

Online Appendix (Not for Publication)

A.1 Data appendix

In this annex, we provide additional information about the data. We first detail a number of adjustments made to the raw data (Section A.1.1). We report a number of standard summary statistics (Section A.1.2). Finally, we provide a detailed table of the sample coverage, along with sources and definitions (Section A.1.3).

A.1.1 Data adjustments

Here, we document a number of data cleaning procedures we applied. These were effected mainly to remove gaps in the series, although in some instances they involve removing outliers or replacing known erroneous observations.

- For government consumption: data for Honduras prior to 1978 were dropped; data for Mali between 1967–1984 were replaced with missing; data for Puerto Rico prior to 1960 were replaced with missing; data for Senegal between 2007–2013 were linearly interpolated with GDP; data for Seychelles between 2004–2005 and 2007–2011 were interpolated with GDP; data for Chad in 2004 and 2006 were interpolated with GDP; datum for Zambia in 2010 was replaced with missing.
- For real GDP: data for Kuwait between 1990–1991 from WDI were replaced with data from the WEO.
- For primary balance/GDP: datum for Dominica in 2002 was interpolated with fiscal balance/GDP; datum for Estonia in 2010 were interpolated with fiscal balance/GDP; datum for Ghana in 1981 was replaced with missing; data for Kiribati in 1992 and 2000 were interpolated with year; datum for St Kitts and Nevis in 1996 was interpolated with fiscal balance/GDP; data for Marshall Islands in 2002 and 2012 were interpolated with fiscal balance/GDP; datum for Swaziland in 1985 was interpolated with fiscal balance/GDP; datum for St Vincent and the Grenadines in 2002 was interpolated with fiscal balance/GDP.
- For the subcomponents of the polity measure, instances of foreign interruption (-66) were converted to missing, and interregna (-77) were replaced with 0 (consistent with the transformation of the raw Polity index to the continuous Polity2 index). Cases of transition (-88) were filled in with the Polity2 score, adjusted to the corresponding subcomponent’s respective weight (executive recruitment: 4/10, executive constraints: 7/20, political competition: 1/2).
- The 2006 observation of government revenue for Zambia (from the WDI) was replaced with 21.8 percent, drawn from the WEO data.

A.1.2 Summary statistics

Table A.1: Summary statistics for main variables of interest, full panel[†]

Variable	N	Mean	Std Dev	Min	Max
<i>Full sample</i>					
Real gov consumption	6,275	9863.32	62086.90	0.01	828714.20
Real gov expenditure	5,383	17638.57	117129.20	0.01	1836263.00
Primary exp/GDP	4,411	19.64	13.73	0.56	66.04
Real output	5,383	85289.33	619755.30	0.03	11000000.00
Real growth	4,411	3.46	4.88	-35.33	53.13
Polity	5,521	3.0	7.0	-10.0	10.0
Public debt/GDP	5,051	54.86	53.80	0.06	2092.92
<i>High income</i>					
Real gov consumption	2,225	4477.51	20634.67	0.24	241919.40
Real gov expenditure	1,781	7631.38	36092.22	0.02	368143.20
Primary exp/GDP	2,966	21.64	15.27	0.56	66.04
Real output	2,225	27127.45	134859.00	2.00	1597514.00
Real growth	2,966	3.22	4.79	-35.33	53.13
Polity	1,857	7.2	5.7	-10.0	10.0
Public debt/GDP	1,846	47.71	35.24	0.06	283.96
<i>Developing</i>					
Real gov consumption	4,050	12822.19	75594.22	0.01	828714.20
Real gov expenditure	3,563	22833.81	141413.10	0.01	1836263.00
Primary exp/GDP	1,445	15.55	8.46	1.21	48.19
Real output	3,563	114247.80	752586.80	0.03	11000000.00
Real growth	1,445	3.96	5.02	-26.48	38.09
Polity	3,664	0.9	6.6	-10.0	10.0
Public debt/GDP	3,205	58.98	61.64	1.03	2092.92

[†] Middle and bottom panels correspond to summary statistics by income group. Summary statistics are for the untransformed variables, allowing the maximum coverage available for a given fiscal policy measure, but statistics may vary depending on the available sample for a given specification.

Table A.2: Correlation matrix for main variables of interest

	G_c	G_e	G_p	Y	\dot{Y}	Polity	Debt
G_c	1.00						
G_e	0.97	1.00					
G_p	-0.13	-0.20	1.00				
Y	0.95	0.98	-0.13	1.00			
\dot{Y}	0.00	0.08	-0.05	0.03	1.00		
Polity	-0.07	-0.03	0.43	-0.04	-0.03	1.00	
Debt	-0.06	-0.06	0.12	-0.05	-0.09	-0.01	1.00

Table A.3: Correlation between different static and dynamic procyclicality measures[†]

	G_c	G_e	G_p
corr (ρ^u, ρ^e)	0.60 (0.00)	0.75 (0.00)	-0.24 (0.00)
corr (ρ^r, ρ^d)	0.67 (0.00)	0.69 (0.00)	0.09 (0.00)

[†] Significance level of each correlation coefficient reported correspondingly below, in parentheses.

A.1.3 Sample, definitions and sources

Table A.4: Sample of countries[†]

Albania ^{†,‡}	Ecuador ^{†,‡}	Paraguay ^{†,‡}
Angola ^{†,‡}	El Salvador*	Peru*
Australia*	Estonia&*	Philippines*
Austria ^{†,‡}	Finland ^{*,†,‡}	Poland ^{*,†,‡}
Azerbaijan*	France ^{†,‡}	Portugal ^{*,†,‡}
Bahrain ^{†,‡}	Greece ^{*,†,‡}	Rwanda ^{*,†,‡}
Bangladesh*	Guatemala ^{†,‡}	Saudi Arabia*
Bolivia&*	Honduras ^{†,‡}	Senegal*
Botswana*	India ^{†,‡}	Singapore ^{†,‡}
Brazil ^{†,‡}	Italy*	South Africa*
Bhutan ^{†,‡}	Kenya ^{*,†,‡}	Spain*
Bulgaria ^{†,‡}	Mali*	Sudan ^{*,†,‡}
Canada ^{*,†,‡}	Mauritania*	Suriname ^{†,‡}
Cape Verde ^{†,‡}	Mauritius*	Sweden ^{*,†,‡}
Chad ^{†,‡}	Moldova*	Tanzania*
Chile ^{*,†,‡}	Montenegro ^{†,‡}	Trinidad & Tobago ^{†,‡}
Congo ^{†,‡}	Morocco*	United States ^{†,‡}
Costa Rica ^{*,†,‡}	Namibia*	Uruguay*
Croatia ^{*,†,‡}	Nicaragua ^{*,†,‡}	Yemen ^{†,‡}
Cyprus ^{†,‡}	Norway ^{*,†,‡}	
Denmark ^{*,†,‡}	Panama*	

Countries included in the G_c subsample.

[†] Countries included in the G_e subsample.

[‡] Countries included in the G_p subsample.

Table A.5: Definitions and sources of variables

Variable	Definition and construction	Data source(s) [†]
	<i>Main dependent variables and alternatives</i>	
Government consumption	Cyclical component* of government final consumption expenditure in constant local currency	WDI
Government expenditure	Cyclical component* of general government total expenditure deflated by GDP deflator	WEO
Primary expenditure	Government primary expenditure as share of GDP	Mauro <i>et al.</i> (2015)
Output	Cyclical component* of gross domestic product in constant local currency	WDI/WEO
Growth	Real GDP growth rate	Mauro <i>et al.</i> (2015)
	<i>Alternative dependent variables</i>	
Fiscal deficit	Difference between government revenue and expenditure as share of GDP	WEO
Fiscal balance	Cyclical component* of difference between government revenue and expenditure in constant local currency	WEO
Primary deficit	Difference between government revenue and primary expenditure as share of GDP	Mauro <i>et al.</i> (2015)
	<i>Main independent variables and alternatives</i>	
Polity	Polity2 score of political participation	Marshall <i>et al.</i> (2002)
Democracy	Institutionalized democracy score	Marshall <i>et al.</i> (2002)
Debt	Government gross debt as share of GDP	Abbas <i>et al.</i> (2011)
Fiscal space	Ratio of government gross debt to tax revenue	WDI
	<i>Additional controls</i>	
Δ money supply	Percentage change in broad money supply as share of GDP	WDI
Δ exchange rate	Percentage change in nominal exchange rate relative to U.S. dollar	WDI
Trade balance	Exports net of imports as share of GDP	WDI
Interest rate	Lending interest rate adjusted by GDP deflator	WDI
Corruption	Subjective assessment of corruption within political system	ICRG
Private credit	Domestic credit to the private sector as share of GDP	Jordà <i>et al.</i> (2017)
Fiscal rules	Number of rules (expenditure, revenue, balanced budget, debt) in place	Schaechter <i>et al.</i> (2012)

[†] ICRG = International Country Risk Guide; WDI = World Development Indicators; WEO = World Economic Outlook database

* Cyclical component extracted from HP-filtered series with smoothing parameter set at 6.25.

A.2 Details of additional robustness checks

In this annex, we report the results for robustness checks where we vary: the measure of political participation (left panel), the debt constraint (middle panel), and the fiscal balance (right panel). For the first, we substitute polity with democracy, under the notion that it is the sort of political competition inherent in democracies that matter more for inducing procyclical behavior, which may or may not be relevant in an autocracy.^{49,50} For the second, we substitute total debt with the ratio of public debt to tax revenue, which is a potential measure of fiscal space (c.f. Aizenman *et al.* 2019). For the third, we compute three different measures of the fiscal balance, which embeds the revenue side of the government balance sheet, and may better capture the possibility that it is *net* fiscal position that matters. These measures are the DCC between the fiscal deficit/GDP ratio and real GDP growth (G_d), the cyclical deviation of the real fiscal balance and cyclical deviations of real GDP (G'_d), and the primary deficit/GDP and real growth rate (G_b).⁵¹ For the same reasons as before, we report the specifications with country and time fixed effects, but excluding additional controls.

As can be seen in Table A.6, the results remain broadly robust to our changes. In some cases, the coefficients for either democracy or fiscal space fall out of significance relative to the baseline, but in other (unreported) specifications—either when including only country fixed effects, or with additional controls—certain coefficients become significant. Overall, however, the effects from political economy are more consistently significant, as in the baseline.

When using the various fiscal balance measures, the coefficients are both negative. This is in accord with *a priori* theory for the political economy effect; that is, heightened political participation gives rise to larger deficits, consistent with reduced spending discipline and greater procyclicality (in other words, if procyclicality were present, the correlation between deficits and economic activity would be negative). However, when the debt constraint is more binding, deficits tend to be larger as well. In our view, this is less likely due to an enhanced ability to spend, but rather a diminished ability to raise revenue (that is, the effect operates along the revenue rather than expenditure margin). This is likely to be the case even with our limited efforts to address simultaneity (by including debt with a lag), mainly because the effects of a high debt burden on the budget

⁴⁹Although not reported, further decompositions of polity into its three constituent indexes—executive recruitment, executive constraint, and political competition—reveal that recruitment and competition tend to be more material for procyclicality. Since the executive recruitment score also includes a subcomponent representing the competitiveness of recruitment—whereas the constraints subindex is essentially about decision rules—we conclude that the degree of political competition (in any aspect of government) is the key mechanism that gives rise to procyclicality.

⁵⁰We also considered, as an alternative, a measure of constraints imposed by different government branches with veto power over policy changes (Henisz 2000). The qualitative results obtained are largely similar to the other instances of robustness reported here, and are available on request.

⁵¹Additional details on the definition and construction of these variables are provided in the data appendix.

balance are likely to be persistent.

As discussed in the main text, the reduced statistical significance of the political economy and financial access proxies when using the correlation of activity to fiscal balances could be due to the fact that revenues may be *countercyclical*; if governments choose to slash taxes during contractions (or hike them during expansions), this additional countercyclicality on the revenue side would diminish the procyclicality effects of spending.

Finally, it is worth noting that the sample sizes, especially when using the alternative fiscal access measure, are substantially smaller, as is the country coverage (in all but one case). This provides some justification for not utilizing these metrics in our baseline results.

In footnote 29, we mention that we perform a series of robustness checks on the sensitivity of the results in the specifications with controls (P3, P6, and P9 of Table 3). Our approach is to systematically consider every possible combination of the controls, incrementally building up from just a single variable (AP1–AP9), to permutations of two controls (AP10–AP18). These results are shown in the top three panels of Table A.7.

In all cases, the debt variable does not enter with a statistically significant coefficient, whereas the polity variable does so on a number of occasions. Looking more carefully at the rightmost columns, it is clear that the inclusion of the change in the money supply tends to compromise the significance of the polity variable. This could be either due to sample changes, or because even purely fiscal operations may be accompanied by changes in the money supply as a consequence (Cochrane 2019; Hamburger & Zwick 1981). To better isolate the effect of monetary policy, then, we substitute the money supply—which we chose as a proxy for monetary policy to maximize sample coverage—with the real interest rate, either singly (AP19–AP21) or with the other two cyclical policy controls (AP22–AP24). In either case, the political economy effect turns out to be positive and significant (with financial access remaining insignificant).

In footnote 31, we point to how public investment appears to be cyclical, especially when financial constraints bind. We test this claim using two proxies for public investment. First, we calculate the expenditure-deflated difference of government expenditure and consumption ($G_c - G_e$), as a proxy for changes in public investment (this approach is imperfect because expenditures also include transfer and interest payments; however, if both are fairly constant, then the difference between the two variables will derive mainly from changes to public investment).⁵² The cyclical component is then extracted from

⁵²There is a secondary, technical problem with combining both series: the data for government consumption are in constant local currency units (LCU) (having been deflated by a national expenditure deflator), while that for government expenditure is in nominal LCU, which is then deflated by the GDP deflator. The base year for these deflators differ. While care was taken to ensure that comparable series were used for the baseline (GDP in constant LCU for the former, and GDP in current LCU, suitably deflated, for the latter; and further ensuring that the corresponding series all relied on the same data source), this is not the case for the combined series. While these differences should not be too consequential, it is worth recognizing that the potential for measurement error exists as a result.

this constructed series, and the dynamic conditional correlation is computed vis-à-vis the cyclical component of real GDP. Second, we obtain a (limited) series for the public share of gross fixed capital formation (G_k), available from the OECD for up to 41 economies.⁵³ Since this is a share, following the logic of the argument for the primary expenditure share, we obtain the dynamic conditional correlation relative to the real growth rate.

Table A.9 reports our results for these proxies for the three baseline specifications analogous to Table 3. We offer several observations. First, we find some evidence that, in the presence of debt constraints, government investment does appear to be counter-cyclical. The coefficients on the debt variable are consistently negative, and statistically significant when using the OECD data (albeit applicable to only a small number of countries). Second, the coefficients on the polity measure, while positive as before, tend to be insignificant. This suggests, as implied in the text, that political economy pressures are less likely to matter for public investment. Finally, the important caveat that colors all these findings is that they are based on a much diminished sample: a maximum of 18 economies (and only 37 years) for the ($G_e - G_c$) proxy, but as little as 7 economies (over 42 years) for the G_k proxy. Consequently, we would not be confident in entirely dismissing the role of political economy factors in influencing public investment, although it is likely to be of second-order importance.

In footnote 24, we allude to alternative calculations of the conditional correlation between the primary expenditure share G_p and real growth. We consider two alternatives: the constant conditional correlation (CCC-GARCH) model, and the varying conditional correlation (VCC-GARCH) model. These alternative models differ from our baseline DCC-GARCH model in terms of the parameter restrictions imposed on the correlation matrix. For the former, conditional correlation parameters that weight nonlinear combinations of the conditional variance are held constant; for the latter, these follow a GARCH-like process. The resulting conditional correlations are reported in Table A.8. Tests of equality of means between the different measures relative to our baseline are not statistically different at the 10 percent level.

In footnote 47, we describe additional robustness checks where we consider whether the EMU economies are driving the result that fiscal rules exacerbate procyclicality. More generally, EMU countries may be more subject to politically-driven fiscal cycles, a finding that has some precedence in the literature (c.f. [Castro & Martins 2018](#)). To verify if this is the case, we conduct two sets of tests. First, we introduce an indicator variable for economies in the EMU and examine whether the coefficient on this EMU effect is positive and significant (in this case, the sample retains both non-EMU as well as EMU economies prior to entry). Second, we restrict our analysis to only EMU economies, and

⁵³However, for the majority of these countries, data only begin in 1995 (running through 2018), with longer durations only for 6 economies. As a consequence, the GARCH model fails to converge in the majority cases, depriving us of many countries.

check whether the interaction between the EMU indicator and fiscal rules is positive and significant. As reported in Table [A.10](#), in either case, the EMU effect turns out to be statistically insignificant. These results indicate that the positive effect of rules on procyclicality are not driven by the EMU effect.

Table A.6: Robustness regressions for fiscal procyclicality, 1801–2015 (unbalanced)[†]

	Political economy			Financial access			Fiscal balance		
	G_c (AR1)	G_e (AR2)	G_p (AR3)	G_c (AR4)	G_e (AR5)	G_p (AR6)	G_d (AR7)	G'_d (AR8)	G_b (AR9)
Democracy	0.014 (0.008)*	0.003 (0.009)	0.016 (0.007)**						
Polity				0.018 (0.013)	0.030 (0.011)**	0.006 (0.015)	-0.049 (0.023)**	0.019 (0.027)	-0.008 (0.009)
Debt	0.041 (0.029)	-0.015 (0.027)	-0.035 (0.011)***				-0.080 (0.040)*	-0.012 (0.031)	-0.010 (0.025)
Fiscal space				0.055 (0.041)	-0.037 (0.034)**	-0.075 (0.032)**			
Fixed effects:									
Time?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
R^2 (adj.)	0.469	0.707	0.446	0.447	0.727	0.458	0.523	0.600	0.392
R^2 (within)	0.010	0.001	0.021	0.012	0.014	0.032	0.024	0.003	0.002
Estimation	FE	FE	FE	FE	FE	FE	FE	FE	FE
Errors	Clustered	Clustered	Clustered	Clustered	Clustered	Clustered	Clustered	Clustered	Clustered
Ctry (yr)	44 (57)	41 (37)	40 (211)	41 (44)	36 (37)	40 (39)	68 (36)	38 (37)	38 (211)
Obs.	1,874	1,081	3,228	1,172	782	1,181	1,670	961	3,112

[†] The dependent variable is the dynamic conditional correlation between the cyclical components of economic activity, and either government spending or the fiscal balance, as listed in the second row. All other variables are expressed using the inverse hyperbolic sine transformation and lagged one period. A constant term was included in all regressions, but not reported. Standard errors, clustered over country and year, are given in parentheses. Goodness-of-fit measures report the adjusted R^2 and within R^2 . * indicates significance at 10 percent level, ** indicates significance at 5 percent level, and *** indicates significance at 1 percent level.

Table A.7: Panel regressions for fiscal procyclicality, 1801–2016 (unbalanced), with alternate controls[†]

	G_c	G_e	G_p	G_c	G_e	G_p
	(AP1)	(AP2)	(AP3)	(AP4)	(AP5)	(AP6)
Polity	0.010 (0.008)	0.020 (0.008)**	0.016 (0.009)*	0.010 (0.009)	0.011 (0.009)	0.015 (0.010)
Debt	0.038 (0.030)	-0.011 (0.030)	-0.039 (0.032)	0.023 (0.041)	-0.018 (0.028)	-0.028 (0.037)
Control		TB			Δ MS	
Ctry (yr)	44 (56)	39 (37)	40 (51)	37 (55)	35 (37)	29 (50)
Obs.	1,797	977	1,622	1,485	871	1,208
	(AP7)	(AP8)	(AP9)	(AP10)	(AP11)	(AP12)
Polity	0.010 (0.007)	0.019 (0.009)**	0.013 (0.008)	0.009 (0.009)	0.016 (0.010)	0.016 (0.010)
Debt	0.025 (0.034)	-0.038 (0.025)	-0.021 (0.030)	0.018 (0.040)	-0.014 (0.029)	-0.027 (0.041)
Control		Δ FX			TB, Δ MS	
Ctry (yr)	44 (55)	41 (37)	40 (50)	37 (55)	33 (37)	29 (50)
Obs.	1,755	979	1,583	1,467	772	1,170
	(AP13)	(AP14)	(AP15)	(AP16)	(AP17)	(AP18)
Polity	0.010 (0.008)	0.025 (0.010)**	0.014 (0.009)	0.010 (0.009)	0.011 (0.009)	0.017 (0.010)
Debt	0.020 (0.035)	-0.043 (0.029)	-0.016 (0.034)	0.023 (0.041)	-0.024 (0.028)	-0.015 (0.038)
Control		TB, Δ FX			Δ FX, Δ MS	
Ctry (yr)	44 (55)	39 (37)	40 (50)	37 (55)	35 (37)	29 (50)
Obs.	1,697	875	1,480	1,485	860	1,197
	(AP19)	(AP20)	(AP21)	(AP22)	(AP23)	(AP24)
Polity	-0.005 (0.015)	0.031 (0.012)**	0.036 (0.015)**	-0.005 (0.015)	0.048 (0.014)***	0.034 (0.015)**
Debt	0.015 (0.047)	-0.024 (0.025)	-0.042 (0.027)	0.010 (0.048)	-0.027 (0.027)	-0.038 (0.039)
Control		IR			TB, IR, Δ FX	
Ctry (yr)	31 (55)	27 (35)	26 (50)	31 (55)	25 (35)	26 (50)
Obs.	910	604	722	887	497	678

[†] The dependent variable is the dynamic conditional correlation between the cyclical components of economic activity and government spending listed in the first row. All other variables are expressed using the inverse hyperbolic sine transformation (except for change variables, which are expressed as percentage changes) and lagged one period. TB = trade balance, MS = money supply, FX = exchange rate, IR = real interest rate. A constant term was included in all regressions, but not reported. Standard errors, clustered over country and year, are given in parentheses. Goodness-of-fit measures report the R^2 and within R^2 . * indicates significance at 10 percent level, ** indicates significance at 5 percent level, and *** indicates significance at 1 percent level.

Table A.8: Alternative calculations of conditional correlations[†]

	G_p			
	Mean	Std Dev	t -stat	p-value
DCC	0.66	0.21		
CCC	0.62	0.15	0.64	0.53
VCC	0.78	0.08	-2.16	0.10

[†] The fiscal variable is the primary expenditure share of output, as listed in the top row, and economic activity is the real growth rate. The test statistic is Student's t , and the p-value corresponds to a two-sided test of equality between the conditional correlation calculated from DCC-GARCH relative to the alternative listed in the first column. * indicates significance at 10 percent level, ** indicates significance at 5 percent level, and *** indicates significance at 1 percent level.

Table A.9: Robustness regressions for fiscal procyclicality with public investment proxies, 1970–2016 (unbalanced)[†]

	$G_e - G_c$			G_k		
	(AR10)	(AR11)	(AR12)	(AR13)	(AR14)	(AR15)
Polity	0.018 (0.029)	0.038 (0.037)	0.029 (0.034)	0.221 (0.191)	0.298 (0.282)	0.455 (0.324)
Debt	-0.078 (0.054)	-0.059 (0.062)	-0.016 (0.055)	-0.065 (0.064)	-0.173 (0.048***)	-0.209 (0.040***)
Fixed effects:						
Time?	No	Yes	Yes	No	Yes	Yes
Country?	Yes	Yes	Yes	Yes	Yes	Yes
Controls	No	No	Yes	No	No	Yes
R^2 (adj.)	0.694	0.688	0.684	0.089	0.385	0.363
R^2 (within)	0.050	0.064	0.072	0.006	0.040	0.102
Estimation	FE	FE	FE	FE	FE	FE
Errors	Clustered	Clustered	Clustered	Clustered	Clustered	Clustered
Ctry (yr)	18 (37)	18 (36)	14 (35)	10 (42)	10 (42)	7 (42)
Obs.	478	477	361	254	254	199

[†] The dependent variable is the dynamic conditional correlation between the cyclical components of economic activity and government investment listed in the first row. All other variables are expressed using the inverse hyperbolic sine transformation (except for change variables, which are expressed as percentage changes) and lagged one period. A constant term was included in all regressions, but not reported. Standard errors, clustered over country and year, are given in parentheses. Goodness-of-fit measures report the R^2 and within R^2 . * indicates significance at 10 percent level, ** indicates significance at 5 percent level, and *** indicates significance at 1 percent level.

Table A.10: Fiscal rules and procyclicality in the EMU[†]

	Rules only			Conditioned on rules		
	G_c (AF1)	G_e (AF2)	G_p (AF3)	G_c (AF4)	G_e (AF5)	G_p (AF6)
EMU	0.139 (0.114)	0.094 (0.057)	-0.077 (0.073)	-0.054 (0.250)	0.291 (0.137)*	0.085 (0.118)
EMU × rules				0.022 (0.059)	-0.070 (0.047)	-0.039 (0.047)
Fixed effects:						
Time?	Yes	Yes	Yes	Yes	Yes	Yes
Country?	Yes	Yes	Yes	Yes	Yes	Yes
R^2 (adj.)	0.475	0.735	0.364	0.509	0.813	0.523
R^2 (within)	0.023	0.050	0.062	0.103	0.080	0.056
Estimation	FE	FE	FE	FE	FE	FE
Errors	Clustered	Clustered	Clustered	Clustered	Clustered	Clustered
Ctry (yr)	28 (29)	25 (29)	29 (26)	7 (29)	6 (29)	11 (26)
Obs.	760	604	712	184	163	267

[†] The EMU is defined as the economies that joined the European Monetary Union, according to their date of accession. The dependent variable is the dynamic conditional correlation between the cyclical components of economic activity and government spending listed in the first row. Coefficients on other variables, including a constant term, are not reported. Standard errors, clustered over country and year, are given in parentheses. Goodness-of-fit measures report the adjusted R^2 and within R^2 . * indicates significance at 10 percent level, ** indicates significance at 5 percent level, and *** indicates significance at 1 percent level.

A.3 Additional figures

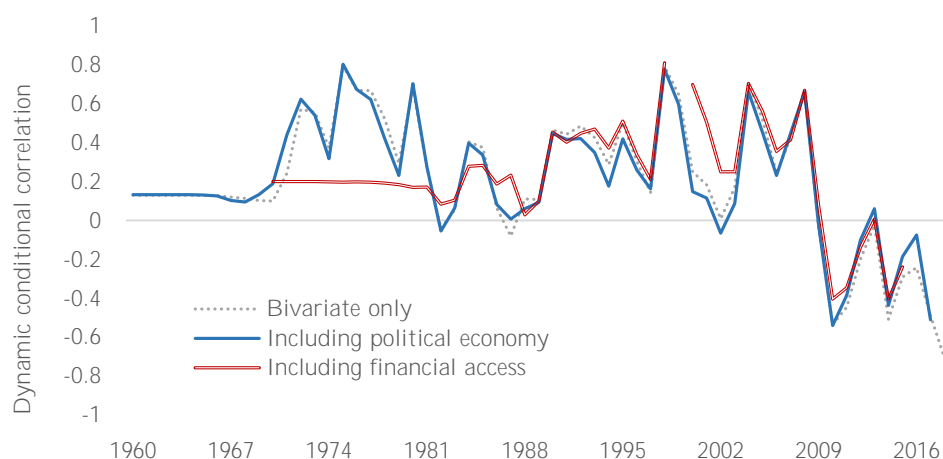
In this appendix, we include a number of additional figures to complement those provided in the main text. Figure A.1 complements Figure 2 in the main text, where dynamic conditional correlations in the bivariate and multivariate models are plotted for Chile and Nicaragua, to illustrate mid-period switches and trends in procyclicality, respectively.

In Section 5.2, we focus the discussion on the conditional effects of including additional variables related to the political economy and financial access channels. Figure A.2 demonstrates that the total effects of polity and public debt never turns significantly negative (these are calculated with the specifications that yield significant coefficients of interest, I3 and I4, respectively). Marginal effects are reported in Table A.11. When evaluated at the means, the marginal effect of polity on $\rho^d(G_p)$ is negative but statistically indistinguishable from zero; similarly, the effect of debt on $\rho^d(G_c)$ is positive but likewise statistically insignificant (these apply as well to the marginal effects of corruption and private credit, although the former is marginally significant). For a hypothetical “average” economy, then, neither political economy nor financial access variables appear to matter for fiscal procyclicality, which underscores the importance of taking into account total effects as well as effects by income-group subsample (both of which were addressed in the main text).

Table A.11: Marginal effects of polity and debt, evaluated at means[†]

	$\frac{dy}{dx}$	CI
Polity	-0.001 (0.013)	[-0.026, 0.024]
Corruption	0.098 (0.055)	[-0.010, 0.207]
Debt	0.010 (0.050)	[-0.088, 0.107]
Credit	0.098 (0.114)	[-0.125, 0.322]

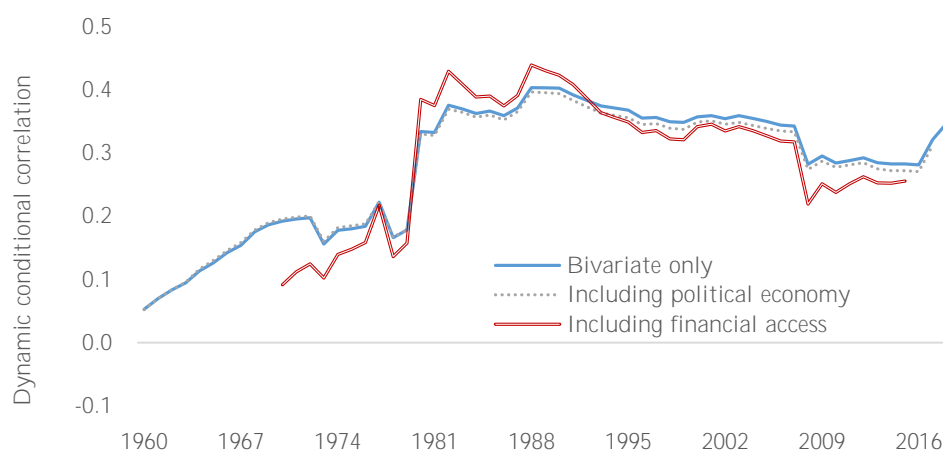
[†] The dependent variable in the regressions is the dynamic conditional correlation between the primary expenditure and economic growth (political economy channel) and the cyclical component of government consumption and output (financial access channel). Variables were expressed using the inverse hyperbolic sine transformation and lagged one period. Standard errors are given in parentheses. * indicates significance at 10 percent level, ** indicates significance at 5 percent level, and *** indicates significance at 1 percent level.



Source: Author's calculations.

Notes: DCC computed from predicted in-sample conditional variance-covariance matrix for bivariate GARCH of cyclical components of real government consumption and GDP, or multivariate GARCH further including either polity or debt.

(a) Chile

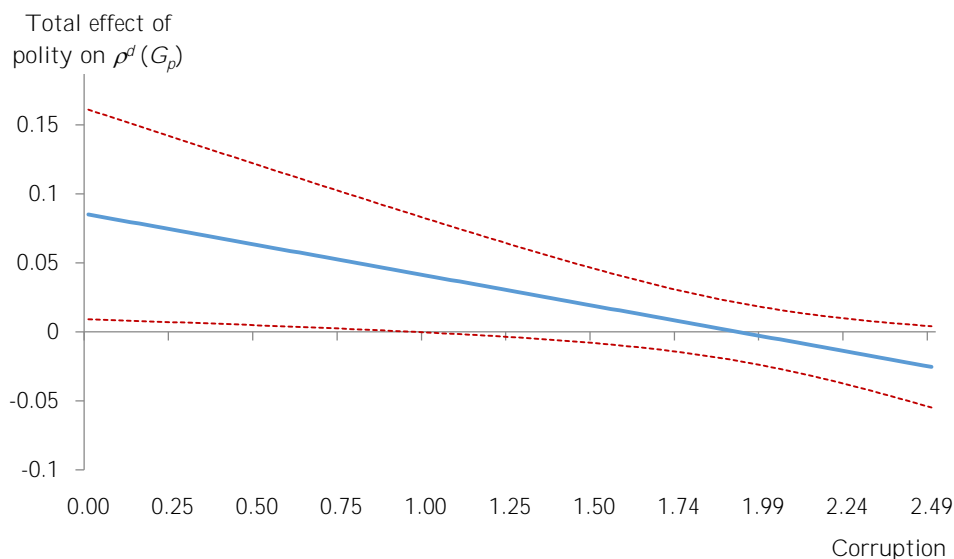


Source: Author's calculations.

Notes: DCC computed from predicted in-sample conditional variance-covariance matrix for bivariate GARCH of cyclical components of real government consumption and GDP, or multivariate GARCH further including either polity or debt.

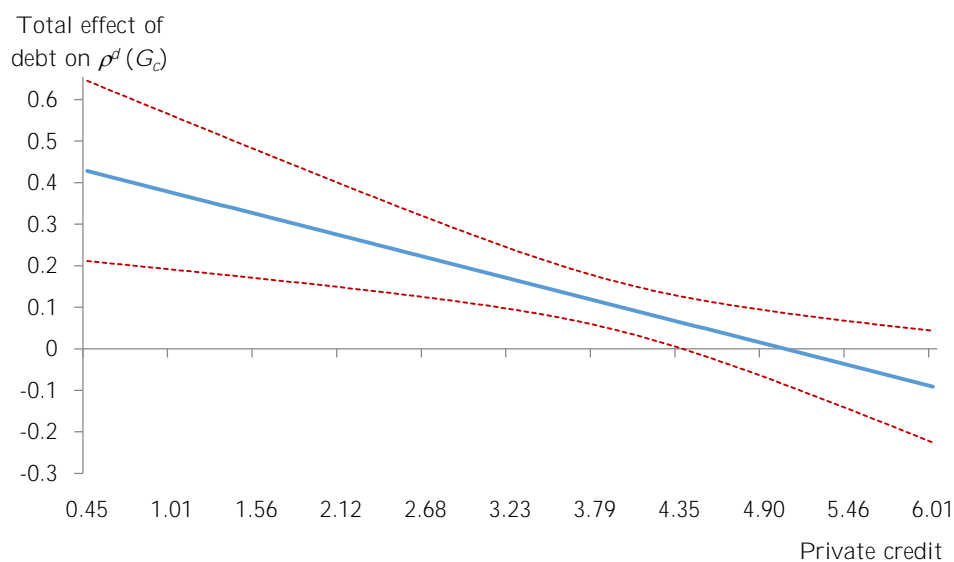
(b) Nicaragua

Figure A.1: Dynamic conditional correlations for Chile (top) and Nicaragua (bottom), 1960–2018, between the cyclical components of government consumption and GDP. In Chile, correlations after accounting for financial access in a multivariate GARCH model are initially very low, before following the bivariate model more closely. Over time, procyclicality is falling in Chile, a result confirmed by others (Frankel 2011). In comparison, procyclicality is rising in Nicaragua, and this appears to be largely due to financial access reasons.



Source: Author's calculations.

(a) Polity-Corruption



Source: Author's calculations.

(b) Debt-Credit

Figure A.2: Total effect of electoral competition, conditional on special interest lobbying (top) and public debt, conditional on private credit (bottom), on the dynamic conditional correlation of primary expenditure and growth, and the cyclical components of government consumption and GDP, respectively. Dashed maroon lines represent the 90 percent confidence bands. Special interest lobbying is proxied with corruption, and private credit with domestic credit to the private sector. Both interaction effects are negative, suggesting that (respectively) electoral competition and lobbying, as well as public and private debt, are substitutes. At very high levels of either corruption and private credit, the respective total effects turn negative, but neither are statistically significant.