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The effects of fiscal rules on financial
crisis: Evidence from advanced and
developing countries.

Anastasios Pappas
Christos Chrysanthakopoulos

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Anastasios Pappas¹, Christos Chrysanthakopoulos²

Abstract

Using a panel of 73 advanced and developing countries from 1990 to 2021, this paper investigates the effect of fiscal rules on the probability of a financial crisis outbreak. We find that fiscal rules and in particular debt and budget balance rules increase the probability of a financial crisis possible due to prioritizing short-term fiscal stability over the medium-term investment. This can weaken economic resilience, reduce future productive capacity, and make the economy more susceptible to external shocks or financial instability. We further examine whether fiscal rules constrain fiscal stabilization capacity by analyzing their medium-term impact on public consumption and investment using local projection methods. Our findings show that fiscal rules significantly exacerbate the negative impact on public consumption and investment, with the effects being more pronounced in the latter. This suggests that fiscal rules may deepen crisis dynamics by preventing countercyclical fiscal responses. Our findings remain valid after conducting various robustness checks.

JEL:

Keywords: Fiscal rules; Financial crisis; Public investment; Public consumption

¹ Hellenic Fiscal Council, 11 Amerikis str. Athens, 10672, Greece, tel. +30 211 1039630, e-mail: pappas@hfisc.gr, www.hfisc.gr

² University of Patras Rio Campus, 26504 Patras, cchrysanthakopoulos@ac.upatras.gr; Centre of Planning & Economic Research, Amerikis 11, Athens 10672, tel: 210-3676400

1 Introduction

Fiscal rules have been at the forefront of economic and political discourse in recent years, serving as a cornerstone of fiscal policy in many economies. Their importance has increased in the aftermath of the 2008 Global Financial Crisis (GFC) and the subsequent sovereign debt crisis in the euro area, events that compelled many countries to strengthen their fiscal frameworks.

Empirical evidence has shown that fiscal rules are associated with several advantages. Among these, fiscal rules are linked to the mitigation of deficit and debt bias by improving fiscal performance (Debrun et al., 2008; Tapsoba, 2012; Nerlich and Reuter, 2013; Maltritz and Wüste, 2015; Guerguil et al., 2017; Caselli and Reynaud, 2020). They also contribute to the reduction of sovereign risk premia by enhancing investor confidence and reducing the perceived risk of default (Iara and Wolff, 2014; Heinemann et al., 2014; Thornton and Vasilakis, 2018; Afonso and Jalles, 2019; Sawadogo, 2020). Moreover, there are evidence that they enhance macroeconomic performance (Afonso and Jalles, 2013; Badinger and Reuter, 2017; Combes et al., 2018; Chmura, 2023), leading to higher economic growth, lower output volatility, and lower inflation.

An area that remains substantially underexplored in the discourse on fiscal rules is their association with financial crises. Financial crises have become a prevalent phenomenon, particularly over the last four decades (Diaz-Alejandro, 1985; Dornbusch and Fischer, 2003; Chari and Kehoe, 2003) coinciding with the progression of financial liberalization and economic globalization. Concerning the nexus between fiscal rules and the outbreak of crises, one perspective posits that fiscal rules mitigate the likelihood of financial crises by maintaining the soundness of public finances, thereby shielding

the economy from exogenous shocks. Conversely, the presence of fiscal rules may exacerbate the risk of a crisis by constraining the capacity of fiscal policy to function as a stabilizing mechanism for the economy—such as by propelling public investment and public consumption when necessary due to business cycle fluctuations.

In this paper, we investigate whether the existence of fiscal rules increases or decreases the likelihood of a financial crisis outbreak, using a sample of 73 countries over the period from 1990 to 2021. To the best of our knowledge, this is the first time this subject has been examined. The crises considered in this study include the European Exchange Rate Mechanism crisis of 1992-1993, the Asian Financial Crisis of 1997-1998, the Global Financial Crisis of 2007-2008, the European Economic Crisis of 2009-2014 and the COVID-19 pandemic crisis of 2020. Our findings indicate that the presence of fiscal rules and in particular debt and budget balance rules, exacerbate the likelihood of a crisis occurring, which is primarily attributed to developing vis-à-vis advanced economies. A possible explanation is that fiscal rules prioritize short-term fiscal stability over medium-term investment and consumption. Thus, we verify this hypothesis, concluding that fiscal rules, and in particular debt and budget balanced rules reduce public consumption and investment over the medium-term. Our findings remain robust after conducting several robustness checks, including the use of alternative estimators (such as IV and AIPW), and after examining the baseline results under different states of nature of an economy.

The remainder of this paper is organized as follows: Section 2 presents a review of the literature. Section 3 provides an overview of the variables, data, econometric methodology and the robustness checks employed in this study. Section 4 presents the empirical findings derived from both the baseline model and a series of rigorous

robustness tests, while Section 5 investigates the medium-term effects of fiscal rules on public consumption and investment. Finally, Section 6 concludes.

2 Literature Review: Background and empirical evidence.

2.1 The Stabilizing Role of Fiscal Policy

Fiscal policy has traditionally served as a key stabilization tool, particularly during economic downturns and financial crises. Both theoretical and empirical evidence consistently underscore its critical role in stabilising economies. While literature extensively examines how fiscal policy can counteract financial crises, there is a notable gap in exploring the potential mechanisms through which fiscal rules (which designed to enforce fiscal discipline) might influence the likelihood of financial crises. This literature review aims to explore these mechanisms, focusing on how fiscal rules may limit the effectiveness of fiscal policy as a stabilization tool or, in some cases, force it to act in a pro-cyclical manner. By doing so, we seek to highlight the ways in which fiscal rules could inadvertently increase the probability of financial crisis occurrence.

The importance of fiscal policy as a stabilisation mechanism has been widely supported by both theoretical and empirical studies. Setterfield (2007) revitalizes the discussion of fiscal policy's stabilization role, challenging its marginalization in New Consensus macroeconomics. His proposed policy framework - which operationalizes the Public Sector Borrowing Requirement (PSBR) through a rule analogous to the Taylor rule (dubbed the "pseudo-Taylor principle") - demonstrates fiscal policy's comparable, if not superior, stabilization effectiveness relative to monetary policy. Similarly, Fatas and Mihov (2009) and Arestis (2012) provide extensive empirical evidence supporting the effectiveness of fiscal policy as a macroeconomic stabilisation tool. They argue that

the fiscal cost of failing to stabilize the economy is likely to be much higher than the cost of running a deficit that accelerates the recovery.

Empirical and theoretical studies have also demonstrated the effectiveness of fiscal policy in specific crisis episodes. Baldacci et al. (2009) examine the fiscal policy responses to 118 systemic banking crises across advanced and emerging market economies between 1980 and 2008. They find that timely countercyclical fiscal policy measures, significantly contribute to shortening the duration of crises by stimulating aggregate demand. Similarly, Blanchard et al. (2009) conclude, from a review of several crisis case studies, that fiscal stimulus is particularly effective when financial crises spill over to the corporate and household sectors. In the context of the European Union crisis (2010-14), Kollmann et al. (2013) employed a New Keynesian model to show that fiscal support for banks was an effective tool for stabilising output, consumption, and physical investment. They also found that the substantial increase in government purchases during the crisis played a key role in stabilising GDP. The need for aggressive macroeconomic stimulus during economic downturns has gained renewed emphasis in recent research. Cerra et al. (2023), highlight the lingering effects of the Global Financial Crisis (2007-08) and the potential long-term effects of the COVID-19 pandemic. These events underscore the necessity of active fiscal and monetary policies to avoid permanent economic scars.

2.2 Fiscal Rules' Constraint on Public Investment and Consumption

Given the critical role of active fiscal policy in mitigating financial crises, a potential explanation for the link between fiscal rules and a higher likelihood of crisis occurrence lies in the constraints these rules may impose on fiscal stabilization. Specifically, depending on their stringency and inflexibility, fiscal rules could limit the capacity of

governments to implement countercyclical measures during economic downturns, potentially exacerbating the risk of crises. By reducing public consumption and/or public investment, fiscal rules may inadvertently play a detrimental role in crisis scenarios. If designed in a rigid or overly restrictive manner, such rules could hinder timely and effective fiscal responses, thereby amplifying economic instability.

Empirical evidence supports the notion that fiscal rules can negatively impact public consumption and investment, which may, in turn, exacerbate crises. For instance, Nerlich and Reuter (2013) analyze a panel of all the EU countries from 1990 to 2012 and find that balanced budget rules, particularly when they are enshrined in law or constitution, significantly reduce government investment. Similarly, Arezki and Ismail (2013) examine public investment in 32 oil-exporting countries between 1992 and 2009, concluding that fiscal rules exacerbate the decline in public investment during periods of low oil prices. Wijsman and Crombez (2021), in their analysis of European economies from 1997 to 2016, also find that fiscal rules tend to decrease public investment. Furthermore, Dahan and Strawczynski (2010), using a sample of OECD countries, demonstrate that fiscal rules not only reduce total government expenditures but also alter the composition of spending, particularly by decreasing the ratio of social transfers to government consumption. Vinturis (2023), analyzing a large panel of 185 countries from 1985 to 2015, finds that fiscal rules reduce total spending and public consumption.

2.3 Fiscal Rules and Pro-Cyclical Fiscal Policy

Fiscal rules are often criticized for compelling governments to adopt pro-cyclical fiscal consolidation measures during economic downturns, thereby exacerbating business cycle fluctuations. This pro-cyclicality can amplify the likelihood of crises and dampen

economic recovery. The potential for fiscal rules to induce pro-cyclical behavior is not a new concern. In Europe, for instance, such concerns were raised as early as the adoption of the Maastricht Treaty in 1992. A key issue was that the fiscal constraints imposed by the Maastricht Treaty and the subsequent Stability and Growth Pact could limit the ability of national governments to pursue stabilizing fiscal policies, a role they had traditionally played (Gali and Perotti, 2003). However, while Gali and Perotti (2003) did not find strong evidence to support this concern, subsequent empirical studies have provided evidence that fiscal rules can indeed lead to pro-cyclical fiscal behavior. For example, Canelon et al. (2010) found that discretionary fiscal policy in the EU remained pro-cyclical after 1992, when fiscal rules were established under the Maastricht Treaty. Similarly, Darvas et al. (2018) observed that European fiscal policy has exhibited pro-cyclical tendencies, both before and after the 2008 GFC. They noted that pro-cyclical fiscal tightening after 2010 likely prolonged the recession and increased unemployment across the EU. Kuusi (2017), using data from the Finnish economy for the period 1984–2014, found that the structural budget balance, which relies on the European Commission’s output gap estimates, tends to push fiscal policy onto a pro-cyclical path.

Further evidence comes from Jalles (2018), who analyzed data from 60 countries between 1980 and 2014 and found that fiscal rules reduce the degree of fiscal counter-cyclicity, particularly in developed economies with debt-related rules. Bausch (2019) highlighted that fiscal policy pro-cyclicity in developing countries is influenced by a lack of social capital, with this relationship partially mediated by the adoption of fiscal rules and the extent of corruption. Lim (2020) also found that fiscal rules tend to amplify rather than mitigate pro-cyclicity. Chrysanthakopoulos and Tagkalakis (2023a), using a panel of 52 countries over the period 1985–2019, demonstrated that

budget balance and revenue rules increase the cyclicalities of tax policy. Capraru et al. (2025), while not focusing exclusively on the link between fiscal rules and pro-cyclicality, concluded that the EU fiscal framework up to 2023 has fostered pro-cyclical fiscal behavior. Similarly, Carnazza (2023), using a panel of 19 euro area countries from 1995 to 2019, found strong evidence of pro-cyclical fiscal policy in the euro area. This pro-cyclicality was not significantly influenced by political variables but was instead shaped by fiscal rules, which constrained governments' ability to implement counter-cyclical measures. The study findings suggest that the observed pro-cyclicality in fiscal policy is primarily attributable to the design and implementation of fiscal rules rather than to macroeconomic fundamentals, institutional factors, or political variables.

3 Data and Methodology

3.1 Data

Using an annual unbalanced dataset for 73 advanced and developing countries from 1990 to 2021,³ we examine whether fiscal rules elevate the probability of a country experiencing an economic crisis. The macroeconomics variables are taken from the IMF World Economic Outlook database (vintage October 2024) and the World Bank, while data for the exchange rate regime are obtained from Reinhart et al. (2004) and Ilzetzi et al. (2019; 2022). Table 1 presents the summary statistics of the variables employed in our analysis.

³ List of countries: Algeria, Armenia, Australia, Austria, Bahrain, Belgium, Belize, Bolivia, Brazil, Bulgaria, Cameroon, Canada, Chile, China, Colombia, Costa Rica, Côte d'Ivoire, Croatia, Cyprus, Czech Republic, Denmark, Dominica, Dominican Republic, Equatorial Guinea, Fiji, Finland, France, Gabon, Georgia, Germany, Greece, Hong Kong, Hungary, Iceland, Iran, Ireland, Israel, Italy, Japan, Korea, Latvia, Lesotho, Luxembourg, North Macedonia, Malaysia, Malta, Mexico, Moldova, Netherlands, New Zealand, Nicaragua, Norway, Pakistan, Paraguay, Philippines, Poland, Portugal, Romania, Russian Federation, Sierra Leone, Slovak Republic, South Africa, Spain, Sweden, Switzerland, Togo, Tunisia, Uganda, Ukraine, United Kingdom, United States, Uruguay and Zambia.

Our dependent variable is a dummy variable that takes the value of 1 in the presence of an economic crisis, and 0 otherwise. Specifically, for the period under examination, the dummy variable "Crisis" takes the value of 1 for the years 1992 and 1993, corresponding to the European Exchange Rate Mechanism crisis; for the years 1997 and 1998, due to the Asian financial crisis; for the years 2007-2008, due to the Global Financial Crisis; for the years 2009-2014, corresponding to the subsequent debt crisis in the Eurozone; and finally, for 2020, reflecting the COVID-19 pandemic crisis and the suspension of economic activities to limit the spread of the virus.

Turning to the variables of interest, i.e. fiscal rules and their specific categories, the data are taken from Davoodi et al. (2022). Thus, we construct a dummy variable that takes the value of 1 if a country has any fiscal rule in place (i.e. spending, revenue, debt and budget balance rule), and 0 otherwise. Furthermore, we create four additional dummy variables to indicate the presence of a spending rule, a revenue rule, a debt rule, and a balanced budget rule. Fiscal rules are legally binding constraints to regulate fiscal policy, primarily focusing on the management of public finances, including government spending, revenue, and budget deficits that are always perceived as numerical constraints on the budget (Debrun et al., 2008). These rules are designed to ensure fiscal discipline, promote long-term economic stability, to ensure the sustainability of public debt and to support the initiation and success of fiscal consolidation programs (Milesi-Ferretti, 2004; Bergman et al., 2016; De Jong and Gilbert, 2020; Chrysanthakopoulos and Tagkalakis, 2023b; 2024).

Table 1. Summary statistics.

VARIABLES	(1) N	(2) mean	(3) sd	(4) min	(5) max
Real effective exchange rate	2,298	4.588	0.193	3.497	5.692
Flexible regime	2,183	0.234	0.588	0	1
Inflation	2,305	32.04	412.5	-32.14	15.444
Debt-to-GDP	2,014	55.51	34.99	0.0520	261.0

Real GDP growth	2,288	3.106	6.044	-30.90	148.0
Trade openness	2,260	85.97	57.10	15.16	442.6
Crisis	2,336	0.406	0.491	0	1
Fiscal rule	2,336	0.519	0.500	0	1
Expenditure rule	2,336	0.232	0.422	0	1
Revenue rule	2,336	0.0612	0.240	0	1
Budget balance rule	2,336	0.502	0.500	0	1
Debt rule	2,336	0.375	0.484	0	1
Public consumption as % of GDP	2,226	16.666	5.248	0.627	43.482
Public investment as % of GDP	2,186	4.142	2.976	0	23.324

Notes: This table presents the summary statistics of the variables used in analysis.

3.2 Methodology

Following Wiese et al. (2018) and Chrysanthakopoulos and Tagkalakis (2023b), we use a random effects panel probit model to estimate whether fiscal rules elevate the probability of a country experiencing an economic crisis. Following Afonso et al. (2022), we examine each fiscal rule one at a time. Hence, the specification is of the form:

$$Pr(Crisis = 1) = a_1 realGDP\ growth_{it-1} + a_2 debt_{it-1} + a_3 trade\ openness_{it-1} + a_4 inflation_{it-1} + a_5 reer_{it-1} + a_6 flexible_{it-1} + a_7 FR_{it} + u_{it} \quad (1)$$

In equation (1), as control variables we include the first lag of the real GDP growth to capture initial macroeconomic conditions (Kaminsky and Reinhart, 1999), the first lag of the debt to GDP ratio to capture initial fiscal conditions (Reinhart and Rogoff, 2009), the first lag of the trade openness to capture the degree of a country's exposure to global markets and its vulnerability to external shocks (Frankel and Rose, 1996; Kaminsky and Reinhart, 1999), the first lag of the inflation rate (based on GDP deflator), since high rate of inflation is often associated with macroeconomic instability and can contribute to the onset of an economic crisis (Fischer, 1993), the first lag of the real effective change rate and the first lag of a dummy variable equal to one when a country

operates under a flexible exchange regime to control for vulnerabilities related to external competitiveness and external shocks. As mentioned above, the variable of interest is FR_{it} , which represents the fiscal rules dummy variable, and its' categories (i.e., spending, revenue, debt and budget balance rules). In all of our regressions, we calculate the marginal effects evaluated at the mean of all regressors. These marginal effects are computed using the Delta method.

3.3 Robustness checks

A potential concern arises from the possibility of endogeneity between the fiscal rules dummy variable and the crisis variable. Specifically, for the reliability of our findings, we must address potential concerns regarding whether fiscal rules lead to crises, or if, conversely, countries establish fiscal rules following economic crises in order to implement mechanisms that monitor and impose limits on budget indicators. To this end, we re-estimate equation (1) with three alternative estimators. First, we use a panel probit model with IV instruments, in order to address potential endogeneity issues of between fiscal rules and crises. Hence, we instrument the fiscal rules dummy variables with the first lag of fiscal rules dummy variables and the change in government effectiveness index. Second, we use heteroscedasticity probit models, to address heteroskedasticity, which can lead to biased and inconsistent parameter estimates and inaccurate standard errors (Ziogas and Panagiotidis, 2021; Chrysanthakopoulos and Tagkalakis, 2023b). Third, we employ a doubly robust estimator, i.e. the augmented inverse propensity-score weighted regression adjustment method as in Jordà and Taylor (2016). This technique employs a two-step procedure. In the first step, a probit model is used to estimate the probability of introducing a fiscal rule which is a function of the first, second and third lag of real GDP growth, the first lag of the fiscal rules dummy variable, and the first lag of the government effectiveness index. In the second stage,

we estimate the average treatment effect of fiscal rules on the probability of a country experiencing an economic crisis.⁴

4 Results

4.1 Baseline findings

Table 2 presents the empirical estimates for equation (1). The estimated coefficients for the control variables are as expected. In more detail, improved economic conditions, i.e. an increase in real GDP growth, decrease the probability of a crisis. When the economy grows, businesses and households generally experience higher incomes, which often result in increased government tax revenues. This in turn, enhances debt sustainability and reduces the likelihood of financial distress that could trigger a crisis (Reinhart and Rogoff, 2009). An increase in the debt to GDP ratio is associated with a decreased probability of a crisis. This is likely due to the fact that an increase in debt, which may lead to fiscal imbalances, will prompt the economy to undergo fiscal adjustments to maintain market credibility and avoid difficulties in external borrowing (Chrysanthakopoulos and Tagkalakis, 2023b). Consequently, this correction in fiscal positions reduces the likelihood of the economy entering a crisis. As anticipated, an increase in trade openness increases the likelihood of a crisis, since more open economies are exposed to external shocks (Kaminsky and Reinhart, 2000). Increased inflation rate is found to be positively associated with the probability of a crisis, but the coefficient is insignificant in the most cases (except in column 1 of Table 2). Higher

⁴ In the first stage the probability of each treatment level is estimated as a function of all relevant observable covariates. These estimated probabilities are then applied to reweight the observations relative to the control group in the second stage. In the second stage, the average treatment effect is estimated by taking into account the reweighted observations (see Jordà and Taylor, 2016).

inflation could lead to a financial crisis by eroding purchasing power and increasing uncertainty, which can destabilize the economy (Kaminsky and Reinhart, 1999). An increase in the real exchange rate raises the likelihood of a crisis, although in most cases the coefficient estimates are statistically insignificant (except in columns 1 and 5 of Table 2). That is due to the fact that an increase in the real effective exchange rate can lead to a financial crisis by reducing export competitiveness and creating trade imbalances, which can strain the economy (Eichengreen and Hausmann, 1999).

Turning to the variables of interest, we find that fiscal rules and primarily debt and budget balance rules increase the probability of a crisis (see columns 1, 4, 5 of Table 2). A possible explanation is that fiscal rules, and in particular debt and budget balance rules, may constrain public investment and lead to an overemphasis on immediate fiscal balance. This could result in underinvestment while prioritizing short-term fiscal stability (Arezki and Ismail, 2013; Nerlich and Reuter, 2013). In addition, fiscal rules may lead to increased public consumption cuts during periods of economic stress, further weakening economic resilience and contributing to a higher likelihood of a crisis. This constrains in public investment of productive sectors can reduce future economic capacity, making the economy more vulnerable to external shocks or financial instability (Vinturis, 2023).

Table 2. Determinants on the probability of a crisis.

VARIABLES	(1)	(2)	(3)	(4)	(5)
Real GDP growth (t-1)	-0.0128*** (0.00457)	-0.0135*** (0.00447)	-0.0134*** (0.00447)	-0.0129*** (0.00451)	-0.0132*** (0.00453)
Debt-to-GDP (t-1)	-0.00160*** (0.000472)	-0.00153*** (0.000492)	-0.00148*** (0.000475)	-0.00160*** (0.000519)	-0.00156*** (0.000471)
Trade openness (t-1)	0.000267 (0.000186)	0.000334* (0.000175)	0.000374** (0.000174)	0.000300* (0.000176)	0.000300* (0.000180)
Inflation (t-1)	0.00278* (0.00165)	0.00138 (0.00153)	0.00125 (0.00148)	0.00213 (0.00159)	0.00216 (0.00163)
Real effective exchange rate (t-1)	0.00197* (0.00114)	0.00175 (0.00112)	0.00174 (0.00112)	0.00183 (0.00115)	0.00188* (0.00114)

Flexible regime (t-1)	0.00694 (0.0285)	0.0153 (0.0276)	0.0189 (0.0269)	0.0328 (0.0284)	0.0143 (0.0275)
Fiscal rule (t)	0.0727*** (0.0233)				
Expenditure rule (t)		0.0174 (0.0211)			
Revenue rule (t)			0.0386 (0.0371)		
Debt rule (t)				0.0556** (0.0220)	
Budget balance rule (t)					0.0434** (0.0208)
Log pseudolikelihood	-1216.18	-1219.96	-1219.78	-1217.79	-1218.72
Wald χ^2	33.17***	29.96***	31.43***	27.73***	30.18***
Observations	1,804	1,804	1,804	1,804	1,804

Notes: Estimator: panel probit with random effects. Dependent variable: Crisis dummy variable. For each independent variable we report dF/dX, i.e., the regressor's marginal effect of a one-unit change (evaluated at the means of all regressors). Robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1.

4.2 Robustness

Our analysis must first address endogeneity concerns, particularly the possibility of reverse causality between fiscal rules and financial crises. A critical methodological challenge lies in determining whether: the adoption of fiscal rules (particularly numerical limits on fiscal variables) increases crisis susceptibility, or crisis-prone economies are more likely to implement such rules as ex-post stabilization measures. This identification problem fundamentally affects the interpretation of our baseline results. To this end, we re-estimate equation (1) with three alternative estimators. Following Ziogas and Panagiotidis (2021) and Chrysanthakopoulos and Tagkalakis (2023b), a heteroskedasticity probit model is employed to address heteroscedasticity, which may lead to biased and inconsistent coefficient estimates, and inaccurate standard errors.⁵ Next, to address the potential endogeneity and reverse causality issues between the introduction of fiscal rules and the crisis dummy variable, we employ a probit model with instrumental variables (IV). We instrument the fiscal rules dummy

⁵ The estimations are presented in the supplementary material, Appendix A, Table A1.

variables with the first lag of the fiscal rules dummy variables and the first lag of the change in government effectiveness index (see Table 3). Finally, following Jordà and Taylor (2016), we employ the doubly-robust estimator, i.e. the augmented inverse propensity-score weighted regression adjustment method, which offers several advantages as described in sub-section 3.3.⁶ Our baseline findings as described in sub-section 4.1 are fully confirmed.

Table 3. Determinants on the probability of a crisis. With IV estimator.

VARIABLES	(1)	(2)	(3)	(4)	(5)
Real GDP growth (t-1)	-0.0299*** (0.00974)	-0.0333*** (0.00973)	-0.0323*** (0.00974)	-0.0310*** (0.00973)	-0.0306*** (0.00969)
Debt-to-GDP (t-1)	-0.00377*** (0.00105)	-0.00342*** (0.00106)	-0.00344*** (0.00104)	-0.00376*** (0.00106)	-0.00369*** (0.00104)
Trade openness (t-1)	0.000782 (0.000609)	0.00111* (0.000612)	0.00113* (0.000605)	0.000914 (0.000602)	0.000774 (0.000609)
Inflation (t-1)	0.0100* (0.00587)	0.00363 (0.00563)	0.00453 (0.00553)	0.00713 (0.00576)	0.00961 (0.00589)
Real effective exchange rate (t-1)	1.104*** (0.255)	1.007*** (0.252)	1.030*** (0.252)	1.048*** (0.255)	1.116*** (0.257)
Flexible regime (t-1)	0.0575 (0.0864)	0.0941 (0.0863)	0.0914 (0.0856)	0.135 (0.0884)	0.0781 (0.0855)
Fiscal rule (t)	0.241*** (0.0762)				
Expenditure rule (t)		-0.0319 (0.0820)			
Revenue rule (t)			0.130 (0.123)		
Debt rule (t)				0.152** (0.0732)	
Budget balance rule (t)					0.213*** (0.0746)
Log pseudolikelihood	-1057.51	-1058.18	-1062.18	-1060.58	-1055.84
Wald χ^2	54.56***	44.19***	45.15***	47.15***	52.21***
Observations	1,584	1,584	1,584	1,584	1,584

Notes: Estimator: Probit model with instrumental variables (IV). Dependent variable: Crisis dummy variable. Instrumented variable: Fiscal rule dummy variable. Instruments: the first lag of fiscal rules dummy and the first lag of the change in government effectiveness index. For each independent variable we report dF/dX, i.e., the regressor's marginal effect of a one-unit change (evaluated at the means of all regressors). Robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1.

⁶ The estimations are presented in the supplementary material, Appendix A, Table A2.

Second, we examine the effect of fiscal rules on the probability of a crisis under different states of nature of an economy and assess whether our findings are driven by distinction between advanced and developing economies. Hence, we re-estimate equation (1) by splitting our sample into advanced and developing economies, countries with fixed versus flexible exchange rate regimes, and countries with high versus low government effectiveness. This classification allows us to assess whether the effects of fiscal rules on crisis probability vary based on a country's level of economic development, exchange rate policy, and institutional quality, all of which influence fiscal policy effectiveness and economic resilience (Frankel et al., 2013; Ilzetzki et al., 2013).

We find that our baseline findings are primarily attributed to developing countries, to countries with fixed vis-à-vis flexible exchange regimes, while the effects are more pronounced in countries with low vis-à-vis high government effectiveness. Limited fiscal policy flexibility and weaker institutions can amplify vulnerabilities, while stronger institutions may mitigate such risks (see supplementary material, Appendix B, Tables B1-B6).

5 Do fiscal rules constrain or support public consumption and investment over the medium-term?

5.1 Framework

We have seen so far that fiscal rules and primarily debt and budget balance rules increase the probability of a crisis; a plausible explanation lies in their restrictive and pro-cyclical effects on public consumption and investment.⁷ These constraints may

⁷ Data on public consumption are obtained from the World Bank (series: general government final consumption as % of GDP), while data on public investment are obtained from the IMF Investment and Capital Stock Dataset.

weaken economic resilience by limiting countercyclical fiscal responses and reducing long-term growth potential. Thus, it would be beneficial to examine this hypothesis, particularly over a medium-term horizon, since short-term analysis may overlook the gradual impact of constrained public spending on economic stability. A medium-term perspective allows us to assess whether fiscal rules create structural weaknesses that heighten crisis risks over time, rather than merely reflecting immediate fiscal adjustments.

Hence, following Auerbach and Gorodnichenko (2012) and Chrysanthakopoulos and Tagkalakis (2024), we employ panel local projections⁸ method as pioneered by Jordà (2005) to examine the medium-term effects of fiscal rules on public consumption and investment. Therefore, we estimate:

$$cons_{it+h} - cons_{it-1} = a^h + a_1^h X_{it-1} + a_2^h FR_{it} + \eta_{i+h} + \lambda_{t+h} + \varepsilon_{it+h} \quad (2)$$

$$inv_{it+h} - inv_{it-1} = a^h + a_1^h X_{it-1} + a_2^h FR_{it} + \eta_{i+h} + \lambda_{t+h} + \varepsilon_{it+h} \quad (3)$$

The dependent variables $cons_{it+h} - cons_{it-1}$ and $inv_{it+h} - inv_{it-1}$ are the cumulative change in the public consumption as % of GDP and in the public investment as % of GDP respectively. The forecast horizon h takes values from 0 up to 5 years ahead. a^h is a vector of constants, η_{i+h} are country effects to account for unobserved heterogeneity between countries, λ_{t+h} are time effects to capture global shocks and ε_{it+h} is the error-term. X_{it-1} is a vector of control variables that includes the first lag of the dependent variable and the lagged values of the total spending as % of GDP, total revenue as % of GDP, inflation rate (based on GDP deflator) and real GDP per capita (as a proxy for economic development). In addition, in equation (3) we use the lagged value of the trade openness.

⁸ Local projections offer several advantages over VAR models and serve as a robust difference-in-differences estimator in panel data. They use simple regressions, are more resilient to model misspecification, and enable direct joint or pointwise analytical inference (see Jordà and Taylor, 2025).

To address endogeneity concerns between fiscal rules and crisis equations (2) and (3) are estimated by means of an IV technique where fiscal rules are instrumented by the first lag of fiscal rules and the first lag of the change in government effectiveness index.

5.2 Empirical findings

Prior to presenting our results, we formally assess the validity of our instrumental variables to ensure they adequately address endogeneity concerns in the fiscal rules-public investment/consumption relationship, thereby establishing the reliability of our estimates. The validity check is based on the Kleibergen-Paap LM statistic, which tests whether our model is under identified, and the Cragg-Donald Wald F-statistic, which evaluates the strength of the instrumental variables.

As shown in Table 4, the Kleibergen-Paap LM statistic rejects the null hypothesis of an under-identified equation, suggesting that our instruments are valid. Furthermore, the values of the Cragg-Donald Wald F-statistic are high, suggesting that our instruments are strong. Therefore, we can proceed with the analysis of the results, as our instruments are sufficiently correlated with the endogenous variables and allow for reliable coefficient estimates.

Table 4: Diagnostics results.

DIAGNOSTICS	(1) Year 0	(2) Year 1	(3) Year 2	(4) Year 3	(5) Year 4	(6) Year 5
Public consumption as % of GDP						
R ²	0.239	0.276	0.299	0.320	0.372	0.416
Kleibergen-Paap rk LM statistic	288.644	277.614	265.567	251.881	237.400	222.033
Cragg-Donald Wald F statistic	1600.483	1466.182	1330.185	1198.567	1071.245	947.959
Public investment as % of GDP						
R ²	0.131	0.189	0.220	0.258	0.286	0.323
Kleibergen-Paap rk LM statistic	272.604	259.318	245.706	231.467	220.645	207.834

Cragg-Donald Wald F statistic	1358.599	1227.580	1100.891	976.286	887.939	795.134
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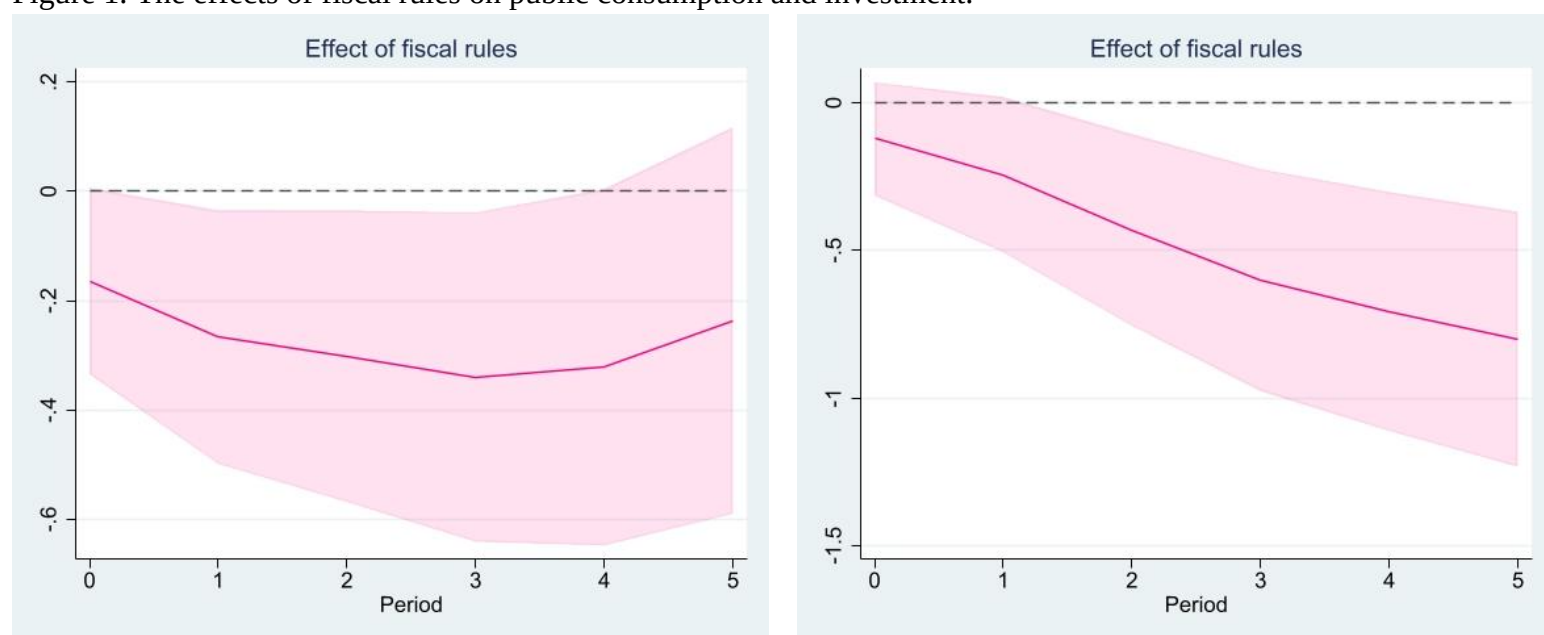
Notes: This table presents diagnostics regarding equations (2) – (3) which are estimated by means of a 2-SLS with IV instruments. The null hypothesis of the LM statistic suggests that the equation is under-identified. As indicated in the table, rejecting the LM statistic confirms the validity of the instruments. Furthermore, the Cragg-Donald Wald F-statistic assesses the strength of the instruments. A rejection of its null hypothesis, as shown in the table, implies that the instruments are strong, i.e. meaning they are sufficiently correlated with the endogenous regressors and can generate reliable IV estimates.

Figure 1 reports the results based on equations (2) and (3). The solid line depicts the cumulative response of public consumption to GDP ratio (left column) and public investment to GDP ratio (right column) from year $t=0$ to year $t+5$, in response to the introduction of fiscal rules. The pink-shaded area corresponds to the 90% confidence bands. We find that the adoption of fiscal rules leads to a reduction in public consumption by 0.23% by the end of the forecast horizon, with the peak response of 0.34% occurring in the third year. The reduction of public consumption is primarily attributed to spending, debt and to a lesser extent to budget balance rules (see supplementary material, Appendix C, Figure C1). In addition, the introduction of rules dampens public investment by 0.80% by the end of the forecast horizon, which is primarily due to debt and budget balance rules (see supplementary material, Appendix C, Figure C2). Furthermore, we find that the associated reduction in public consumption and investment after the introduction of fiscal rules, is more pronounced in developing versus advanced countries, in low vis-à-vis high government effectiveness countries, while the results depending on the exchange regime are mixed (see supplementary material, Appendix C, Figure C3).

Overall, the introduction of fiscal rules leads to a reduction in both public consumption and public investment over the medium-term, which is in line with previous studies (such as Nerlich and Reuter, 2013; Arezki and Ismail, 2013; Vinturis, 2023). This suggests that the fiscal constraints imposed by fiscal policy rules play a significant role

in limiting government consumption and investment activities, which could not only hinder economic growth but also exacerbate macroeconomic instability, increasing the likelihood of financial crises..

Figure 1. The effects of fiscal rules on public consumption and investment.



Notes: Figure 1 reports the cumulative response of public consumption as % of GDP (left column) and public investment as % of GDP (right column) after the introduction of fiscal rules. Estimator: 2 SLS with IV instruments and country and time fixed effects. Instrumented variable: Fiscal rules. Instruments: the first lag of the change in government effectiveness indicator and the first lag of fiscal rules. Shaded area indicates the 90% bands. The full set of estimations are presented in the supplementary material, Appendix C, Tables C1 and C2.

6 Conclusions

This study demonstrates that fiscal rules and in particular debt and budget balance rules, significantly increase the likelihood of financial crises across a global sample of 73 advanced and developing economies from 1990 to 2021. Crucially, this effect is driven primarily by developing economies, where fiscal rules—often adopted to reassure external creditors amid constrained market access—compel governments to adopt procyclical policies (e.g., austerity during downturns). Unlike advanced

economies, which can borrow countercyclically, developing countries face binding fiscal constraints that force cuts to public consumption and investment precisely when stimulus is needed, thereby amplifying crisis risks . The findings highlight an unintended consequence of fiscal discipline: by prioritizing short-term stability over medium-term growth, these rules may exacerbate vulnerabilities to shocks, particularly in economies with fixed exchange rate regimes or weaker institutional frameworks.

The GFC of 2007-08 underscored the brittle nature of inflexible fiscal rules, as their standard specifications often failed to account for non-standard shocks (Lane, 2010). On the contrary the EU's activation of its general escape clause during the Covid-19 pandemic crisis (allowing temporary deviations from fiscal targets) demonstrates the importance of built-in flexibility to mitigate pro-cyclicality and safeguard public investment (Mody and Stehn, 2009; Romer and Romer, 2019).

The findings highlight how fiscal rules in developing economies - often designed to ensure market access - may inadvertently worsen instability by mandating procyclical austerity when countercyclical measures are needed. . Effective reforms should prioritize adaptable designs, such as well-defined escape clauses triggered by severe shocks and cyclical adjustment mechanisms to avoid procyclical austerity during downturns. Equally critical is safeguarding growth-enhancing public investment (through exemptions or "golden rules") to prevent the erosion of productive capacity. For countries with weaker institutions or fixed exchange rates, rules must balance credibility-enhancing measures (e.g., independent fiscal councils) with targeted flexibility, ensuring frameworks do not exacerbate vulnerabilities. These adjustments align with broader calls for simpler, more resilient fiscal architectures (Eyraud et al., 2018; Blanchard et al., 2021; Capraru et al., 2025), where discipline coexists with the capacity to respond to crises without sacrificing long-term growth. For policymakers,

these findings suggest that fiscal frameworks must reconcile discipline with resilience, ensuring they do not inadvertently precipitate the very crises they aim to prevent.

This study challenges the assumption that fiscal rules uniformly enhance stability. Their impact hinges on design, implementation, and above all, the flexibility to respond to crises without sacrificing long-term growth. Future research should explore optimal escape clause thresholds and the role of political economy constraints in rule adherence.

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