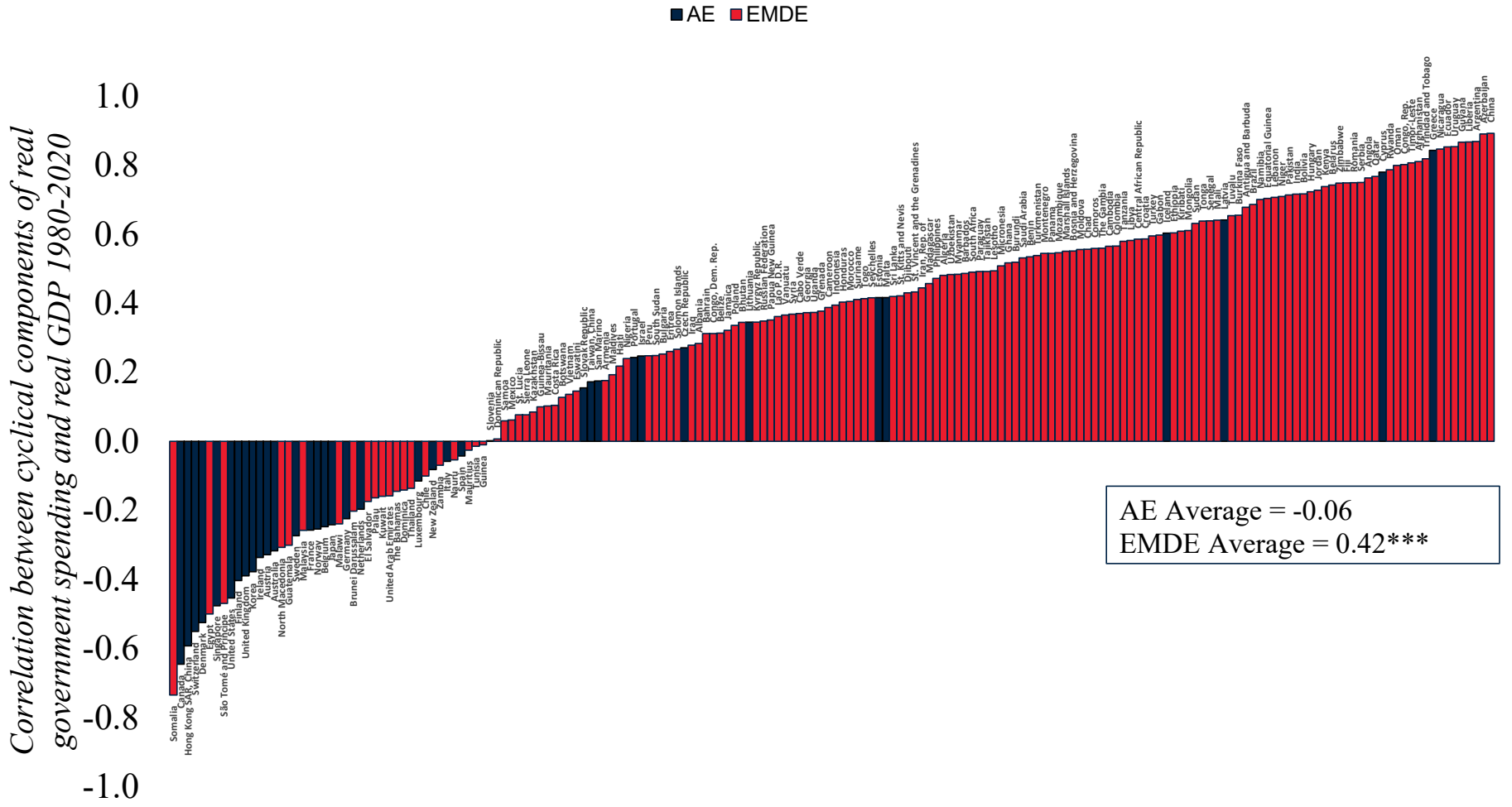
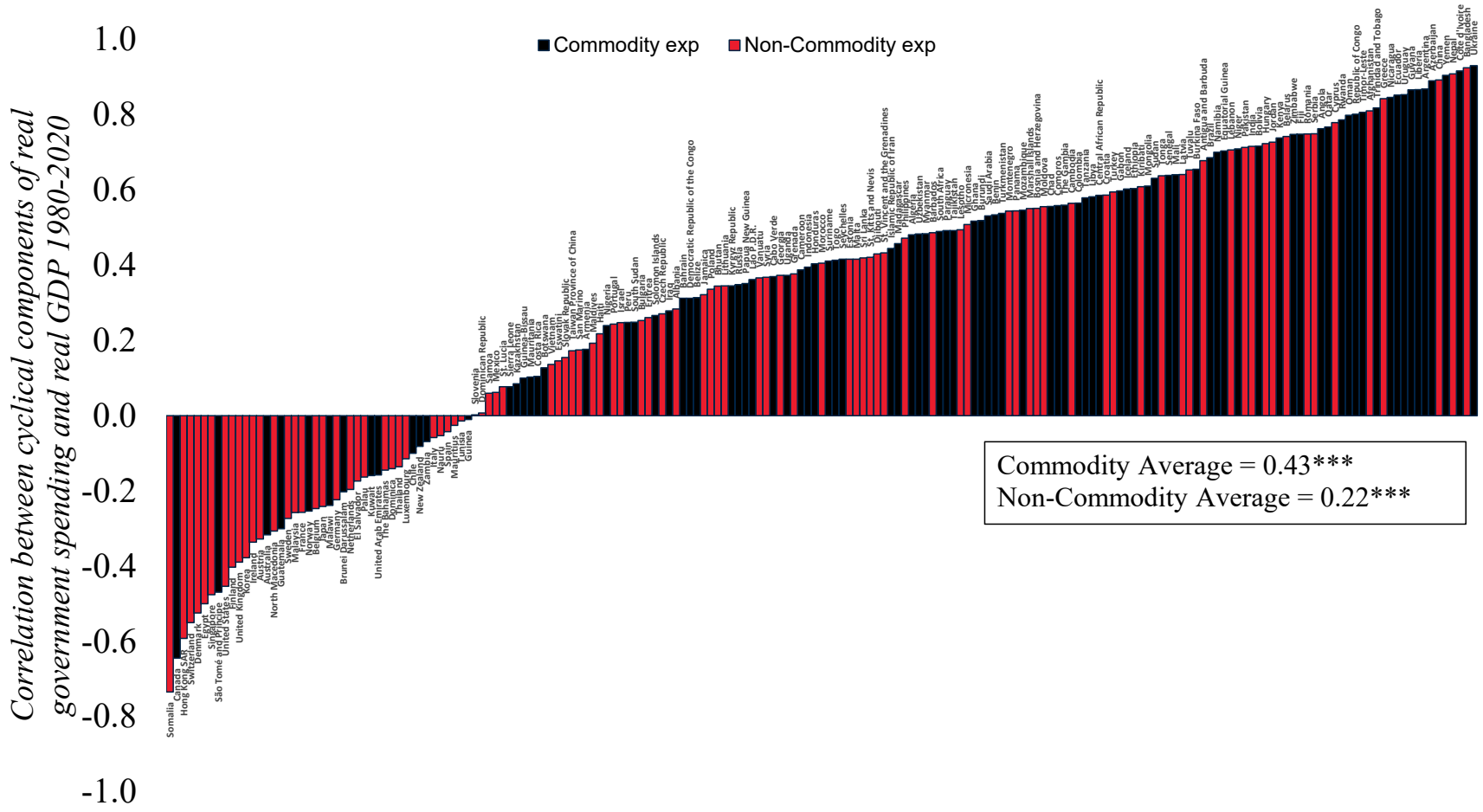
Figure 1. Country correlations between cyclical components of real government spending and real GDP, 1980-2020



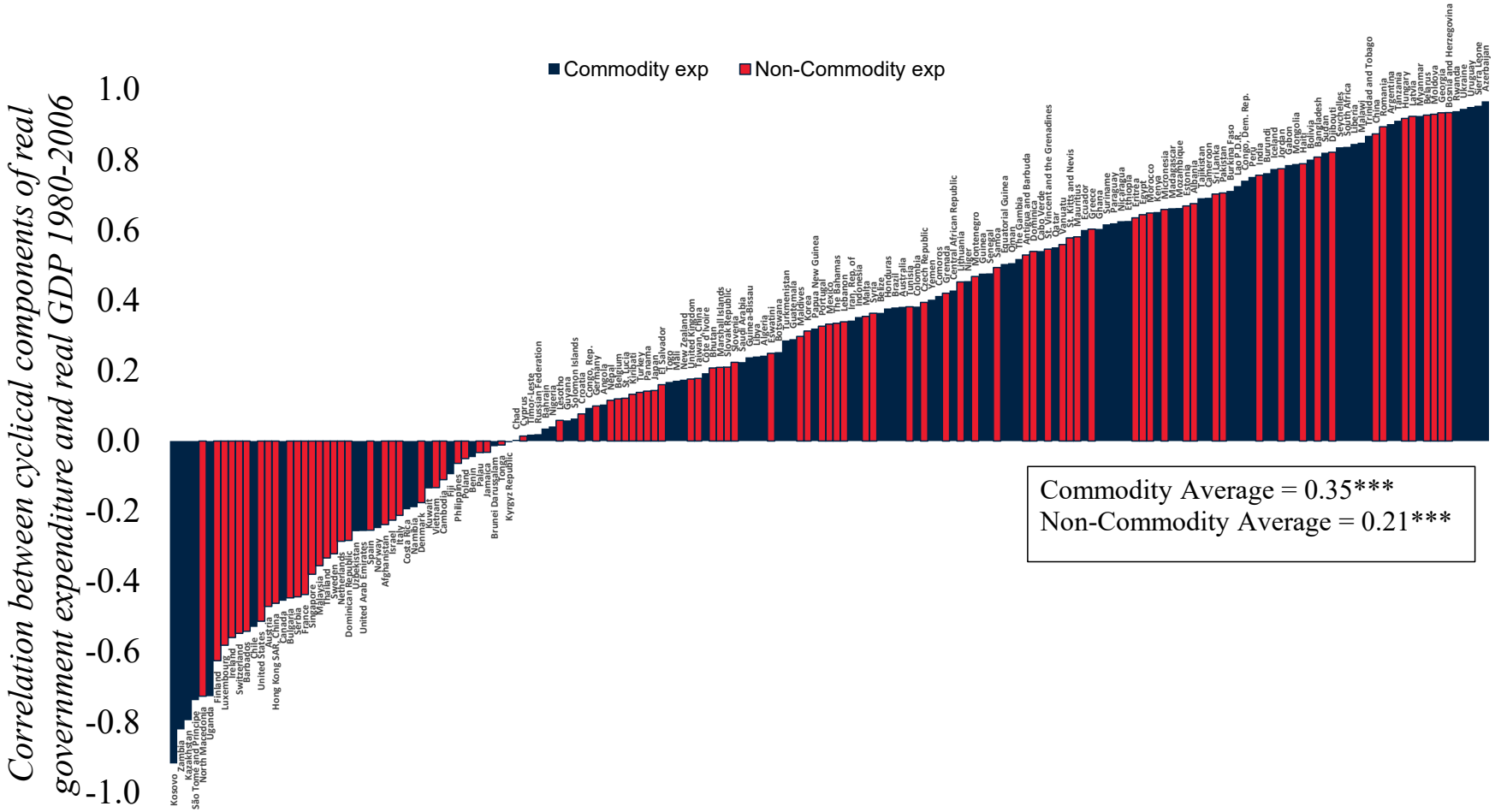
Notes: Black (dark) bars denote advanced economies (AE). Red (light) bars denotes emerging markets and developing economies (EMDE). Each bar represents the correlation between the Hodrick-Prescott cyclical components of real GDP and real government spending. *, **, and *** denote significance at the 10, 5, and 1 percent level, respectively.

Figure 2. Commodity exporters versus non-commodity exporters, 1980-2020



Notes: Same as Figure 1, but bars are now divided between commodity exporters and non-commodity exporters.
Sources: Authors' calculations based on WEO (IMF) data. Commodity classification from World Bank.

Figure 3. Commodity exporters versus non-commodity exporters, 1980-2006



Note: Identical plot as in Figure 2, but for the period 1980-2006.
Sources: Authors' calculations based on WEO (IMF) data.

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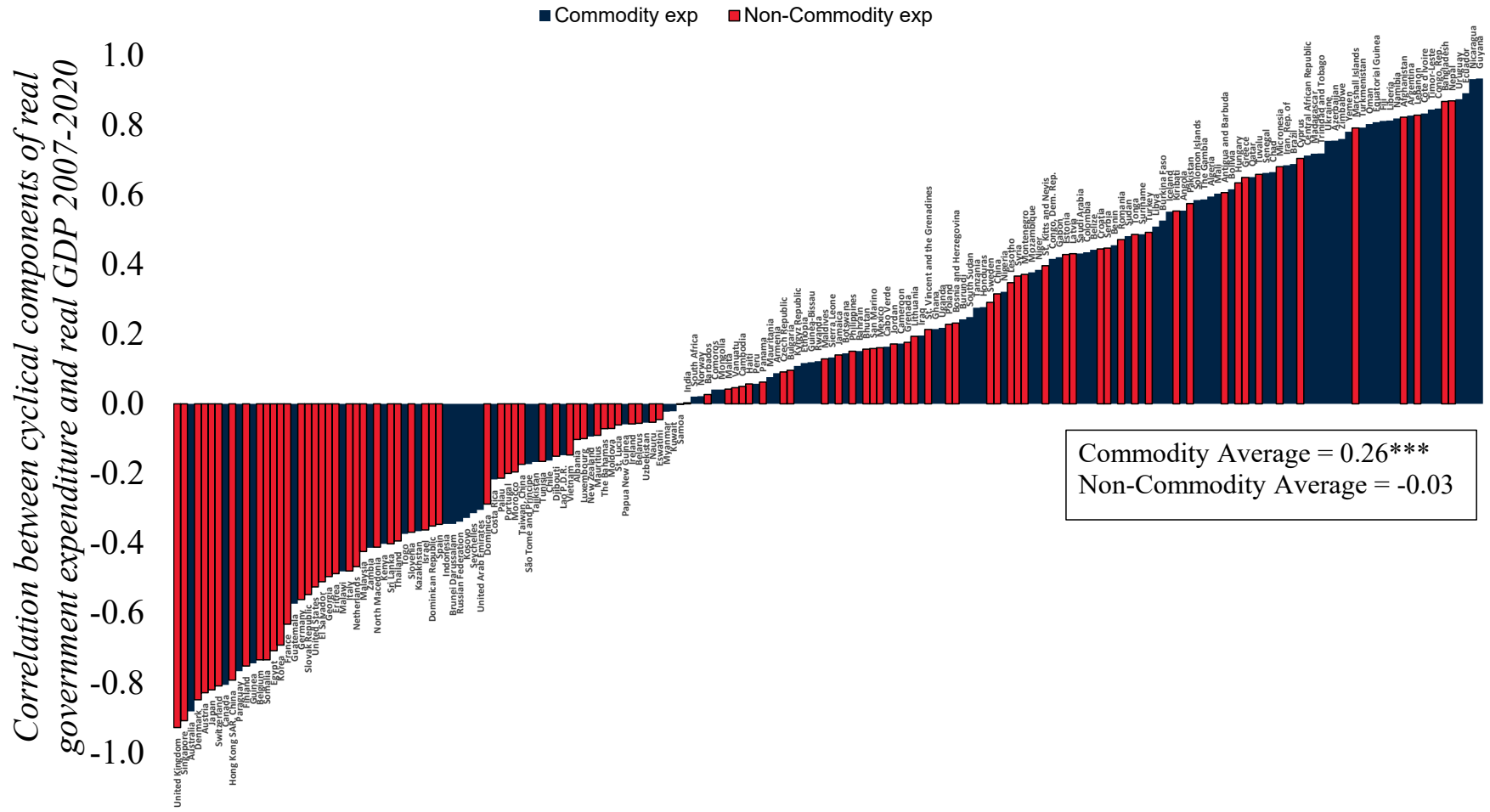
Figure 4. Commodity exporters versus non-commodity exporters, 2007-2020



Note: Identical plot as Figure 2, but for the period 2007-2020.
Sources: Authors' calculations based on WEO (IMF) data.

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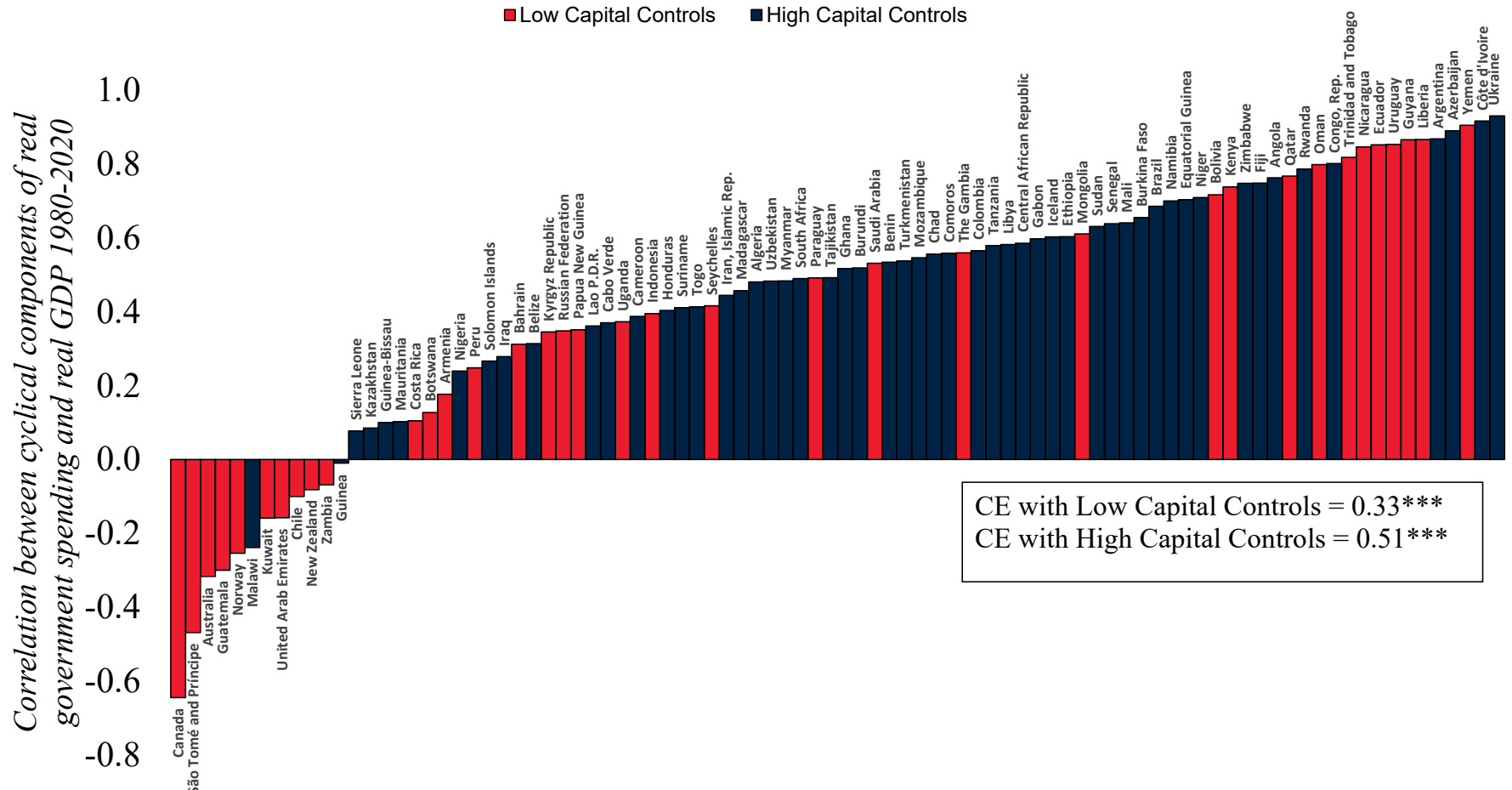
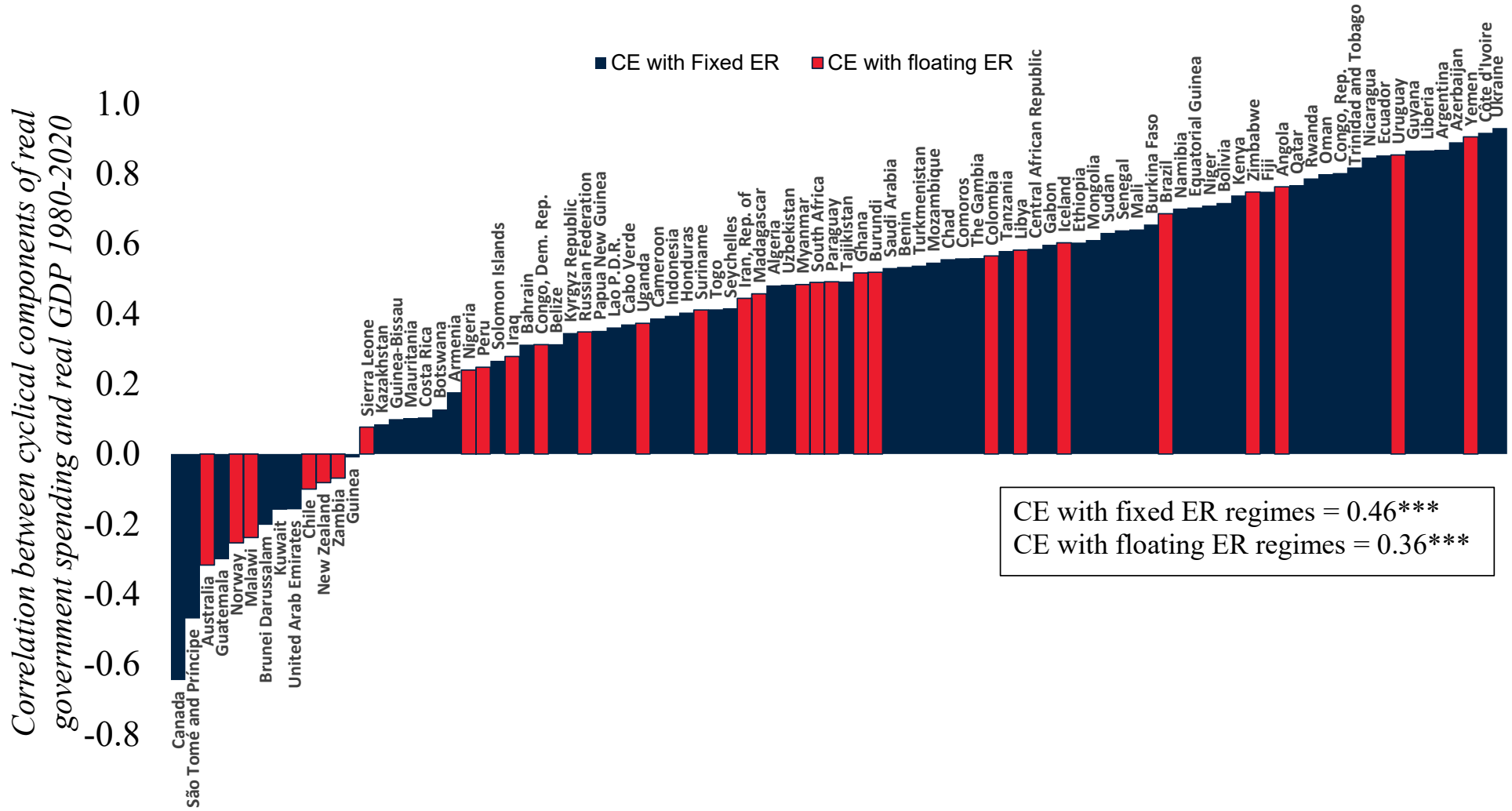
Figure 5. High versus low capital account restrictions, 1980-2020



Notes: Same as Figure 2 but countries are now divided into high and low capital account restrictions. Based on the Chinn-Ito index of financial openness (where a higher number represents more financial openness), a country is classified as having high (low) capital account restrictions if its Chinn-Ito index is below (above) the median. The difference between the two averages is significant at the 5 percent level.

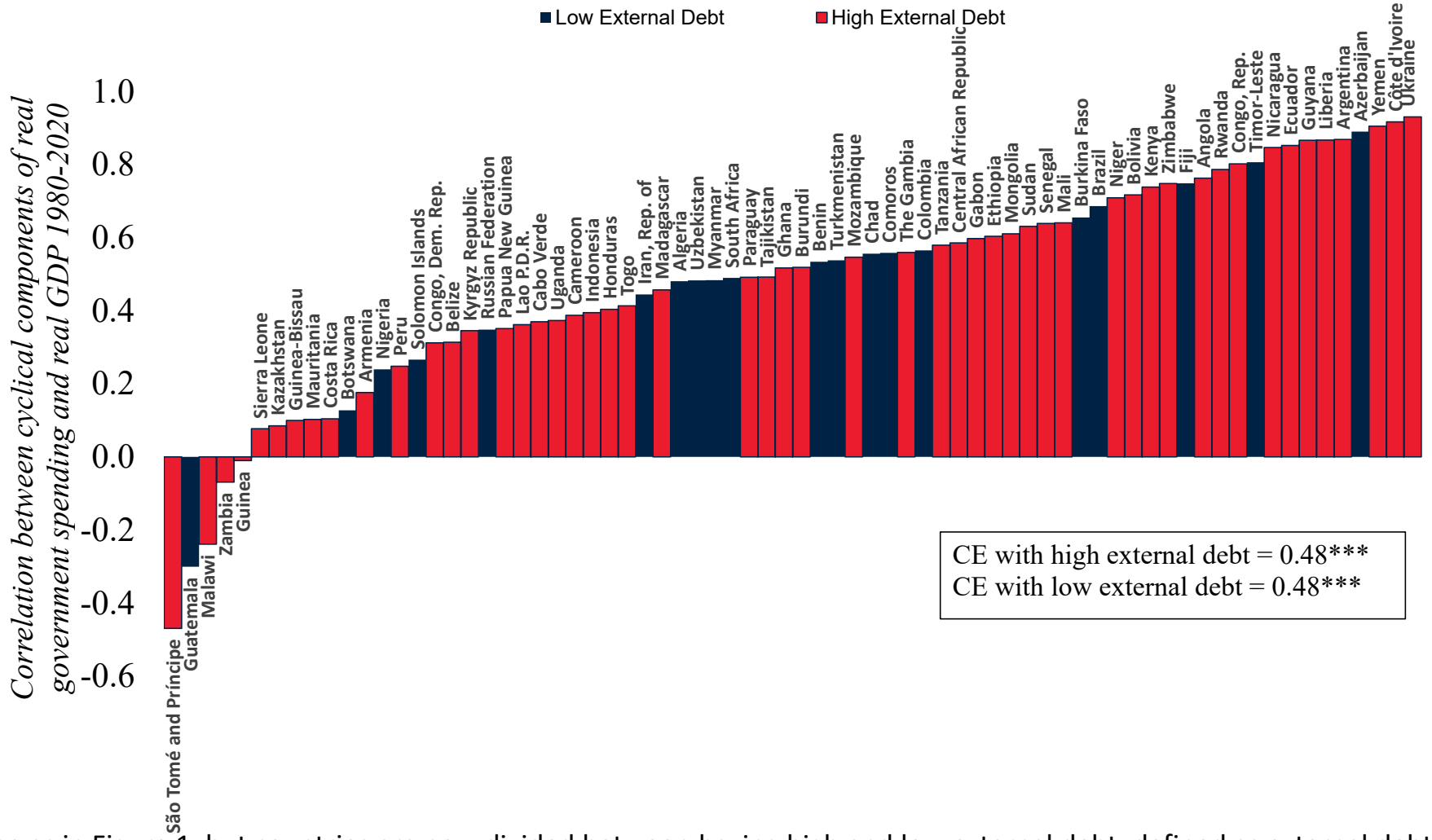
Sources: Authors' calculations based on Chinn-Ito index and WEO (IMF) data.

Figure 6. Exchange rate regime



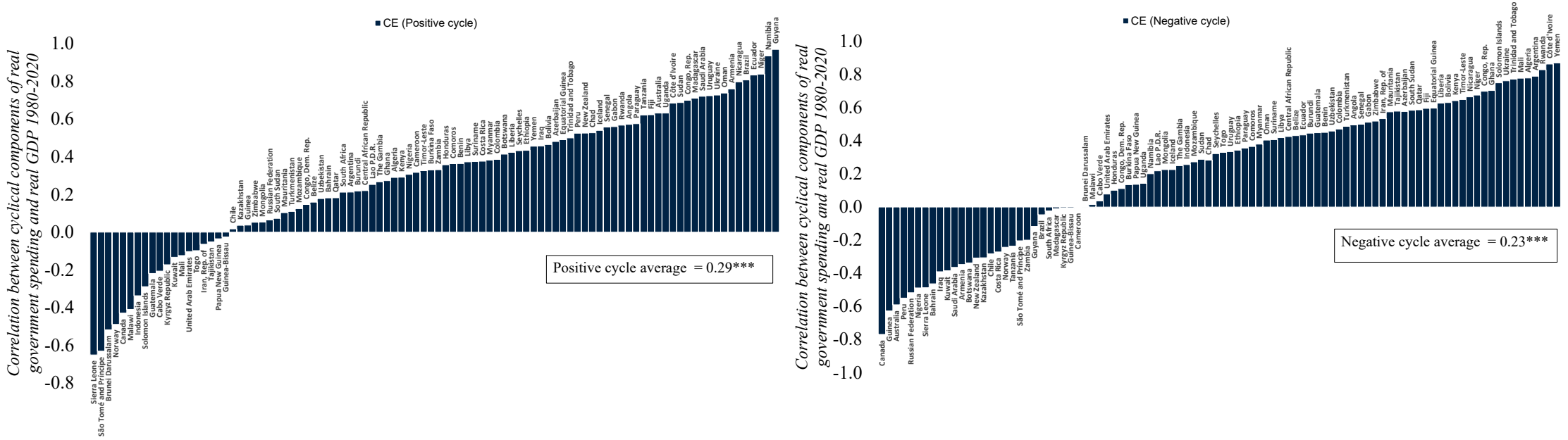
Notes: Same as in Figure 2, but countries are now divided between those operating under fixed exchange rates or floating exchange rate regimes during the sample period, according to the classification in Ilzetzki *et al.* (2021). The difference between the two averages is not significant (p-value is 0.17).
Sources: Authors' calculations based on Ilzetzki *et al.* (2021) and WEO (IMF) data.

Figure 7. High and low external debt



Notes: Same as in Figure 1, but countries are now divided between having high and low external debt, defined as external debt, as percentage of GNI, above (below) the sample median. The difference between the two averages is not significant.
Sources: Authors' calculations based on International Debt Statistics (World Bank) and WEO (IMF) data.

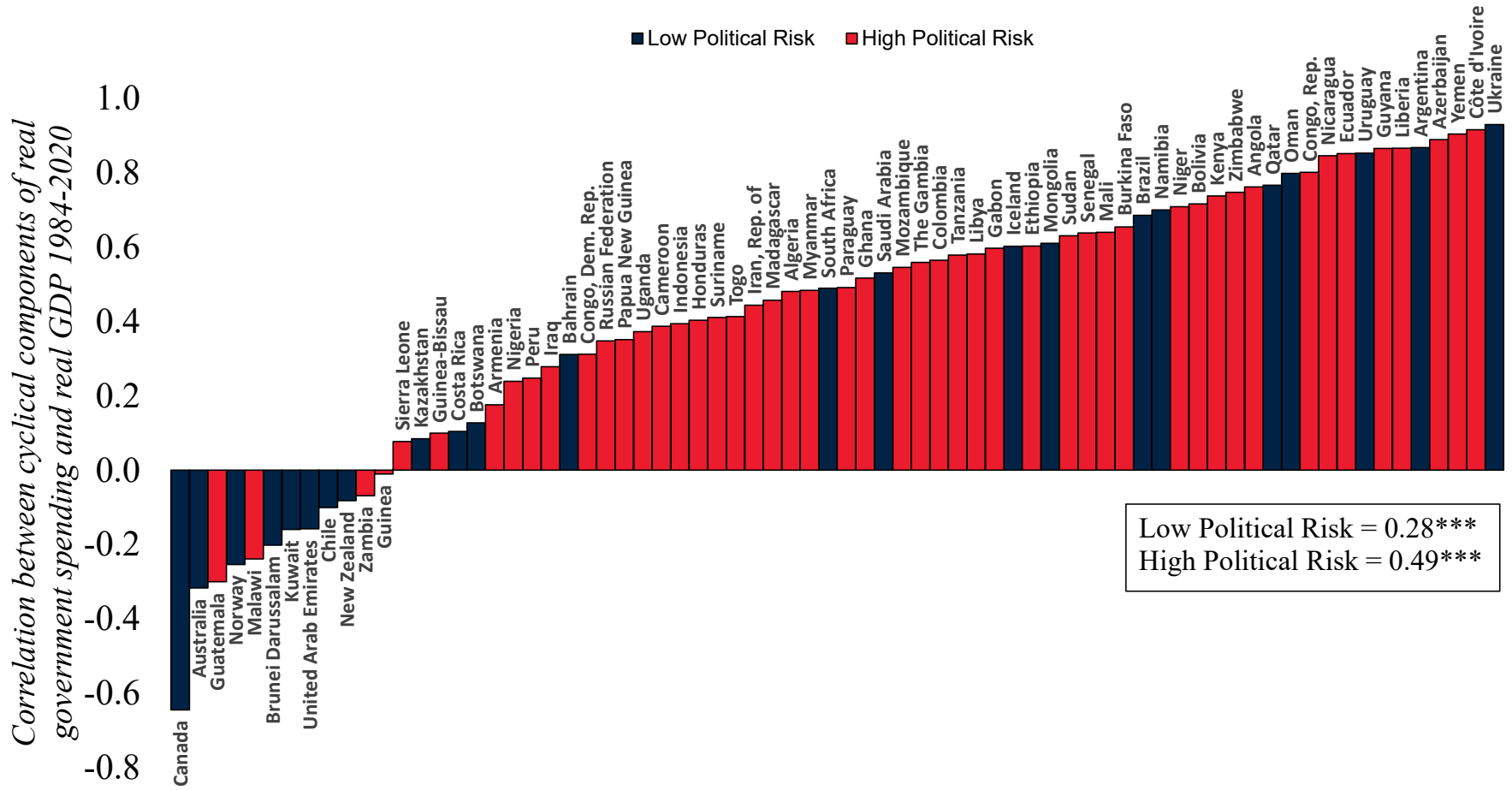
Figure 8. Good versus bad times



Notes: Same as in Figure 2, but countries are now divided between good or bad times. Good (bad) times are defined as a positive (negative) Hodrick-Prescott cycle. The difference between the two averages is not significant.

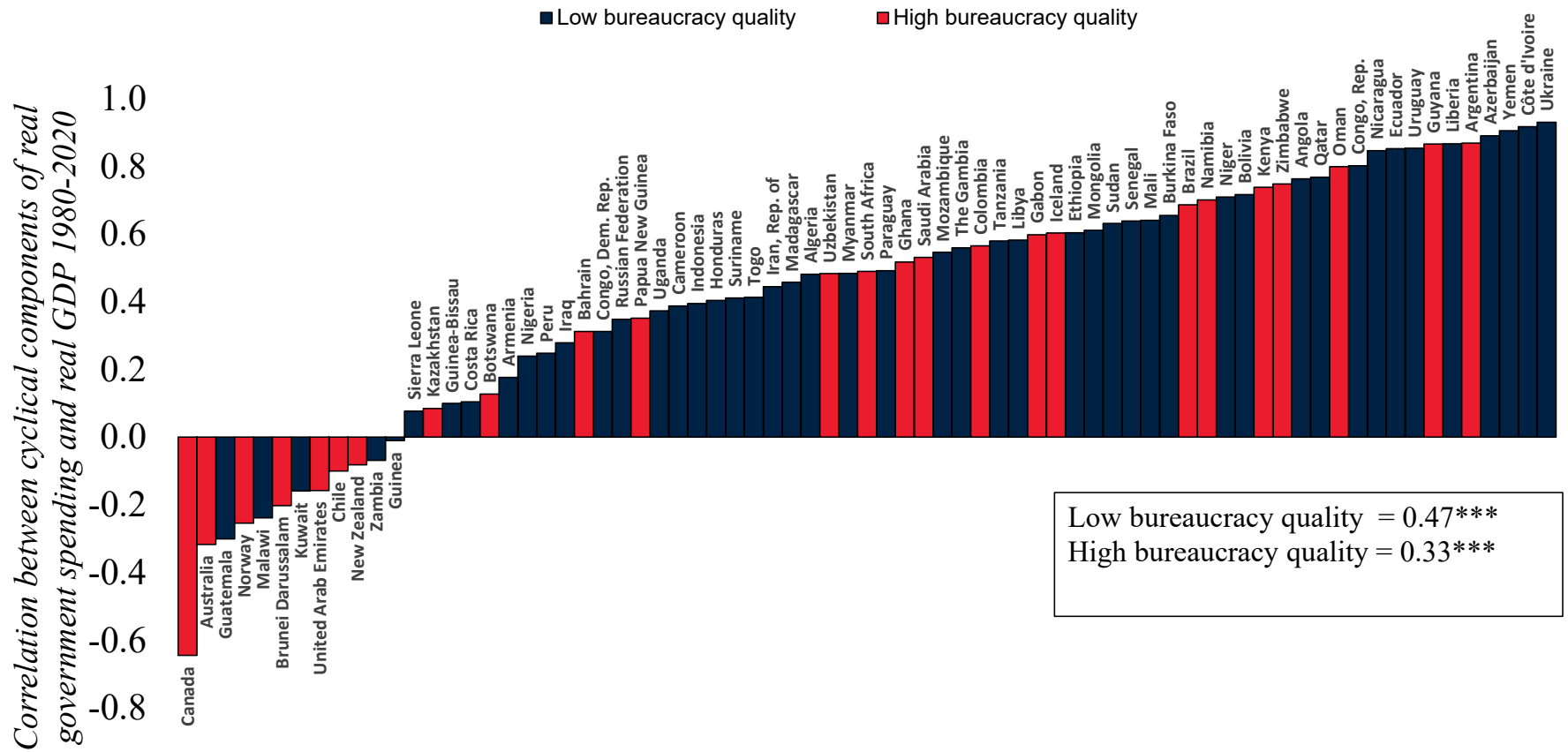
Sources: Authors' calculations based on WEO (IMF) data.

Figure 9. Political risk



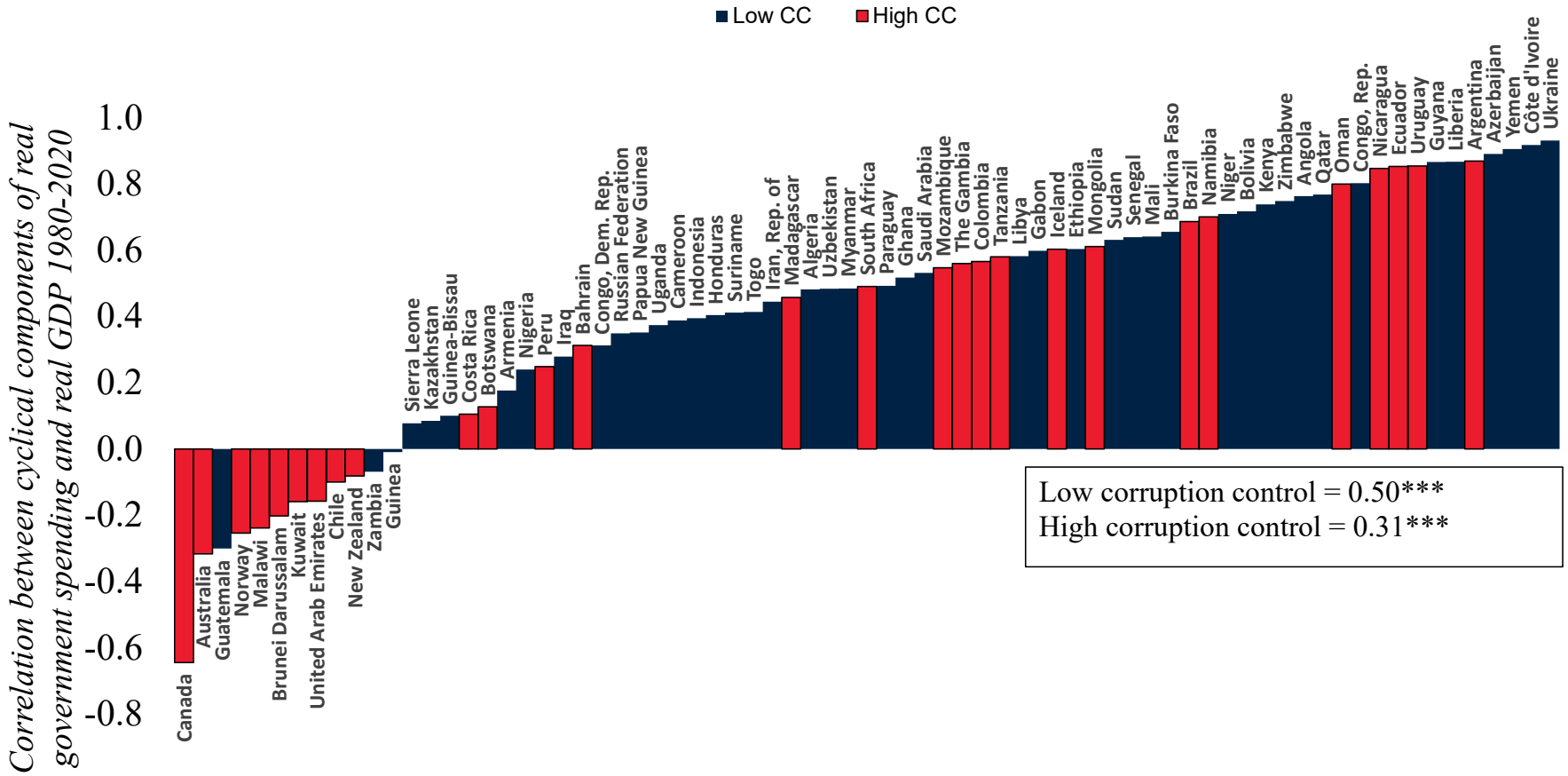
Notes: Same as Figure 2, but countries are now divided according to political risk. High (low) political risk is defined as political risk above (below) the sample median. The difference between the two averages is significant at the ten percent level.
Sources: Authors' calculations based on International Country Risk Guide and WEO (IMF) data.

Figure 10. Level of bureaucracy quality



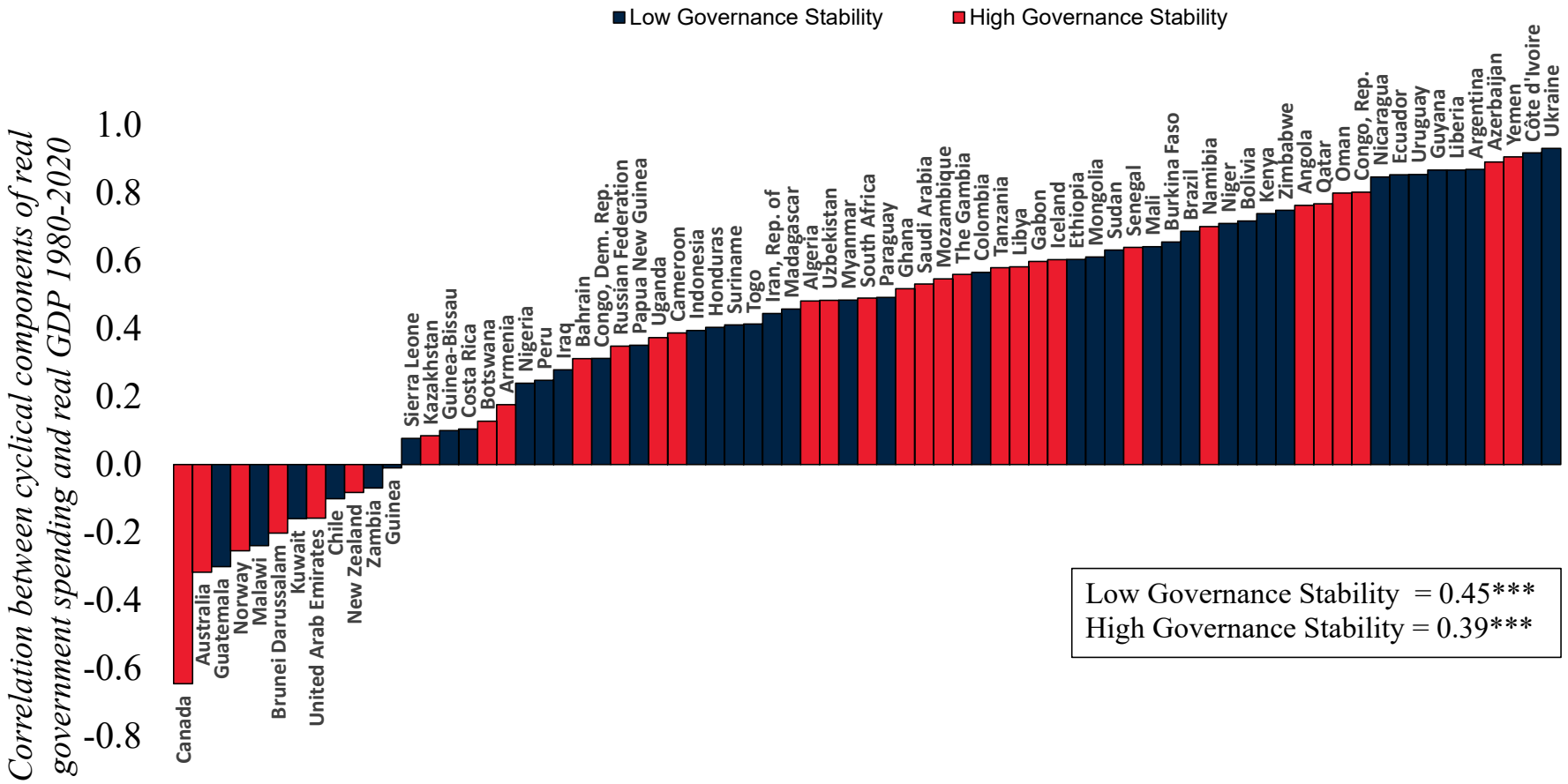
Notes: Same as in Figure 2, but countries are now divided according to level of bureaucracy quality, defined as bureaucracy quality above (below) the sample median. The difference between the two averages is not significant at the 10 percent level (p-value = 0.16).
Sources: Authors' calculations based on International Country Risk Guide and WEO (IMF) data.

Figure 11. Control of corruption



Notes: Same as Figure 2, but countries are now divided between having high (low) control of corruption, defined as control of corruption above (below) the sample median. The difference between the two averages is significant at the 10 percent level.
Sources: Authors' calculations based on International Country Risk Guide and WEO (IMF) data.

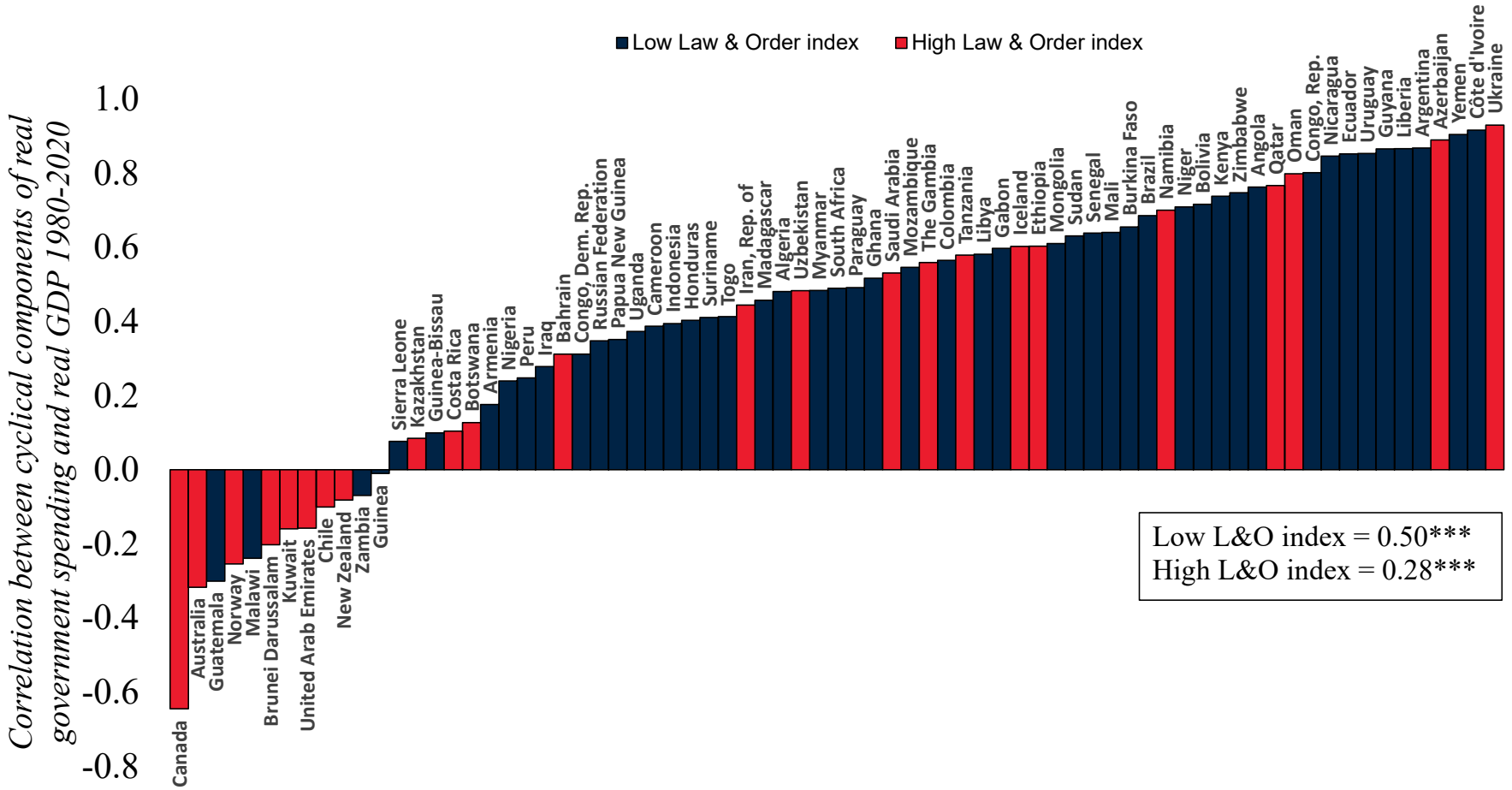
Figure 12. Government stability



Notes: Same as Figure 2, but countries are now divided between having high (low) government stability, defined as government stability above (below) the sample median. The difference between the two averages is not significant.

Sources: Authors' calculations based on International Country Risk Guide and WEO (IMF) data.

Figure 13. Law and order



Notes: Same as in Figure 2, but countries are now divided according to law and order, defined as law and order above (below) the sample median. The difference between the two averages is significant at the 5 percent level.

Sources: Authors' calculations based on International Country Risk Guide and WEO (IMF) data.

Figure 14. Fall in commodity prices

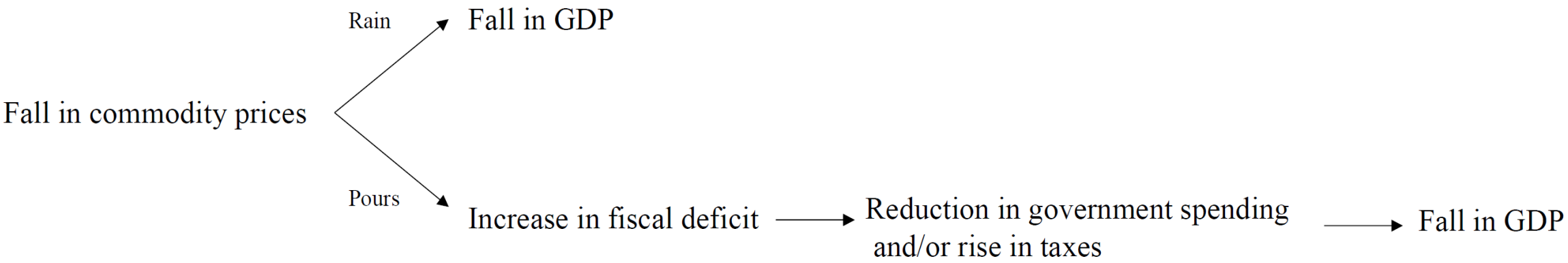
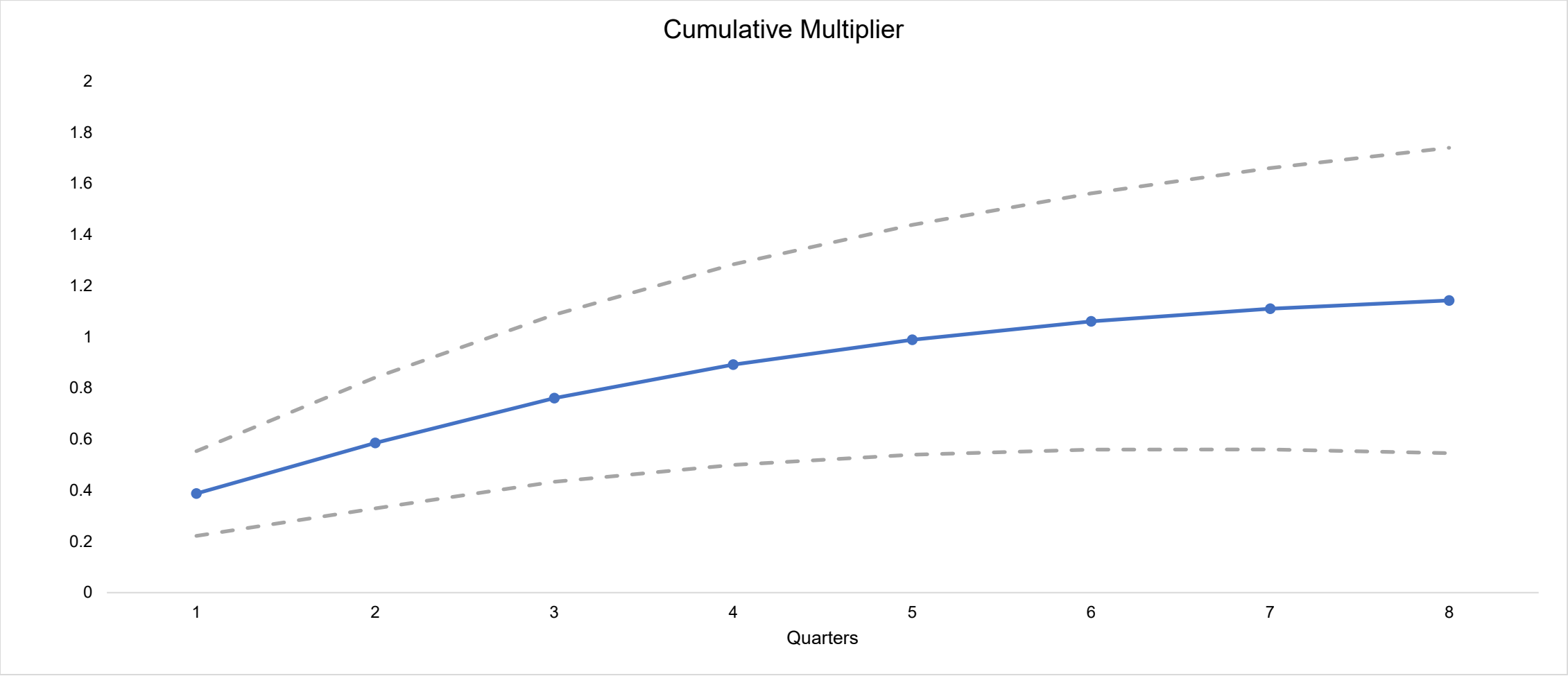


Figure 15. Fiscal multiplier



Source: Computed by the authors from quarterly data for commodity exporters using a panel SVAR with the Blanchard-Perotti identification.

Table 1. Testing theories of fiscal procyclicality

	Dependent variable: CORR(g, y)				
	(1)	(2)	(3)	(4)	(5)
Financial openness	**-0.25 ****				**-0.19**
	(-0.11)				**(0.13)**
Corruption Control		**-0.12 *****			**-0.07**
		(-0.04)			**(0.05)**
Political Constraint Index			**-0.470 ****		**-0.08**
			(0.23)		**0.3**
GDP Volatility				**1.58 ****	**1.26**
				(0.63)	**(0.81)**
F-test					******
R-squared	**0.05**	**0.13**	**0.05**	**0.06**	**0.18**
Observations	**92**	**74**	**92**	**97**	**72**

Notes: Cross-section OLS for commodity exporters. Standard deviations in parentheses. For regression (5), the F-test evaluates the joint significance of financial openness, corruption control, and GDP volatility. *, **, and *** denote significance at the 10, 5, and 1 percent level, respectively.

Table 2. Panel fixed-effects regression of output growth on commodity prices

Table 2. GDP regressions (fixed effects)

	Dependent variable: GDP					
	(1)	(2)	(3)	(4)	(5)	(6)
Explanatory variables	**EMDE**	**EMDE**	**EMDE**	**Full**	**Full**	**Full**
Commodity Export Price Index (EPI)	0.085 ***	0.063 ***	0.080 ***	0.024	0.018	0.026
	(0.014)	(0.017)	(0.013)	(0.021)	(0.03)	(0.026)
Terms of Trade		0.029			0.026	
		(0.022)			(0.02)	
GDP (-1)			0.367 ***			0.366 ***
			(0.045)			(0.038)
Commodity Export Price Index x EMDE				0.062 **	0.046 *	0.054 **
				(0.024)	(0.026)	(0.02)
Observations	381	364	370	533	436	518
Countries	11	11	11	15	15	15
R2	0.068	0.09	0.26	0.065	0.08	0.26
F-Test joint Commodity EPI and EMDE interaction				***	***	***

Notes: Panel least squares with country fixed effects. Standard deviations in parentheses. All variables are in log-differences. Full refers to the sample with AE and EMDE. *,**, and *** indicate statistical significance at 10, 5, and 1 percent, respectively.

Table 3. Panel fixed-effects regression of government spending on commodity prices

Table 3. Fiscal regressions (fixed effects)

	Dependent variable: Real Government Spending					
	(1)	(2)	(3)	(4)	(5)	(6)
Explanatory variables	**EMDE**	**EMDE**	**EMDE**	**Full**	**Full**	**Full**
Commodity Export Price Index (EPI)	0.061 *	0.080 *	0.061 *	-0.123 ***	-0.072	-0.121 ***
	(0.034)	(0.044)	(0.033)	(0.0423)	(0.056)	(0.04)
Terms of Trade		-0.060			-0.072	
		(-0.066)			(0.058)	
GDP (-1)			0.688 ***			0.625 ***
			(0.134)			(0.107)
Commodity Export Price Index x EMDE				0.184 ***	0.158 ***	0.183 ***
				(0.051)	(0.058)	(0.049)
Observations	276	269	276	415	341	413
Countries	11	11	11	15	15	15
R2	0.01	0.0115	0.11	0.03	0.03	0.123
F-Test joint Commodity EPI and EMDE interaction				***	**	***

Notes: Panel least squares with country fixed effects. Standard deviations in parentheses. All variables are in log-differences. Full refers to the sample with AE and EMDE. *,**, and *** indicate statistical significance at 0.10, 0.05, and 0.01 percent, respectively.

Table 4. Pours as a fraction of rain in CE

Emerging Markets	Pours/rain
Argentina	23.4%
Brazil	31.2%
Chile	16.3%
Colombia	18.3%
Costa Rica	12.1%
Ecuador	22.8%
Honduras	17.8%
Indonesia	11.6%
Russian Federation	26.6%
South Africa	20.5%
Ukraine	35.0%
Average	21.4%

Advanced Economies	Pours/rain
Australia	-61.9%
Canada	-66.6%
New Zealand	-65.3%
Norway	-67.8%
Average	-65.4%

Note: Authors' calculations (see text for details).

Table 5. EMDE: Pours as a fraction of change in GDP

Emerging Markets	Pours	Rains
Argentina	19.0%	81.0%
Brazil	23.8%	76.2%
Chile	14.0%	86.0%
Colombia	15.5%	84.5%
Costa Rica	10.8%	89.2%
Ecuador	18.6%	81.4%
Honduras	15.1%	84.9%
Indonesia	10.4%	89.6%
Russian Federation	21.0%	79.0%
South Africa	17.0%	83.0%
Ukraine	26.0%	74.0%
Average	17.4%	82.6%

Note: Columns add up to 100.
Source: Authors' calculations (see text for details).

Table 6. Application to commodity boom episode

2003-2008 Cycle	
Increase in commodity export prices EMDE	76.3%
Increase in commodity export prices AE	65.7%
Government reaction EMDE	4.6%
Government reaction AE	-8.1%
GDP reaction EMDE	6.5%
GDP reaction AE	1.6%
Pours EMDE (GDP pp)	1.1%
Pours AE (GDP pp)	-3.0%
Rain EMDE (GDP pp)	5.4%
Rain AE (GDP pp)	4.6%

Source: Authors' calculations (see text for details).

Table 7. Welfare costs

σ	EM: Pours/GDP	A: Pours/GDP
0.5	2.62%	-5.30%
0.75	2.62%	-5.30%
1	2.63%	-5.30%

Source: Authors' calculations (see text for details).

Table A1. Sample of countries

Table A1. Sample of countries

Commodity exporters	
Algeria	Liberia
Angola	Libya
Argentina	Madagascar
Armenia	Malawi
Australia	Mali
Azerbaijan	Mauritania
Bahrain	Mongolia
Belize	Mozambique
Benin	Myanmar
Bolivia	Namibia
Botswana	New Zealand
Brazil	Nicaragua
Brunei Darussalam	Niger
Burkina Faso	Nigeria
Burundi	Norway
Cabo Verde	Oman
Cameroon	Papua New Guinea
Canada	Paraguay
Central African Republic	Peru
Chad	Qatar
Chile	Russian Federation
Colombia	Rwanda
Comoros	São Tomé and Príncipe
Congo, Dem. Rep.	Saudi Arabia
Congo, Rep.	Senegal
Costa Rica	Seychelles
Côte d'Ivoire	Sierra Leone
Ecuador	Solomon Islands
Equatorial Guinea	South Africa
Ethiopia	South Sudan
Fiji	Sudan
Gabon	Suriname
Ghana	Tajikistan
Guatemala	Tanzania
Guinea	The Gambia
Guinea-Bissau	Timor-Leste
Guyana	Togo
Honduras	Trinidad and Tobago
Iceland	Turkmenistan
Indonesia	Uganda
Iran, Islamic Rep.	Ukraine
Iraq	United Arab Emirates
Kazakhstan	Uruguay
Kenya	Uzbekistan
Kuwait	Yemen
Kyrgyz Republic	Zambia
Lao PDR	Zimbabwe

Non-commodity exporters	
Afghanistan	Malaysia
Albania	Maldives
Antigua and Barbuda	Malta
Austria	Marshall Islands
Bangladesh	Mauritius
Barbados	Mexico
Belarus	Micronesia
Belgium	Moldova
Bhutan	Montenegro
Bosnia and Herzegovina	Morocco
Bulgaria	Nauru
Cambodia	Nepal
China	Netherlands
Croatia	North Macedonia
Cyprus	Pakistan
Czech Republic	Palau
Denmark	Panama
Djibouti	Philippines
Dominica	Poland
Dominican Republic	Portugal
Egypt	Romania
El Salvador	Samoa
Eritrea	San Marino
Estonia	Serbia
Eswatini	Singapore
Finland	Slovak Republic
France	Slovenia
Georgia	Somalia
Germany	Spain
Greece	Sri Lanka
Grenada	St. Kitts and Nevis
Haiti	St. Lucia
Hong Kong SAR, China	St. Vincent and the Grenadines
Hungary	Sweden
India	Switzerland
Ireland	Syria
Israel	Taiwan, China
Italy	Thailand
Jamaica	The Bahamas
Japan	Tonga
Jordan	Tunisia
Kiribati	Turkey
Korea	Tuvalu
Latvia	United Kingdom
Lebanon	United States
Lesotho	Vanuatu
Lithuania	Vietnam
Luxembourg	

Notes: This list comprises 189 countries, divided into 152 EMDE and 37 AE, and 94 commodity exporters and 95 non-commodity exporters.

Table O2: Baxter-King filter

	Figure 1	Figure 2	Figure 4	Figure 5
AE	-0.19***			
EMDE	0.26***			
CE		0.27***	0.28***	0.20***
Non-CE		0.07	0.04	-0.14**