Valencia, Oscar M.; Gómez González, José Eduardo; Sánchez, Gustavo A.

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Oscar M. Valencia
Jose E. Gomez-Gonzalez
Gustavo A. Sánchez

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Oscar M. Valencia, Fiscal Management Division, Inter-American Development Bank

Jose E. Gomez-Gonzalez, Department of Economics and Business of Lehman College, City University of New York

Gustavo A. Sánchez, Economics Department, Universidad del Rosario,

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Abstract[*]

This paper studies the effect of fiscal rules on debt affordability in a large set of developed and emerging market economies, using a panel data model which allows the inclusion of weakly exogenous regressors, and which deals appropriately with cross-sectional dependence. The results show a positive and significant effect of fiscal rule implementation on public debt affordability which is robust to various model specifications. The effect is stronger for emerging market economies which benefit from the implementation of any fiscal rule. In contrast, developed countries benefit only from high-quality fiscal rules. The findings have important policy implications for fiscal management, especially in emerging market economies.

JEL Classifications: C33, F34, G15

Keywords: cross-sectional dependence, debt affordability, emerging market economies, fiscal rules, weakly exogenous regressors

[*] Author Information: Oscal M. Valencia, Fiscal Management Division, Inter-American Development Bank, Washington, DC, oscarva@iadb.org; Jose E. Gomez-Gonzalez, Department of Economics and Business, Lehman College of the City University of New York, NY, jose.gomezgonzalez@lehman.cuny.edu; Gustavo A. Sánchez, Economics Department, Universidad del Rosario, Bogota, Colombia, gustavoa.sanchez@urosario.edu.co

Introduction

The pandemic-induced recession of 2020 led to the largest single-year surge in global debt in the last half century. Governments worldwide face the daunting challenge of managing the highest global debt levels seen since at least 1970. If left unchecked, the rising interest burden will divert precious fiscal resources that can be put toward economic development priorities. This burden is particularly high in emerging market and developing countries (EMDCs). At worst, it may lead to widespread sovereign debt crises. Policymakers need to prepare for the possibility of debt distress when financial market conditions turn less benign, especially in an environment of high inflationary pressures, which are inducing central banks to start increasing short-term interest rates.

Maintaining fiscal discipline is essential to achieving macroeconomic stability, reducing vulnerabilities, and improving aggregate economic performance (Auerbach and Gorodnichenko, 2012; Beetsma and Uhlig, 1999; Buti and Carnot, 2012; De Jong and Gilbert, 2020; Von Hagen, 2010). This is especially important if countries are to successfully meet the challenges, and reap the benefits, of economic and financial globalization (Hemming, Kell, and Mahfouz, 2002). It is also essential for moderating the volatility of capital flows, especially in EMDCs (Caballero, 2016) and in commodity-dependent economies (Pieschacon, 2012).

The role of fiscal institutions in attenuating economic fluctuations has been strongly emphasized in the literature. Fiscal rules, an important tool for the credibility of fiscal institutions, have become an important component of the toolkit of macroeconomic stabilization policies. Their implementation seeks to confer credibility on the conduct of fiscal policies by removing discretionary intervention (Kopitis, 2001). The core idea is that such rules will allow a country's macroeconomic fundamentals to remain sound and stable regardless of the government in charge and the influence of political cycles (Bonfatti and Forni, 2019). While governments value fiscal discipline, they may have incentives to overspend under certain circumstances, creating large public budget misalignments. For instance, governments can see active public spending as a way to counteract large private spending shortages during periods of economic depression, or as a way of reducing the intensity of business cycles driven by the fluctuation in commodity prices in natural resource-dependent emerging market economies (Fernandez, Schmitt-Grohé, and Uribe, 2017).

The growing literature on the effects of fiscal rule implementation has shown their effectiveness in achieving fiscal and macroeconomic sustainability (Argimón and Hernandez de Cos, 2012; Benito, Bastida, and Vicente, 2013; Milessi-Ferreti, 2004; Neyapti, 2013; Schaltegger and Feld, 2009; Tapsoba, 2012) and in reducing the size of the state government (Krol, 2007). A recent contribution by Gomez-Gonzalez, Valencia, and Sánchez, (2022) shows that fiscal rules reduce sovereign debt default risk measured through sovereign bond interest rate spreads, and the probability that a country suffers a sudden stop in capital flows.

Interestingly, the literature has not studied comprehensively the role played by fiscal rules in the affordability of public debt. A credible fiscal rule should give governments more access to capital markets and should reduce borrowing costs. Studies on this potential benefit of fiscal rules are, however, scarce. The few existing studies have shown that fiscal rules are

effective in reducing governments' borrowing costs, but evidence is limited to specific U.S. states (Poterba and Rueben, 1999) or specific countries (e.g., Arbeláez et al., 2021).

This paper fills this gap in the literature by evaluating the effect of fiscal rule implementation on debt affordability for a set of developed and EMDCs. To control for potential endogeneity, we use the model of Chudik and Pesaran (2015), which enables us to include weakly exogenous regressors and accounts for cross-sectional dependence between panels. Cross-sectional dependence is an issue when cross-sectional units correspond to countries, as in this study.

Results from our empirical exercises show that fiscal rules significantly reduce the cost of government borrowing, enhancing fiscal affordability. These findings have important policy implications, as they show the importance of imposing credible fiscal rules in countries which have not yet implemented them. They also indicate that countries which have suspended their fiscal rules due to the COVID-19 pandemic should resume implementation.

The rest of the paper is organized as follows. The second section describes the data used in the empirical analysis. The third section presents estimation results, and the last section concludes.

Data

The data used for the estimation of the effect of fiscal rules on debt affordability come from 34 EMDCs [1] and 31 developed countries[2] between 1995 and 2020. This information was collected from seven sources: (i) the IMF's World Economic Outlook of April 2021 database; (ii) the IMF (2017)'s information on worldwide fiscal rule implementation; (iii) Andrian et al. (2021)'s actualization of fiscal rule implementations and estimations of fiscal rule quality; (iv) the World Bank's Worldwide Governance Indicators database; (v) the World Bank International Debt Statistics database information on debt reduction or forgiveness, (vi) Bank of Canada information on debt defaults, and (vii) the IMF database on countries in a program with it. Table 1 presents the variables used in our empirical analysis.

[1] The EMDCs in our sample are Argentina, Barbados, Bosnia and Herzegovina, Brazil, Bulgaria, Chile, China, Colombia Costa Rica, Croatia, Dominican Republic, Ecuador, Egypt, El Salvador, Guatemala, Hungary, Jordan, Kazakhstan, Malaysia, Mauritius, Mexico, Morocco, Panama, Paraguay, Peru, Philippines, Poland, Russia, South Africa, Suriname, Thailand, Tunisia, Turkey, and Vietnam.

[2] The developed countries in our sample are Australia, Austria, Belgium, Canada, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Iceland, Ireland, Israel, Italy, Korea, Latvia, Lithuania, Luxembourg, Malta, Netherlands, New Zealand, Norway, Portugal, Slovak Republic, Slovenia, Spain, Sweden, Switzerland, the United Kingdom, and the United States.

Table 1. Debt Affordability Regressors

Variable	Description	Source
Affordability	1 - Interest payments / Revenues	Authors' calculations / IMF-WEO
Structural primary balance	General government structural primary balance % of HP filtered real gross domestic product (GDP)	Authors' calculations / IMF-WEO
Real GDP growth	GDP in constant prices, year-to-year change (%)	Authors' calculations / IMF-WEO
Real depreciation	(1+change national currency per U.S. dollar, end period) / (1+ inflation, end period)	Authors' calculations / IMF-WEO
Public debt	General government gross debt % GDP current prices	Authors' calculations / IMF-WEO
Dummy: Crisis	1 if real GDP growth < 0	Authors' calculations / IMF-WEO
Dummy: Fiscal rule	1 if the country has at least a rule of expenditure, debt o balance in place	Authors' calculations / IMF (2017) and Adrian et al. (2020)
Fiscal rule quality	Mean quality of rule of expenditure, debt, and/or balance. 0 if the country does not have a fiscal rule in place.	Authors' calculations / Adrian et al. (2020)
Regulatory quality	Governance indicators: regulatory quality, estimate	World Bank
Control corruption	Governance indicators: control of corruption, estimate	World Bank
Dummy: Inflation crisis	1 if inflation end period exceeds 20%	IMF-WEO following Reinhart and Rogoff (2011)
Dummy: Debt relief	1 if there is a debt forgiveness or reduction	Authors' calculations / World Bank
Dummy: IMF program	1 if the country was in a program with the IMF	Authors' calculations / IMF
Dummy: Post-default =L	1 if the country had a sovereign default one year ago, but now it is not in default.	Authors' calculations / Bank of Canada

Note: This table lists and describes the variables used as regressors for the estimation of fiscal rule incidence in debt affordability. The dataset is constructed by merging the databases from the listed sources, narrowing down the sample of countries according to the available data, and taking out outliers.
Source: Authors' elaboration.

Table 2 shows a summary of the statistics on debt affordability and its regressors between EMDCs and developed countries, highlighting the differences between these two groups of countries. Debt affordability is notably lower and more volatile in EMDCs, even when they have lower levels of debt and higher rates of GDP growth.

Almost all developed countries have a fiscal rule and more than 70 percent of the observations. On the other hand, rules in EMDCs are more the exception. Only half of the countries in our sample had at least one in place and only 24 percent of our observations. Also, the quality of the implemented rules is lower in the EMDCs.

Fewer than 1 percent of the observations for developed countries correspond to an inflation crisis, a debt relief episode, or a post-default period. That is why we do not include these as regressors for this sample of countries. In EMDCs, however, they are common.

Table 2. Summary Statistics

Variable	Emerging markets and developing countries				Developed countries			
	Mean	Std. Dev.	Min	Max	Mean	Std. Dev.	Min	Max
Affordability	89.9	8.0	49.8	104.9	96.0	3.9	76.8	105.3
Structural primary balance	0.0	3.3	-16.7	21.0	-0.2	2.9	-12.7	9.0
Real GDP growth	3.6	4.5	-17.9	62.2	2.5	3.4	-14.8	25.3
Public debt	47.1	24.7	3.9	165.8	56.2	30.8	3.8	155.6
Real depreciation	98.7	13.4	52.4	238.6	98.3	10.3	71.1	168.6
Regulatory quality	0.1	0.5	-1.3	1.6	1.4	0.4	0.3	2.1
Control of corruption	-0.2	0.6	-1.4	1.7	1.4	0.7	-0.4	2.5
Fiscal rule quality =L5	0.4	0.8	0.0	3.8	1.3	1.1	0.0	4.9
Fiscal rule quality =L5 (> 0)	1.6	0.8	0.4	3.8	1.9	0.9	0.2	4.9
	Cases	**%**	**Countries**	**%**	**Cases**	**%**	**Countries**	**%**
Dummy: Fiscal rule =L5	208	23.5	17	50.0	572	71.0	30	96.8
Dummy: Crisis	114	12.9	32	94.1	108	13.4	31	100.0
Dummy: Inflation crisis	53	6.0	16	47.1	2	0.2	2	6.5
Dummy: Debt relief	156	17.6	24	70.6	0	0.0	0	0.0
Dummy: IMF program	291	32.9	31	91.2	48	6.0	9	29.0
Dummy: Post-default =L	47	5.3	8	23.5	4	0.5	4	12.9

Note: This table presents summary statistics of included regressors in estimating fiscal rule incidence in debt affordability. The statistics presented for continuous variables are the mean, standard deviation, minimum and maximum value in the sample. For dummy variables, this table shows the number of cases in which the variable equals 1, the number of countries where there is at least one case, and the percentage relative to total observations and countries in the sample, respectively. L, L2 and L5 indicate one-year, two-year, and five-year lags, respectively.
Source: Authors' elaboration.

Results

We study the determinants of fiscal affordability for several developed and emerging market economies, focusing on the role played by fiscal rules. In short, debt affordability in this study relates to a government's ability to meet is current debt obligations using its current income. We measure it as the ratio of (implicit) interest payments to the general government's current income.

We use the model developed by Chudik and Pesaran (2015), a panel data model which allows for weakly exogenous regressors and treats cross-sectional dependence using common factors. Regressions are performed separately for developed countries and EMDCs. The literature has shown that admissible public debt levels (Reinhart and Rogoff, 2010; Reinhart, Reinhart, and Rogoff, 2012), measures of debt affordability (Amstad and Packer, 2015), and the effect of fiscal rules on fiscal and macroeconomic sustainability (Combes, Minea, and Sow, 2017) may vary for both sets of countries. In both cases, various alternative specifications are considered.

shows the results for EMDCs. The baseline model includes as regressors the first lag of the dependent variable, a one-year lag of the government's structural primary balance, a one-year lag of per capita GDP growth, a one-year lag of the debt-to-GDP ratio, real depreciation, and a dummy variable controlling for times of crisis. Fiscal rules are introduced in two distinct ways, as a dummy variable taking on the value of one when a country has a fiscal rule in place and zero otherwise ("Rule"), and as a continuous variable taking a value in the closed interval [0,5] depending on the quality of the fiscal rule that has been implemented ("Quality"). Fiscal rules are lagged five years, reflecting the fact that governments take time to adjust their behavior to the fiscal rule and, hence, a positive effect of fiscal rule implementations on macroeconomic stability takes time (see Gomez-Gonzalez et al., 2022).

Note that all variables included in the two specifications of the baseline model are statistically significant, except for real depreciation. Signs are as expected. Debt affordability at time t is correlated with debt affordability at time t-1, having a stronger primary balance increases debt affordability, increases in the debt to GDP ratio negatively affect affordability, and affordability is reduced during times of crisis. Importantly, the introduction of a fiscal rule is crucial for government debt affordability. Countries that introduce a fiscal rule see, on average, a reduction in their debt interest payments. Additionally, better-quality fiscal rules enhance public debt affordability. This result, which is in line with those of regional and national studies, shows the importance of fiscal rules for fiscal sustainability: governments of EMDCs in which fiscal rules are introduce face lower interest payments for their debt. This fact indirectly shows that fiscal rules may help governments gain access to international capital markets.

The model labeled "Regulatory Quality" corresponds to the "Baseline Model" to which a one-year lag of the regulatory quality variable is added. Results are qualitatively identical to those of the "Baseline Model." Importantly, the lagged regulatory quality variable is statistically insignificant at conventional levels. Several other specifications are considered for means of robustness, namely "Control Corruption," "Inflation Crisis," "Debt Relief," "IMF Program," and "Post-Default." In al specifications, the two fiscal rule variables are statistically significant and have the expected sign. This indicates the robustness of our main result, namely that fiscal rule implementation is beneficial for government debt affordability.

Table 3. Estimation Results of Chudik and Pesaran (2015) for EMDCs

Variable	Base		Regulatory quality		Control corruption		Inflation crisis		Debt relief		IMF program		Post-default	
	Rule	Quality	Rule	Quality	Rule	Quality	Rule	Quality	Rule	Quality	Rule	Quality	Rule	Quality
Affordability =L	0.347***	0.365***	0.242***	0.265***	0.242***	0.247***	0.324***	0.339***	0.323***	0.343***	0.362***	0.377***	0.375***	0.394***
Structural primary balance =L	0.193**	0.196*	0.148	0.146	0.0443	0.0269	0.188**	0.193*	0.152*	0.162*	0.193*	0.201*	0.180*	0.204*
Per capita GDP growth =L	0.101**	0.113**	0.109*	0.116*	0.0206	0.0219	0.0975**	0.109*	0.0492	0.0612	0.105**	0.117**	0.0796*	0.0996*
Public debt =L	-0.120**	-0.116**	-0.117**	-0.117**	-0.0693	-0.0734	-0.125**	-0.121**	-0.128**	-0.124**	-0.140***	-0.135**	-0.113**	-0.107**
Real depreciation	-0.0225	-0.0207	-0.0229	-0.0218	0.00376	0.00801	-0.0209	-0.0198	-0.0191	-0.0183	-0.0215	-0.0196	-0.0165	-0.0154
Dummy: Crisis	-1.061***	-1.112***	-0.880**	-0.924**	-0.493	-0.572	-1.096***	-1.146***	-1.135***	-1.189***	-1.054***	-1.079***	-1.151***	-1.213***
Dummy: Fiscal rule =L5	0.597**		0.778***		0.876**		0.605**		0.651***		0.630**		0.622*	
Fiscal rule quality =L5		1.355*		1.574*		1.491*		1.362*		1.288*		1.338*		1.339*
Regulatory quality =L			-0.221	-0.155										
Control corruption =L					-1.071	-0.571								
Dummy: Inflation crisis							0.0521	0.0207						
Dummy: Debt relief =L2									0.00106	0.0138				
Dummy: IMF program =L											0.248	0.298		
Dummy: Post-default =L													0.0482	0.00854

Number of countries	34	34	34	34	34	34	34	34	34	34	34	34	34	34
Observations	720	720	720	720	720	720	720	720	713	713	720	720	720	720

Note: *** p<0.01, ** p<0.05, * p<0.1. All not-dummy variables are also included as cross-sectional averages with at least one lag. L, L2 and L5 indicate one-year, two-year, and five-year lags, respectively.
Source: Authors' elaboration.

Table 4 presents the results for developed countries. A subset of four of the specifications presented above is considered. An important difference with respect to the effect of fiscal rules in EMDCs is clearly observed: for developed countries, having a fiscal rule by itself does not make the difference. The quality of the fiscal rule that is implemented is what matters. However, the level of statistical significance is not as strong as it is for EMDCs. This result holds for all four model specifications. Additionally, fundamental variables such as the structural primary balance and the debt-to-GDP ratio are also unimportant for fiscal affordability in developed countries. This result is in line with previous findings indicating that debt thresholds are not as important for developed countries as they are for EMDCs. Developed countries have open capital markets even if they have considerable fiscal imbalances. EMDCs, by contrast, are punished more strongly by international capital market creditors when their fiscal balances deteriorate (see, for example, Eyraud et al., 2018).

Table 4. Estimation Results of Chudik and Pesaran (2015) for Developed Countries

Variable	Base		Regulatory Quality		Control Corruption		IMF Program	
	Rule	Quality	Rule	Quality	Rule	Quality	Rule	Quality
Affordability =L	0.333***	0.318***	0.271***	0.240***	0.316***	0.307***	0.314***	0.321***
Structural primary balance =L	0.0413	0.0549**	0.0134	0.0253	0.0576*	0.0517	0.0376	0.0578**
Per capita GDP growth =L	0.0433	0.0245	0.0395	0.0271	0.0342	0.0211	0.0324	0.0172
Public Debt =L	-0.00380	-0.00371	-0.0235	-0.00856	-0.00836	-0.0127	-0.00818	-0.0117
Real depreciation	-0.00281	-0.00265	-0.00187	-0.00410	-0.00278	0.000363	-0.00207	-0.00352
Dummy: Crisis	-0.138	-0.261*	-0.199	-0.298**	-0.0315	-0.185	-0.123	-0.249*
Dummy: Fiscal rule =L5	0.118		0.184		0.139		0.150	
Fiscal rule quality =L5		0.513*		0.456*		0.472*		0.543*
Regulatory quality =L			0.441	0.0669				
Control corruption =L					-0.409	-0.222		
Dummy: IMF program =L							0.000621	-0.0168
Dummy: Post-Default =L								
Number of countries	31	31	31	31	31	31	31	31
Observations	739	739	739	739	739	739	739	739

Note: *** p<0.01, ** p<0.05, * p<0.1. All not-dummy variables are also included as cross-sectional averages with at least one lag. L, and L5 indicate one-year and five-year lags, respectively.
Source: Authors' elaboration.

Overall, the results suggest that fiscal rules are important for reducing the cost of public debt. The implementation of any fiscal rule improves debt affordability in EMDCs. For developed economies, only the quality of the fiscal rule matters.

Conclusions

We study the effect of fiscal rule implementation on public debt affordability. Previous studies focused on U.S. states and on individual countries. Our main contributions consist of using a large dataset including a large number of developed and EMDCs and using a panel data methodology that allows including weakly exogenous covariates and that deals with cross-sectional dependence. Our findings indicate that implementing a fiscal rule improves debt affordability. However, important differences are observed for both set of countries. While EMDCs benefit from the implementation of any fiscal rule, developed countries are benefited only by high-quality fiscal rules. Additionally, fiscal fundamentals matter for EMDCs than for developed economies. Altogether, our findings have relevant policy implications, as they suggest that countries that have not implemented a fiscal rule yet should do so. While there is no one-fits-all rule, countries should procure to implement a high-quality fiscal rule, as they are more effective in improving debt affordability. Additionally, countries that suspended their fiscal rules during the COVID-19 pandemic should activate them again soon to avoid the development of episodes of public debt distress. Our results complement those of other recent studies which have shown that fiscal rules are beneficial for fiscal and macroeconomic stability.

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