act as substitutes in promoting fiscal sustainability. However, these studies are based on EU countries, where institutional quality is stronger, and fiscal transparency tends to be higher. When the sample is expanded to include both advanced and developing economies, the evidence in the literature largely supports the view that stronger political institutions enhance the effectiveness of fiscal rules.

limited experience managing fiscal policy—can undermine the long-term effectiveness of fiscal rules.

To test this hypothesis, we construct a state variable that differentiates countries with relatively weak political institutions from those with relatively strong ones, using a median split of the political institutions index in the set of controls (note that since institutional strength can evolve over time, countries may transition between states). Figure 3, panels (c) and (d) presents the results, which strongly support the importance of political institutions for fiscal rule effectiveness. Fiscal rule adoption has a clear and lasting impact on the primary balance in EMDEs with strong institutions.[18] The effect peaks in the sixth year at to a relatively high level of 4% of GDP before gradually declining to approximately 2% of GDP. In contrast, rules adopted in EMDEs with weaker institutions generate no improvements relative to the counterfactual. Overall, this suggests that fiscal rules can have a sizeable and lasting impact on the primary balance in EMDEs as well, provided they are supported by a strong institutional environment.

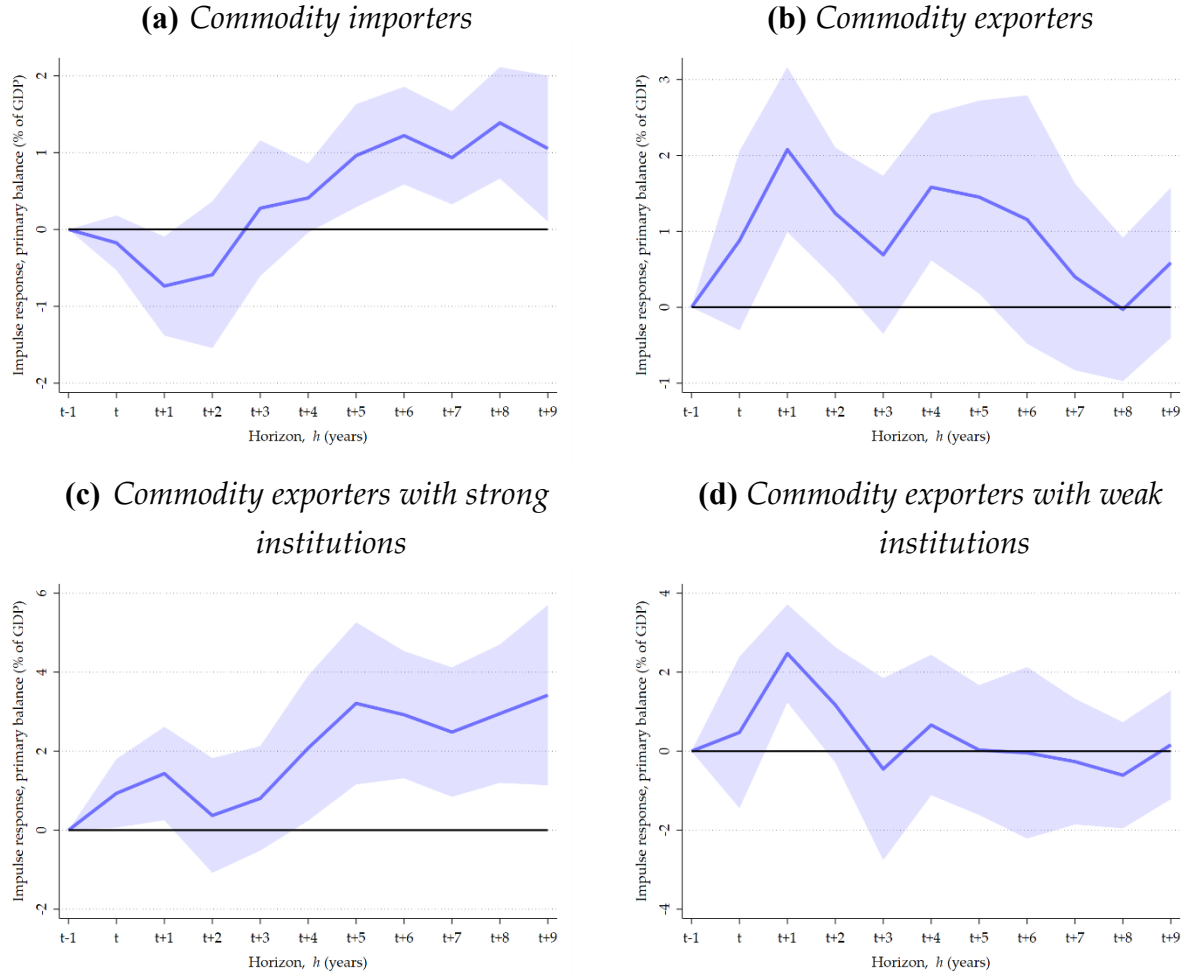
Anecdotal country experiences further underscore this dynamic. In Latin America, for example, differences in rule effectiveness across countries such as Colombia and Chile can be attributed to institutional quality, with Chile's greater success largely driven by its prior experience with strong governance frameworks (Barreix and Corrales 2019). This observation is also consistent with the experiences of Nigeria and Botswana. Nigeria adopted fiscal rules in 2007 to de-link public expenditures from oil revenue earnings and for macroeconomic stabilization purposes. However, saddled with weak institutions, performance has been mixed despite initial gains (Okonjo-Iweala and Osafo-Kwaako 2007; World Bank 2022). By contrast, the experience of Botswana, which adopted rules in 2003 to anchor long-term fiscal sustainability in the context of expected decline of diamond revenues, has been more successful on account of the country's relatively high institutional strength (Apeti, Basdevant, and Salins 2023).

Similar patterns emerge when we distinguish between commodity exporters and commodity importers. As shown in Figure 4, fiscal rule adoption has a significant and lasting impact on the primary balance in commodity importers, whereas the effects tend

[18] Since all advanced economies have relatively strong political institutions, we focus on EMDEs here. Results are similar when we differentiate countries with relatively weak political institutions from those with relatively strong ones (i.e., including advanced economies). Results are available on request.

to be temporary in commodity exporters. For commodity exporters, rule adoption tends to lead to an immediate improvement in the primary balance, likely because it coincides with the discovery of natural resources or broader efforts to improve the management of revenues (Eyraud, Gbohoui, and Medas 2023). This urgency can therefore accelerate the integration of fiscal rules into the fiscal policy process.[19] However, without strong institutional support, these improvements in the budget are more likely to fade over time.

Figure 4: Impulse responses: commodity importers vs. commodity exporters.



Notes: See notes Figure 2. The analysis is based on 108 countries; the number of observations included in each regression ranges between 1,807 and 1,817.

[19] For example, following the discovery of significant natural gas deposits, Tanzania introduced the Oil and Gas Revenue Management Act in 2015, which established a non-oil and gas deficit ceiling of 3% of GDP. This rule applies only when oil and gas revenues are higher than 3% of GDP (IMF 2016).

5. Fiscal rule effectiveness and the conditions at the time of adoption

We have demonstrated that the effects of fiscal rule adoption are not uniform. Depending on the country contexts, rule adoption has a persistent effect on the primary balance in some cases, while it tends to diminish after several years in others. Our next hypothesis is that differences in effectiveness may also stem from the motivations and the conditions present at the time of adoption, independent of a country's broader institutional context.

We consider conditions that exhibit significant variation over time, complementing the earlier investigation that focused on relatively static factors. We examine both political and economic conditions at the time of adoption, drawing inspiration of studies that have examined the drivers of fiscal rules (IMF 2009; Hallerberg and Scartascini 2015; Elbadawi, Schmidt-Hebbel, and Soto 2015; Badinger and Reuter 2017; Altunbaş and Thornton 2017). Our hypothesis is that, as conditions prompting rule adoption can change over time, the government's commitment to adhere to the constraints may weaken. Consequently, factors driving adoption may contribute to both successful and unsuccessful outcomes.

5.1. State of the economy

We begin with studying how economic conditions might affect the response to adopting fiscal rules. To measure the state of the economy, we follow as similar approach as Auerbach and Gorodnichenko (2012), Ghassibe ans Zanetti (2022), and Alesina et al. (2024) and consider the following equation:

$$F(z_{it}) = \frac{e^{-\omega z_{it}}}{1 + e^{-\omega z_{it}}}. \qquad (3)$$

In this equation, z serves an indicator of the state of the economy, normalized to have zero mean and unit variance at the country level.[20] We employ a weighted average of real GDP growth over the past three years.[21] The weighting function $F(z_{it})$ ranges between 0 and 1, which can be interpreted as the probability of being in a given state of the economy.

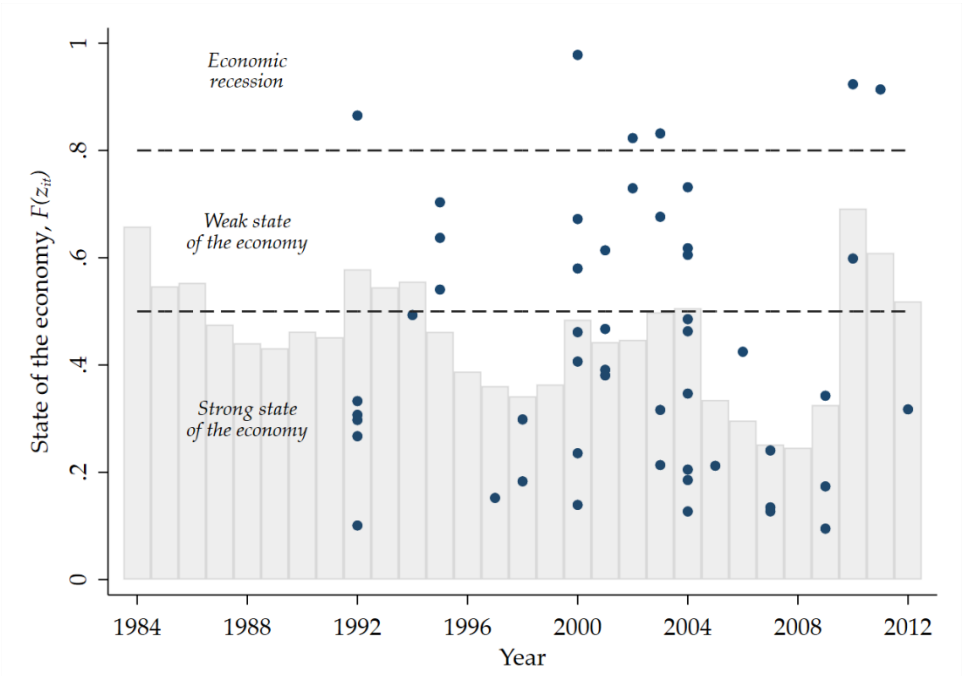
[20] Our approach slightly differs from Auerbach and Gorodnichenko (2012) and Alesina et al. (2024) as we consider a three-year window, and we account for variations in growth patterns across countries.

[21] The findings remained consistent when we use real GDP per capita growth or when we use the unweighted average of real GDP growth over the preceding three years. Results are available upon request.

In line with Auerbach and Gorodnichenko (2012) and Alesina et al. (2024), we set $\omega = 1.5$.[22] This ensures that the economy spends approximately 20% of the time in a recessionary regime (i.e., $F(z_{it}) > 0.8$), which aligns with business cycle patterns across the world.

Figure 5 illustrates the distribution of fiscal rule adoption across the state of the economy. It highlights that these rules are more likely to be implemented during periods of relative economic stability or growth yet a notable proportion of adoptions occurred under weaker economic conditions, including during times of crisis. Specifically, 35% of fiscal rules were adopted in weak economic states, with 12% occurring amidst economic crises. For example, following a severe economic crisis, Colombia introduced fiscal rules in 2000 as part of an IMF program. Similarly, the United States implemented fiscal rules in 2011 after experiencing the credit crunch that led to the global financial crisis of 2008-09.

Figure 5: Fiscal rule adoption and the state of the economy

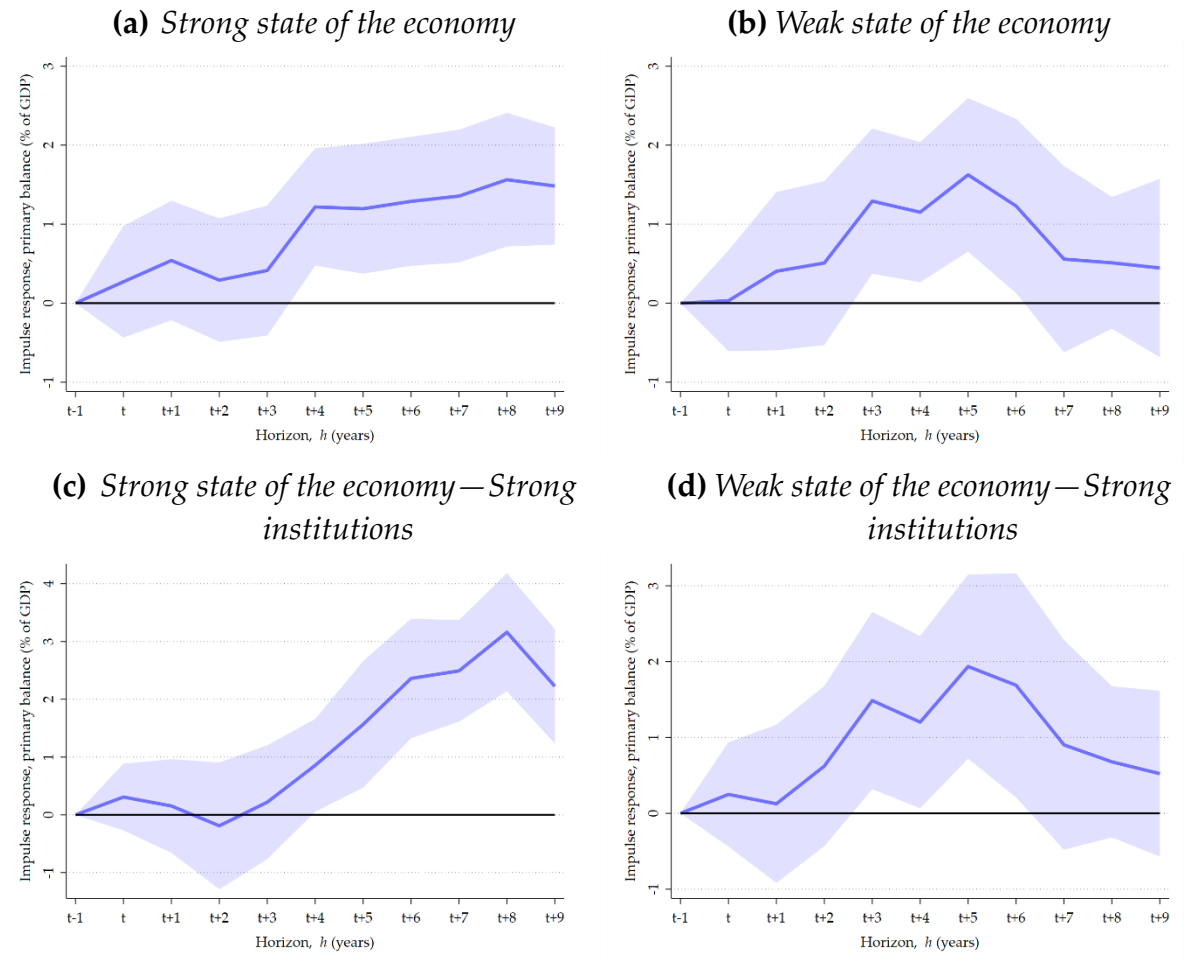


Notes: The figure displays all instances of fiscal rule adoption between 1982 and 2012 that enter our analysis, with each blue dot representing a country-specific case. 51 cases of fiscal rule adoption are considered (the adoption of fiscal rules by Greece in 1992 is not considered as we data for the state of the economy in that year is missing). The horizontal lines indicates the economic state classifications. The gray vertical bars show the annual median of the state of the economy.

[22] We obtain similar results for different values of ω (available upon request).

Next, we investigate the dynamic effects of fiscal rule adoption under different states of the economy. We create a binary indicator to differentiate responses, classifying the state of the economy as strong ($F(z_{it}) < 0.5$) or weak ($F(z_{it}) \geq 0.5$). Figure 6, panels (a) and (b), show that in the initial years, fiscal rule adoption leads to a relatively similar improvement in the primary balance across both states, exceeding 1% of GDP. However, differences emerge over the medium term. Fiscal rules adopted during periods of economic strength continue to have a lasting impact, improving the primary balance at approximately 1.5% of GDP after ten years. In contrast, rules introduced during weaker economic conditions peak in effectiveness around the sixth year before gradually losing traction. These findings are consistent with the results of Bordon, Ebeke and Shirono (2016), who find that structural product market reforms have stronger effects in a growth-friendly environment.

Figure 6: Impulse responses conditional on the state of the economy



Notes: See notes Figure 2. The analysis is based on 108 countries; the number of observations in each regression ranges from 1,795 to 1,806.

A plausible explanation for the temporary effects of fiscal rules is that establishing credibility in the initial years is critical for long-term success. However, when fiscal rules are adopted under adverse economic conditions, they are often driven by immediate macroeconomic pressures rather than broad consensus and careful preparation. As a result, their credibility may be weaker from the outset. In Argentina, for example, the Fiscal Solvency Law (1999) was passed during a period of macroeconomic distress and shrinking political support. Lacking the institutional backing, the fiscal rules never gained traction (Artana et al. 2021).

If this hypothesis is correct, it might be that countries with strong institutions can overcome the difficulties in establishing credibility when adopting fiscal rules during weak states of the economy. However, panels (c) and (d) of Figure 6 show that similar patterns persist regardless of institutional strength. In other words, strong institutions alone do not offset the negative influence of adopting a rule in a weak economic environment, suggesting that the timing of adoption is an important factor for rule effectiveness. Taken together, our findings strongly suggest that adopting rules is more effective when economic conditions are favorable—'making hay while the sun shines'—rather than as a reactive measure, in line with the idea of 'never waste a good crisis'.

5.2. Fiscal position

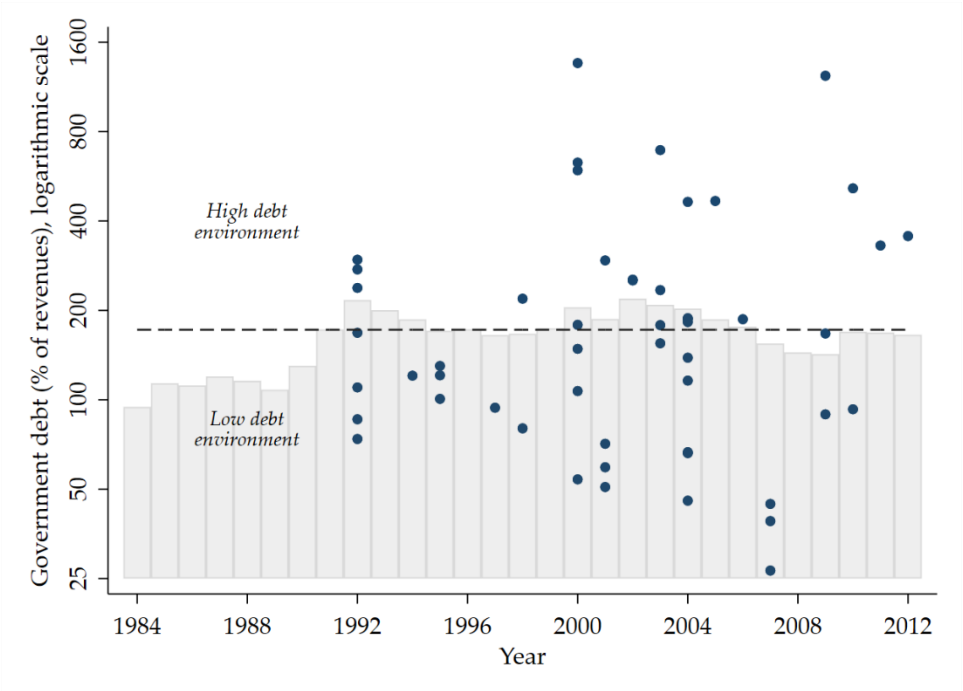
When fiscal sustainability pressures are high, adopting fiscal rules can provide crucial policy guidance. The literature on fiscal rule determinants has shown that fiscal rules are more likely to be adopted in times of high debt (Hallerberg and Scartascini 2015; Altunbaş and Thorton 2017). However, IMF (2009) argues that fiscal rules may be more credible if rule introduction is preceded by significant fiscal consolidation. Indeed, if fiscal pressures are already acute, the rules may struggle to mitigate the fiscal strain effectively; for example, not all rules have been effective in high-debt environments (Combes et al., 2017).

To assess the fiscal position at the time of rule adoption, we use the lagged government debt-to-revenues ratio, sourced from the World Economic Outlook (WEO), October 2024.[23] Figure 7 shows the distribution of fiscal rule adoptions across different debt regimes. The sample median corresponds to a government debt-to-revenue ratio of 178%, with adoptions evenly split: 47% of adoptions occurring in high-debt regimes and 53% in low-debt regimes. Two cases of fiscal rule adoption under exceptionally high debt stand

[23] We obtain similar results when we use the debt-to-GDP ratio (available on request).

out: Guinea-Bissau in 2000 and Liberia in 2009, with debt-to-revenue ratios of 1,233% and 1,361%, respectively.[24] Other examples of fiscal rules adopted under high-debt scenarios include Greece in 1992 (296%), India in 2004 (356%), and the United States in 2011 (331%).

Figure 7: Fiscal rule adoption and the debt environment

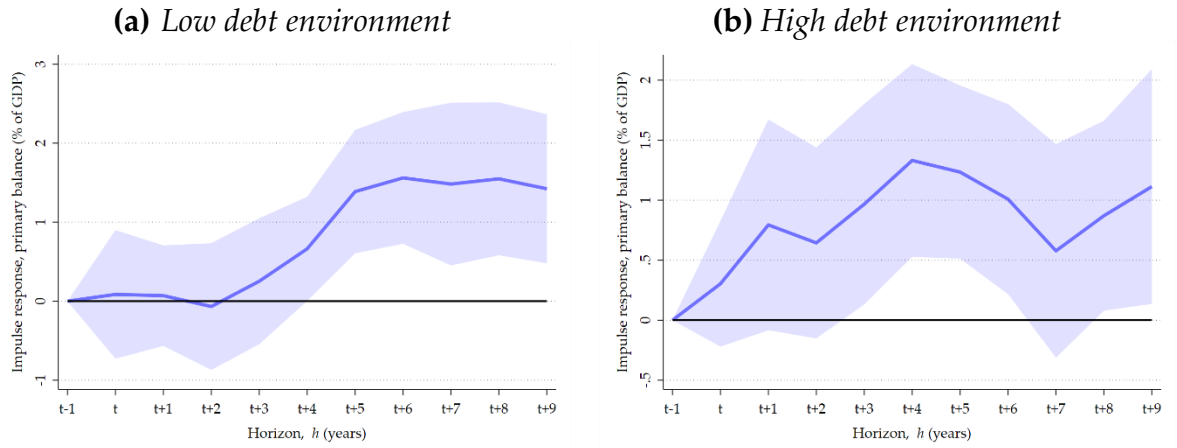


Notes: See notes Figure 5. All 52 cases of fiscal rule adoption as considered in the baseline are included. The dashed horizontal line reflects the sample median of the government debt-to-revenue ratio (on a logaritmic scale). The gray vertical show the annual median of the government debt-to-revenue ratio (on a logaritmic scale).

Figure 8 shows similar responses of the primary balance across both debt regimes. The only notable difference is that the point estimates for highly indebted countries are larger in the early years of fiscal rule adoption, though this effect is not statistically significant. These results suggest that the level of indebtedness does not lead to any differences in the effect of fiscal rules relative to the counterfactual scenario where countries would not have adopted fiscal rules in their current state. Consequently, rule adoption can help prevent countries in low-debt regimes from facing debt challenges, while it may assist countries in high-debt environments in establishing fiscal discipline, potentially setting them on a more sustainable debt trajectory.

[24] Both Guinea-Bissau and Liberia adopted fiscal rules in the context of the Heavily Indebted Poor Countries (HIPC) Initiative, reaching decision points in 2000 and 2008 respectively (IMF 2010a, b).

Figure 8: Impulse responses conditional on fiscal regime



Notes: See notes Figure 2. The analysis is based on 107 countries; the number of observations in each regression ranges from 1,794 to 1,803.

5.3. Political landscape

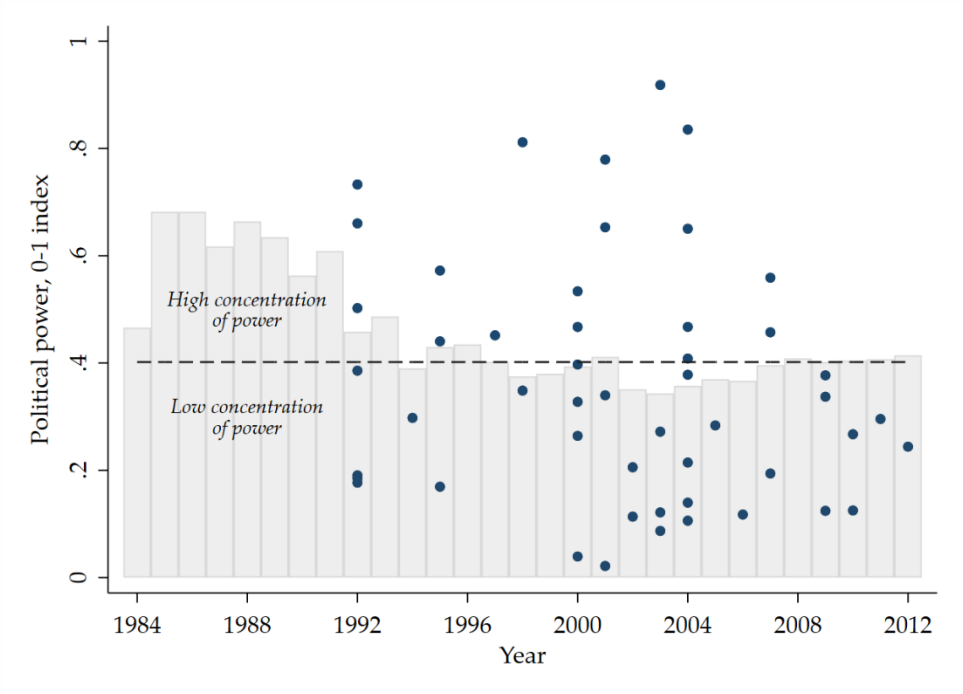
A central theme in the literature on economic reforms is the importance of the political environment. While there is no consensus on the specific effects of political conditions on reforms (see Duval, Furceri and Miethe 2021 for a recent survey), one critical element that consistently emerges as a factor for success is the "use of consultation, communication and mitigating strategies" (IMF 2024, p. 67). In the context of fiscal rules, Kopits and Symansky (1998) highlight the importance of thorough preparation before implementation of the rule. Our next step is therefore to explore how the political environment at the time of implementation influences the results.

We focus on the concentration of political power held by the government at the time of adoption. Powerful governments may find it easier to implement laws, including fiscal rules. However, a higher concentration of power of the government may also reduce the need to build broad-based support for these fiscal rules. Instead, weaker governments may need to rely more on building consensus. While the preparation of fiscal rules in such cases may encounter more resistance, a more thorough, consensus-building approach helps garner broad-based support.

We measure the concentration of power using the margin of seats held by the government in parliament, drawing data from the Database of Political Institutions (DPI) 2020 (Scartascini, Cruz, and Keefer 2021). Similar to our approach for assessing the state of the economy, we normalize the government's seat margin to have a mean of zero and unit

variance at the country level. Next, we construct a binary (0-1) index that captures the degree of political power, based on the normalized seat margin, where lower values indicate less concentrated power and higher values reflect greater concentration.[25] Figure 9 shows that most countries adopted fiscal rules when government power was relatively diffuse, though in 36% of cases, power was more concentrated.

Figure 9: Fiscal rule adoption and the political conditions



Notes: See notes Figure 5. 50 cases of fiscal rule adoption are included. Fiscal rule adoptions of Côte d'Ivoire (2000) and Lithuania (2004) are omitted due to missing observations for the margin of seats held by government. The dashed horizontal line shows the sample median of the political power index. The gray vertical barsshow the annual median of the concentration of political power.

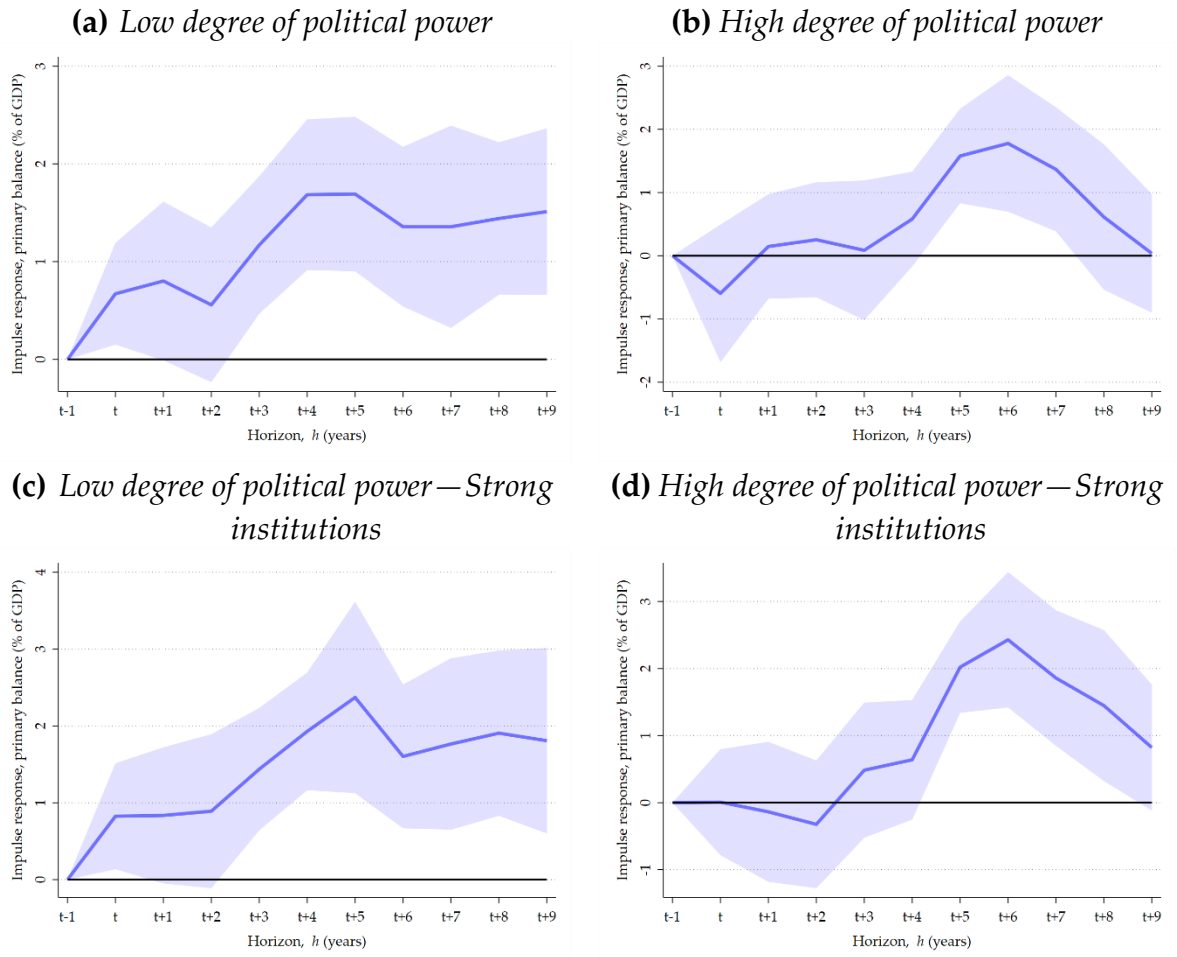
Figure 10 presents the dynamics effects of fiscal rules depending on whether countries are in a low or high state of concentrated political power at adoption time. The figure demonstrates that there are clear differences between the two groups. Panel (a) shows that when fiscal rules are adopted under less concentrated political power, their effect on the primary balance is immediate and gradually strengthens over time, stabilizing around a 1.5% of GDP improvement after six years. This pattern is consistent with the

[25] For countries that always have the full margin of seats held in parliament (e.g., China, Oman, Qatar), we set the index equal to 1. Omitting these countries from the analysis does not change the results.

interpretation that less powerful governments require a more consensus-building approach in the process of adopting fiscal rules, yielding strong and sustainable results.

In contrast, panel (b) illustrates a delayed impact when fiscal rules are introduced under high concentrated political power. Here, fiscal rules only become effective after five years relative to the counterfactual on no rule adoption, peaking at the seven-year mark before quickly losing significance.

Figure 10: Impulse responses conditional on political conditions



Notes: See notes Figure 2. The analysis is based on 108 countries; the number of observations in each regression ranges from 1,744 to 1,755.

The results suggest that in relatively more centralized political environments, fiscal rule adoption may ultimately lack the credibility and political support needed for lasting impact. When we repeat the analysis focusing on cases where strong institutional frameworks are in place, we see no differences relative to the initial outcomes (see panels

(c) and (d) of Figure 10). This indicates that even in the presence of strong institutions, rules adopted in environments with greater political power do not tend to produce sustainable outcomes.

Building consensus supported by conducive political conditions has been central to the successful implementation of fiscal rules and fiscal adjustments. As an example, Jamaica adopted a fiscal rule in 2014 that sought to address the country's chronic fiscal challenges. The fiscal rules were instrumental in helping Jamaica reduce its debt stock from a peak of 144 percent of GDP in 2012 to about 72 percent in 2023. This was possible in part because Jamaica forged partnerships that built and sustained consensus for fiscal adjustment, while credibly monitoring and reporting on the government's adherence to its fiscal rules and the progress of the overall economic reform program (Arslanalp, Eichengreen, and Henry 2024).

6. Robustness analyses

6.1 Nickell bias

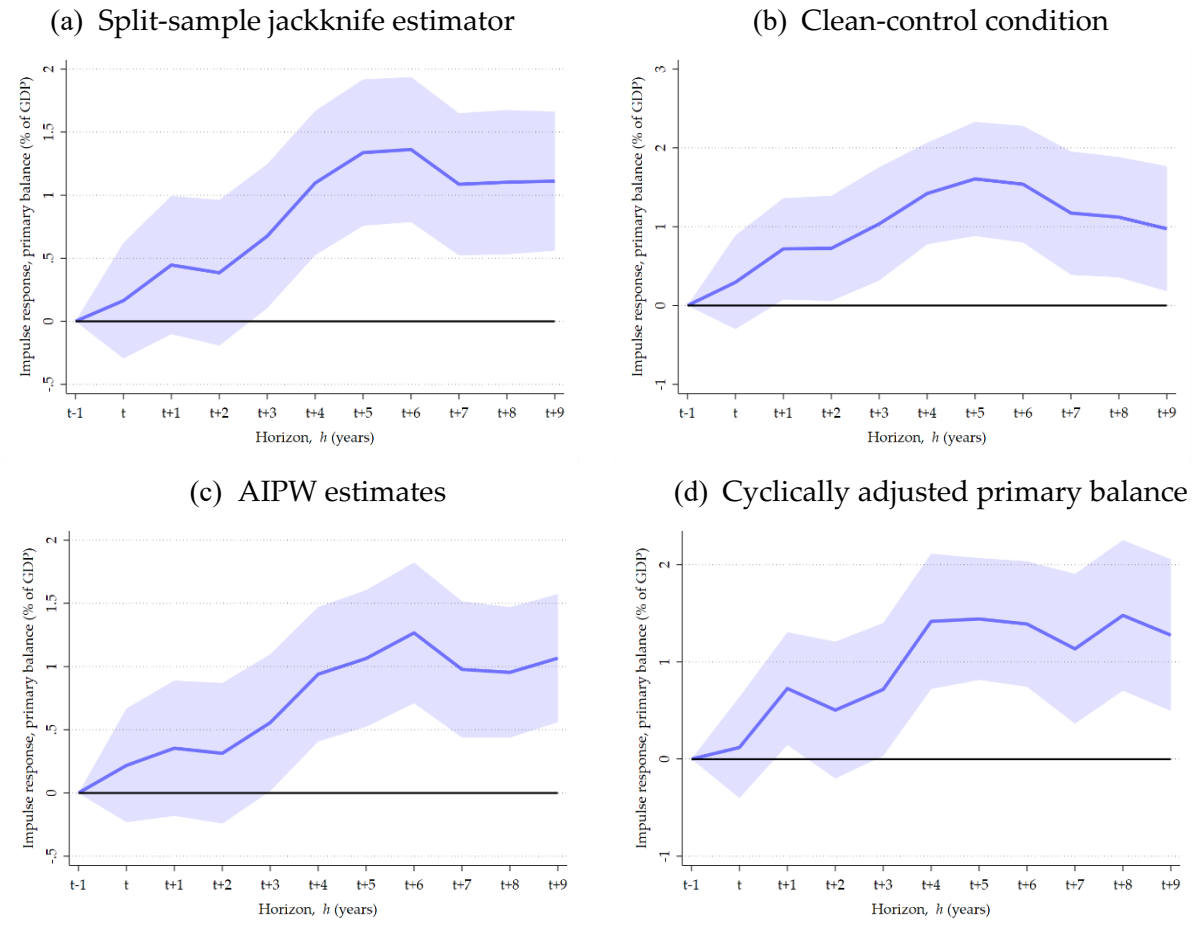
Mei, Sheng, and Shi (2023) demonstrate that the fixed effects estimator in the local projections model may suffer from the presence of the Nickell bias (Nickell 1981), even when lagged dependent variables are omitted from the model. They highlight a consistent pattern of underestimation of the shock's impact in the FE estimator.

To eliminate asymptotic bias and restore standard statistical inference, we use a split-panel jackknife (SPJ) estimator following Dhaene and Jochmans (2015) and Chudik et al., (2018), such that:

$$\hat{\beta}^{(h)spj} = 2\hat{\beta}^{(h)fe} - \frac{\hat{\beta}_a^{(h)fe} + \hat{\beta}_b^{(h)fe}}{2} \quad (4)$$

where $\hat{\beta}^{(h)fe}$, $\hat{\beta}_a^{(h)fe}$, and $\hat{\beta}_b^{(h)fe}$ are the FE estimates from the full sample period, the first half ($t \leq T/2$), and the second half ($t > T/2$), respectively. Panel (a) of Figure 11 shows that when we use the SPJ estimator, the results closely align with those from the baseline. Under the SPJ estimator, the primary balance follows a similar trajectory post-adoption of fiscal rules, converging to a 1.1 percent of GDP improvement after ten years.

Figure 11: Robustness analyses



Notes: See text and notes Figure 2. Across all panels, the regression includes 108 countries. The number of observations varies as follows: panel (a) ranges from 1,807 to 1,817, panel (b) from 1,397 to 1,403, panel (c) from 1,807 to 1,817, and panel (d) from 1,815 to 1,822.

6.2 Clean-control condition

Recent literature on heterogeneous treatment effects indicates that with staggered treatment and treatment effects occurring gradually over time, the standard differences-in-differences event-study design may be flawed (Goodman-Bacon 2021; Callaway and Sant'Anna 2021; Sun and Abraham 2021; Dube et al. 2023). Even under the assumption of parallel trends and no-anticipation effects, treatment effects can be contaminated because previously treated units are used as comparisons for newly treated units as if they were untreated. In our set-up, countries that adopted fiscal rules earlier in the sample (or prior to entering the sample) are included in the control group for countries newly adopting fiscal rules. As a result, the impact of fiscal rule adoption on fiscal performance might be

biased, as the estimator might fail to distinguish dynamic causal effects from time trends in the context of staggered adoption.

Dube et al. (2023) address this issue by resolving dynamic heterogeneous treatment effects within local projections. They introduce a flexible 'clean control' condition to define treated and control units. In this approach, the control group consists of units that never receive the treatment, as well as those that have not yet been treated. By restricting the sample to comparing newly treated units (fiscal rule adoption) with control units (country-year observations without a fiscal rule), we exclude treated observations (countries with established fiscal rules).

In panel (b) of Figure 11, we present the results using the clean control approach.[26] The output reveals a similar impact of fiscal rule adoption on the primary balance. The effect of fiscal rules becomes significant in the second year after adoption, with the primary balance improving by 1.0% of GDP after ten years. Overall, our baseline finding therefore remains robust when restricting the sample to cases of initial fiscal rule adoption and country-year observations without a fiscal rule. However, the clean control restriction becomes less feasible for model analysis when there are too few untreated observations in later stages of the sample period. Our sample suffers from this limitation, particularly for groups such as advanced economies or countries with strong political institutions.

To address this, we modify the clean control condition by assuming that the dynamic effects of fiscal rule adoption stabilize after ten years, consistent with our baseline setup. Under this assumption, all key findings from Sections 4 and 5 remain unchanged. Results are available on request.

6.3 Endogeneity

Endogeneity concerns around fiscal rules are commonly discussed in the literature (Heinemann et al., 2018).[27] As a way of dealing with potential endogeneity of treatments,

[26] Rather than omitting country-year data for fiscal rule adoption between $t + 1$ and $t + h$, as suggested by Dube et al. (2023), we address the impact of future fiscal rule adoption by including leads of fiscal rule adoptions. We prefer this approach because several countries introduced additional rules to their initial set within the projected horizon. The inclusion of leads allows us to capture these changes, whereas simply omitting the h years before fiscal rule adoption would not.

[27] To address endogeneity concerns, the literature often employs instrumental variable (IV) analysis. However, identifying good instruments for fiscal rules is challenging. Some studies have used promising approaches, such as fiscal rule adoption by neighboring countries (Caselli and Reynaud, 2020) or other

Jordà and Taylor (2016) propose a 'doubly robust' estimator, combining inverse probability weighting (IPW) with a regression model to estimate the impulse responses—denoted as augmented inverse probability weighting (AIPW). In the first stage, propensity scores are calculated to estimate the probability of being treated. In the second stage, weights are assigned based on these propensity scores: treated observations are weighted by the inverse of the probability score (w =1/p), while observations without treatment are weighted by the inverse of one minus the probability score (w = 1/(1−p)). This weighting scheme ensures that treated observations with low propensity scores and control observations with high propensity scores are given greater weight in the regression (de Haan and Wiese 2022).

To calculate the propensity scores, we estimate a probit model that assesses the likelihood of having a fiscal rule in place. The model incorporates all control variables specified in Section 3 (results are available on request). The consistency of the estimated average treatment effect requires either the conditional mean model or the propensity score model to be correctly specified (Jordà and Taylor, 2016). Figure A2 in Appendix 1 provides smooth kernel density estimates of the propensity score distribution for treated and control units. The figure shows significant overlap in the estimated probabilities for country-year observations with and without fiscal rules, indicating that the first-stage model is well-specified.

Using the augmented weighting scheme, we estimate the local projections model. Panel (c) of Figure 11 shows that the response of the primary balance under the AIPW estimation is similar compared to the baseline results. Specifically, fiscal rule adoption is associated with an improvement of approximately 1.1 percent of GDP in the primary balance after ten years. This consistency also holds when we re-do the analyses in all subsequent sections, further reinforcing the robustness of our findings (detailed results are available upon request).

6.4 Cyclical effects

The local projections estimator calculates the average response of the primary balance to fiscal rule adoption across all potential future economic trajectories. However, some of

macroeconomic policies in place (Gootjes and de Haan, 2022b). For our analysis, however, these instruments do not adequately capture the precise timing of fiscal rule adoption, which limits their suitability for our purposes (recall that good instruments need to be relevant and valid).

the observed results may be influenced by changes in the denominator (GDP) rather than the numerator (primary balance). This limitation arises because the model does not account for GDP dynamics beyond the time of rule adoption, leaving the trajectory of GDP post-adoption unaccounted for in the analysis (apart from the inclusion of time-fixed effects, which roll over with the projected horizon h).

To address this issue, one way is to use the cyclically adjusted primary balance (CAPB) as the dependent variable. These measures filter out the influence of GDP fluctuations on the primary balance. However, official data on the CAPB is only available for a limited set of countries—primarily advanced economies—and for a shorter time span. Consequently, these measures are not feasible for use in our study.

Alternatively, we can remove cyclical effects by regressing the primary balance on GDP growth.[28] Following Arroyo Marioli, Fatás, and Vasishtha (2024), we estimate the following equation:

$$f_{it} = \alpha + \gamma_i Y_t + \mu_i + v_{it} \quad (5)$$

where f_{it} corresponds to the primary balance and Y_{it} reflects nominal GDP growth. In this regression, the model's linear prediction isolates the part of the primary balance driven by cyclical effects, capturing both automatic stabilizers and governments' discretionary responses to economic fluctuations. Consequently, the residual v_{it} captures the part of the primary balance unrelated to business cycle fluctuations.[29] We derive a measure of the cyclically adjusted primary balance as the residual in equation (5).

Figure 11, panel (d), confirms the robustness of our findings when using the cyclically adjusted primary balance. The results remain largely similar, with the cyclically adjusted primary balance converging to 1.3 percent of GDP improvement after ten years. Furthermore, re-estimating the model while conditioning on the economic context at the time of adoption yields nearly identical results. This suggests that the observed relationship between favorable economic conditions and fiscal rule adoption is not merely driven by cyclical effects that improve the primary balance. Finally, using the

[28] Alternatives for economic activity, such as the output gap, are more difficult to construct and less readily available for a large panel of EMDEs (Arroyo Marioli, Fatás, and Vasishtha, 2024).

[29] "We can think of these decisions as being the result of political decisions (such as changes in tax rates or spending associated with the political cycle) or errors in policy (such as mismeasurement of the output gap)" (Arroyo Marioli, Fatás, and Vasishtha, 2024; p. 762).

structural primary balance as provided in the IMF WEO dataset produces results similar to those obtained for advanced economies or countries with strong political institutions, which is consistent with the limited availability of this measure for countries outside these groups. All results are available upon request.

6.5 Design and intensity of fiscal rules

We have extended our analysis to the potential role of the strength and intensity of fiscal rules. A growing body of research highlights the importance of rule design in promoting fiscal discipline (Guerguil, Mandon, and Tapsoba 2017; Caselli and Reynaud 2020; Gootjes, de Haan, and Jong-A-Pin 2021). Our results indicate that while strongly designed rules typically lead to a sustained improvement in the primary balance, weakly designed rules tent to generate only short-term effects.

However, when we account for the quality of political institutions, we find no significant medium-term differences between weakly and strongly designed fiscal rules. The key distinction lies in the speed of impact: strong rule design accelerates improvements in the primary balance, a desirable outcome. Further tests indicate that neither the number nor type of fiscal rules—whether sustainability-oriented rules (i.e., deficit and debt limits) or operational rules (i.e., expenditure and revenue constraints)—drive these results: Once we control for institutional quality, all findings consistently point in the same direction. Overall, these results emphasize the pivotal role of political institutions in embedding fiscal discipline into government budgets through fiscal rules. For brevity, these additional findings are available upon request.

7. Conclusions

An increasing number of countries have adopted fiscal rules to ensure fiscal sustainability and constrain suboptimal macroeconomic stabilization policies. This trend stems for two factors: rising government debt levels requiring more disciplined fiscal governance frameworks, and the fact that as more countries adopt these rules, they are also becoming the *de facto benchmark* for fiscal policy.

Our paper fills a gap in the literature by exploring how the effects of fiscal rules develop over time and how these effects depend on the conditions under which the rules are adopted. Using a large sample of 108 countries, the results confirm that fiscal rules have positive effects on primary balances, though these effects take time to materialize.

Moreover, we find distinct patterns across different country types. In advanced economies, the medium-term effects of fiscal rules are substantially greater than the short-term effects. In contrast, for EMDEs, we find a positive short- to medium-term impact, but the effects typically diminish as time passes. Ultimately, we show that the strength of institutions, rather than country classification, largely drives the impulse response of fiscal policy to rule adoption.

Examining the conditions under which fiscal rules are adopted, we find two key insights. *First*, we find strong evidence that fiscal rules adopted during prosperous times lead to significant benefits for fiscal policy—i.e., "making hay while the sun shines". Moreover, we find that the fiscal regime a government operates within—characterized by low or high debt environment—does not determine the effectiveness of fiscal rules. However, rules adopted during periods of economic hardship—i.e., "never waste a good crisis"—tend to be less successful. While economic challenges can encourage policymakers and political parties to set aside individual interests for the greater good, these interests often resurface as conditions improve, potentially undermining initial momentum of the rules.

Second, we find evidence that fiscal rules adopted in an environment characterized by greater consensus building are more likely to result in lasting fiscal discipline. While governments with high concentration of power may find it easier to implement laws and change governance structures, they may also feel less compelled to build broad-based support within parliament. In contrast, weaker governments must rely more on consensus-building.

Overall, the results suggest that fiscal rules are more likely to be successful when they are adopted in a supportive environment—characterized by strong institutions favorable economic conditions, and a political landscape more prone to consensus. Such environments foster broad-based political support, allow for careful rule design, and prioritize long-term fiscal discipline over short-term crisis management, ultimately enhancing the credibility and effectiveness of fiscal rules. This insight is straightforward yet ever so crucial: fiscal rules are frequently adopted under conditions that are not conducive to achieving lasting effects.

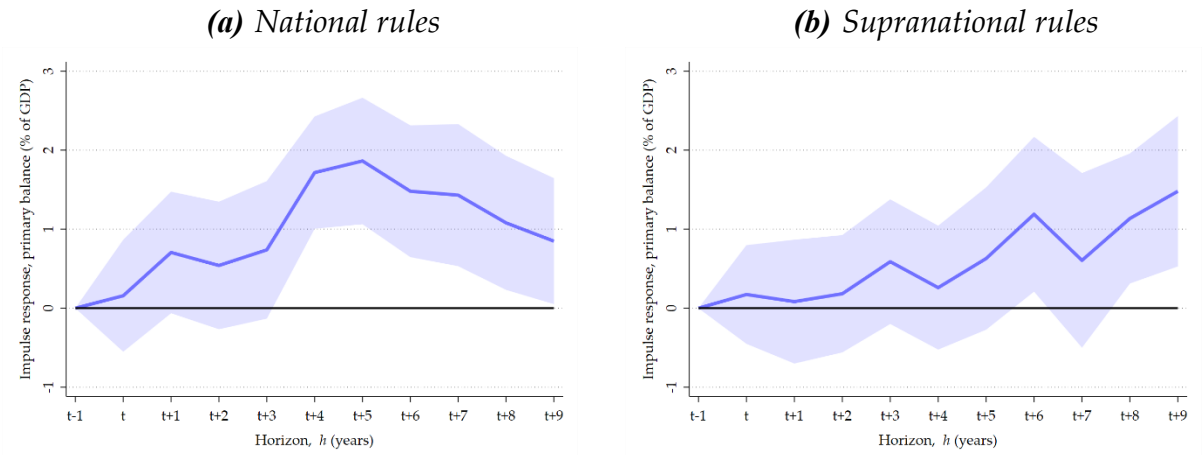
Appendix 1

Table A1: Definition and sources of variables

Variable	Definition	Source
Primary balance	Net lending (+)/borrowing (-) plus net interest payable/paid (interest expense minus interest revenue)	WEO (October 2024), IMF
Fiscal rules	0-1 indicator capturing the presence of a fiscal rule	Fiscal Rules Dataset, IMF
Debt environment	Government debt (% of revenues)	WEO (October 2024), IMF
Real GDP growth	Annual percentages of constant price GDP are year-on-year changes	WEO (October 2024), IMF
Inflation	$\ln(\text{GDP deflator} + \sqrt{(\text{GDP deflator}^2 + 1)})$, where GDP deflator is derived by dividing current price GDP by constant price GDP.	WEO (October 2024), IMF
Current account balance	All transactions other than those in financial and capital items (% of GDP)	WEO (October 2024), IMF
Elections	In an election year, the variable equals $M/12$, where M represents the month of the election, and $(12 - M)/12$ in the preceding year. For all other years, the variable is set to zero. The type of election considered (legislative or executive) depends on the political system in place (presidential, assembly-elected president, or parliamentary).	DPI 2020
Democratic accountability	0-6 indicator assessing how responsive government is to its people, on the basis that the less responsive it is, the more likely it is that the government will fall, peacefully in a democratic society, but possibly violently in a non-democratic one.	ICRG Database
Law and Order	0-6 indicator of the assessment of established law and order in a country. Law and Order are assessed separately, with each sub-component comprising zero to three points. The Law sub-component is an assessment of the strength and impartiality of the legal system, while the Order sub-component is an assessment of popular observance of the law.	ICRG Database

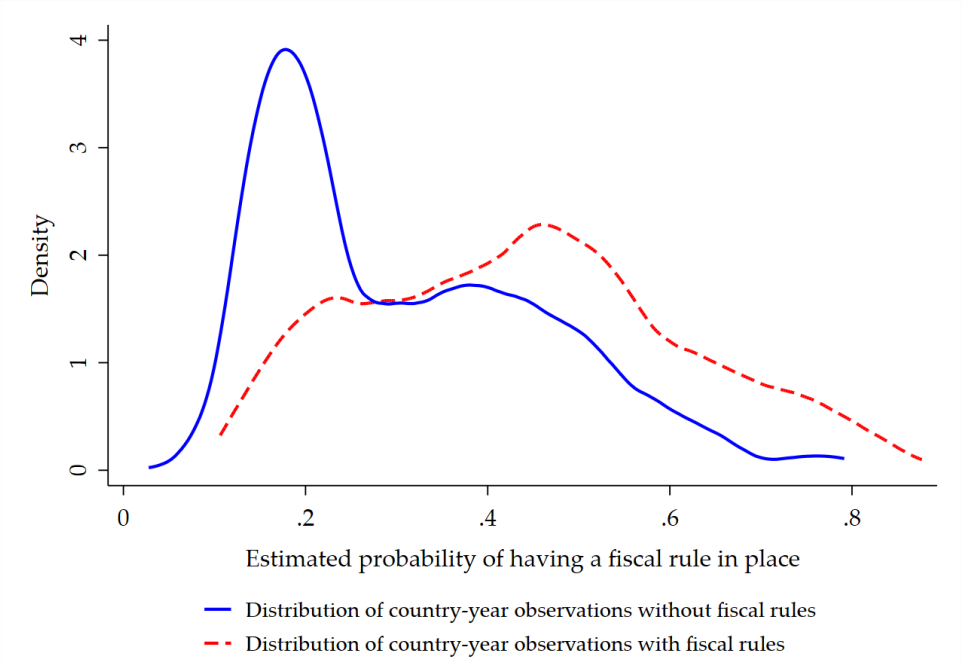
Bureaucracy quality	0-4 indicator capturing the assessment of the institutional strength and quality of the bureaucracy. High points are given to countries where the bureaucracy has the strength and expertise to govern without drastic changes in policy or interruptions in government services.	ICRG Database
Control of corruption	0-6 indicator reflecting the assessment of corruption within the political system. The measure is mostly concerned with actual or potential corruption in the form of excessive patronage, nepotism, job reservations, 'favor-for-favors', secret party funding, and suspiciously close ties between politics and business.	ICRG Database
Independent fiscal councils	0-1 binary indicator that captures the presence of an independent fiscal council.	Fiscal Council Dataset, IMF
Sovereign wealth funds	0-1 binary indicator that captures the presence of a sovereign wealth fund.	Global SWF
Inflation targeting regime	0-1 binary indicator that captures the presence of am inflation targeting regime.	AREAR Dataset, IMF
Exchange rate regime	1-15 indicator of the de facto exchange rate arrangement classification.	Ilzetzki, Reinhart, and Rogoff (2019)
Capital account openness	0-1 index that captures the de jure capital account openness.	Chinn and Ito (2006)
Government debt	All liabilities that require payment or payments of interest and/or principal by the debtor to the creditor at a date or dates in the future (% of GDP)	WEO (October 2024), IMF
Margin of majority	The fraction of seats held by the government. It is calculated by dividing the number of government seats by total seats.	DPI 2020

Figure A1: Impulse responses of primary balances, national vs. supranational rules



Notes: See notes Figure 2. The regression includes 108 countries, and the number of observations ranges from 1,807 to 1,817.

Figure A2: Overlap check: empirical distributions of the treatment propensity score



Notes: See text. Figure shows smooth kernel density estimates for the estimated probability of having a fiscal rule in place (see Table A2).

Appendix 2

We use Principal Component Analysis (PCA) to analyze institutional quality, drawing on four key measures: democratic accountability, bureaucracy quality, control of corruption, and rule of law. These variables are sourced from the International Country Risk Guide (ICRG) dataset for 2021–22, which provides ratings for 140 countries spanning the period 1984 to 2022. The ICRG compiles political, financial, and economic data, converting these into risk scores for each component based on a consistent evaluation framework.

Political risk assessments are derived through qualitative analysis of available information by ICRG staff. The variables, except for bureaucracy quality (which ranges from 0 to 4), are scored on a scale from 0 to 6. Higher scores indicate stronger institutional quality, reflecting less corruption, more robust legal and judicial system, a government more responsive to its citizens, and greater bureaucratic quality.

We take the first principal component—a linear combination of the original variables that accounts for the most variance. This component explains over 70% of the variation in the data (Table B1). All variables contribute positively to the first component (Table B2), meaning higher values of each variable result in a higher predicted score for the component. We interpret this first component as a composite measure of the quality of political institutions.

Table B1: Principal component, eigenvalues

Eigenvalues	Coefficients	Explained variation
Component 1	2.818	0.705
Component 2	0.558	0.139
Component 3	0.335	0.084
Component 4	0.290	0.072

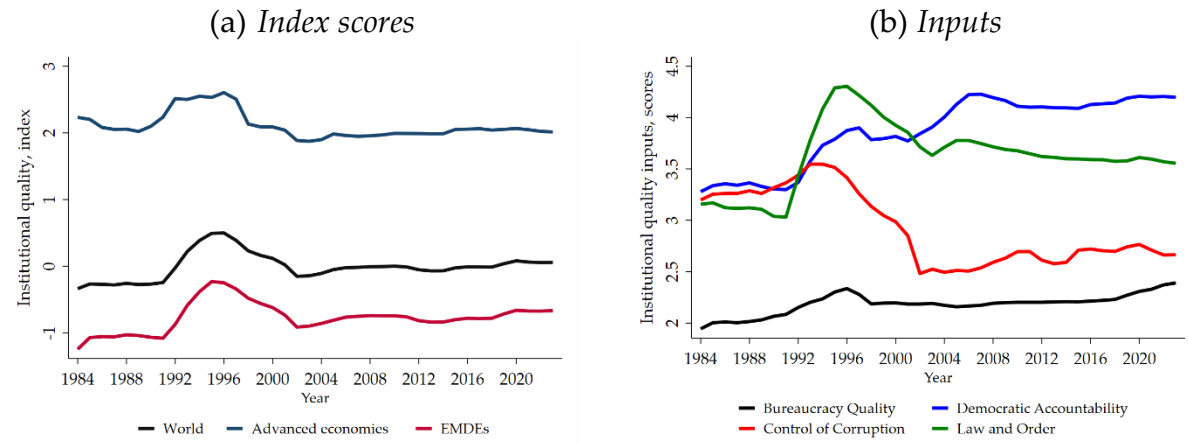
Table B2: Principal component, correlation matrix

Component 1	Coefficients
Bureaucracy quality	.530***
	(.004)
Democratic accountability	.453***
	(.007)
Control of corruption	.513***
	(0.005)
Rule of law	.500***
	(0.005)

The institutional quality measure ranges from -4.15 (Liberia, 1991–92) to 3.47, achieved by several advanced economies, including Canada (1985–2000), Denmark (1984–2000; 2021–23), Finland (1984–1995; 1998–2011), France (1992–93), Iceland (1984–2000), Luxembourg (1986–1996), the Netherlands (1984–2000), New Zealand (1984–1995), Norway (1984; 1995), Sweden (1984–2000), and Switzerland (1984–1995).

Figure B1, panel (a), illustrates a general improvement in institutional quality worldwide between 1984 and 2023, particularly in EMDEs. A notable bump in the 1990s stands out across both AEs and EMDEs. Panel (b) highlights that this bump was largely driven by a spike in the scores for control of corruption and law and order, which declined in later decades. These setbacks were only partially offset by improvements in bureaucracy quality and democratic accountability in the following decades.

Figure B1: Institutional quality



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