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Explaining Africa's Public Consumption Procyclicality: Revisiting Old Evidence*

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Abstract

This paper compiles a novel dataset of time-varying measures of government consumption cyclicality for a panel of 46 African economies between 1960 and 2014. Government consumption has, generally, been highly procyclical over time in this group of countries. However, sample averages hide serious heterogeneity across countries with the majority of them showing procyclical behavior despite some positive signs of graduation from the "procyclicality trap" in a few cases. By means of weighted least squares regressions, we find that more developed African economies tend to have a smaller degree of government consumption procyclicality. Countries with higher social fragmentation and those are more reliant on foreign aid inflows tend to have a more procyclical government consumption policy. Better governance promotes counter-cyclical fiscal policy whileincreased democracy dampens it. Finally, some fiscal rules are important in curbing the procyclical behavior of government consumption.

Keywords: government consumption; time-varying coefficients; weighted least squares; inequality; financial constraints; institutions

JEL codes: C22, C23, H50, H60, H62

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1. Introduction

The Global Financial Crisis and its legacies have put fiscal policy at the center of the debate about the policy mix required to help steering economies towards a stable growth path. In addition to the allocation and distribution roles, fiscal policy is also responsible for the macroeconomic stabilization against business cycle fluctuations (Musgrave, 1959). Pressing policy challenges have revived the debate on the effectiveness of fiscal policy as a stabilizer (van der Ploeg, 2005; Botman et al., 2006).[1] A growing number of countries have turned to fiscal policy as their primary stabilization tool either because of changes in their monetary regime or because financial conditions deteriorated to the point of making monetary policy ineffective (Spilimbergo et al., 2008). As economic conditions normalize, policymakers expect to rely on fiscal stabilizers to prevent short-term setbacks and dampen any future volatility, which in turn is known to negatively affect medium-term growth (Ramey and Ramey, 1995).[2]

Against this background, understanding how government expenditure fluctuates with business conditions is extremely relevant from a policy making perspective. Expenditure patterns may change due to policy makers' discretionary actions (even though the majority of the empirical literature suggests a pro-cyclical bias of these measures - van den Noord, 2000) or as a result of the operation of automatic stabilizers (by lessening the effects of the liquidity constraints faced by households and alleviating the impact of exogenous shocks on aggregate current consumption and output - Granado et al., 2013). Government spending has a stabilizing effect if it increases when output growth rises and falls when output growth declines (Furceri, 2010).[3] The more countercyclical government spending is, the higher its stabilizing effect.

Most of the empirical literature looking at the cyclical properties of government expenditure typically uncover i) an acyclical or countercyclical behavior in advanced countries (see e.g. Hallerberg and Strauch, 2002); and ii) a procyclical pattern in developing countries (Gavin et al., 1996; Kaminsky et al., 2004; Alesina and Tabellini, 2005). A number of explanations have been advanced to justify the different cyclical patterns in different groups of countries (see section 2 for more details). Moreover, most empirical studies on this topic can be split in two: i) those that document the cyclical properties of fiscal policy and/or its components; and ii) those that inspect their determinants. The overwhelming majority of papers has focused (due to data-related issues) on empirical analyses of European or OECD countries, with a few exceptions (see e.g. Thornton (2008) for African countries, which serves as the key reference for this paper).

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[1] This stabilization goal can be thought of as a "residual" since it is only a byproduct of choices concerning the size, the structure and the way government is financed which are dictated either by efficiency or distributive considerations.

[2] The argument relates to skill losses due to unemployment in recessions with negative effects on productivity and medium-term growth (Martin and Rogers, 1997); a second argument rests on the observation that growth is usually low in periods of political instability (Alesina et al., 1992); a third one relates to credit market imperfections (Stiglitz, 1994); the most common argument stresses the importance of uncertainty in investment decisions (Dixit and Pyndic, 1994).

[3] Fiscal stabilizers reduce output fluctuations because some components of fiscal accounts react automatically to the business cycle, increasing public deficits in recessions and decreasing them in expansions.

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In this paper we ask two main questions. First, how stabilizing is *de facto* government's consumption in African countries and how has its cyclicality varied over time, between countries and around business cycles' turning points? Second, which macroeconomic, financial, institutional and political variables determine the degree of cyclicality of government consumption in this group of African countries? We make a positive contribution to the debate and we answer the two research questions using a novel empirical strategy. Specifically, we estimate time-varying measures of government consumption cyclicality for a panel of 46 African countries between 1960 and 2014.[4] To the best of our knowledge, this is the first paper that estimates time-varying measures of government consumption cyclicality for a large set of African economies.[5] In addition, we examine which are the most relevant determinants of the time-varying measures of government spending cyclicality. The use of time-varying measures of government spending cyclicality overcomes the key limitation of previous studies assessing the drivers of fiscal cyclicality that rely on cross-country regressions and, therefore, are not able to account for country-specific as well as global factors.

We find that government consumption has been highly procyclical over time in our sample of African countries. However, sample averages hide serious heterogeneity across countries: while the majority show a procyclical behavior, there are some that display positive signs of graduation from procyclicality. By means of weighted least squares regressions, we find that more developed African economies tend to be less procyclical. Also, countries with higher social fragmentation and those more reliant on foreign aid inflows have a more procyclical government spending policy. Better governance promotes counter-cyclical fiscal policy whileincreased democracy dampens it. Finally, some fiscal rules are important in curbing the procyclical behavior of government spending.

The remainder of the paper is organized as follows. Section 2 briefly reviews the literature. Section 3 outlines the methodological framework and discusses the data. Section 4 presents some stylized facts on the estimated cyclicality coefficients. Section 5 discusses the main empirical results on the factors explaining cross-country differences in cyclicality coefficients. The last section concludes.

2. Literature Review

Most discussions on the cyclicality patterns of fiscal policy are centred around two main theories: the Keynesian approach and the Neoclassical tax-smoothing model (Barro, 1979). The Keynesians posit that governments should spend and tax countercyclically, i.e., boosting demand through increased spending or lowering taxes during a recession and doing the opposite during booms (Prasad and Gerecke, 2010). In contrast, Barro's tax-smoothing model recommends an

[4] The selection of countries was based on the criteria of having at least 20 continuous time-series observations of government consumption so as to be able to properly estimate time-varying coefficient models.
[5] Thornton (2008) relied on a sample of 37 African countries between 1960-2004 and carried out a static cross-country empirical analysis.

acyclical fiscal policy that helps keeping government expenditure and tax constant regardless of output fluctuations.

As far as expenditure policy is concerned, in order to stabilize the economy, governments should increase public spending during a downturn and vice versa. This would be a desirable feature from a fiscal stabilization point of view - and indeed a characteristic of most Advanced Economies (Talvi and Vegh, 2005; Staehr, 2008; Egert, 2012). However, Gavin et al. (1996)[6] called the attention to the procyclical nature of expenditure policy in many developing countries (Kaminsky, Reinhart and Vegh, 2004; Talvi and Vegh, 2005; Ilzetzki and Vegh, 2008; Diallo, 2009; Abdih et al., 2010). That is, we observed in several developing countries spending indicators comoving positively with the business cycle, a behaviour that exacerbates booms and aggravates busts. This procyclical pattern was particularly evident in periods of financial distress (Real and Vicente, 2008; Vegh and Vuletin, 2012). [7] Recently, Frankel, Vegh and Vuletin (2013) argued that, over the course of the last decade, roughly one third of the developing world could escape the procyclicality trap and engage in countercyclical fiscal policy.

A number of explanations has been put forward to justify differentiated cyclical fiscal patterns in different groups of countries. Inadequate access to international credit markets and lack of financial depth (Gavin et al., 1996; Gavin and Perotti, 1997; Calderon and Schmidt-Hebbel, 2008) as well as political distortions and weak institutions (Tornell and Lane, 1999[8]; Alesina et al., 2008; Talvi and Vegh, 2005; Acemoglu et al. 2013; Fatas and Mihov 2013; Abbott, Cabral, Jones, Palacios, 2015) were the two main reasons behind the procyclical expenditure behavior in developing countries. The first argument related to the limited access to the international financial market as credit rationing imposed by investors (especially during economic downturns) limits governments´ ability to conduct countercyclical fiscal policy. The second reason was built around the perception that political issues and weak institutions were prime contributors to procyclical fiscal policies (Alesina et al., 2008).

3. Methodology and Data

Our empirical strategy has two stages (following Lane (1998) and Woo (2005)). First, we estimate country-specific coefficients of government consumption cyclicality. Once these coefficients are estimated, we inspect in a second stage, their main determinants based on variables found in the literature to affect fiscal cyclicality. This two-stage strategy will be conducted twice: once using a static approach and once using a dynamic approach.

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[6] These authors were the first to notice the procyclical phenomenon in Latin American countries which differed substantially from the one observed in OECD countries.

[7] Emerging markets have a high reliance on external debt to finance government expenditure (Reinhart and Rogoff, 2011) and face countercyclical interest rates(see Neumeyer and Perri (2005) and Uribe and Yue (2006)).

[8] Tornell and Lane´s (1999) framework highlighted different political blocs competing for a share of fiscal revenues. They argued that competition among these fiscal blocs increased during booms. This approach resulted in increased government expenditure as compared to increased general income – an effect known as voracity.

(continued)

To empirically estimate the degree of cyclicality of fiscal policy, we consider as the key variable of interest the log of real government consumption (*G*). This is the same approach taken by Thornton (2008) which can be justified as follows. First, in analyzing the stance of fiscal policy, public investment should be excluded from governments´ fiscal constraints (Blanchard and Giavazzi (2004), Buiter and Grafe (2004) and Fatás (2005)).[9] Second, expressing government consumption as a share of GDP could lead to erroneous conclusions if the cyclicality effect ends up being dominated by that coming from the denominator (Kaminsky et al., 2004). As mentioned in the introduction, a procyclical fiscal policy is one in which government consumption increases in good times and decreases in bad times. Econometrically, we are interested in first estimating for each country *i* the coefficient β in the following equation:

$$\Delta \log(G_t) = \alpha + \beta \cdot \Delta \log(Y_t) + \gamma \cdot \Delta \log(G_{t-1}) + \varepsilon_t \qquad (1)$$

where Δ is the annual change in a given variable (with t in years), Y_t is real GDP. β captures the degree of government cyclicality. A β>0 implies a procyclical fiscal policy (with values of β above one corresponding to a more-than-proportionate response of government consumption to a change in real GDP), with the reverse being true for β<0. The lagged government consumption variable is included to allow for long-term mean-reversion, a feature consistent with fiscal sustainability in adherence to the government's intertemporal budget constraint and the need to avoid Ponzi schemes. ε is a white noise disturbance satisfying usual assumptions of zero mean and constant variance.

We then assess how government consumption cyclicality coefficients have changed over time in each country by taking a model that generalizes the linear regression model (given by equation 1) and introducing the assumption that regression coefficients may vary over time. We take equation (1) and rewrite it with time-varying parameters, as follows:

$$\Delta \log(G_t) = \alpha_t + \beta_t \cdot \Delta \log(Y_t) + \gamma_t \cdot \Delta \log(G_{t-1}) + \varepsilon_t \qquad (2)$$

The coefficient of interest β is assumed to change slowly and unsystematically over time and its conditional expected value today is equal to yesterday's value. The change of the coefficient β is denoted by $v_{i,t}$, which is assumed to be normally distributed with expectation zero and variance σ_i^2:

$$\beta_t = \beta_{t-1} + v_t \qquad (3)$$

[9] Government investment is perceived as being very different from current consumption expenditures. First, investment decisions have a multi-year horizon, so the reaction to the business cycle might not be contemporaneous and might potentially affect government budgets over several years. Second, the benefits resulting from public investment are spread over many years and generations (raising issues of intergenerational justice and fairness which are outside this paper´s purpose). This paper also does not distinguish between discretionary and non-discretionary components of government consumption (which can be the object of future research), because what really matters for our analysis is the aggregate response of government consumption to the cycle. We thank an anonymous referee for this point.

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Equations (2) and (3) are jointly estimated using the Varying-Coefficient model proposed by Schlicht (1985). In this approach, variances σ_i^2 are calculated by a method-of-moments estimator that coincides with the maximum-likelihood estimator for large samples (see Schlicht, 1985; Schlicht, 2003; Schlicht and Ludsteck, 2006 for details).[10] The model described in equations (2) and (3) generalizes equation (1), which is obtained as a special case when the variance of the disturbances approaches zero. As discussed by Aghion and Marinescu (2008), this method has several advantages compared to other approaches used to compute time-varying coefficients (such as rolling windows and Gaussian methods). First, it allows using all observations in the sample to estimate the government´s consumption cyclicality coefficient in each year—which is not possible in the rolling windows approach. Second, changes in the cyclicality coefficient in a given year come from innovations in that same year, rather than from shocks occurring in neighboring years. Third, it reflects the fact that changes in policy are slow and depend on the immediate past. Fourth, it reduces reverse causality problems when time-varying cyclicality coefficients are used as explanatory variable as they depend on its own past. In addition to statistical superiority, the use of this time-varying technique allows one to better map annual changes in cyclicality with good and bad times of the economic activity for a given country-time pair.[11]

In our second stage, we empirically assess the importance of various macroeconomic, structural and institutional factors in affecting the degree of government spending cyclicality. To formally test the importance of different factors that may explain the cross-country variation in government consumption cyclicality, we estimate the following specification:

$$\hat{\beta}_{it} = \delta_i + \gamma_t + \boldsymbol{\theta}'\boldsymbol{X_{it}} + \epsilon_{it} \qquad (4)$$

where $\hat{\beta}_{it}$ are the static or time-varying coefficient estimates obtained from equations (1) or (2), respectively. $\boldsymbol{X_{it}}$ is a vector of time-varying macroeconomic, structural and institutional variables (to reduce reverse causality, explanatory variables are lagged by one year).[12] δ_i are country effects, to control for unobserved cross-country heterogeneity and time-unvarying factors such as geographical variables. γ_t are time effects to control for global shocks such as the global business cycle or oil shocks. We first estimate equation (4) with Ordinary Least Squares (OLS) using both static (making equation (4) effectively a cross-sectional equation capturing average effects between 1960 and 2014) and time-varying coefficient (TVC) estimates. There is only one study – to the best of our knowledge – that assessed the determinants of fiscal cyclicality at the general level (i.e. not looking specifically at government consumption) using time-varying measures. This paper is by Aghion and Marinescu (2008) but they have focused on a subset of advanced economies. However, since our dependent variable is based on estimates (and it is measured with different levels of precision), we also employ a weighted least squares (WLS) estimator. Specifically, the WLS

[10] The approach proposed by Schlicht (2003) is very similar to that used by Aghion and Marinescu (2008). The main difference is in the computation of the variances σ_i^2. Aghion and Marinescu (2008) uses the Markov Chain Monte Carlo method to approximate these variances, while Schlicht (2003) uses a method-of-moments estimator.

[11] We thank an anonymous referee for this point.

[12] Similar results are obtained using contemporaneous regressors (not shown).

estimator assumes that the errors $\xi_{i,t}$ are distributed as $\xi_i \sim N(0, \sigma^2/s_i)$ in which s_i is the estimated standard deviation of the residuals of the static and time-varying coefficients for each country i, and σ^2 is an unknown parameters that is estimated in the second-stage regression.

In our vector of explanatory variables, X_{it}, we consider five key factors: the level of development, financial constraints, social fragmentation, the degree of corruption and democratic status.

We include real GDP per capita as a proxy of economic development in line with Talvi and Vegh (2005), Thornton (2008) and Mpatswe, Tapsoba and York (2011). This variable is also included to control for potential effects of economic backwardness on fiscal policy and it is expected to be negatively correlated with procyclicality.

In line with Avellan and Vuletin (2015), terms-of-trade can also play a role in affecting the degree of fiscal cyclicality. To capture the international trade component, we rely on trade openness (defined as the sum of exports and imports over GDP) and the growth rate of each economy´s main trading partners. Both variables come from the IMF´s International Financial Statistics.[13]

There is also a literature on how cyclicality changes during good and bad times (Manasse, 2006). Hence, we use a measure of output gap to control for the phase of the business cycle.[14]

Several variables have been used as proxies of the stringency of financial constraints.[15] Developing countries typically face credit constraints, a feature that becomes particularly relevant during bad times. This fact makes fiscal policy more procyclical (Gavin and Perotti, 1997; and Kaminsky et al., 2004). We use as a measure of financial deepening the private credit-to-GDP ratio, as a higher level of financial development positively influences the ability of governments to borrow during downturns, and therefore it is expected to decrease fiscal procyclicality. In addition, most African countries dependent largely on foreign aid. However, budgets in which foreign aid is a major financing component may take overall fiscal stance outside the control of the recipient country, as a result of the limited predictability of aid disbursements (Pallage and Robe, 2001; Bulir and Lane, 2004).

On social fragmentation, on the one hand, societies characterized by more unequal distributions of income are socially more fractionalized and, hence, more susceptible of pursuing procyclical fiscal policies. This happens since divergent preferences about the composition of government spending between different social actors, makes policymakers spend more on the revealed preferences of their key constituencies, contributing to larger overall public expenditure. On the other hand, income inequality has also been shown to be negatively correlated with government spending, particularly on social programs, which tends to strengthen automatic fiscal stabilizers and reduce fiscal procyclicality (Fatas and Mihov, 2001; Pestieau, 2006).

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[13] We decided not to use directly a terms of trade variable since its coverage for African countries is relatively small and would limit the sample size considerably.

[14] The output gap is obtained by filtering with the HP filter the log of real GDP and applying a smoothing parameter of 100 as commonly used when employing annual data.

[15] Incomplete markets are also a reason commonly advocated to rationalize procyclical fiscal policy (Riascos and Vegh, 2003). We thank an anonymous referee for this point.

(continued)

Institutional variables comprise of the following. We include a proxy for constrains on the executive, following Acemoglu et al. (2013) and Fatas and Mihov (2013), that captures potential veto points on the decisions of the executive.[16] This variable is likely to reduce spending volatility and negatively influence procyclicality. Other political variables are checks and balances and regime durability. Indeed, some political economy models suggest that better democracies with appropriate checks and balances increase the scope for sounder macroeconomic management (including counter-cyclical fiscal policy) by reducing the rents extracted by politicians (Persson et al., 1997). Specifically on corruption, according to Alesina and Tabellini (2005) procyclical fiscal policy tends to be observed in countries where political corruption is pervasive. However, to other authors better governance (lower corruption) per se may do nothing to make fiscal policy less counter-cyclical. Tanzi and Davoodi (1997), Friedman et al. (2000) and Ghura (2002) suggest that corruption leads to lower tax revenues and, consequently, to sub-optimal government expenditure.

We use data on 46 African countries in our analysis and the time period is 1960-2014 but data for some countries starts later. We restrict our sample to countries with at least 20 years of continuous annual data. The data source for both real GDP and government consumption is the IMF's International Financial Statistics. Summary statistics of all variables are displayed in Table A1 in the appendix. Table A2 presents variables´ definitions and sources.

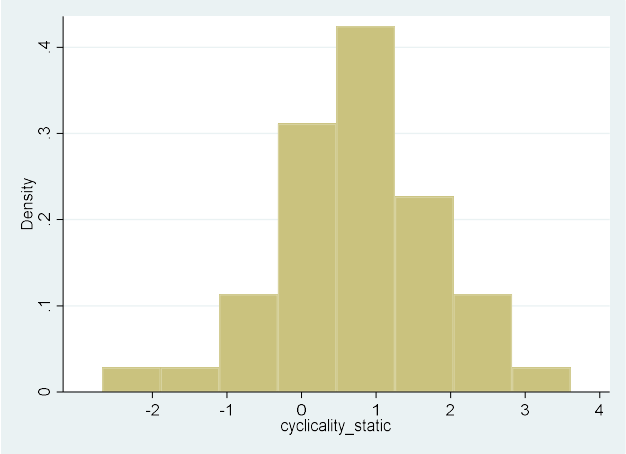
4. Stylized Facts

3.1 Static Government Consumption Cyclicality Estimates

Figure 1 shows the histogram for the estimated β coefficients from equation (1) for our sample of African countries. The average cyclicality coefficient is 0.92, that is, an increase in output growth by 1 percentage point increases real government consumption by 0.92 percentage points in this group of African countries. The distribution is skewed towards the positive side suggesting procyclicality. Note, however, that there is considerable heterogeneity; the standard deviation is 1.79. This fact is consistent with other studies, namely Thornton (2008).

[16] Indeed, Tornell and Lane (1999) point to political distortions as a determinant of procyclical fiscal policy.

Figure 1. Cyclicality of Government Consumption: Histograms of static β



Mean = 0.919 ; Sd = 1.796

Note: histogram drawn using the static version of the government cyclicality coefficients – vide equation (1).

Table 1 shows the country-specific static cyclicality coefficients. In 20 out of 45 cases, we find evidence of positive and statistically significant β coefficients, suggesting procyclical fiscal policies. Particularly high in magnitude (and above unity) are the cases of the Democratic Republic of Congo, Kenya, Madagascar, Namibia, Sierra Leone, Zambia and Zimbabwe. In one case, Eritrea, we obtain a negative and statistically significant coefficient, suggesting that over the last 20 years fiscal policy in this country has behaved countercyclically.[17] All other countries yield statistically insignificant β's, suggesting acyclicality – which is potentially good news for the procyclicality trap (Frankel, Vegh and Vuletin, 2013). Moreover, the coefficient on the lagged level of the log of real government consumption comes with the expected negative sign, indicating mean reversion in government consumption. The fiscal procyclicality pattern uncovered here is consistent with the results found by Woo (2003a,b, 2005) and Thornton (2008) for African countries but it contrasts with the much smaller coefficient estimates estimated by Alesina and Tabellini (2005) (who specified government spending in percent of GDP).

[17] In contrast, Thornton (2008) found that to be the case of Zimbabwe.

Table 1. Cyclicality Coefficients for Government Consumption by country, Static β

Country	Observations	$\Delta\log(Y_t)$	s.e.	$\log(G_{t-1})$	s.e.	R-squared
Algeria	54	1.173***	(0.27)	-0.024	(0.036)	0.212
Angola	34	1.461	(4.689)	-0.016	(0.052)	0.025
Benin	54	1.731**	(0.66)	-0.119**	(0.059)	0.145
Botswana	54	0.328	(0.36)	-0.043	(0.041)	0.16
Burkina Faso	54	-0.876	(1.028)	-0.227**	(0.107)	0.118
Burundi	54	1.056***	(0.307)	-0.054	(0.035)	0.203
Cabo Verde	45	0.461	(0.548)	-0.071	(0.093)	0.087
Cameroon	49	0.219	(0.463)	-0.116	(0.082)	0.059
Central African Republic	54	0.193	(0.208)	-0.171**	(0.076)	0.105
Chad	54	0.13	(0.376)	-0.128	(0.136)	0.071
Comoros	51	-0.887	(1.934)	-0.259*	(0.142)	0.14
Congo, Democratic Republic	54	10.336***	(2.44)	-0.009	(0.022)	0.405
Congo, Republic	54	1.815***	(0.673)	-0.056	(0.045)	0.214
Cote Ivoire	54	0.799**	(0.365)	-0.083*	(0.048)	0.131
Equatorial Guinea	49	0.122	(0.323)	-0.036	(0.049)	0.019
Eritrea	22	-1.219*	(0.654)	-0.523***	(0.178)	0.331
Ethiopia	51	0.396	(0.643)	-0.226**	(0.102)	0.126
Gabon	45	-1.101	(1.293)	-0.193**	(0.083)	0.124
Gambia	37	0.296	(0.659)	-0.219**	(0.093)	0.124
Ghana	54	1.521	(1.773)	-0.094*	(0.056)	0.083
Guinea	45	-1.101	(1.293)	-0.193**	(0.083)	0.124
Guinea Bissau	44	0.619	(0.511)	-0.103	(0.095)	0.095
Kenya	54	2.157***	(0.671)	-0.117***	(0.037)	0.306
Lesotho	54	0.141	(0.326)	-0.142*	(0.078)	0.094
Liberia	38	1.044***	(0.241)	-0.038	(0.034)	0.193
Madagascar	54	2.310***	(0.493)	-0.014	(0.036)	0.238
Malawi	54	0.113	(0.815)	-0.054*	(0.032)	0.13
Mali	51	0.907**	(0.419)	-0.126	(0.081)	0.107
Mauritius	38	1.073**	(0.476)	-0.092	(0.12)	0.168
Morocco	49	0.508	(0.413)	-0.092	(0.064)	0.17
Mozambique	34	-2.673	(3.023)	-0.072	(0.119)	0.196
Namibia	34	2.051**	(0.925)	-0.152	(0.142)	0.186
Niger	52	0.902*	(0.49)	-0.166*	(0.083)	0.16
Nigeria	45	0.546	(0.452)	-0.004	(0.053)	0.08
Rwanda	54	0.920**	(0.432)	-0.051	(0.056)	0.162
Senegal	45	0.576	(0.868)	-0.092	(0.063)	0.06
Seychelles	38	1.359***	(0.479)	-0.043	(0.044)	0.351
Sierra Leone	50	2.369***	(0.519)	-0.059*	(0.033)	0.27
South Africa	54	1.402*	(0.763)	-0.059	(0.041)	0.23
Swaziland	51	0.904	(1.279)	-0.286**	(0.124)	0.167
Tanzania	54	1.257	(1.252)	-0.05	(0.04)	0.07
Togo	54	0.042	(0.736)	-0.150*	(0.081)	0.085
Tunisia	54	0.704**	(0.266)	-0.072	(0.061)	0.115
Uganda	54	0.54	(2.339)	-0.038	-0.046)	0.051
Zambia	54	3.611***	(0.989)	-0.027	-0.021)	0.232
Zimbabwe	54	2.038**	(0.803)	-0.186	-0.193)	0.458

Note: Table presents details of the government consumption cyclicality coefficients β and the coefficients of the level of real government consumption lagged from estimates of equation (1) for each country in the sample. "s.e." denotes robust standard errors. *, **, *** denote statistical significance at the 10, 5 and 1 percent levels, respectively.

Key results are summarized in Table 2 which also compares with statistics from Thornton's (2008) paper. Real government consumption is overwhelmingly procyclical in African countries, with β coming out positive in 19 out of 46 cases and strictly larger than one – that is, with government spending responding more than proportionately to output fluctuations - in 18 cases. Adding 9 more countries and 10 more years, changes results slightly compared to Thornton's (2008) original findings (e.g. more volatility in cyclicality attributed to adding 10 years of more recent data marked also by the Global Financial Crisis), but the main conclusion remains valid.

Table 2. Summary Cyclicality Coefficients

Statistics	New	Thornton (2008)	New with Thornton (2008) sample
Number of countries	46	37	37
Mean β	0.919	0.913	0.818
Standard deviation β	1.796	0.398	1.111
Maximum β	-2.673	-0.173	-2.673
Minimum β	10.336	1.640	3.611
Number of times $\beta > 1$	18	18	14
Number of times $\beta > 0$	40	36	33
Number of times $\beta < 0$	6	1	3

Note: "new" corresponds to the sample coverage and time span of this paper; "Thornton" corresponds to the sample coverage and time span of Thornton (2008) paper; in column 3 we use the same set of countries as in Thornton's (2008) paper extended from 2004 to 2014.

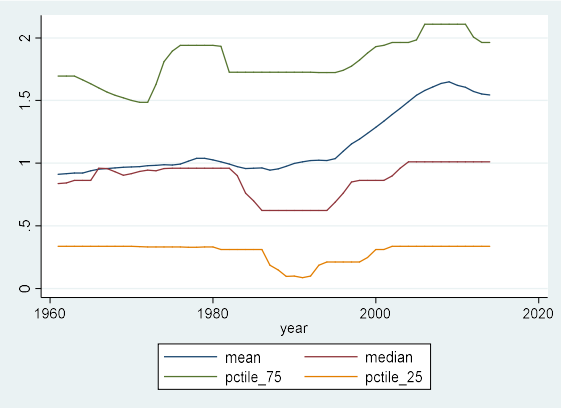
While useful, a focus only on averages (that is, taking a static approach) misses the substantial heterogeneity illustrated in the previous set of histograms and, arguably more importantly, the temporal dynamics. Moreover, understanding some of the sources of this heterogeneity requires a closer look at the country-by-country estimates. We turn to these aspects in the following (sub-)sections.

3.2 Dynamic Government Consumption Cyclicality Estimates

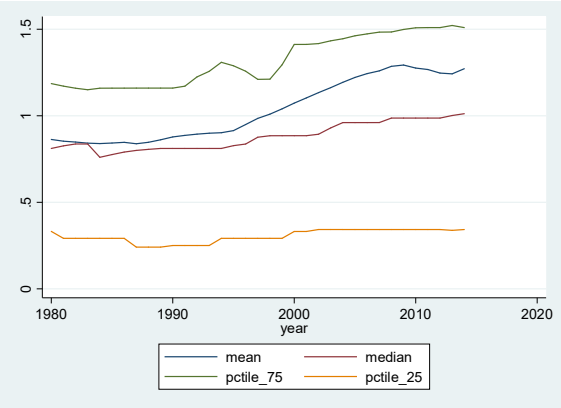
We now allow β to be time-varying and run the model described by equations (2) and (3). In Figure 2 we plot the interquartile range of the time-varying government spending cyclicality coefficients (using balanced samples). The general picture is that the mean cyclicality coefficient between 1960 and mid-1990s has remained relatively stable and only then started to increase. The Global Financial Crisis in 2008 seems to have reduced the degree of pro-cyclicality in this group of countries in the years that followed. In addition, we see a small increase in the dispersion in cyclicality coefficients from the early/mid 2000s (observed by the widening of the distance between the top and bottom quartiles of the distribution).

Figure 2. Interquartile Range of Time-Varying Government Consumption Cyclicality

Panel A: 1960-2014



Panel B: 1980-2014

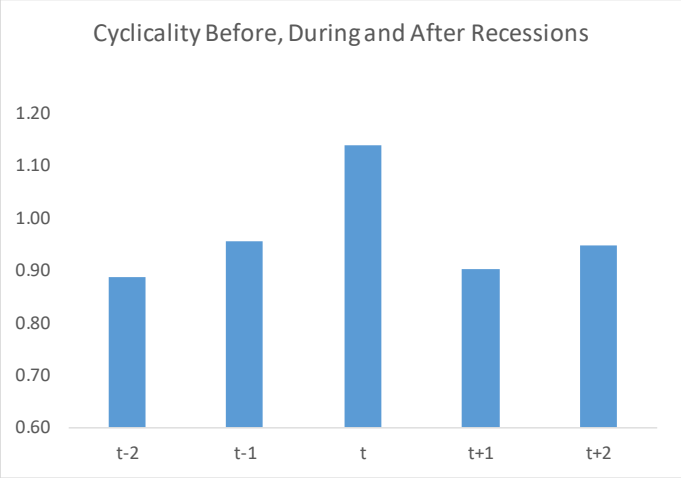


Note: Figure displays the inter-quartile time profile of the TVC cyclicality coefficient estimates on balanced samples. Panel A) includes African economies with at least 54 observations; panel B) contains African countries with at least 24 observations.

The individual time-varying country patterns are displayed in Figure A1. While each country has its own particular pattern, one common message is the fact that government spnding cyclicality has been far from stable over time. The degree of procyclicality has increased in countries such as Algeria, Benin, Burkina Faso, Cameroon, Democratic Republic of Congo, Cote Ivoire, Madagascar, Senegal, Seychelles, Uganda and Zambia. In contrast, in Botswana, Chad, Lesotho, Equatorial Guinea, Tunisia, Guinea, Namibia, Nigeria and South Africa, cyclicality coefficients have had a downward trend, that is, fiscal policy has become less procyclical over time.

A final aspect worth considering before moving on to explore the underlying determinants of government spending cyclicality coefficients, is to inspect their behavior around recession periods. Recessions are defined as years with negative annual real output growth. Looking at Figure 3, cyclicality coefficients in African economies increase in absolute value in the run-up to recessions, but they fall immediately after. This is in line with Frankel, Vegh and Vuletin (2013) prediction: that over the last decade (following the Global Financial Crisis) about one third of the developing world started escaping the procyclicality trap and began engaging in countercyclical fiscal policy.

Figure 3: Behavior of Time Varying Cyclicality Coefficients during Recessions



Note: The figure displays the average TVC government spending cyclicality. "t" denotes the year of the recessions measured by negative annual GDP growth. "t-2", "t-1", "t+1", "t+2", denote 2 or 1 years, prior or after the recession year.

5. Explaining Cross-Country Heterogeneity in Africa's Fiscal Procyclicality

Moving on to the main empirical analysis and beginning with the static version, Tables 2 and 3 show the results for the simple cross-country multivariate regression based on equation (4) using OLS and WLS, respectively. We find that the initial level of per capita GDP is negative but not statistically significant, suggesting that the level of development in itself is not a factor explaining fiscal procyclicality in African countries. We also get a positive and highly significant relationship between net foreign aid and fiscal procyclicality – a finding consistent with that of Pallage and Robe (2001), Bulir and Hamann (2003) and Barrett (2001) for a more diverse group of countries and Thornton (2008) for Africa. This fact supports the financing constraints view put forward by Kaminsky et al. (2004) and Gavin and Perotti (1997). The higher the inflationary pressures, the more the government engages in procyclical fiscal policy. Moreover, looking at both Tables 2 and 3, better governance (reduced corruption) does seem to be statistically relevant in negatively impacting the degree of fiscal procyclicality. This finding is not consistent with Thornton's (2008) claim that better governance makes available additional resources for new government spending. In fact, our finding is in line with the conclusions reported by Alesina and Tabellini (2005). Furthermore, results also show a positive and seldomly significant relationship between income distribution (social fragmentation) and fiscal procyclicality which contrasts with the hypothesis that inequality promotes spending. This is in line with the conclusions by Woo (2003a,b, 2005) for a larger panel of developed and developing countries.[18] Finally, we get a positive and weakly significant (i.e., at the 10 percent significance level) relation between democracy and procyclicality, suggesting that increased democracy deteriorates fiscal management which is

[18] Since the Gini index limits the total number of observations, in specifications 7-10 we drop this variable to maximize our degrees of freedom. We confirm that previous findings are robust.

similar to the findings of Alesina and Tabellini (2005). With respect to the interaction between the control of corruption and democracy, we obtain a statistically insignificant coefficient throughout the different specifications.

Table 3. OLS regression of government consumption cyclicality static coefficients on main determinants

Specification	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Real GDP per capita	-0.094	-0.094	-0.602	-0.170	-0.048	0.421	-0.071	-0.095	-0.321	0.001
	(0.436)	(0.469)	(0.429)	(0.429)	(0.241)	(0.661)	(0.398)	(0.433)	(0.387)	(0.368)
Aid	0.108**	0.108**	0.086*	0.115***	0.047*	0.134**				
	(0.041)	(0.042)	(0.044)	(0.041)	(0.024)	(0.060)				
Gini Index	6.526	6.524	3.917	9.626*	2.603	6.325	1.637	1.644	1.098	2.671
	(6.034)	(6.178)	(6.549)	(5.162)	(3.377)	(6.980)	(4.402)	(4.459)	(4.530)	(4.236)
Democracy	0.229	0.229	0.020		0.169	0.270	0.256	0.255	0.069	
	(0.230)	(0.235)	(0.238)		(0.128)	(0.279)	(0.170)	(0.172)	(0.142)	
Control for corruption	-2.182**	-2.186*		-1.891**	-0.785	-2.231*	-1.335*	-1.419		-0.675
	(0.842)	(1.117)		(0.789)	(0.500)	(1.083)	(0.709)	(0.910)		(0.578)
democ*contcorrup		0.002						0.038		
		(0.319)						(0.253)		
Inflation					0.114***					
					(0.015)					
Private Credit						-5.341				
						(4.922)				
Observations	32	32	32	32	32	25	44	44	44	45
R-squared	0.354	0.354	0.187	0.329	0.810	0.421	0.102	0.103	0.021	0.041

Note: Ordinary Least Squares regression. Robust standard errors in parenthesis. *, **, *** denote statistical significant at the 10, 5, and 1 percent levels, respectively.

Table 4. WLS regression of government consumption cyclicality static coefficients on main determinants

Specification	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Real GDP per capita	0.007	0.147	-0.269	-0.099	0.046	0.231	-0.008	0.131	-0.120	0.012
	(0.296)	(0.312)	(0.268)	(0.297)	(0.213)	(0.448)	(0.256)	(0.272)	(0.229)	(0.233)
Aid	0.064*	0.060*	0.051	0.068**	0.040*	0.067				
	(0.032)	(0.032)	(0.033)	(0.033)	(0.024)	(0.047)				
Gini Index	0.892	1.719	-0.496	4.500	-0.557	-0.180	-1.000	-0.398	-1.208	-0.210
	(4.267)	(4.263)	(4.391)	(3.718)	(3.081)	(4.807)	(2.639)	(2.643)	(2.629)	(2.543)
Democracy	0.257	0.265*	0.132		0.222*	0.264	0.145	0.165	0.085	
	(0.161)	(0.159)	(0.153)		(0.116)	(0.198)	(0.103)	(0.102)	(0.083)	
Control for corruption	-1.051*	-0.522		-0.678	-0.678	-1.108	-0.428	-0.041		-0.059
	(0.562)	(0.691)		(0.526)	(0.411)	(0.741)	(0.435)	(0.512)		(0.352)
democ*contcorrup		-0.260						-0.206		
		(0.202)						(0.148)		
Inflation					0.119***					
					(0.024)					
Private Credit						-1.333				
						(3.668)				
Observations	32	32	32	32	32	25	44	44	44	45
R-squared	0.236	0.284	0.134	0.162	0.621	0.263	0.052	0.098	0.029	0.001

Note: Weighted Least Squares regression where the weights are given by the inverse of the standard deviation of the estimated static Okun coefficients. Robust standard errors in parenthesis. *, **, *** denote statistical significant at the 10, 5, and 1 percent levels, respectively.

Turning to the dynamic (panel) analysis, similarly to Tables 2 and 3, Tables 4 and 5 show the results for pooled cross-country regressions based on equation (4) using OLS and WLS, respectively. As in the static case, we find that, more developed African economies tend to have a

smaller degree of government consumption procyclicality. Talvi and Vegh (2005) and Mpatswe et al. (2011) predict that, as nations become richer, their fiscal policies become more stabilizing (or counter-cyclical). Aid keeps its positive sign but losses statistical significance. With the panel dimension, we do find the strong association between social fragmentation and fiscal procyclicality found by Woo (2003a,b, 2005). International trade proxies come out statistically not different from zero, while the output gap is positive and highly significant suggesting that procyclicality increases during periods of positive output gap – in line with e.g. Granado et al. (2013). Looking at the political economy and institutional variables, we find that constraints on the executive are robustly negatively and significantly associated with government consumption procyclicality.[19] These results are consistent with the evidence provided in Fatas and Mihov (2013) and Lane (2003), who find that more constraints on the executive tend to reduce government spending volatility and positively influence the overall role of fiscal policy stabilization. Regime durability seems to be positively correlated with government consumption procyclicality. The presence of budget balance rules seems to reduce the degree of procyclicality in African countries (while debt rules have the opposite effect).[20]

Table 5. Country and Time Effects OLS regression of government consumption cyclicality time-varying coefficients on main determinants

Specification	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Real GDP per capita (t-1)	-0.089	-0.071	-0.052	-0.061	-0.851***	-0.122	-0.075	-1.048***	-0.001	-0.096	-0.023
	(0.233)	(0.259)	(0.253)	(0.238)	(0.189)	(0.222)	(0.230)	(0.276)	(0.224)	(0.233)	(0.233)
Aid (t-1)	0.001	0.003	0.004	0.001	0.005	0.002	0.000	0.009			
	(0.006)	(0.007)	(0.006)	(0.006)	(0.006)	(0.005)	(0.006)	(0.006)			
Output Gap (t-1)	0.034***	0.036***	0.034***	0.033***	0.030***	0.031***	0.037***	0.025***	0.030***	0.034***	0.033***
	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)	(0.005)	(0.006)	(0.007)	(0.005)	(0.006)	(0.005)
Gini Index (t-1)	3.867***	3.603***	3.971***	3.880***	3.911***	3.159***	3.151***	3.539***	3.142***	3.729***	3.627***
	(1.452)	(1.551)	(1.548)	(1.453)	(1.087)	(1.333)	(1.451)	(1.499)	(1.311)	(1.445)	(1.434)
Growth of Main Trading Partners (t-1)		-0.020									
		(0.036)									
Democracy	0.010	0.005	0.011	0.020	-0.004		0.008	-0.008			0.020
	(0.015)	(0.016)	(0.015)	(0.023)	(0.014)		(0.015)	(0.015)			(0.016)
Control for corruption	-0.192*	-0.174*	-0.219**	-0.229*		-0.146	-0.209**	0.043	-0.206**	-0.202**	-0.179*
	(0.099)	(0.108)	(0.104)	(0.117)		(0.093)	(0.098)	(0.109)	(0.093)	(0.100)	(0.097)
Trade Openness (t-1)			-0.037								
			(0.153)								
democ*contcorrup				0.014							
				(0.024)							
Inflation (t-1)							0.066***				
							(0.021)				
Private Credit (t-1)								0.023			
								(0.622)			
Regime durability (t-1)									0.012***		
									(0.004)		
Executive constraints (t-1)										-0.221***	
										(0.029)	
debt_rule											0.273*
											(0.155)
expenditure_rule											-0.164
											(0.191)
revenue_rule											-0.406
											(0.427)

[19] Results for checks and balances yielded positive and insignificant coefficients and were omitted for reasons of parsimony. Democracy without fixed effects yielded positive and significant coefficients. Adding fixed effects removes the statistical significance.

[20] Fiscal space might help explain the fiscal reaction of cyclicality to the business cycle as countries with higher public debt will be bound to act procyclicality. Adding lagged public debt as a regressor in the different specifications in Table 5 indeed reveals a positive coefficient estimate; however, it is not statistically different from zero (results available upon request). We thank an anonymous referee for this comment.

budget_balance_rule											-0.247***
											(0.021)
Observations	411	368	385	411	660	436	411	307	436	411	411
R-squared	0.932	0.931	0.930	0.932	0.864	0.935	0.934	0.952	0.937	0.932	0.936

Note: Ordinary Least Squares regression. Robust standard errors in parenthesis. Country and time effects estimated but omitted for reasons of parsimony. See equation 4 and main text for further details. *, **, *** denote statistical significant at the 10, 5, and 1 percent levels, respectively.

In Table 6 we redo the previous estimations with WLS instead. Results in column (4) of Table 6 show that when the two variables are interacted, a reduction in corruption promotes counter-cyclical fiscal policy, and increased democracy dampens it, and the interaction variable is negative and statistically significant. This is yet another similarity with respect to Alesina and Tabellini (2005). In their paper, when the two variables are interacted, the interaction term comes out negative and significant, suggesting that the effect of corruption on procyclicality is particularly apparent in democracies.

Table 6. Country and Time Effects WLS regression of government consumption cyclicality time-varying coefficients on main determinants

Specification	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Real GDP per capita (t-1)	-0.109	-0.125	-0.161	-0.079	-0.270**	-0.067	-0.094	-0.341*	-0.155	-0.107	-0.208
	(0.164)	(0.183)	(0.178)	(0.167)	(0.129)	(0.154)	(0.163)	(0.185)	(0.159)	(0.163)	(0.170)
Aid (t-1)	-0.000	-0.000	-0.002	-0.001	-0.002	0.002	0.001	0.005			
	(0.004)	(0.005)	(0.004)	(0.004)	(0.004)	(0.003)	(0.004)	(0.004)			
Output Gap (t-1)	0.018***	0.019***	0.017***	0.018***	0.013***	0.015***	0.020***	0.010**	0.014***	0.018***	0.018***
	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.005)	(0.004)	(0.004)	(0.004)
Gini Index (t-1)	4.856***	4.719***	5.044***	4.911***	2.692***	5.182***	4.654***	8.909***	5.339***	4.806***	5.084***
	(1.179)	(1.269)	(1.266)	(1.182)	(0.746)	(1.058)	(1.176)	(1.247)	(1.048)	(1.179)	(1.173)
Growth of Main Trading Partners (t-1)		-0.003									
		(0.027)									
Democracy	0.008	0.007	0.010	0.004	0.001		0.007	0.004			0.009
	(0.010)	(0.011)	(0.011)	(0.018)	(0.009)		(0.010)	(0.010)			(0.012)
Control for corruption	-0.118*	-0.117*	-0.149**	-0.086		-0.091	-0.122*	-0.061	-0.113*	-0.124*	-0.110*
	(0.065)	(0.072)	(0.070)	(0.076)		(0.060)	(0.065)	(0.070)	(0.061)	(0.066)	(0.066)
Trade Openness (t-1)			-0.152								
			(0.136)								
democ*contcorrup				-0.016*							
				(0.009)							
Inflation (t-1)							0.038**				
							(0.017)				
Private Credit (t-1)								-0.035			
								(0.374)			
Regime durability (t-1)									0.006**		
									(0.003)		
Executive constraints (t-1)										0.016	
										(0.019)	
debt_rule											0.181*
											(0.101)
expenditure_rule											-0.037
											(0.120)
revenue_rule											-0.245
											(0.412)
budget_balance_rule											-0.065
											(0.138)
Observations	411	368	385	411	660	436	411	307	436	411	411
R-squared	0.913	0.908	0.913	0.913	0.866	0.915	0.914	0.933	0.916	0.913	0.916

Note: Weighted Least Squares regression, where the weights are given by the inverse of the standard deviation of the estimated time-varying cyclicality coefficients. Robust standard errors in parenthesis. See equation 4 and main text for further details. Country and time effects estimated but omitted for reasons of parsimony. *, **, *** denote statistical significant at the 10, 5, and 1 percent levels, respectively.

In Table 7 we take the most representative specifications of Table 6 (namely 1-4) and run, by WLS, regressions before and after 2000.[21] Interestingly, the relevance of some procyclicality determinants matter more in the older period (e.g. aid and institutional proxies), while for others their strength materializes in the most recent period (output gap and income distribution). All in all, most signs and effects are consistent with previous evidence when the sample is not split.

Table 7. WLS regression of government consumption cyclicality time-varying coefficients on main determinants: pre and post-2000

Specification	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Estimator	Pre-2000				Post-2000			
Real GDP per capita (t-1)	-1.045**	-1.530***	-1.392***	-0.355	0.182	0.175	-0.638***	-0.564***
	(0.508)	(0.534)	(0.316)	(0.298)	(0.251)	(0.253)	(0.242)	(0.230)
Aid (t-1)	0.008	0.013**	0.027***	0.006	0.004	0.004	0.004	0.004
	(0.005)	(0.006)	(0.009)	(0.005)	(0.005)	(0.005)	(0.005)	(0.004)
Gini Index (t-1)	2.118	2.501	6.706***	0.986	10.697***	10.669***	10.381***	11.220***
	(3.178)	(3.073)	(2.106)	(3.026)	(1.648)	(1.653)	(1.603)	(1.536)
Output Gap (t-1)	0.007	0.008	0.015**	0.006	0.035***	0.035***	0.036***	0.034***
	(0.005)	(0.005)	(0.008)	(0.004)	(0.005)	(0.005)	(0.005)	(0.005)
Democracy	-0.001	0.048	0.035*		0.010	0.015	0.010	
	(0.022)	(0.030)	(0.020)		(0.017)	(0.025)	(0.017)	
Control for corruption	-0.039	-0.229*		-0.002	0.089	0.063		0.099
	(0.110)	(0.135)		(0.097)	(0.107)	(0.138)		(0.102)
democ*contcorrup		0.059**				0.007		
		(0.026)				(0.025)		
Observations	93	93	342	99	318	318	318	337
R-squared	0.989	0.990	0.883	0.989	0.967	0.967	0.967	0.969

Note: Weighted Least Squares regressions, where the weights are given by the inverse of the standard deviation of the estimated time-varying cyclicality coefficients. Robust standard errors in parenthesis. See equation 4 and main text for further details. *, **, *** denote statistical significant at the 10, 5, and 1 percent levels, respectively.

Finally, in Table A3 in the appendix we checked if our results were robust to outliers. A closer inspection of the data could hint that influential outliers could play a role. The sample sensitivity of cross-country empirical studies is well known. Therefore, one advance in this paper over earlier work is the use of two robust estimators, the Method of Moments (MM) and the Least Absolute Deviation (LAD). The former fits the efficient high breakdown estimator proposed by Yohai (1987) which on the first stage takes the S estimator applied to the residual scale and derives starting values for the coefficient vectors, and on the second stage applies the Huber-type bisquare M-estimator using iteratively re-weighted least squares to obtain the final coefficient estimates. As for the LAD, it minimizes the sum of the absolute deviations. We then exclude any observations for which the LAD residual is more than two standard deviations from the mean residual, before re-estimating the model by OLS or FE. When the two sets of estimates are very different, then it may be that the observations are drawn from several different regimes, and/or the OLS (FE) estimates are driven by a few outliers. These procedures are not perfect, but should help to exclude the worst outliers, including some that would not be identified by more conventional OLS (FE) diagnostics. As one

[21] The choice of 2000 was ad-hoc. Splitting alternatively half-way would result in too few observations in the first half of the sample (due to the limited coverage far back in time of the Gini index).

can observe, results remain qualitatively unchanged, hence, our findings are not driven by particular outliers.

6. Conclusion

Fiscal policy can influence medium-term growth through its support to macroeconomic stability. Most research on fiscal policy cyclicality has, for a long time, focused on advanced economies due to data availability and data quality reasons. In this paper, we focused on a sample of 46 African countries between 1960 and2014 and explored, using a novel empirical strategy, the degree of cyclicality of government consumption. Using time-varying estimates of government consumption cyclicality, we provided a characterization of its behavior across countries and over time and then inspected its main macroeconomic and institutional determinants.

We found that government consumption has been, on average, highly procyclical in African countries. This is likely to have amplified GDP fluctuations and weakened development efforts in several countries. However, sample averages hide high degrees of heterogeneity in government consumption cyclicality between countries. The great majority of African countries in our sample displayed procyclical spending behavior, with government consumption responding more than proportionately to fluctuations in output in many cases. However, as Frankel et al. (2013) alluded to, some countries seem to be graduating away from procyclicality into acyclicality or even counter-cyclicality (e.g. Eritrea). Moreover, results presented in this paper suggest that several macroeconomic policies as well as institutional and political characteristics can affect the degree of government spending cyclicality. First, more developed African economies tend to have a smaller degree of government consumption procyclicality. Also, countries with higher social fragmentation and those more reliant on foreign aid inflows tend to have a more procyclical spending policy. Looking at the political economy and institutional variables, we find that constraints on the executive and regime durability are robustly negatively and significantly associated with government consumption procyclicality. Better governance promotes counter-cyclical fiscal policy while increased democracy dampens it. Finally, some fiscal rules seem to be important in curbing the procyclical behavior of government spending.

Future research on the topic could consider looking at the consequences of procyclical government fiscal policy for macroeconomic volatility and long-term growth. Also, it would be interesting to properly disentangle the automatic fiscal response to the cycle from the discretionary fiscal policy reaction. Finally, yet another avenue of future work could be the exploration of revenues´ cyclicality – being these the natural budget counterpart to government expenditures.[22]

[22] At the cost of exploring these issues insufficiently, partially or in a limited way due to space constraints, we decided to leave them for another, separate, research project.

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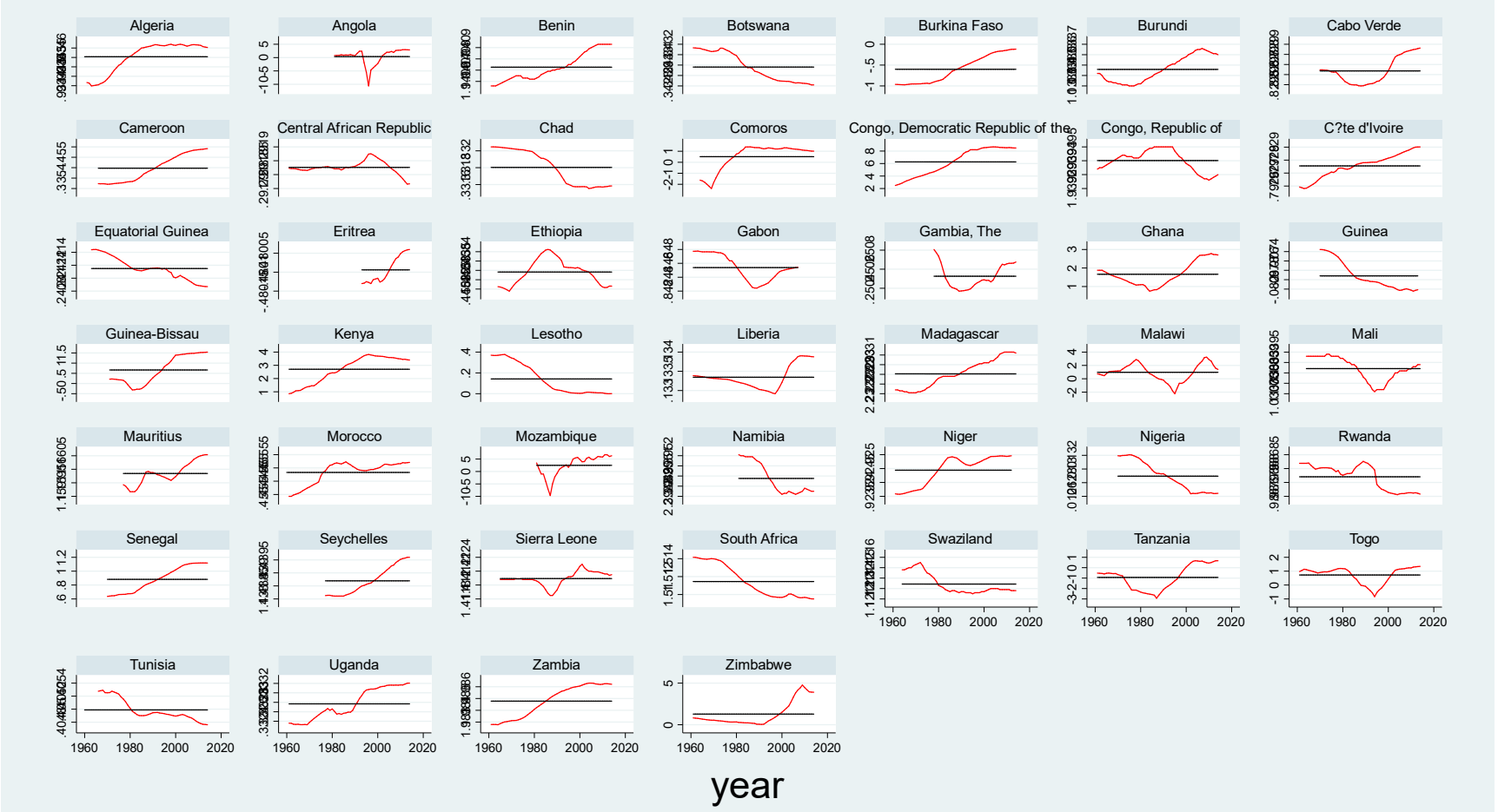
APPENDIX

Figure A1. Time-Varying Government Consumption Cyclicality, by country



Note: the red line denotes the TVC cyclicality coefficient, while the black one denotes the average.
Source: authors' calculations

Table A1. Summary Statistics

Variable	Observations	Mean	Standard Deviation	Minimum	Maximum
GDP per capita (log)	2323	7.134	0.905	5.080	10.381
GDP deflator	2488	65.454	86.103	2.81e-14	795.75
Real government consumption	2310	0.929	4.446	-0.4870	32.770
Private Credit	1449	0.187	0.156	2.30e-7	1.007
Democracy	2115	2.228	3.132	0	10
Foreign aid	1718	186.50	17.209	92.103	224.32
Gini index	1004	0.419	0.075	0.276	0.611
Executive constraints	1692	3.026	1.914	1	7
Checks and balances	1631	1.826	1.075	1	6
Regime durability	2225	12.06	14.88	0	105
Expenditure rule	2640	0.004	0.070	0	1
Revenue rule	2640	0.006	0.077	0	1
Debt rule	2640	0.082	0.275	0	1
Budget balance rule	2640	0.085	0.028	0	1

Note: summary statistics computed over the sample for which the time-varying Okun coefficients were computed.

Table A2. Variables' Definitions and Sources

Variables	Definition	Source
GDP per capita	Real gross domestic product divided by population	World Bank, World Development Indicators
GDP deflator	Price Deflator of GDP	IMF, International Financial Statistics
Real government consumption (log)	Nominal government consumption expenditure deflated with GDP deflator	IMF, International Financial Statistics
Private credit	Domestic credit to private sector refers to financial resources provided to the private sector by financial institutions	World Bank, World Development Indicators
Democracy	Democracy score (DEMOC2) measures the general openness of political institutions.	Polity IV Project
Foreign aid (log)	Net official development assistance and official aid received	World Bank, World Development Indicators
Gini index	Gin index on disposable income (0-1 scale)	Standardized World Income Inequality Database
Executive constraints	This variable refers to the extent of institutionalized constraints on the decision-making powers of chief executives, whether individuals or collectivities.	Polity IV Project
Checks and balances	Checks and balances	Database of Political Institutions 2015
Regime durability	Number of years since the most recent regime change	Polity IV Project
Expenditure rule	Takes the value 1 when an expenditure rule is in place	IMF Fiscal Rules Dataset http://www.imf.org/external/datamapper/FiscalRules/map/map.htm
Revenue rule	Takes the value 1 when a revenue-based rule is in place	IMF Fiscal Rules Dataset http://www.imf.org/external/datamapper/FiscalRules/map/map.htm
Debt rule	Takes the value 1 when a debt rule is in place	IMF Fiscal Rules Dataset http://www.imf.org/external/datamapper/FiscalRules/map/map.htm
Budget balance rule	Takes the value 1 when a budget balance rule is in place	IMF Fiscal Rules Dataset http://www.imf.org/external/datamapper/FiscalRules/map/map.htm

Table A3. Outlier Robust regressions of government consumption cyclicality time-varying coefficients on main determinants

Specification	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Estimator	LAD				MM			
Real GDP per capita (t-1)	-0.089	-0.129**	-0.055	-0.006	-0.128*	0.197***	-0.157***	-0.078
	(0.059)	(0.061)	(0.050)	(0.064)	(0.068)	(0.061)	(0.043)	(0.051)
Aid (t-1)	0.014***	0.015***	0.011**	0.016***	0.007*	0.011***	-0.009***	0.006
	(0.004)	(0.004)	(0.005)	(0.005)	(0.004)	(0.004)	(0.003)	(0.005)
Gini Index (t-1)	0.764	1.259*	-0.045	1.718**	1.920***	2.738***	0.772	2.196***
	(0.656)	(0.674)	(0.643)	(0.713)	(0.627)	(0.499)	(0.574)	(0.688)
Democracy	0.120***	0.094***	0.103***		0.062***	0.034***	0.039**	
	(0.014)	(0.016)	(0.013)		(0.011)	(0.011)	(0.017)	
Control for corruption	-0.465***	-0.219		-0.193*	-0.502***	-0.228*		-0.427***
	(0.109)	(0.140)		(0.115)	(0.188)	(0.130)		(0.128)
democ*contcorrup		-0.067***				-0.087***		
		(0.024)				(0.021)		
Observations	358	358	358	358	411	411	660	436
R-squared	0.209	0.226	0.168	0.037				

Note: Least Absolute Deviation and MM estimators as identified in the second row (see main text for details). Standard errors in parenthesis. *, **, *** denote statistical significant at the 10, 5, and 1 percent levels, respectively.