

What Determines the Adoption of Fiscal Rules in Resource-Rich Developing Countries? An Empirical Investigation

Zubin Deyal
Lodewijk Smets

Country Department Caribbean
Group

DISCUSSION
PAPER N°
IDB-DP-00754

What Determines the Adoption of Fiscal Rules in Resource-Rich Developing Countries? An Empirical Investigation

Zubin Deyal
Lodewijk Smets

March 2020



<http://www.iadb.org>

Copyright © 2020 Inter-American Development Bank. This work is licensed under a Creative Commons IGO 3.0 Attribution-NonCommercial-NoDerivatives (CC-IGO BY-NC-ND 3.0 IGO) license (<http://creativecommons.org/licenses/by-nc-nd/3.0/igo/legalcode>) and may be reproduced with attribution to the IDB and for any non-commercial purpose. No derivative work is allowed.

Any dispute related to the use of the works of the IDB that cannot be settled amicably shall be submitted to arbitration pursuant to the UNCITRAL rules. The use of the IDB's name for any purpose other than for attribution, and the use of IDB's logo shall be subject to a separate written license agreement between the IDB and the user and is not authorized as part of this CC-IGO license.

Note that link provided above includes additional terms and conditions of the license.

The opinions expressed in this publication are those of the authors and do not necessarily reflect the views of the Inter-American Development Bank, its Board of Directors, or the countries they represent.



CET@IADB.ORG

Abstract

Over the past three decades, fiscal rules have increasingly been used as a tool to promote fiscal responsibility and macroeconomic stability. In principle, fiscal rules have numerous benefits, especially for resource-rich economies. Many countries, however, still opt to leave fiscal policy unconstrained. This paper investigates the reasons for this by determining the economic, institutional, and political factors which influence the likelihood that a country will adopt a fiscal rule. It focuses on resource-rich countries and accounts for the role of development agencies. Results from a conditional fixed-effects logit model indicate that strong macroeconomic fundamentals and government stability are associated with the adoption of a fiscal rule. Furthermore, the evidence shows that the presence of more development partners—especially multilateral agencies—increases the likelihood of adoption, even when controlling for the volume of aid and the presence of an IMF program. Generally, these results are robust to the use of different estimation techniques, an alternative measure for commodity dependence, and a restriction on the estimation sample.

JEL Codes: E62, O11, O19, O23, Q30

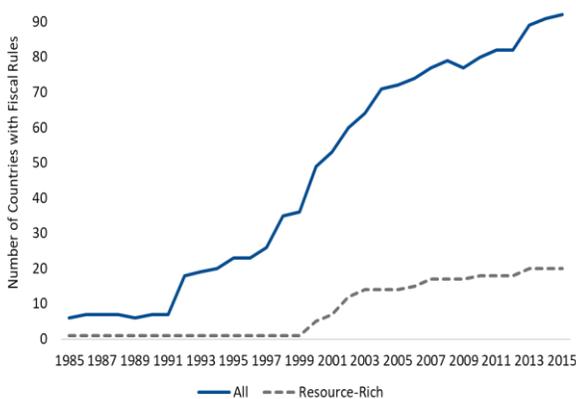
Keywords: fiscal rules, macroeconomic stability, development assistance, aid effectiveness, resource-rich countries

1. Introduction

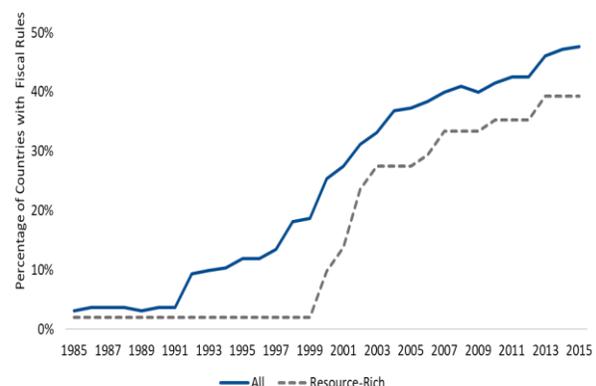
Fiscal rules, expressed as numerical limits on budgetary aggregates such as government debt, are permanent constraints on fiscal policy and serve to promote fiscal responsibility and macroeconomic stability (IMF, 2009).¹ Specifically, fiscal rules aim to correct for distorted incentives in policymaking and short-term demands by containing pressures to overspend, particularly in economic good times (Alesina and Tabellini, 1990; Rogoff, 1990). As such, fiscal rules encourage long-term macroeconomic stability and debt sustainability (Schick, 2003; Debrun and Kumar, 2007). While the identification of a causal link between fiscal rules and macroeconomic outcomes is not straightforward (Heinemann et al., 2018), recent research suggests that well-designed fiscal rules have a positive impact on fiscal balances (see, e.g., Caselli and Reynaud, 2019).

Effective and well-designed fiscal rules are especially important for resource-rich countries, which often face large economic shocks coming from volatile commodity prices and inherent uncertainty in the extraction of natural resources. Having proper fiscal rules and (counter-cyclical) policies in place can help to mitigate shocks and smooth the business cycle. Furthermore, fiscal rules can be introduced to support intergenerational equity in resource-rich countries by requiring the accumulation of public assets from the earnings of exhaustible natural resources (IMF, 2016).

Figure 1: The Adoption of Fiscal Rules, 1985–2015



Panel 1: number of countries (source: IMF)



Panel 2: percentage of countries (source: IMF)

By 2015, a total of 96 countries had adopted at least one fiscal rule, up from 6 in 1985 (see Figure 1, panel 1). Up to 1999 only one resource-rich country, Indonesia, had at least one fiscal rule in place. Since then, the number of resource-rich countries with fiscal rules grew, albeit at a slower pace, reaching 20 countries

¹ One of the first and most prominent examples of a fiscal rule is the set of fiscal guidelines contained in the Maastricht convergence criteria, and later in the Stability and Growth Pact of 1997 for European countries. It established that the government budget deficit should not exceed 3 percent of each member country's GDP and that the gross debt-to-GDP ratio should not exceed 60 percent. See IMF (2009) for a detailed analysis of the different types of fiscal rules and their effectiveness in constraining fiscal policy.

by 2015. However, as panel 2 of Figure 1 indicates, more than 60 percent of resource-rich countries have yet to implement rules and restrictions to govern fiscal policy.

Given that many countries still opt to leave fiscal policy unconstrained, it is worth examining the reasons why countries choose to put fiscal rules in place. In the most comprehensive study to date, Schmidt-Hebbel and Soto (2017) estimate a series of probit and logit models on a sample 115 countries to determine which factors influence the adoption of fiscal rules. The authors find that both political conditions (i.e., democracy, federalism, checks and balances, and government stability) and macro-fiscal variables (i.e., budget balance, population dependency ratio, and pro-cyclicality) contribute significantly to the likelihood of having a fiscal rule in place. Furthermore, their results show that capital account openness and financial and economic development increase the probability of having a fiscal rule. Other studies that relied on the same estimation methods came to similar conclusions (see, e.g., Calderón and Schmidt-Hebbel, 2008; Altunbas and Thornton, 2017; Elbadawi, Schmidt-Hebbel and Soto, 2015). IMF (2009) examined the likelihood of adopting a fiscal rule using an exponential hazard model and found that the odds of having a fiscal rule are raised by a higher primary budget balance, lower public debt ratio, positive GDP growth, higher reserves to GDP, and greater fiscal and economic stability. High inflation and currency depreciations were associated with lower odds of introducing a fiscal rule.

This paper adds value to the existing literature in two important ways. First, instead of analyzing a global sample, we specifically focus our analysis on resource-rich developing countries, for which fiscal rules are all the more important (cf. above). The dynamics of adopting fiscal rules may also differ between resource-rich and non-resource-rich economies (see footnote 4). Second, next to political and macro-fiscal variables, we also consider the role of development agencies. An important role of development agencies is the provision of policy support, particularly in countries that face capacity constraints and imperfect political competition (Clemens and Kremer, 2016). Multilateral donors, such as the IMF, the World Bank, and the Inter-American Development Bank, play a leading role in this area. Development agencies can support the adoption of new policies and rules in multiple ways (see Smets, 2020). They can generate evidence and produce analytical work about the costs and benefits of new policy proposals, organize study tours to expose policymakers to new ideas, engage in policy dialogue with key officials, and provide financing—typically as budget support—to mitigate any adjustment costs. In this paper we examine whether development institutions matter for the adoption of fiscal rules in resource-rich developing countries.

Results from estimating a conditional fixed-effects logit model on 366 observations indicate that the presence of more development partners and an ongoing IMF program are related to the adoption of fiscal rules, even when controlling for aid flows. When replacing the number of donors by the number of multilateral donors, the association is even more pronounced. In line with the previous literature, we find that strong macroeconomic fundamentals and government stability increase the likelihood of adopting a fiscal rule. Furthermore, regression estimates show that the number of donors and government stability also matter for the adoption of high-quality fiscal rules. Generally, results are robust to a large number of tests.

The remainder of the paper is structured as follows. Section 2s describes the data and methods used. Section 3 presents the results, and Section 4 concludes.

2. Data and Methods

To limit the analysis to resource-rich countries, we rely on two variables. The main classification comes from the IMF (2012). It considers a country to be resource-rich if either natural resource revenue or exports are at least 20 percent of total fiscal revenue or exports. Using this measure, 51 countries are considered resource-rich (see the Appendix for detailed definitions and sources). We also test our models using UNCTAD's classification, which considers a country to be resource-rich when more than 60 percent of goods exports are generated by primary commodities.

For our dependent variable, we rely on the IMF's fiscal rules database, which covers 96 countries from 1985 to 2015. Based on that database, we created a dummy coded 1 if a country had a *de jure* fiscal rule in place. As can be seen from Figure 1, 20 out of 51 resource-rich countries adopted at least one fiscal rule by 2015.

To examine the influence of development agencies, we include three aid-related variables. First, several studies have shown that the size of the international community matters for development outcomes (see, e.g., Knack and Smets, 2013; Molenaers et al., 2015). That is why we count for each country the number of aid donors present, including both bilateral and multilateral donors. Second, we add the total official development assistance (ODA) received by a country as a covariate. Aid flows may provide an incentive for countries to reform and help mitigate adjustment costs (Devarajan et al., 2001). On the other hand, continued access to aid may create moral hazard and prevent countries from introducing fiscal rules (Svensson, 2000; 2003). The sign of the aid variable therefore is an empirical question. Finally, given the IMF's deep knowledge on macro-fiscal matters and its leverage during times when a country faces macroeconomic difficulties (see, e.g., Dreher, 2009), we include a binary variable which captures whether or not a country has ongoing IMF program.

As the adoption of fiscal rules inherently reflects a political process, we include measures of democracy, stability, and checks and balances. Fiscal rules reflect greater transparency and stronger accountability; it is expected that stronger democratic standards increase the likelihood of fiscal rule adoption (Schmidt-Hebbel and Soto, 2017). A strong ability to remain in office and large popular support may alleviate the time inconsistency problem governments face to pre-commit to fiscal rules (Dollar and Svensson, 2000; Acemoglu, 2003). To assess this, we include a measure of government stability provided by the International Country Risk Guide. Having checks and balances in place to constrain executive decision making may lead to the selection of sound social and fiscal policies (Besley and Persson, 2011). On the other hand, with plenty of checks and balances the initiation and consolidation of reform may be inhibited, thus reducing the probability of adopting fiscal rules (Haggard and Webb, 1994). Which effect dominates is an empirical question which we test by including a measure for checks and balances in our model.

In line with previous research, we include a large set of macroeconomic variables. First, countries with greater economic development are more likely to have the human and social capital to undertake the complex task of instituting a fiscal rule. That is why GDP per capita is included in the model. Second, we also test whether indebtedness matters for the adoption of fiscal rules by including total public debt over GDP as a regressor. Third, to test whether a fixed exchange rate encourages fiscal discipline, we add Reinhart and Rogoff's (2018) exchange rate classification as a covariate. Finally, in more developed and open financial markets, governments are more likely to access external funding during downturns. This subjects them to closer scrutiny by agencies and analysts. As such, fiscal rules may more likely be present

in countries with these markets to ensure commitment and prudence (Schmidt-Hebbel and Soto, 2017). We use two financial variables to account for this: financial development, measured by private sector credit as a percentage of GDP, and financial openness, where we rely on a measure by Chinn and Ito (2008).

Econometrically, we follow Schmidt-Hebbel and Soto (2017) and estimate a conditional fixed-effects logit model using maximum-likelihood.² The fixed-effects logit model can be written as

$$P(y_{it} = 1|x_{it}) = F(\alpha_i + x_{it}\beta) \quad (1a)$$

where $F(\cdot)$ is the cumulative logistic distribution

$$F(z) = \frac{\exp(z)}{1 + \exp(z)} \quad (1b)$$

Fitting this model with full maximum-likelihood leads to inconsistent estimates when the number of time periods is fixed (Chamberlain, 1980). However, this problem can be avoided by looking at the probability of $y_i = (y_{i,1}, y_{i,2}, \dots, y_{i,T_i})$, conditional on $\sum_{t=1}^{T_i} y_{it}$. The coefficients of such a conditional logit model can be approximated using maximum-likelihood estimation with the following log-likelihood function:

$$\log L = \sum_{i=1}^n \left\{ \sum_{t=1}^{T_i} y_{it} x_{it} \beta - \log \sum_{t=1}^{T_i} \exp(\sum_{t=1}^{T_i} d_{it} x_{it} \beta) \right\} \quad (1c)$$

Our baseline fixed-effects logit model relies on 366 observations for 14 resource-rich developing countries, that is, countries that implemented a fiscal rule between 1985 and 2015.³ To address endogeneity concerns, we lag the covariates with one period. To test the robustness of our results, we also estimate a random-effects probit model, implement random-effects parametric survival model, use an alternative indicator for resource-rich countries, and estimate model (1) on a reduced sample where all observations for a country are dropped after a fiscal rule has been adopted. The empirical findings are presented in the next section.

3. Results

Baseline Results

Table 1 presents the results from estimating the conditional fixed-effects logit model with maximum likelihood.⁴ We find that when resource-rich developing countries have strong macroeconomic

² Maximum-likelihood estimation obtains parameter values that maximize a likelihood function $L(\beta) = \prod_{i=1}^n f(y_i, \beta)$. The maximum-likelihood estimator $\hat{\beta}$ is the β that maximizes $L(\beta)$: $\hat{\beta} = \operatorname{argmax} \log L(\beta) = \operatorname{argmax} \sum_{i=1}^n \log f(y_i, \beta)$. For a conditional fixed-effects logit model, the default estimator is computed using the Gauss-Hermite quadrature.

³ In 1985, no resource-rich developing country in our sample had a fiscal rule in place. Hence, our sample consists of countries that adopted a fiscal rule during the period of analysis.

⁴ Table A.3 in the Appendix shows that the results for resource-rich countries are markedly different compared to a group of non-resource-rich developing countries. For instance, while both groups have a number of variables in common, financial openness, exchange rate flexibility, and development assistance matter for the non-resource-rich developing economies, but not for resource-rich countries. Furthermore, the coefficient on donors for resource-rich countries is more than twice the size of the coefficient for the other group.

fundamentals, they are more likely to adopt a fiscal rule. Higher levels of economic development, developed financial markets, and low debt levels are associated with a higher probability of adopting a fiscal rule. In line with other research in this field, Table 1 also shows that stable governments are more likely to adopt a fiscal rule.

Table 1: Conditional Fixed-Effects Logit Model

Variable	Coef.	Std. Err.	z	P> z	[95% Conf. Interval]	
Checks and Balances	0.476588	1.77655	0.27	0.788	-3.005386	3.958561
Democracy	-0.00354	0.0192	-0.18	0.854	-0.0411752	0.034088
Economic Development	8.603855	4.395605	1.96	0.05	-0.0113728	17.21908
Exchange Rate	0.157449	0.445954	0.35	0.724	-0.7166039	1.031502
Financial Development	0.144666	0.072531	1.99	0.046	0.0025086	0.286823
Financial Openness	-0.63007	0.70426	-0.89	0.371	-2.010393	0.750254
Government Stability	0.390922	0.213659	1.83	0.067	-0.0278408	0.809686
IMF Program	1.817321	0.938736	1.94	0.053	-0.0225669	3.657209
Public Debt	-0.04859	0.022877	-2.12	0.034	-0.0934268	-0.00375
Total Donors	0.54869	0.091815	5.98	0.001	0.3687352	0.728645
Total ODA	-0.58824	0.520525	-1.13	0.258	-1.60845	0.431969
Log Likelihood	-198.82					
Observations	366					

Interestingly, in our baseline regression, two aid variables come in significantly. The more development partners that are present in a resource-rich developing country, the more likely the country will adopt a fiscal rule. This association is not driven by the financial resources provided, as we control for ODA. IMF programs, on the other hand, increase the probability of adoption. The institution's deep knowledge on the topic and its leverage during times when a country faces macroeconomic difficulties may explain why this variable comes in significantly positive.

To explore the donor variable in more depth, we replaced the number of donors present in a country with the number of multilateral donors. When running the conditional fixed-effects model with the latter variable, the odds of having a fiscal rule in place increase substantially (see Appendix A.4). As multilateral donors are more likely to be engaged in providing policy support through analytical work and/or financing, this finding is in line with expectations.

Finally, Caselli and Reynaud (2019) find empirical evidence that only well-designed fiscal rules have a positive impact on fiscal balances. To gauge the quality of design, the authors rely on an index of fiscal rule strength that captures institutional coverage, legal strength, enforcement mechanisms, and supporting institutions (see Schaechter et al., 2012, for more detail). We build on the same index to define high-quality fiscal rules, and we estimate model (1) with high-quality rules as the dependent variable. Regression results (presented in Appendix A.5) indicate that economic development and the number of donors are positively associated with the adoption of high-quality fiscal rules. Table A.5 also shows that at times when more development aid flows in, countries are less likely to adopt fiscal rules. This finding is consistent with the idea that aid resources may create moral hazard on the side of the recipient, leading to a Samaritan's Dilemma where donors transfer resources and recipients refrain from reforming (Buchanan, 1975).

Robustness Tests

We have tested the robustness of our results in several ways. First, we estimated a random-effects probit model.⁵ The (marginal effects) results are presented in Table 2 and generally confirm our baseline findings: next to strong macroeconomic fundamentals and government stability, the number of donors and the presence of an IMF program also matter for the adoption of fiscal rules. Furthermore, the marginal effects analysis indicates that, on average, one additional donor increases the probability of adoption by 0.9 percentage points. For multilateral donors, the marginal effect increases to 1.3 percentage points (see Appendix A.6). An IMF program, on the other hand, increases the probability of adoption by 3.6 percentage points on average.

Table 2: Random-Effects Probit Model

Variable	dy/dx	Std. Err.	z	P>z	[95% Conf. Interval]	
Checks and Balances	0.017869	0.02358	0.76	0.449	-0.0283467	0.064084
Democracy	-0.00523	0.009855	-0.53	0.596	-0.024544	0.014086
Economic Development	0.031326	0.017632	1.78	0.076	-0.003233	0.065885
Exchange Rate	-0.00017	0.000328	-0.53	0.596	-0.0008173	0.00047
Financial Development	0.002474	0.000767	3.22	0.001	0.00097	0.003977
Financial Openness	0.008213	0.008177	1	0.315	-0.0078138	0.024241
Government Stability	0.006107	0.003129	1.95	0.051	-0.0000254	0.012239
IMF Program	0.035881	0.014218	2.52	0.012	0.0080136	0.063748
Public Debt	-0.00093	0.000316	-2.95	0.003	-0.0015513	-0.00031
Total Donors	0.008599	0.001322	6.5	0.001	0.0060071	0.011191
Total ODA	-0.00406	0.007003	-0.58	0.562	-0.0177881	0.009665
Observations	897					

We implement a random-effects parametric survival model as a second robustness test.⁶ Table 3 presents the results from estimating a random-effects exponential proportional hazard. The coefficient estimates measure the conditional hazard ratios for adopting a fiscal rule. Table 3 confirms that strong macroeconomic fundamentals—in this case, low debt levels, exchange rate flexibility and financial development—and government stability and democracy are associated with the adoption of fiscal rules. Furthermore, more development partners and the presence of an IMF program increase the probability of introducing a fiscal rule, even though the former variable is not significant at conventional levels. When replacing the number of donors by the number of multilateral agencies, the odds ratio jumps from 1.06 to 1.43, significant at the 10 percent level (see Appendix A.7).

⁵ Implementing such a model substantially increases the number of observations, from 366 to 897, covering 39 instead of 14 resource-rich aid-receiving countries. The probit model also enables marginal effects to be calculated. These benefits, however, come at the expense of stronger assumptions. In a random effects probit model, the individual effect is not allowed to be correlated with the included covariates.

⁶ Survival analysis is based on the duration that an entity spends in a certain state. Parametric survival models allow us to determine which factors affect the probability of leaving that state. The benchmark duration distribution for survival analysis is the exponential distribution. For the purposes of this paper, the entities are resource-rich countries while the duration is interpreted as the time it takes to introduce a fiscal rule.

Table 3: Random-Effects Exponential Proportional Hazard Regression

Variable	Haz. Ratio	Robust Std. Err.	z	P>z	[95% Conf. Interval]	
Checks and Balances	0.0152492	0.0320336	-1.99	0.046	0.000248	0.93614
Democracy	1.331036	0.1578987	2.41	0.016	1.054904	1.679447
Economic Development	0.9694594	0.440957	-0.07	0.946	0.397523	2.364271
Exchange Rate	0.3605862	0.1616729	-2.28	0.023	0.149749	0.86827
Financial Development	1.065313	0.0193803	3.48	0.001	1.027997	1.103983
Financial Openness	1.08733	0.3322527	0.27	0.784	0.597395	1.979068
Government Stability	1.256527	0.1492484	1.92	0.055	0.99556	1.585902
IMF Program	3.306677	1.983666	1.99	0.046	1.020372	10.71581
Public Debt	0.9888895	0.0066401	-1.66	0.096	0.975961	1.00199
Total Donors	1.061677	0.0826681	0.77	0.442	0.911409	1.236721
Total ODA	1.111807	0.238825	0.49	0.622	0.729768	1.693848
Constant	0.0000364	0.0001076	-3.46	0.001	1.11E-07	0.011927
Log Pseudolikelihood	-71.01					
Observations	238					

Thirdly, instead of using the IMF's indicator for resource-rich countries, we rely on UNCTAD's measure, which considers a country to be resource-rich when more than 60 percent of its goods exports are generated by primary commodities. With UNCTAD's indicator the sample size increases to 660 observations, covering 26 resource-rich countries. The findings from this analysis are presented in Table 4. Again, it yields similar results: macroeconomic variables—that is, per capita GDP and both financial sector openness and development—and government stability are associated with the adoption of fiscal rules. All three aid variables come in significantly as well, of which the number of donors and the presence of an IMF program at very low significance levels (p -values <0.001). When replacing the number of donors by the number of multilateral donors, the coefficient increases from 0.44 to 0.74, thus raising the odds of adopting a fiscal rule (see Appendix A.8).

Table 4: Fixed-Effects Logit with UNCTAD Resource-Rich Classification

Variable	Coef.	Std. Err.	z	P>z	[95% Conf. Interval]	
Checks and Balances	1.211734	1.052919	1.15	0.25	-0.85195	3.275416
Democracy	-0.01545	0.01654	-0.93	0.35	-0.04787	0.01697
Economic Development	4.872976	1.836081	2.65	0.008	1.274323	8.471629
Exchange Rate	-0.01556	0.269939	-0.06	0.954	-0.54464	0.513506
Financial Development	0.06522	0.028701	2.27	0.023	0.008969	0.121472
Financial Openness	0.828188	0.35986	2.3	0.021	0.122874	1.533501
Government Stability	0.346772	0.11484	3.02	0.003	0.121691	0.571854
IMF Program	2.280652	0.553904	4.12	0.001	1.195022	3.366283
Public Debt	0.000957	0.009251	0.1	0.918	-0.01717	0.019088
Total Donors	0.442142	0.053137	8.32	0.001	0.337996	0.546289
Total ODA	-0.50003	0.296423	-1.69	0.092	-1.08101	0.080947
Log Likelihood	-82.9					
Observations	660					

Finally, to limit potential bias arising from reverse causality, we have estimated the baseline equation on a reduced sample where all observations for a country are dropped after a fiscal rule has been adopted. The results of this robustness test are presented in Table 5. The macroeconomic variables still come in with the same sign, but not significant at conventional levels. Table 5 also shows that government stability and more donors are associated with the introduction of fiscal rules, even when controlling for aid flows and the presence of an IMF program (which are now no longer significant).

Table 5: Baseline Equation in Reduced Sample

Variable	Coef.	Std. Err.	z	P>z	[95% Conf. Interval]	
Checks and Balances	-0.027278	2.86046	-0.01	0.992	-5.63368	5.57912
Democracy	-0.010682	0.0288936	-0.37	0.712	-0.06731	0.045948
Economic Development	8.580056	7.341719	1.17	0.243	-5.80945	22.96956
Exchange Rate	-1.326515	1.667322	-0.8	0.426	-4.59441	1.941376
Financial Development	0.0545578	0.1226903	0.44	0.657	-0.18591	0.295026
Financial Openness	-0.158998	1.211644	-0.13	0.896	-2.53378	2.215781
Government Stability	0.5838151	0.3386878	1.72	0.085	-0.08	1.247631
IMF Program	0.4248084	1.491767	0.28	0.776	-2.499	3.348618
Public Debt	-0.014686	0.0404902	-0.36	0.717	-0.09405	0.064673
Total Donors	0.2852742	0.1425149	2	0.045	0.00595	0.564598
Total ODA	-0.699198	0.886697	-0.79	0.43	-2.43709	1.038696
Log Likelihood	-16.99					
Observations	218					

4. Conclusion

This study examined the factors determining the adoption of fiscal rules for resource-rich developing countries. Results from estimating a conditional fixed-effects logit model indicate that strong macroeconomic fundamentals—economic development, developed financial markets, and low debt levels—and government stability are associated with the introduction of fiscal rules. Interestingly, also the presence of more development partners and an ongoing IMF program are related to the adoption of fiscal rules, even when controlling for aid flows. Government stability and aid donors are also associated with the adoption of high-quality fiscal rules. These findings are generally robust to the use of different estimation techniques, an alternative measure for commodity dependence, and a restriction on the estimation sample.

The results from this study thus suggest that donor agencies, especially multilaterals, have a real influence on the way resource-rich developing countries shape their fiscal policies, even beyond the aid they provide. We interpret this finding to mean that the process of policy dialogue and the technical expertise that is offered make the difference.

However, future research should investigate in more depth how the international community can be most effective in supporting the design and implementation of sound, de facto fiscal policies. For instance, given that fiscal rules work best when they are localized, embedded in a larger fiscal framework, and backed by

sound political institutions (IMF, 2009), there is a need to take these dimensions into account when supporting the introduction of fiscal rules.

References

- Acemoglu, D., 2003. Why not a political Coase Theorem? Social Conflict, Commitment, and Politics. *Journal of Comparative Economics* 31, 620–652.
- Alesina, A. and G. Tabellini. 1990. A Positive Theory of Fiscal Deficits and Government Debt. *Review of Economic Studies*, 7: 403–14.
- Altunbaş, Y. and J. Thornton. 2015. Why do countries adopt fiscal rules? Bangor: The Business School, Bangor University .
- Besley, T. and T. Persson. 2011. Fragile States and Development Policy. *Journal of the European Economic Association*, 9(3): 371–98.
- Buchanan, J., 1975. The Samaritan's Dilemma. In: Phelps, E. S. (Ed.), *Altruism, Morality, and Economic Theory*. New York: Russel Sage Foundation.
- Calderón, C., and K. Schmidt-Hebbel. 2008. The Choice of Fiscal Regime in the World. Working Paper No. 487. Santiago: Central Bank of Chile.
- Caselli, F. and J. Reynaud. 2019. Do Fiscal Rules Cause Better Fiscal Balances? A New Instrumental Variable Strategy. IMF Working Papers 19/49. Washington, DC: International Monetary Fund.
- Chinn, M.D. and Ito, H. 2008. 'A New Measure of Financial Openness', *Journal of Comparative Policy Analysis* (10): 309-322.
- Clemens, M. A. and M. Kremer. 2016. The New Role for the World Bank. *Journal of Economic Perspectives* 30(1): 53–76.
- Debrun, X., and M. S. Kumar. 2007. The Discipline Enhancing Role of Fiscal Institutions: Theory and Empirical Evidence. Washington, DC: International Monetary Fund.
- Devarajan, S., D. Dollar, and T. Holgren. 2001. Aid and Reform in Africa: Lessons from Ten Case Studies. Washington DC: World Bank.
- Dollar, D. and J. Svensson. 2000. What Explains the Success or Failure of Structural Adjustment Programmes? *The Economic Journal* 110(466): 894–917.
- Dreher, A. 2009. IMF Conditionality: Theory and Evidence. *Public Choice* 141: 233–67.
- Elbadawi, I., K. Schmidt-Hebbel, and R. Soto. 2015. Why do countries have fiscal rules? Santiago: In R. J. Caballero and K. Schmidt-Hebbel (Eds.), *Economic Policies in Emerging-Market Economies Festschrift in Honor of Vittorio Corbo*, 1(21), Chapter 9, pp. 55–189. Santiago: Central Bank of Chile.

- Haggard, S. and S. Webb. 1994. *Voting for Reform : Democracy, Political Liberalization, and Economic Adjustment*. Washington DC: World Bank.
- Heinemann, F., M. D. Moessinger, and M. Yeter. 2018. Do Fiscal Rules Constrain Fiscal Policy? A Meta-Regression Analysis. *European Journal of Political Economy* 51: 69–92.
- IMF (International Monetary Fund). 2009. *Fiscal Rules: Anchoring Expectations for Sustainable Public Finances*. Washington, DC: IMF.
- _____. 2012. *Macroeconomic Policy Frameworks for Resource-Rich Developing Countries*. Washington, DC: IMF.
- Knack, S. and L. Smets. 2013. Aid Tying and Donor Fragmentation. *World Development* 44 (C): 63–76.
- Molenaers, N., A. Gagiano, L. Smets, and S. Dellepiane. 2015. What Determines the Suspension of Budget Support? *World Development* 75: 62–73.
- Reinhart, C. M. and K. S. Rogoff. 2017. *Exchange Arrangements Entering the 21st Century: Which Anchor Will Hold?* NBER Working Paper 23134. Cambridge: National Bureau of Economic Research.
- Rogoff, K. 1990. Equilibrium Political Budget Cycles. *American Economic Review* 80(1): 21–36. March.
- Schaechter, A., Budina, N., Weber, A. and Kinda, T. 2012. *Fiscal Rules in Response to the Crisis. Toward the Next Generation Rules: A New Dataset*. IMF Working Papers 12/187, International Monetary Fund.
- Schick, A. 2003. *The Role of Fiscal Rules in Budgeting*. Paris: OECD.
- Schmidt-Hebbel, K. and R. Soto. 2017. *Fiscal Rules in the World: Rethinking Fiscal Policy After the Crisis*. Cambridge: Cambridge University Press.
- Smets, L. 2020. Supporting Policy Reform from the Outside. *World Bank Research Observer* 35 (1): 19–43.
- Svensson, J. 2000. Foreign Aid and Rent-Seeking. *Journal of International Economics* 51(2): 437–61.

Appendix

A.1 Variable Definitions and Sources

Variable Name	Source	Period	Countries	Definition
Checks and Balances	Polcon 2017	1960-2016	227	Measure of political constraints from 0 to 1 where 1 represents as high as possible checks and balances, and 0 represents none.
Democracy	Polity IV Project 2017	1960-2017	167	An additive eleven-point scale (0-10). The operational indicator of democracy is derived from codings of the competitiveness of political participation, the openness and competitiveness of executive recruitment, and constraints on the chief executive.
Economic Development	WDI 2017	1960-2017	264	Log of GDP per capita.
Exchange Rate	Reinhart and Rogoff Classification.	1946-2016	194	Exchange rate classification set on a scale of 1 to 6, with 1 being most rigid (fixed) and 6 "freely sinking".
Financial Development	WDI 2017	1960-2016	264	Domestic credit to private sector (% of GDP).
Financial Openness	Chinn-Ito Index	1970-2016	182	Index which assesses the regulatory controls over current or capital account transactions, the existence of multiple exchange rates, and the requirements of surrendering export proceeds.
Fiscal Rules	IMF	1985-2015	96	Dummy variable coded 1 if a country had a <i>de jure</i> fiscal rule in place.
Government Stability	International Country Risk Guide.	1984-2016	146	The risk rating assigned is the sum of three subcomponents, each with a maximum score of four points and a minimum score of 0 points. A score of 4 points equates to Very Low Risk and a score of 0 points to Very High Risk.
IMF Program	IMF	1960-2015	189	Binary variable takes value 1 if country has IMF loan in place.
Public Debt	IMF WEO	1960-2015	189	Debt-to-GDP (%)
Resource Rich Classification 1	IMF	1960-2016		1 if the country is considered resource rich where it is defined as a country in which natural resource revenue or exports are at least 20 percent of total fiscal revenue or exports.
Resource Rich Classification 2	Unctad and own calculations	1995-2017	223	1 if the country is considered resource-rich where it is defined as countries whose primary commodity exports make up more than 60 percent of total merchandise exports.
Total Donors	AidData	1947-2013	224	Takes each arm of organisations separately.
Total Multilateral Donors	AidData	1947-2013	224	Number of multi-lateral donors, reducing the different arms of each International Organisation into their parent company.
Total ODA	AidData	1947-2013	224	Log of total ODA in a given year (2011 USD constant).

A.2 Descriptive Statistics

Variable	Observations	Mean	Std. Dev.	Min	Max
Checks and Balances	366	0.307257	0.283833	0	0.776868
Democracy	366	4.393443	3.421665	0	10
Economic Development	366	7.928749	1.114414	5.676883	9.594332
Exchange Rate	366	2.153005	1.264295	1	6
Financial Development	366	22.15154	17.99881	3.30208	108.56
Financial Openness	366	-0.23032	1.316583	-1.91043	2.359998
Government Stability	366	7.469754	2.035634	2	11.5
IMF Program	366	0.360656	0.480848	0	1
Public Debt	363	53.51466	46.49504	3.89	367.72
Total Donors	352	21.34943	9.017871	1	42
Total Multilateral Donors	345	4.971014	2.08379	1	12
Total ODA	352	20.41923	1.414361	14.68701	24.21806

A.3 Fixed-effects Logit Model for Non-Resource-Rich Developing Countries

Variable	Coef.	Std. Err.	z	P>z	[95% Conf. Interval]	
Checks and Balances	1.408549	1.17047	1.2	0.229	-0.88553	3.702629
Democracy	0.047331	0.029685	1.59	0.111	-0.01085	0.105513
Economic Development	10.15521	1.576281	6.44	0.001	7.065751	13.24466
Exchange Rate	-1.15544	0.369704	-3.13	0.002	-1.88005	-0.43083
Financial Development	0.036706	0.015551	2.36	0.018	0.006228	0.067184
Financial Openness	1.31285	0.301923	4.35	0.001	0.721092	1.904608
Government Stability	0.361148	0.108081	3.34	0.001	0.149312	0.572983
IMF Program	1.54166	0.397653	3.88	0.001	0.762275	2.321046
Public Debt	0.028247	0.006876	4.11	0.001	0.014771	0.041723
Total Donors	0.231215	0.035267	6.56	0.001	0.162093	0.300337
Total ODA	-0.51144	0.17011	-3.01	0.003	-0.84485	-0.17803
Log Likelihood	-121.84					
Observations	668					

A.4 Fixed-effects Logit Model with Multilateral Donors

Variable	Coef.	Std. Err.	z	P>z	[95% Conf. Interval]	
Checks and Balances	0.435269	1.131154	0.38	0.7	-1.78175	2.652289
Democracy	0.006573	0.015102	0.44	0.663	-0.02303	0.036172
Economic Development	5.936706	2.200262	2.7	0.007	1.624273	10.24914
Exchange Rate	0.564867	0.329119	1.72	0.086	-0.08019	1.209928
Financial Development	0.053265	0.038763	1.37	0.169	-0.02271	0.129238
Financial Openness	0.12717	0.401374	0.32	0.751	-0.65951	0.913849
Government Stability	0.401513	0.135414	2.97	0.003	0.136107	0.666919
IMF Program	2.240307	0.63202	3.54	0.001	1.001571	3.479042
Public Debt	-0.07512	0.014755	-5.09	0.001	-0.10404	-0.0462
Total Multilateral Donors	0.900156	0.180321	4.99	0.001	0.546732	1.253579
Total ODA	-0.34644	0.309604	-1.12	0.263	-0.95326	0.260369
Log Likelihood	-70.3					
Observations	360					

A.5 Fixed-effects Logit Model with High-Quality Fiscal Rules

Variable	Coef.	Std. Err.	z	P>z	[95% Conf. Interval]	
Checks and Balances	3.105159	2.605223	1.19	0.233	-2.00099	8.211303
Democracy	0.002351	0.024409	0.1	0.923	-0.04549	0.050192
Economic Development	13.63309	7.811281	1.75	0.081	-1.67674	28.94292
Exchange Rate	-2.70558	17.21022	-0.16	0.875	-36.437	31.02583
Financial Development	0.065888	0.139348	0.47	0.636	-0.20723	0.339004
Financial Openness	0.832331	2.41078	0.35	0.73	-3.89271	5.557372
Government Stability	0.464102	0.354553	1.31	0.191	-0.23081	1.159012
IMF Program	0.906741	1.21659	0.75	0.456	-1.47773	3.291214
Public Debt	-0.03091	0.030853	-1	0.316	-0.09138	0.02956
Number of Donors	1.043186	0.327358	3.19	0.001	0.401578	1.684795
Total ODA	-1.42194	0.820882	-1.73	0.083	-3.03084	0.186959
Log Likelihood	-16.3					
Observations	252					

A.6 Random-effects Probit Model with Multilateral Donors

Variable	dy/dx	Std. Err.	z	P>z	[95% Conf. Interval]	
Checks and Balances	0.001365	0.01516	0.09	0.928	-0.02835	0.031078
Democracy	0.00013	0.000227	0.57	0.566	-0.00031	0.000575
Economic Development	0.022246	0.013367	1.66	0.096	-0.00395	0.048444
Exchange Rate	0.006358	0.004553	1.4	0.163	-0.00257	0.015281
Financial Development	0.001213	0.000416	2.92	0.004	0.000398	0.002029
Financial Openness	0.007908	0.005534	1.43	0.153	-0.00294	0.018754
Government Stability	0.0057	0.002156	2.64	0.008	0.001475	0.009925
IMF Program	0.029427	0.01029	2.86	0.004	0.00926	0.049595
Public Debt	-0.00106	0.000285	-3.71	0.001	-0.00162	-0.0005
Total Multilateral Donors	0.012644	0.003307	3.82	0.001	0.006163	0.019126
Total ODA	-0.00289	0.004093	-0.7	0.481	-0.01091	0.005137
Observations	872					

A.7 Random-effects Proportional Hazard Model with Multilateral Donors

Variable	Haz. Ratio	Robust Std. Err.	z	P>z	[95% Conf. Interval]	
Checks and Balances	0.0168573	0.0326777	-2.11	0.035	0.000377	0.753066
Democracy	1.279668	0.1230961	2.56	0.01	1.059783	1.545175
Economic Development	1.031643	0.4103711	0.08	0.938	0.473081	2.249696
Exchange Rate	0.5012123	0.2458654	-1.41	0.159	0.191634	1.310905
Financial Development	1.067441	0.0149766	4.65	0.001	1.038487	1.097202
Financial Openness	1.167604	0.2939159	0.62	0.538	0.712897	1.912339
Government Stability	1.216641	0.1459621	1.63	0.102	0.961707	1.539155
IMF Program	3.379987	2.242421	1.84	0.066	0.920859	12.40614
Public Debt	0.9894201	0.005337	-1.97	0.049	0.979015	0.999936
Total Multilateral Donors	1.436572	0.2911613	1.79	0.074	0.965623	2.137209
Total ODA	0.9802491	0.2294278	-0.09	0.932	0.619601	1.550817
Constant	0.0001265	0.0003869	-2.93	0.003	3.15E-07	0.05082
Log Pseudolikelihood	-70.5					
Observations	234					

A.8 Fixed-Effects Logit with UNCTAD Resource-Rich Classification and Multilateral Donors

Variable	Coef.	Std. Err.	z	P>z	[95% Conf. Interval]	
Checks and Balances	0.6418555	0.8339685	0.77	0.442	-0.99269	2.276404
Democracy	-0.007226	0.012523	-0.58	0.564	-0.03177	0.017319
Economic Development	9.477789	1.371978	6.91	0.001	6.788761	12.16682
Exchange Rate	-0.050111	0.2257257	-0.22	0.824	-0.49253	0.392303
Financial Development	-0.011444	0.0215969	-0.53	0.596	-0.05377	0.030886
Financial Openness	0.3482414	0.2207918	1.58	0.115	-0.0845	0.780985
Government Stability	0.5092092	0.0936997	5.43	0.001	0.325561	0.692857
IMF Program	1.730414	0.3831753	4.52	0.001	0.979404	2.481424
Public Debt	-0.01339	0.0060975	-2.2	0.028	-0.02534	-0.00144
Total Multilateral Donors	0.7432484	0.1122708	6.62	0.001	0.523202	0.963295
Total ODA	-0.472122	0.2291144	-2.06	0.039	-0.92118	-0.02307
Constant	0.0001265	0.0003869	-2.93	0.003	3.15E-07	0.05082
Log Pseudolikelihood	-143.3					
Observations	654					

A.9 Baseline Equation in Reduced Sample with Multilateral Donors

Variable	Coef.	Std. Err.	z	P>z	[95% Conf. Interval]	
Checks and Balances	-1.09057	2.39915	-0.45	0.649	-5.79281	3.611679
Democracy	-0.01108	0.027541	-0.4	0.687	-0.06506	0.042901
Economic Development	6.624686	6.206794	1.07	0.286	-5.54041	18.78978
Exchange Rate	-1.32213	1.179551	-1.12	0.262	-3.634	0.989753
Financial Development	-0.02846	0.106198	-0.27	0.789	-0.2366	0.179689
Financial Openness	0.275843	0.982094	0.28	0.779	-1.64903	2.200712
Government Stability	0.658257	0.310205	2.12	0.034	0.050266	1.266248
IMF Program	0.880074	1.345354	0.65	0.513	-1.75677	3.516919
Public Debt	-0.02384	0.036405	-0.65	0.513	-0.09519	0.047514
Total Multilateral Donors	-0.05629	0.335302	-0.17	0.867	-0.71347	0.600886
Total ODA	0.177484	0.841258	0.21	0.833	-1.47135	1.826318
Log Likelihood	-19.7					
Observations	212					