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# Is Procyclical Fiscal Spending Peculiar to ORDC's?

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# Overview

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# Background

- The poor macroeconomic performance of oil rich developing countries (ORDC's) has led to a large body of research examining potential explanatory factors.

Table 1: Displaying the major explanatory factors outlined in the literature behind ORDC's poor macroeconomic performance.

Factors	Authors
Dutch disease	Corden and Neary (1982), Van Wijnbergen (1984) and Ismail (2010).
Rent seeking	Ross (1999), Karl (2004), Collier and Hoeffler (2004), Arezki and Brückner (2009).
Weak democracy	Ross (2001).
Political tensions and civil wars	Tallroth (1997) and Collier and Hoeffler (2002).
Corruption	Karl (1997) and Leite and Weidmann (1999).
Political patronage	Robinson et al. (2006) and Kolstad and Søreide (2009).
Oil price volatility	Husain et al. (2008), El Anshasy and Bradley (2012), Chian (2017).

Source: Author's Derivation.

# Background Cont'd

- Another common factor put forth in the literature is the conduct of sub-optimal procyclical fiscal spending by the state, Coutinho (2011) and Chian (2016).
- Empirical studies generally highlight that fiscal policy is highly procyclical in ORDC's.
- These findings has pertinent policy implications as procyclical fiscal policy has been outlined as one of the contributing factors to the resource curse as outlined by Coutinho (2011), Schmidt-Hebbel (2016), Mohaddes and Raissi (2017).
- Previous studies generally provide anecdotal evidence that procyclical fiscal policy is more pronounced in ORDC's in relation to other developing countries on account of the volatility in oil prices which affects the business cycle.

# Research Questions

- This paper therefore seeks to address the primary research question; was the fiscal response in ORDC's more procyclical in comparison to non ORDC's?
- We also address a secondary research question whereby the following is also examined; was the procyclical bias more prominent in ORDC's compared to manufacturing, agriculture and mineral rich developing countries respectively? .

# Pertinent policy implications on account of procyclical spending

Table 2: Displaying several negative macroeconomic impacts associated with procyclical fiscal policies outlined in the literature.

	Authors
Resource curse	Coutinho (2011), Aguirre and Giarda (2015), Schmidt-Hebbel (2016) and Mohaddes and Raissi (2017).
Macroeconomic volatility and instability	Talvi and Vegh (2005), Alesina et al. (2008), Villafuerte and López-Murphy (2010), Frankel (2011), McManus and Ozkan (2015) and Schmidt-Hebbel (2016).
Inflationary pressures	Villafuerte and López-Murphy (2010), Coutinho (2011), Ossowski (2013) and McManus and Ozkan (2015).
REER (Dutch Disease)	Schmidt-Hebbel (2016).
Hampers long-term economic growth	Tornell (1999), Gurvich et al. (2009), Fatas and Mihov (2009), Woo (2011), Bova et al. (2014) and Mohaddes and Raissi (2017).

# Measuring Fiscal Cyclicity

- The simplest measure of fiscal cyclicity implemented in the literature is the use of the cross-correlation coefficients between the cyclical component of output (the business cycle) and that of a fiscal variable or indicator, see for example Blackburn and Ravn (1992), Kaminsky et al. (2004) and Talvi and Végh (2005).
- However, Lane (2003) and Woo (2009) argues that regression based approaches can be considered more precise.

# Measuring Fiscal Cyclicity

- Fatás and Mihov (2009) highlights that the disparity of findings in the literature may well be on account of the diversity in the measure of fiscal cyclicity or the cyclical indicator utilized.
- The common theme typically arising in the literature is to regress the growth in real government consumption on real GDP growth, see studies by Ilzetzki and Vegh (2008), Thornton (2008), Woo (2009), Erbil (2011), Koh (2016).
- There exists another strand of literature, see works done by Gavin and Perotti (1997), Catão and Sutton (2002) and Alesnia et al. (2008) among many others, that regresses government surplus, or public spending on the output gap, i.e. the business cycle.

# Methodology

- The following dynamic panel model is employed to examine the direction of fiscal cyclicity for 138 developing countries spanning the period 1990 to 2016:

$$\Delta g_{it} = \alpha + \delta \Delta g_{it-1} + \beta \Delta y_{it} + \eta \Delta y_{it} * s_i + \pi s_i + \lambda \Delta W_{it} + \eta_i + \tau_t + \varepsilon_{it} \quad (1)$$

where  $g_{it}$  is the dependent variable real government consumption expenditure in logarithms and  $s_i$  is a binary (0,1) dummy variable taking the value of unity if  $i$  belongs to the group of ORDC's. The independent variable on the right hand side is the log of real GDP ( $y_{it}$ ) and a set of other control variables denoted as  $W$ .

- For all  $i$  for which  $s_i$  equals unity, Equation (1) reduces to:

$$\Delta g_{it} = \alpha + \pi + \delta \Delta g_{it-1} + (\beta + \eta) \Delta y_{it} + \lambda \Delta W_{it} + \eta_i + \tau_t + \varepsilon_{it} \quad (2)$$

- $\eta$  is the key parameter/coefficient of interest, as it highlights the difference in the incremental impact of output on the cyclicity of fiscal policy between developing ORDC's and all other developing countries.

# Methodology Cont'd

- OLS fails on account of the endogeneity problem which can result in biased coefficient estimates.
- Endogeneity bias arises due to: 1. reverse causality between output and government spending; 2. time-invariant country characteristics (fixed effects) may be correlated with the explanatory variables, namely real GDP growth; 3. the presence of the lagged dependent variable in the equation gives rise to autocorrelation in relation to the error term.
- Hence, we use the system generalized method of moments (SGMM) estimator of Arellano and Bover (1995) and Blundell and Bond (1998).

# Data Review

## Definitions and Sources of Variables

<b>Variable</b>	<b>Source</b>	<b>Description</b>
Real GDP growth	WDI	Growth in nominal GDP deflated using the CPI
Real growth in government consumption	WDI	Growth in nominal government consumption deflated using the CPI
Terms of trade	WDI	The percentage ratio of the export unit value indexes to the import unit value indexes
Democracy	Polity IV Project database	Difference between a democracy index (0 to 10) and an autocracy index (0 to 10). For a description of the Polity IV Project database see Marshall and Jaggers (2009).
Dependency	WDI	Ratio of dependants to working age population
Urbanization	WDI	Ratio of urban population to total population
Consumer Price Index (CPI)	WDI	Changes in the cost to the average consumer of acquiring a basket of goods and services

Notes: World Banks World Development Indicators (WDI)

# Examining fiscal cyclicity in ORDC's

Table 3: Cyclical properties of government spending for the period 1990-2016.

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	dln_rgcons									
$\delta$	-0.006	-0.006	0.004	0.006	-0.009	-0.010	-0.003	-0.002	0.000	-0.002
	(0.653)	(0.600)	(0.795)	(0.499)	(0.488)	(0.422)	(0.849)	(0.871)	(0.961)	(0.854)
$\beta$	0.579*	0.615**	0.860**	0.935***	0.497*	0.513**	0.655**	0.680**	0.701***	0.658***
	(0.060)	(0.012)	(0.021)	(0.000)	(0.091)	(0.041)	(0.028)	(0.012)	(0.001)	(0.001)
$\eta$	0.925*	0.883*								
	(0.099)	(0.071)								
$\eta_{HIC}$			-0.830*	-0.260						
			(0.065)	(0.568)						
$\eta_{MIC}$					1.025**	0.953**				
					(0.019)	(0.027)				
$\eta_{MICUPPER}$							0.025	-0.046		
							(0.968)	(0.931)		
$\eta_{MICLOWER}$									0.923***	0.979***
									(0.004)	(0.003)
dln_tot	-0.193**	-0.183**	-0.071	-0.086	-0.148***	-0.139***	-0.068	-0.063	-0.116***	-0.103**
	(0.015)	(0.017)	(0.292)	(0.144)	(0.006)	(0.006)	(0.138)	(0.177)	(0.008)	(0.014)
democracy		0.000*		0.000		0.000		0.000		0.000
		(0.086)		(0.238)		(0.186)		(0.105)		(0.234)
dependency		-0.000		-0.000		-0.000*		-0.000		-0.000*
		(0.579)		(0.481)		(0.066)		(0.114)		(0.060)
urbanization		-0.000		0.000		0.000		-0.000		0.000
		(0.503)		(0.975)		(0.887)		(0.553)		(0.418)
$\alpha$	0.026	0.032	-0.020	-0.001	0.015	0.038	-0.006	0.008	-0.011	0.007
	(0.389)	(0.262)	(0.461)	(0.965)	(0.531)	(0.189)	(0.878)	(0.831)	(0.630)	(0.799)
$\pi$	-0.036	-0.034	0.010	0.006	-0.033*	-0.033*	0.004	0.005	-0.012*	-0.017**
	(0.187)	(0.173)	(0.182)	(0.192)	(0.069)	(0.088)	(0.738)	(0.686)	(0.094)	(0.049)
Observations	2,041	1,879	2,041	1,879	2,041	1,879	2,041	1,879	2,041	1,879
Number of ISO_code	138	122	138	122	138	122	138	122	138	122
Country FE	Yes									
Year FE	Yes									
No. instruments	45	48	36	48	42	45	42	45	42	45
AR(1) (p-value)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
AR(2) (p-value)	0.52	0.47	0.62	0.52	0.47	0.40	0.43	0.32	0.48	0.39
Hansen test (p-value)	0.52	0.55	0.35	0.46	0.75	0.77	0.57	0.67	0.70	0.69

pval in parentheses

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

Notes:

(i) Robust standard errors in parentheses. Windmeijer small sample correction applied.

# Comparing fiscal cyclicality in ORDC's to other export rich countries classifications

Table 4: Cyclical properties of government spending for the period 1990-2016 for various *export rich countries classifications*.

VARIABLES	(1) dln_rgcons	(2) dln_rgcons	(3) dln_rgcons	(4) dln_rgcons	(5) dln_rgcons	(6) dln_rgcons	(7) dln_rgcons	(8) dln_rgcons
$\delta$	-0.006 (0.653)	-0.006 (0.600)	-0.000 (0.995)	-0.002 (0.787)	-0.002 (0.865)	0.002 (0.808)	0.000 (0.968)	0.001 (0.900)
$\beta$	0.579* (0.060)	0.615** (0.012)	0.862*** (0.007)	1.009*** (0.000)	0.737* (0.090)	0.880*** (0.006)	0.763*** (0.000)	0.772*** (0.000)
$\eta$	0.925* (0.099)	0.883* (0.071)						
ORDC's dummy	-0.036 (0.187)	-0.034 (0.173)						
manu_gdp			-0.097 (0.755)	-0.254 (0.422)				
Manu_dummy			0.006 (0.670)	0.011 (0.440)				
agri_gdp					-0.906 (0.930)	-5.306 (0.206)		
agri_dummy					-0.071 (0.924)	0.083 (0.854)		
min_gdp							0.446 (0.205)	0.535** (0.029)
mineral_dummy							-0.019 (0.359)	-0.025* (0.097)
dln_tot	-0.193** (0.015)	-0.183** (0.017)	-0.092 (0.111)	-0.103* (0.058)	-0.080 (0.605)	-0.101 (0.369)	-0.098** (0.049)	-0.098** (0.038)
dependency		-0.000 (0.579)		-0.000 (0.322)		-0.000 (0.591)		-0.000 (0.112)
polity		0.000* (0.086)		0.000 (0.396)		0.001 (0.621)		0.000 (0.241)
urbanization		-0.000 (0.503)		-0.000 (0.873)		-0.000 (0.850)		-0.000 (0.639)
Constant	0.026 (0.389)	0.032 (0.262)	0.005 (0.743)	0.015 (0.406)	0.020 (0.594)	-0.003 (0.960)	-0.007 (0.765)	0.009 (0.734)
Observations	2,041	1,879	2,041	1,879	2,041	1,879	2,041	1,879
Number of countries	138	122	138	122	138	122	138	122
Country FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
No. instruments	45.00	48.00	45.00	48.00	45.00	48.00	45.00	48.00
AR(1) (p-value)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
AR(2) (p-value)	0.52	0.47	0.52	0.36	0.59	0.53	0.96	0.69
Hansen test (p-value)	0.52	0.55	0.62	0.68	0.27	0.33	0.58	0.60

pval in parentheses

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

# Conclusion

- The conduct of fiscal policy has been highly procyclical for the sample of developing ORDC's.
- Fiscal response is inversely related to income levels in ORDC's.
- The findings indicate that procyclicality is more pronounced in ORDC's versus all other non-oil rich countries in addition to manufacturing, agriculture and mineral rich developing countries respectively.
- The findings highlight that pronounced procyclical fiscal response in ORDC's, particularly lower middle income ORDC's could potentially be an explanatory factor behind these countries poor long term growth performance, i.e. the resource curse as well as other key macroeconomic imbalances.



Thank You!!