A Tale of Procyclicality, Aid Flows and Debt : Government Spending in Sub-Saharan Africa[1]

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Abstract

This paper documents cyclical patterns of government expenditures in sub-Saharan Africa since 1970 and explains variation between countries and over time. Controlling for endogeneity and applying dynamic GMM techniques, it finds that government expenditures are slightly more procyclical in sub-Saharan Africa than in other developing countries and some evidence that procyclicality in Africa has declined in recent years after a period of sharp increase through the 1990s. Greater fiscal space, proxied by lower external debt, and better access to concessional financing, proxied by larger aid flows, seem to be important in diminishing procyclicality in the region. The role of institutions is less clear cut: changes in political institutions have no impact on procyclicality.

I. INTRODUCTION

Like other developing countries, many countries in sub-Saharan Africa (SSA) are using fiscal policy to counter the impact of the global economic slowdown. In 2009 about three-fourths of African countries are expected to increase their fiscal deficits excluding grants, or to decrease their projected surplus (IMF, 2009a). Many are currently letting automatic stabilizers operate, and some are even actively pursuing countercyclical policies. This contrasts with the much more modest increases, and even decreases, in fiscal deficits that were possible in past global slowdowns (Figure 1[3]); there is some cross-country evidence that, as in other developing countries, fiscal policy in SSA has been mostly procyclical in the past (Thornton, 2008, Diallo, 2009).

Figure 1 : Evolution of the fiscal balance in sub-Saharan Africa, current and past cycles
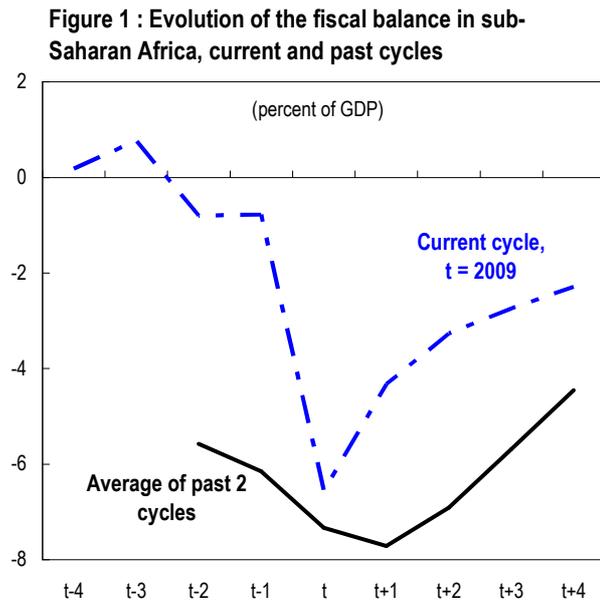
The apparent shift towards countercyclical, or at least less procyclical, fiscal policies has been attributed mainly to steady improvements in macroeconomic performance and structural reforms in developing countries, including SSA, over the last three decades (Table 1 and IMF, 2009b). Since the late 1990s, such improvements led most SSA countries to what is commonly referred to as the "post-stabilization phase" (Adam and Bevan, 2001). Countries reaching this phase have been characterized by sustainable fiscal and external positions, single-digit inflation, deeper domestic financial markets, and better institutions. These factors in turn endow countries with the requisite policy flexibility, fiscal space, and institutional environment to rely credibly and appropriately on fiscal policy as a stabilization tool.

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[3] This Figure is taken from IMF, 2009b.

Table 1 : Number of sub-Saharan African countries satisfying various macroeconomic performance and institutional quality criteria by decade.

	1970-1979	1980-1989	1990-1999	2000-2008
Macroeconomic performance				
Per capita GDP growth>2.25%	9	5	10	30
Inflation<6%	3	10	17	24
Current balance in surplus	6	2	2	9
Public external debt<60%	33	22	13	20
Private credit to GDP>30%	4	16	12	16
Quality of institutions				
Moderate or low composite ICRG risk rating	n.a.	3	7	16
Democratic polity	5	6	19	26
'Substantial' limits on the executive	5	4	14	21

A country satisfies the condition if the median value for the decade satisfies it. The ICRG considers a score of 60 or above on its composite index as indicating low or moderate overall (political economic and financial) risk. A country is coded 'democratic' if its polity2 score (see data appendix) is above zero. Constraints on the executive are considered 'substantial' if the xconst score in the polity4 dataset is 5 or above (see Marshall and Jaggers (2009)).

Rigorous econometric analysis of facts and factors related to the evolution of fiscal cyclicality in SSA have lagged behind the policy discussion. Most of the evidence is anecdotal, and the few econometric studies to date neither looked at changes in procyclicality over time nor analyzed factors that might be associated with those changes. Many econometric studies of the reaction of fiscal policy to the business cycle also ignored the possibility of reverse causality.

This paper aims to close these gaps by (i) documenting facts about the magnitude and evolution of cyclical patterns in government expenditures in SSA since 1970, correcting for possible bias due to endogeneity and applying recent GMM techniques developed for dynamic panels; and (ii) identifying factors underlying changes in cyclicality over time, with reference mainly to macroeconomic and institutional conditions.

Our focus on government spending is consistent with the argument developed by Kaminsky, Reinhart, and Vegh (2004) that policy instrument variables, rather than outcome or target variables, are a more appropriate way to measure the cyclicality of fiscal policy.

Another policy instrument that may also serve this purpose is government tax rates, but data limitations for our sample prevent us from using tax rates as dependent variables. Other measures of fiscal policy, such as the overall fiscal balance and tax revenues, are less appropriate for measuring the cyclicality of fiscal policy because they reflect outcomes that are only partially determined by policymakers and that are themselves likely to be affected by fluctuations in the output cycle.

In what follows, Section II reviews the literature on facts and factors related to fiscal cyclicality especially in developing countries. Section III discusses our strategy. Section IV summarizes the results related to the magnitude and evolution of procyclicality in SSA. Section V makes some policy recommendations and discusses possible extensions

II. LITERATURE REVIEW

The average cyclicality of fiscal policy in developing countries is the focus of a large and growing literature. Gavin and Perotti (1997) were the first to call attention to the fact that on average fiscal policy in Latin America appears procyclical. Studies have since shown that though this seems to be the case in developing countries in general, in advanced economies fiscal policy is consistently acyclical or even countercyclical (Braun, 2001; Lane, 2003; Kaminsky, Reinhart, and Végh, 2004; Alesina, Campante, and Tabellini, 2008; and Ilzetzki and Végh, 2008). Recently, however, Rigobón (2003) and Jaimovich and Panizza (2007) have questioned the extent to which fiscal policy is significantly more procyclical in developing countries.

The literature focusing on the evolution of cyclical fiscal behavior in developing countries, as opposed to static cyclical caracteristics is much smaller and less conclusive. Kaminsky, Reinhart, and Végh (2004) provide some evidence that the procyclicality of fiscal policy in developing countries declined after 1980, but Alesina, Campante, and Tabellini (2008) do not find such evidence. This contrasts with more compelling evidence showing that fiscal policy has became less countercyclical in more advanced economies, with European Monetary Union (EMU) members lagging behind members of the Organization for Economic Cooperation and Development (OECD) (Galí and Perotti 2003; Galí, 2005; Aghion and Marinescu, 2007; and Strawczynski and Zeira, 2009).[4] Strawczynski and Zeira (2007) find that fiscal policy in Israel became less procyclical after 1985 after an economic stabilization program that increased fiscal discipline.

Econometric evidence on the relative magnitude and evolution of procyclical patterns in fiscal policy among SSA countries is sparse. Using time series regressions for 37 low-income African countries for 1960–2004, Thornton (2008) finds government consumption to be on average highly procyclical. Using panel data regression methods that address potential endogeneity bias, Diallo (2009) also finds evidence that fiscal policy was on average

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[4]   Galí and Perotti (2003) found that the fiscal policies of EMU members became more countercyclical in the 1990s after the Maastricht Treaty was adopted. Galí (2005) shows that this finding holds in general for all industrial countries and hypothesizes that it is related to an observed reduction in public debt.

procyclical for 1989–2002. The evidence on the evolution of cyclical fiscal patterns has been mostly anecdotal or based on case studies (see O'Connell, 1988; World Bank, 2008). Regression-based analysis has been limited to South Africa, where procyclicality seems to have increased since 1994 (Du Plessis and Boshoff, 2007; Du Plessis, Smit, and Sturzenegger, 2007).

A large literature suggests that procyclical fiscal policy is harmful because it tends to exacerbate business cycle fluctuations.[5] The driving assumption for this theory is that countercyclical fiscal expansions do not contract ouput or, in Keynesian terms, that fiscal multipliers are not negative. Multipliers can be negative if fiscal expansions crowd out private investment or raise debt sustainability concerns, which is more likely among low-income countries because they have shallow financial markets and relatively high debt. Recent work corroborates these views. Caballero and Krishnamurthy (2004), for instance, show that procyclicality can be optimal when financial depth is low because expansionary fiscal policy leads to too much crowding out of private investment. Gupta et al. (2005), on the other hand, find procyclical cuts in nonproductive spending to be expansionary in countries where the risk of debt distress is high. Procyclical fiscal policy can also be an optimal response when, in the absence of institutional controls, there is a high likelihood that revenue windfalls would be spent inefficiently or missapropriated (Talvi and Vegh, 2005; Alesina, Campante and Tabellini, 2008).

Both theoretical and empirical studies have thus identified two broad groups of factors that explain why fiscal policy has often been procyclical in developing countries[6]: political and institutional factors that lead to fiscal profligacy in good times, and financing constraints and limited access to international capital markets in bad times. These factors can reinforce each other. For instance, lack of political and institutional controls in bad times

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[5]   See Lane (2003a) for a review of neoclassical and Keynesian arguments related to optimal cyclicality in fiscal policy.

[6]   Technical, structural, and administrative constraints have been commonly invoked in more policy-oriented papers to explain procyclical fiscal responses in developing countries (Balassone and Kumar, 2007; IMF, 2008). They arise from difficulties in identifying downturns and recoveries in real time, limited capacity to appraise and realize new projects, and, in the case of low-income countries, the need to comply with multiple, sometimes conflicting, donor procedures. The small size of automatic stabilizers lengthens implementation lags in these countries.

prevents fiscal prudence in good times. This in turn jeopardizes fiscal sustainability and creditworthiness, making financing constraints more binding.

A growing literature on the political economy of fiscal cyclicality looks at the role of political and institutional factors that encourage or fail to prevent fiscal profligacy and rent-seeking activities in good times. Tornell and Lane (1999) argue that good times bring resource windfalls and intensify competition for public resources between different constituencies and lobbies. If there are no institutional controls to limit policy discretion, this eventually leads governments to overspend. Such patterns, and the resulting fiscal procyclicality, have tended to be more pervasive in developing countries, which have more volatile tax bases (Talvi and Vegh, 2005), more corruption (Alesina, Campanti and Tabellini, 2005), worse institutions, and fewer checks on the executive (Calderon, Duncan, and Schmidt-Hebbel, 2004; and Akitoby et al, 2006). Using samples of SSA countries, Thornton (2008) finds a similar impact for corruption and Diallo (2009) corroborates the results related to institutional restraints on the executive. Manasse (2006) finds that fiscal rules tend to reduce procyclicality but the result is not robust when controlling for institutional quality.

Financing constraints are another factor that induces procyclical fiscal behavior. Financing constraints become more pronounced during bad times, which heighten concerns about government creditworthiness and fiscal sustainability. The constraints can be both external and domestic. Gavin and Perotti (1997) emphasize external constraints by showing that developing countries find it hard to access international capital markets during recessions. Caballero and Krishnamurthy (2004) focus on domestic financing constraints by singling out a country's financial depth. Financing constraints become more binding the more procyclical the source of financing (Kaminsky, Reinhart, and Vegh, 2004) and the more debt sustainability perceptions worsen (Alberola and Montero, 2007). The evidence of the impact on procyclicality of aid flows—a major source of government finance in SSA—is less conclusive. Akitoby et al. (2006) find no evidence that aid dependency leads to more procyclical spending, but Thornton (2008), using a sample of SSA countries, does.

This paper extends the endogeneity-corrected regression estimates of Iltetzki and Vegh (2008) to benchmark the magnitude of procyclical fiscal policy in SSA. It also extends

Gali and Perotti (2003) and Aghion and Marinescu (2007) by estimating the evolution of cyclical fiscal patterns in advanced, developing, and SSA economies. And it complements the work of Thornton (2008) and Diallo (2009) by looking at specific factors that can explain changes in fiscal procyclicality in SSA over time. Finally, the paper contributes to the current policy discussion on the appropriateness of countercyclical fiscal policies in SSA (see Berg et al,, 2009; and IMF, 2009a and 2009b) by providing econometric evidence of the role of fiscal space in diminishing procyclicality in the region. To our knowledge, this is the first paper to do all of the above.

III. EMPIRICAL STRATEGY

A. Empirical Model and Identification

Our empirical analysis consists in two stages: we first estimate the cyclicality of fiscal policy and then move on to looking at how cyclicality is affected by different factors. In the first stage we use the following model to estimate the cyclicality of fiscal policy :

$$F_{i,t} = \alpha + \beta \, Y_{i,t} + \partial F_{i,t-1} + \theta Z_{it} + \mu_i + \varepsilon_{i,t} \tag{1}$$

where F and Y measure the growth in the fiscal variable and output; i denotes the country and t the time period, Z is a set of control variables, and μ_i is a country level fixed effect. The cyclicality of fiscal policy is determined by looking at the sign and size of coefficient β: if $\beta < 0$, fiscal policy is countercyclical; if $\beta = 0$ it is acyclical; and if $\beta > 0$ it is procyclical. There are several reasons to expect an OLS estimate of equation 1 to be biased. The first is the reverse causality problem pervasive in any attempt to estimate cyclicality of fiscal policy : the growth in government spending is likely to affect output growth. Another problem is the possible correlation of all our regressors (in particular the lagged dependant variable) with

the country fixed effect μ_i. Finally our estimate of β may capture both the short run reaction of fiscal policy to the business cycle and a long run trend common to both variables.

We choose to address these problems by using dynamic panel GMM estimators (Arellano and Bond, 1991). By taking first difference of the data these methods take out the fixed effect from the estimated equation, and they allow for the use of internal instruments for both the endogenous regressor and the lagged dependant variable (treated as a predetermined variable) .These methods are particularly appropriate in cases for which they are no exogenous instruments available (Roodman, 2006). Though the literature has identified several plausible exogenous instruments for GDP growth, we find that none of these are particularly satisfactory for sub-Saharan Africa. Rainfall shocks, though undoubtedly exogenous to fiscal policy, is a weak instrument (Miguel, Satyanath and Sergenti, 2004), and we find that the instrument used by Jaimovich and Panizza (2007), growth of major trading partners, is relatively weak and potentially endogenous for sub-Saharan Africa. We report 2SLS estimates using this instrument however and compare it to our preferred estimation method. Two dynamic GMM methods are available : difference (Diff-) GMM and system (Sys-) GMM. They yield very similar results but we report mostly Diff-GMM results because this method imposes fewer restrictions on the correlation between the instruments and the error term (see Roodman, 2009, for a discussion)[7].

Both these methods require no serial correlation of the error term, and that past levels of the instrumented regressors (lags 2 and above of government expenditure and GDP growth) are uncorrelated with current changes in the error term. We report p-values for the standard overidentification and serial correlation tests which suggest that these assumptions hold. A potential concern with Diff and Sys-GMM is proliferation and weakness of the link between current changes and lagged levels of the instruments, leading to potential finite sample bias towards OLS (over-fitting) , biased standard errors, and low power of the Hansen over-identification test. We therefore limit and collapse our instrument set[8] following

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[7] We show below that the additional identifying assumption necessary for Sys-GMM to be valid (that past changes in the instruments be uncorrelated to the fixed effect) probably does not hold well in our sample.

[8] The default option in both Diff and Sys GMM is to use all available lags of the instrumented variables. We restrict this to maximum 20 lags, down from a maximum of 35. Using the collapse option reduces the

Calderon Chong and Loayza (2000) and Beck and Levine (2004), report Sys-GMM results (which helps with weakness by estimating differenced and levels equations as a system) as well as Diff-GMM, and report both the Hansen and the Sargan overidentification statistics to exploit their complementary weaknesses and strengths. The autocorrelation test and the robust estimates of the coefficient standard errors assume no correlation across countries in the idiosyncratic disturbances, so we control for possible common country shocks throughout using the growth in (lagged) terms of trade, and other controls in our robustness checks.

A final concern is the need to differentiate between the reaction of fiscal policy to the output cycle and the long-run relationship between GDP growth and growth in government spending[9]. The worry here is that β may be capturing common growth trends as well as the cyclical relationship, as a vast literature on "Wagner's Law" suggests that government activity increases as economies grow (see Akitoby et al., 2006, for a discussion of the distinction between the long-run trend and the cyclical behavior of fiscal policy). By applying the first difference transform to the data, we are in effect using deviations from fixed long-run trends of our variables, ruling out any structural relationship between F and Y which is linear and time invariant.[10] We include long-run determinants of government spending possibly correlated with output growth in our robustness checks to control for possible changes in this effect over the period.

In our second stage we estimate the following equation :

$$F_{i,t} = \alpha + \beta_0 Y_{i,t} + \beta_1 X_{i,t} * Y_{i,t} + \partial F_{i,t-1} + \theta Z_{it} + \mu_i + \varepsilon_{i,t} \tag{2}$$

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instrument count by creating one instrument per lag distance for each variable rather than one instrument per lag distance and time period.

[9]   We explain below why we do not filter out the trend from GDP growth and our fiscal variable.

[10] $F_{i,t}$ in (1) can be decomposed into a long run trend F^*, which is a function of the GDP trend growth, ($F_t^* = \lambda_t Y_t^*$), and a cyclical component, which responds to the output cycle, ($F_{i,t} - F_t^* = \beta(Y_{i,t} - Y_t^*)$). Taking first differences of (1) including this decomposition (but excluding the vector of controls and the lagged dependent variable) gives us $\Delta F_{i,t} = \beta \Delta Y_{i,t} + \Delta \varepsilon_{i,t}$ if $\Delta Y^* = \Delta \lambda^* = 0$.

This enables us to look at how our estimated cyclicality coefficient is affected by different factors X, as $\beta = \beta_0 + \beta_1 X_{i,t}$. By taking first differences (i.e., $\Delta\beta_{i,t} = \beta_1\Delta P_{i,t}$), it easy to se that a decrease in procyclicality will depend on the values estimated for β_1 and changes in the factor itself: decreases in the factor will decrease procyclicality if $\beta_1 > 0$; and increase procyclicality if $\beta_1 < 0$.

B. Data, Measurement, and Specification

We use annual data in an unbalanced panel covering 39 years (1970–2008) and 174 countries, of which 44 are in SSA, 33 are advanced economies, and 97 are non-SSA developing countries.[11] Appendix 1 gives more details on the variables used. Our dependent variable is real central government spending and our key explanatory variable is growth in real GDP. An alternative approach would be to measure GDP and government spending as deviations from their long-run trends by using the Hodrik-Prescott filter to detrend the original series, but detrending is highly problematic in developing countries (see Aguiar and Gopinath, 2004) so we use this less parametric approach. We follow Iltzetki and Vegh (2008) in not attempting to differentiate between discretionary and automatic (likely very small in SSA) government spending because we wish to capture the overall cyclical behavior of fiscal policy regardless of whether it is a consequence of discretionary measures or of legal constraints (unemployment benefits, for example) that systematically increase government spending in bad times. All our specifications include as controls lagged central government spending growth (instrumented for using past values), to allow for long-term mean reversion in government spending, and growth in terms of trade, to control for common fiscal shocks. Other controls in our robustness checks are growth in oil prices and commodity prices as an alternative to capture common shocks to government spending, and a set of variables

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[11]   Iltzetki and Vegh (2008) argue that quartely data is more appropriate for tackling the issue of reverse causality. While quarterly fiscal data are available for some SSA countries, quarterly GDP data is not available for most.

identified in the literature as long-run determinants of fiscal spending: trade openness, a measure of democracy, the ratio of dependent to working age population, and the degree of urbanization.

We look at the role of political institutions in cyclical fiscal behavior using the Polity 4 dataset on political regimes (see Marshall and Jaggers, 2009, for a description of the dataset) and focus on variables identified as relevant in the literature, namely the degree of democracy, constraints on the executive, and political competition (Diallo, 2009). This covers more time than any alternative dataset on political institutions, and we run robustness checks using the shorter variables from the *International Country Risk Guide*, which starts in 1985, and the World Bank's *Database of Political Institutions*, which starts in 1975. The share of commodity exports in GDP is used to proxy for volatility in tax revenues.

Variables capturing financing restrictions are divided into domestic and external. Domestic financial restrictions are measured by the share in GDP of credit to the private sector, as a proxy for the depth of the domestic financial sector, and the real central bank interest rate, to reflect the cost of domestic financing. Access to international finance is measured by the ratios of net capital flows to GDP and of official development aid to GDP. We finally consider variables that proxy for macroeconomic policy sustainability and stabilization concerns., namely the debt-to-GDP ratio and the inflation as well as a dummy equal to 1 if the country has reached the decision point to be considered for HIPC initiative assistance. To capture potential de facto fiscal controls, we use a dummy variable that takes a value of 1 if the country has an IMF program in the current year, and several transformed versions of this variable, which we explain later.

When estimating how these factors affect cyclicality, all our specifications include these variables interacted with GDP growth as well as controls. Reverse causality is a cause for concern for many because they could be affected by the growth rate of government spending; we therefore take lags of the factor of interest whenever appropriate.

IV. RESULTS

A. Key Facts

Our estimates indicate that fiscal policy is procyclical in SSA over the period 1970–2008. Table 2 shows that regardless of the specification used, our estimate of the cyclicality coefficient β in equation 1 is always positive and significant for all developing countries. Moreover, procyclicality seems to be more pronounced for SSA than for other developing countries. We cannot, however, reject the null hypothesis that the coefficients for SSA and for other developing countries are not significantly different. Consistent with previous studies, we also find that there is no evidence of procyclical fiscal behavior in advanced economies.

Table 2 : Cyclical Properties of Government Spending, 1970-2008
Dependent variable : growth in central government expenditures

	OLS	2SLS	Diff-GMM
	(1)	(2)	(3)
Sub-Saharan Africa	0.92***	2.21	1.89***
	(5.5)	(1.51)	(3,45)
Other Developing Countries	0.68***	1.25*	1.09**
	(5.05)	(1.87)	(2.34)
Advanced Economies	-0.18	-1.85	-0.36
	(0.64)	(0.41)	(0.64)

* significant at 10% level; ** significant at 5% level; *** significant at 1% level. Absolute values of T statistics in parentheses, using Windmeijer (2005)'s finite sample correction for standard errors for two-step GMM in column (3). Standards errors are clustered at the country level. The country classification comes from the *World Economic Outlook* (IMF). All regressions include country fixed effects, the lagged dependent variable and a control for terms of trade growth. In column (2) GDP growth is instrumented using the growth of trading partners weighted by exports. Instruments in column (3) are past values of real GDP growth of the lagged dependant variable .

We first estimate equation 1 using fixed effects OLS[12] (Table 2, column 1), which is likely to yield biased estimates due to the endogeneity concerns outlined above. Estimates in the second column are a first attempt to address those concerns using the growth of major trading partners as an instrument, as suggested by Jaimovich and Panizza (2007). Though we

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[12] Hausman tests always soundly favor the fixed effects over the random effects estimator, so the latter are not reported.

find that this instrument is relatively weak and potentially endogenous[13] for our region of interest it is reassuring to see that the estimates are close to those obtained with our preferred estimation method in column (3) for the other two regions. Unlike Jaimovich and Panizza (2007) but like Ilzetzkhi and Végh (2008), we find that coefficients obtained using 2SLS or Diff-GMM are larger than the OLS coefficients for both developing countries and SSA, but as expected lower for advanced economies. Our preferred estimation method—(two-step) Diff-GMM—yields results that are more precise (column 3). For all developing countries the estimated elasticity of government spending with respect to output growth is higher than 1, though the estimate is significantly higher than one for sub-Saharan Africa only when we include more controls in our robustness checks (see Table 3). We find that a 2 percentage point increase in the rate of real GDP growth raises the growth rate of real government spending by about 3 points in SSA countries and 2.4 points in other developing countries; it does not affect the growth of real government expenditure in advanced economies.

We run a series of tests (Table 3,) to address the potential pitfalls with Diff-GMM, namely instrument proliferation and serial correlation in the error term (see Roodman, 2006). The Arellano-Bond (1991) tests for first- and second-order serial correlation in the first difference in the error term are satisfactory; they suggest that the former is present but the latter is not, which is consistent with the identifying assumption of no serial correlation of the underlying error terms in equation 1. Instrument proliferation can lead to implausibly high p-values of the Hansen statistics, so is it reassuring that the p-values are high enough to reject endogeneity but below 0.8. We also report the Sargan test, which is less vulnerable to instrument proliferation but is not robust to heteroskedasticity. Though the p-values are too low for other developing countries they are large enough to confirm that our specification for SSA is appropriate. Table (3) also shows that the estimated dynamics of the growth in government spending are as expected: the coefficients for the lagged dependent variable are always negative, consistent with long run mean reversion, but only significantly so in

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[13] The Kleibergen Paap Wald F statistics (not reported) for the 2SLS estimates are low with respect to Stock and Yogo (2005)'s critical values for weak instruments, for sub-Saharan Africa only. Another cause for concern is potential endogeneity of this instrument in sub-Saharan Africa if the growth of donor countries is related to the changes in aid flows, an important source of public resources and one which we identify affects procyclicality.

advanced economies whose government spending to GDP ratios are arguably closer to their steady state.

Our results may be affected by the inclusion of control variables that are known to affect government spending and might also be correlated to GDP growth through channels other than the cyclicality of public spending. The computation of standard errors in our preferred estimation method is also vulnerable to correlation of the error terms between countries, for example, correlation due to common shocks to government spending. Table 3, columns 2 , 5, and 8, presents results obtained by including control variables for common shocks (changes in oil and commodity prices) and long-term determinants of growth in government spending (all other additional controls). The coefficients are of the expected sign but nearly never statistically significant, which suggests that, as noted, taking differences does take out the long-term relationship between output and government spending and that common shocks do not undermine the validity of our specification. The estimated cyclicality coefficients change a little but stay in the 1.5–2.2 range for SSA and the 1.1–1.4 range for other developing countries.

Finally we report Sys-GMM estimates in columns 3 6 and 9. This method combines differenced and levels equations to obtain estimates that are more efficient than Diff-GMM, at the price of an additional assumption: past changes in the instruments must be uncorrelated with the fixed effect. It is therefore reassuring to obtain results that are very similar to the Diff-GMM estimates, and not particularly more precisely estimated. The Difference in Hansen test (not reported) for sub-Saharan Africa however rejects by a small margin the additional assumption required by Sys-GMM, validating our choice to concentrate on Diff-GMM.

Table 3 : Robustness checks, System-GMM estimates and additional controls

Dependent variable : growth in central government expenditures

	Sub-Saharan Africa			Other Developing Countries			Advanced Economies		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	Diff-GMM	Diff-GMM	Sys-GMM	Diff-GMM	Diff-GMM	Sys-GMM	Diff-GMM	Diff-GMM	Sys-GMM
GDP growth	1.89***	2.21***	1.55***	1.09**	1.41***	1.10**	-0.36	2.11	-0.38
	(3.45)	(3.83)	(3.12)	(2.34)	(2.6)	(2.30)	(0.53)	(0.8)	(0.68)
Terms of trade growth	0.32	0.67	0.26	-0.22	-0.09	-0.21	-0.34	-3.07	-0.53
	(1.25)	(2.38)	(1.14)	(0.98)	(0.5)	(1.07)	(0.51)	(0.85)	(0.94)
Lagged growth in government spending	-0.02	-0.16	-0.1	-0.06	0.14	-0.05	-0.17***	-0.49***	-0.13***
	(0.1)	(1.23)	(0.08)	(0.61)	(0.86)	(0.54)	(5.33)	(6.68)	(3.56)
Growth in the price of oil		-0.07			-0.08			-0.24	
		(0.51)			(0.79)			(1.28)	
Growth in commodity prices		-0.58			0.05			-0.26	
		(1.43)			(0.81)			(0.9)	
Democracy		0.03*			0.04			0.26	
		(1.79)			(1.12)			(1.06)	
Trade openness		0.01			0.01			-0.05	
		(0.22)			(0.98)			(0.95)	
Dependency ratio		1.14			-0.91			19.7	
		(1.03)			(0.66)			[1.26]	
Urban population ratio		1.87			-3.07			12.27	
		(1.55)			(1.12)			(0.63)	
Observations	1464	938	1507	2782	1562	2875	1088	670	1120
Arrelano-Bond test for AR(1)	0.001	0.001	0.001	0.004	0.038	0.004	0.249	0.478	0.244
Arrelano-Bond test for AR(2)	0.324	0.927	0.233	0.814	0.622	0.770	0.565	0.341	0.618
Hansen test	0.556	0.755	0.608	0.142	0.667	0.2	0.556	0.876	0.683
Sargan test	0.339	0.98	0.313	0.001	0.009	0.001	0.364	0.036	0.233

* significant at 10% level; ** significant at 5% level; *** significant at 1% level. Absolute values of T statistics in parentheses, using Windmeijer (2005)'s finite sample correction for standard errors for two-step GMM. Standards errors are clustered at the country level. The country classification comes from the *World Economic Outlook* (IMF). We report the p-values for the Hansen test of overidentifying restrictions and the Arellano-Bond test for AR(1) and AR(2) in first differences. All regressions include the lagged dependent variable and a control for terms of trade growth. Instruments are lagged GDP growth and twice lagged growth in central government spending. See data appendix for variable description.

Evolution : Changes by Decade

Table 4 presents the evolution of procyclicality by decade for the three country groups. Fiscal policy in advanced economies was acyclical throughout the period; and we find limited evidence ofa shift toward more countercyclicality, as in Aghion and Marinescu (2007), who concentrate on a smaller sample of OECD countries. We also find that there is no clear trend in non-SSA developing countries, in particular there is no decline in procyclicality towards the end of the period .

By contrast, there is a clear trend for SSA countries: we cannot reject the hypothesis that fiscal policy was acyclical for the 1970s, but in the 1980s and 1990s the coefficients are positive, statistically higher than zero at the 1% significance level, and increasing. For 2000–08 this coefficient falls to the point that it is lower than that for other developing countries and only statistically different from zero at the 10% significance level. This suggests that fiscal policy in the region has in recent years become less procyclical. However, given large standard deviations in the procyclicality coefficient, the decline is not statistically significant. This indicates that in seeking evidence of systematic changes in cyclical patterns in sub-Saharan Africa over time, it will be necessary to look beyond arbitrary time splits and search for changes in specific factors over time—as we do in the next section.

Table 4 : Cyclical Properties of Government Spending by decade
Dependent variable : growth in central government expenditures
Two step Diff-GMM estimates

	1970-1979	1980-1989	1990-1999	2000-2008
Sub Saharan Africa	-1.47*	1.81***	2.1***	1.48*
Other developing countries	2.38*	-0.01	1.02	1.53***
Advanced economies	-0.04	0.09	-0.13	-0.49

* significant at 10% level; ** significant at 5% level; *** significant at 1% level. Standard errors are computed using Windmeijer (2005)'s finite sample correction for two-step GMM.The coutry classification comes from the *World Economic Outlook* (IMF). All regressions include the lagged dependent variable and a control for terms of trade growth. Instruments are past values of real GDP growth and past values of the lagged dependent variable .

B. Factors

This section presents our results related to the determinants of cyclical fiscal behavior focusing on SSA between 1970 and 2008. We will look at political economy factors, financial restrictions, and macroeconomic and fiscal space.[14]

Political Economics and Political Institutions

Several studies suggest that better political institutions, such as more constraints on the executive or additional checks and balances, should lead to less procyclical fiscal policies (Calderón et al., 2004; Diallo, 2009).[15] However, we find no evidence that political institutions have any effect on the cyclical behavior of fiscal policy (see Table 5, columns 1–3). When we also look at the impact of political variables on procyclicality during good times (as suggested by the literature), the results remain the same (see Appendix Table A.4).[16] This may be because institutional quality in SSA is too low (see Appendix Table A.3) for any variation in political institutions to have much effect on fiscal decision-making or because those political variables do not vary much over time. Restricting the sample to the years after 1990, during which there has arguably been considerable political change in SSA (Bratton and Van de Walle, 1997) does not affect the results. Neither does using other measures of institutional quality, such as those compiled by the International Country Risk Group or the World Bank's Database on Political Institutions (all these results are available from the authors upon request)..

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[14] Difficulties in properly measuring automatic stabilizers and policy formulation and implementation capacity in SSA prevented us from looking at technical, structural, and administrative factors.

[15] The effect of democracy itself on procyclicality may, however, be ambiguous; see Alesina, Campante and Tabellini (2008).

[16] This was done by interacting GDP growth and the respective political variable with a dummy that equals one when GDP growth is above median growth (consistent with the definition of 'good times' in Kaminsky et al., 2004) as suggested by the literature, and the results are unchanged.

We find limited evidence that is consistent with political economy mechanisms in the form of a large and positive estimated coefficient for the share of commodity exports in GDP , though the paucity of data on commodity exports cautions against reading too much

Table 5 : Political factors, impact on procyclicality, 1970-2008
Dependent variable : Growth in central government expenditures
Two-step difference-GMM estimates

	(1)	(2)	(3)	(4)
GDP Growth	2.35***	2,8	2.18	0.18
	(3.36)	(1.25)	(1.29)	(0.06)
All variables below are interacted with GDP growth				
Political institutions				
Democracy	0.07			
	(0.52)			
Degree of constraints on the executive		-0.29		
		(0.31)		
Degree of political competition			-0.03	
			(0.08)	
Commodity exports to GDP ratio				7.8*
				(1.83)
Observations	1295	1205	1205	652

 * significant at 10% level; ** significant at 5% level; *** significant at 1% level. Absolute values of T statistics using Windmeijer (2005)'s finite sample correction for standard errors in parentheses. All regressions include a control for terms of trade growth and lagged growth in central government spending. GDP growth and the lagged dependent variable are instrumented for using lags. See data appendix for variable description.

into that coefficient.[17] Talvi and Vegh (2005) argue that because spending pressures from different political groups are an increasing function of tax base variability, countries with more volatile tax bases will be more procyclical. Reliance on commodity exports is known to increase volatility of output in developing countries (World Bank, 2009), so the share of commodity exports in GDP is a plausible proxy for output volatility and the volatility of revenues generally.[18] Our result (though only marginal in a statistical sense) provides some

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[17]   Data on commodity exports are not available for more than half our sample. However, many of the country-year observations that are missing may be observations for which total commodity exports were zero or very low. When we run the same regression coding all missing observations as zero, the estimated coefficients are qualitatively unaffected, though they lose statistical significance. Results are available upon request.

[18]   Reliance on export taxes for revenues has lowered over the period to the point that these taxes have now virtually disappeared in SSA (Keen and Mansour, 2009), so commodity export volatility cannot be directly used as a measure of tax base variability.

support for SSA countries that higher volatility leads to more procyclical fiscal behavior consistent with the evidence in Lane (2003), Talvi and Vegh (2005), and Aghion and Marinescu (2007) .

Financing Restrictions

One reason for the procyclicality of fiscal policy may be that it is difficult for SSA countries to access financial markets to borrow during downturns. Table 6 investigates the role of restrictions on both domestic (columns 1 and 2) and international (columns 3 and 4) financing in the cyclical behavior of fiscal policy. It appears that characteristics of the domestic debt market are irrelevant for cyclicality; coefficients on the variables proxying for the depth of financial markets and the cost of domestic credit are both very close to zero and imprecisely estimated. This is also true when we restrict the sample to years during which GDP growth is below the median (bad times) when financial constraints could be more binding (Appendix Table A.4). This could be because domestic financial markets are underdeveloped in SSA: the median share of private credit to GDP in SSA is half the developing-country average for the period considered (see Appendix Table A.3). More exposure to capital flows does not decrease procyclicality significantly either, but is large and has a positive sign. This is particularly interesting given the fact that net capital flows are consistently found to be procyclical in developing countries, so we would expect the coefficient to have a positive sign. The relationship seems to be somewhat weaker in low-income countries because they tend to be less integrated into global financial markets and more capital-scarce than medium-income countries (Kaminsky, Reinhart, and Végh, 2004). In these circumstances, capital flows are likely to behave less procyclically; by relaxing financial constraints larger capital inflows may even help to decrease procyclicality. Our negative but statistically insignificant coefficient seems to corroborate this hypothesis.

Table 6 : Financing constraints, impact on procyclicality, 1970-2008

Dependent variable : Growth in central government expenditures

Two-step difference-GMM estimates

	(1)	(2)	(3)	(4)	(5)
GDP Growth	2.4***	2.35***	3.13***	3.27***	3.1***
	(2.76)	(4.51)	(3.47)	(4.13)	(5.14)
All variables below are interacted with GDP growth					
Financing restrictions					
Private credit to GDP ratio	-0.001				
	(0.21)				
Lagged real central bank interest rate		-0.00			
		(0.1)			
Lagged net capital flows to GDP ratio			-1.89		
			(1.45)		
Lagged aid to GDP ratio				-7.93*	-8.46*
				(1.80)	(1.9)
HIPC decision point reached					2.43
					(0.46)
Observations	1196	1147	1428	1387	1387

 * significant at 10% level; ** significant at 5% level; *** significant at 1% level. Absolute values of T statistics using Windmeijer (2005)'s finite sample correction for standard errors in parentheses. All regressions include a control for terms of trade growth, lagged growth in central government spending and the factor itself. GDP growth and the lagged dependent variable are instrumented for using lags. See data appendix for variable description.

A larger share of aid in GDP seems to decrease procyclicality, suggesting that access to concessional sources of finance enables countries in SSA to mitigate the tendency for spending growth to follow output growth. Previous studies have found that aid flows are weakly procyclical (Bulir and Hamman, 2008) and, given the high share of aid in total government spending in most of the countries we are considering (Appendix Table A.3), it is perhaps surprising to find a negative, significant, and large estimate of the impact of the aid-to-GDP ratio on procyclicality (Table 6, column 4). This result contrasts with the findings of Thornton (2008) that countries receiving more foreign aid are more procyclical. Because official aid flows include debt relief we control for the impact of having reached HIPC decision point[19] (Table 6, column 5) and find that the estimated coefficient is affected very little. Though surprising these results are related to those in Chauvet and Guillaumont (2008) who find that aid has had a stabilizing effect on countries vulnerable to external shocks because it is less procyclical than exports, and that the procyclicality of aid flows has

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[19] Countries reaching the HIPC decision point may immediately begin receiving interim relief on debt service falling due; they also typically begin to receive significant increases in aid inflows. To disentangle both effects on changes in fiscal procyclicality, we created a dummy that equals 1 at or after the year the country reached the HIPC decision point, which, together with aid to GPD, was interacted with GDP growth.

declined since the 1990s, particularly in SSA. This may explain why aid flows seem to have played a useful role in mitigating financial constraints on fiscal policy in SSA for the whole period, given our previous finding that procyclicality has fallen in recent years.

Macroeconomic Stability and Fiscal Space

We now turn to the role of key macroeconomic policy variables in SSA countries since 1970. At independence these countries had little public debt, thanks to the prohibition on budget deficits imposed by colonizers, but also fragile systems of public finance and heavy pressures to increase public spending (Siebrits and Calitz, 2007). Mounting debt during the 1970s was mitigated by high growth and commodity export booms, but in the 1980s the combination of a global economic slowdown, a decline in the terms of trade, and higher interest rates lead to mushrooming debt, chronic fiscal deficits, and hyperinflation. This triggered—in SSA as elsewhere in the developing world—a series of stabilization reforms, often characterized by the cutting back of expenditure and subordination of fiscal policy to the overarching priorities of deficit and inflation reduction. Many countries in SSA have since the early 2000s entered what Adam and Bevan (2005) call the "post-post-stabilization" phase: they have had an extended period of adjustment since stabilization reforms without any fiscal or inflation crises, and today key macroeconomic indicators (deficit and debt levels but also exchange rates and stocks of reserves) are at sustainable levels (see Table 1). The average share of public external debt to GDP in the region mirrors this evolution strikingly: it was at 18 percent in 1970 and 40 percent at the start of the debt crisis (1982), reached 80 percent in 1996 when the HIPC initiative was launched, and in 2007 had dropped back to 40 percent.

Why should we expect this macroeconomic evolution to have affected the procyclicality of fiscal policy? High inflation and debt can affect a government's ability to adjust to the economic cycle, because fiscal policy is subordinated to the aims of keeping price increases in check and reassuring creditors—avoiding hyperinflation and default. More generally, the constraints governments face in setting macroeconomic policies have loosened in recent years thanks to successful stabilization; in other words, countries now have more fiscal space, defined as the availability of budgetary room so that a government can use

resources for a desired purpose without prejudicing its fiscal sustainability (Heller, 2005). Table 7 provides some evidence of the impact of inflation and debt—proxies for overall macroeconomic policy conditions—on procyclicality. Lagged inflation does not seem to affect fiscal cyclicality (column 1).[20] We find some evidence, however, that a smaller (lagged) external debt-to-GDP ratio appears to diminish procyclicality over the period (columns 2) though the coefficient falls short of statistical significance. Focusing on the countries in which debt distress was more acute – Highly Indebted Poor Countries, we find however that debt relief for HIPC countries significantly decreased procyclicality (column 3). This is consistent with the idea that countries can only smooth out fiscal policy over the cycle when debt sustainability concerns do not overwhelm all other policy concerns, constraining the choices available to policymakers.

The concept of fiscal space and a lack of international financial constraints are closely related: higher debt-to-GDP ratios could be conducive to more procyclicality simply because they signal tighter financial conditions. It is well-known, for example, that countries can be shut out of international financial markets because of a recent history of default or high debt (see, for example, Reinhart, Rogoff, and Savastano, 2003) so that no external credit is available to help smooth fiscal policy over the cycle. To disentangle the fiscal space effect from financing constraints, we run a regression with proxies for both fiscal space and external financial conditions. We find (Table 7, column 4) that the impact of public external debt is affected very little and remains close to statistical significance, but the remaining factors become very imprecisely estimated, including HIPC debt relief. This suggests that even for a given level of access to international financial resources and aid, including debt relief, countries with less debt are more likely to have less procyclical fiscal policies, possibly because for them bringing debt down to a more sustainable level is less of a policy constraint.

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[20]   We considered other variables that could affect a country's fiscal space, such as its exchange rate system and the share of foreign currency reserves to GDP; these turned to be statistically and economically insignificant.

Table 7 : Macroeconomic stability and fiscal space, impact on procyclicality, 1970-2008
Dependent variable : Growth in central government expenditures
Two-step difference-GMM estimates

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
GDP Growth	1.88***	0.15	2.48***	0.16	1.03	3.09**	1.51**
	(3.4)	(0.09)	(3.08)	(0.05)	(0.92)	(2.67)	(2.64)
All variables below are interacted with GDP growth							
Fiscal space							
Lagged inflation	0.00						
	(0.35)						
Lagged public external debt to GDP ratio		3.17		3.38			
		(1.49)		(1.59)			
HIPC decision point reached			-3.03*	2.73			
			(1.73)	(0.73)			
Fiscal space and financing conditions							
Lagged net capital flows to GDP ratio				8.3			
				(0.91)			
Lagged aid to GDP ratio				-8.47			
				(0.59)			
Impact of IMF programs							
IMF program					2.82*		
					(1.92)		
IMF program completed						-1.70	
						(1.38)	
IMF program about to start							1.91
							(0.73)
Observations	1291	1464	1464	1291	1464	1464	1423

* significant at 10% level; ** significant at 5% level; *** significant at 1% level. Absolute values of T statistics using Windmeijer (2005)'s finite sample correction for standard errors in parentheses. All regressions include a control for terms of trade growth and lagged growth in central government spending, as well as the factors themselves. GDP growth and the lagged dependent variable are instrumented for using lags, and the growth of major trading partners is used as an exogenous instrument. See data appendix for variable description.

The role of IMF programs in creating more fiscal space is explored in the last three rows of Table 7. Because these programs are generally accompanied by structural reform and macroeconomic stabilization they may have put countries in a fiscal position where they can afford to be more flexible during macroeconomic fluctuations. On the other hand, the structural reforms themselves may have restricted the extent to which governments can adapt their fiscal spending to the economic cycle because respecting IMF conditions took a higher priority, thus increasing procyclicality. Finally, a country may require an IMF program because it has very little access to credit and is in a fragile macroeconomic condition, both characteristics that we have shown increase procyclicality.

The impact of a country having an IMF program in any given year is therefore ambiguous; we find that it tends to increase procyclicality (column 5). We try to disentangle

those effects by creating a dummy variable that takes the value 1 if the country had an IMF program in the previous year but not in the current year. Such a country should have undertaken structural reforms but no longer be subject to restrictive fiscal commitments or in a state of financial distress. Indeed, we find that it was on average mildly less procyclical, though the coefficient isn't statistically significant (column 6). We find however no clear evidence that a country that will start an IMF program in the next year (column 7) has more procyclical policies, as would be expected if that country typically faces more fiscal constraint than the average.

Discussion: Explaining the Evolution of Procyclicality

A final question of interest is the extent to which our results help explain how fiscal procyclicality evolves over time. Our data do not allow us to estimate the impact of different variables on cyclicality decade by decade, but if we assume that the impact was constant throughout the period, we can compute how factors predict the evolution of a cyclicality parameter over time based on their median value for each period.[21] The predicted parameters (Table 8) reveal that public external debt-to- GDP is the only variable amongst the potential factors explaining cyclicality we have identified that could be driving this evolution. Factors that proxy for financing restrictions (aid and capital flows) show little improvement over the period, but the evolution of public external debt mirrors that of the cyclicality coefficient identified: starting from a relatively low 15.5 percent in the 1970s, the median ratio of public external debt to GDP increased to 75.5 percent in the 1990s before falling back to 62.5 percent in recent years. It is the only variable that comes close to explaining the increase then decrease of the procyclicality in SSA that we identified between 1970 and 2008.

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[21] This is done by predicting the value of the cyclicality parameter, β, for each decade using the estimated values for β_0 and β_1 and the median value in each decade for the factor under consideration.

Table 8 : How can we explain the evolution of procyclicality over time in sub-Saharan Africa?

	1970-1979		1980-1989		1990-1999		2000-2008	
	Median	Predicted β	Median	Predicted β	Median	Predicted β	Median	Predicted β
Net capital flows to GDP	1.6	2.43	2.9	2.41	2.5	2.42	1.5	2.43
Aid to GDP	4.3	2.97	8.5	2.62	11	2.42	9.1	2.57
Public external debt to GDP	15.5	0.73	43.4	1.55	75.5	2.50	62.5	2.11

The "predicted β" is the value taken by the cyclicality parameter when the variable takes its median value for the period, using the estimates from tables 6 and 7.

V. CONCLUSIONS AND POLICY IMPLICATIONS

This paper has documented the cyclical behavior of government spending with respect to output growth in sub-Saharan Africa since the 1970s and examined institutional and macroeconomic variables that may explain variations in cyclicality across countries and over time. We find that in SSA fiscal policy is strongly procyclical, with an elasticity of government spending to output growth close to or above one (more than in other developing countries), and provide some limited evidence that procyclicality has declined over the last decade. Our results are consistent with the idea that countries have tended to be procyclical because they lacked access to aid in bad times. The decrease in debt ratios in recent years explains a large share of the fall in procyclicality in SSA since 2000; we suggest that this is at least partly due to the fact that lower debt ratios have allowed countries more flexibility in setting fiscal policy objectives—have, in other words, created fiscal space.

A direct implication of our results is that higher flows of aid to SSA do help by making countries less procyclical. This is of particular importance with respect to recent debates about the destabilizing potential of volatility in flows of official development aid. While this volatility is a concern in its own right, we find that more aid to the region could reinforce recent less procyclical trends.

Of more relevance to domestic policy-making is our finding that efforts to stabilize debt levels are indeed paying off and should be furthered by countries that wish to use fiscal

policy as a stabilizing tool. Extrapolating somewhat from our results, the fact that procyclicality is higher in SSA than in other developing countries suggests that factors unique to the region could be of importance in determining a country's capacity for less procyclical fiscal policy. It is well-known that weak automatic stabilizers and fragile revenue mobilization characterize the countries in our study, and both can be expected to increase procyclicality compared to other developing countries. Expanding the base of taxes like the VAT or the corporations tax could help make revenue collection more responsive to the cycle, and reinforcing automatic stabilizers with more comprehensive social safety nets would help make spending more responsive by explicitly minimizing the welfare costs of downturns.

Our analysis suggests potential avenues for future research. We document the evolution of procyclicality over time in different regions but look into the implications only for sub-Saharan Africa. It would be interesting to understand why the patterns are so different in other developing countries, especially if the finding that those countries have become more procyclical is confirmed by other studies. We find no impact of formal political institutions but expect that a study of the variety of fiscal institutions and rules adopted to promote the sustainability of fiscal policy in SSA in the last two decades could provide insight into the role of political and fiscal institutions in promoting less procyclical policies.

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APPENDIX

A. Countries in the Sample

Table A.1 : Countries in the sample

Sub-Saharan Africa	Other Developing Countries		Advanced Economies
Angola	Afghanistan	Lebanon	Australia
Benin	Albania	Libya	Austria
Botswana	Algeria	Lithuania	Belgium
Burkina Faso	Antigua and Barbuda	Macedonia	Canada
Burundi	Argentina	Malaysia	Hong Kong
Cameroon	Armenia	Maldives	Cyprus
Cape Verde	Azerbaijan	Mauritania	Czech Republic
Central African Republic	Bahamas	Mexico	Denmark
Chad	Bahrain	Montenegro	Finland
Comoros	Bangladesh	Morocco	France
Democratic Republic of Congo	Barbados	Myanmar	Germany
Republic of Congo	Belarus	Nepal	Greece
Côte d'Ivoire	Belize	Nicaragua	Iceland
Equatorial Guinea	Bhutan	Oman	Ireland
Eritrea	Bosnia	Pakistan	Israel
Ethiopia	Brazil	Panama	Italy
Gabon	Brunei Darussalam	Papua New Guinea	Japan
Gambia	Bulgaria	Paraguay	Korea
Ghana	Cambodia	Peru	Luxembourg
Guinea	Chile	Philippines	Malta
Guinea-Bissau	China	Poland	Netherlands
Kenya	Colombia	Qatar	New Zealand
Lesotho	Costa Rica	Russia	Norway
Liberia	Croatia	Samoa	Portugal
Madagascar	Djibouti	Saudi Arabia	Singapore
Malawi	Dominica	Serbia	Slovak Republic
Mali	Dominican Republic	Solomon Islands	Slovenia
Mauritius	Egypt	Sri Lanka	Spain
Mozambique	El Salvador	St. Kitts and Nevis	Sweden
Namibia	Estonia	St. Lucia	Switzerland
Niger	Fiji	St. Vincent & Grenadines	Taiwan
Nigeria	Georgia	Sudan	United Kingdom
Rwanda	Grenada	Suriname	United States
Senegal	Guatemala	Syria	
Seychelles	Guyana	Tajikistan	
Sierra Leone	Haiti	Thailand	
South Africa	Honduras	Timor-Leste	
Swaziland	Hungary	Tonga	
São Tomé & Príncipe	India	Trinidad and Tobago	
Tanzania	Indonesia	Tunisia	
Togo	Iran	Turkey	
Uganda	Jamaica	Ukraine	
Zambia	Jordan	United Arab Emirates	
Zimbabwe	Kazakhstan	Uruguay	
	Kiribati	Vanuatu	
	Kuwait	Venezuela	
	Kyrgyz Republic	Vietnam	
	Laos	Yemen	
	Latvia		

The country classification comes from the *World Economic Outlook* (IMF).

B. Definitions and Sources of Variables

Table A.2 : Variable Description and Source

	Source	Description
Real GDP growth	World Economic Outlook (WEO), IMF	Growth in nominal GDP deflated using the CPI
Real growth in central government spending	WEO, IMF	Growth in nominal central government total spending deflated using the CPI
Real GDP growth of main trading partners	WEO, IMF	GDP growth of main trading partners (each partner weighted by its share of exports in the country's total exports) weighted by the share of exports in GDP.
Growth in terms of trade	WEO, IMF	Price of exports divided by the price of exports
Trade openness	WEO, IMF	Sum of total exports and exports divided by GDP
Oil price	WEO, IMF	Price in US dollars of a barrel of crude oil
Index of commodity prices	WEO, IMF	Price of non fuel commodity exports
Dependency ratio	World Development Indicators (WDI), World Bank	Ratio of dependants to working age population
Urbanization	WDI, World Bank	Ratio of urban population to total population
Private credit to GDP	WDI, World Bank	Ratio of credit to the private sector to GDP
Real central bank interest rate	International Financial Statistics, IMF	Central bank main interest rate deflated using the CPI
Net foreign capital flows	WEO, IMF	Capital inflows minus capital outflows
Aid	Global Development Finance, World Bank	Official Development Assistance
Current account balance	WEO, IMF	
Commodity Exports	UN Comtrade database	Based on Collier and Hoeffler (2002)'s definition of commodity exports: goods categories 0, 1, 2, 3,4 and 68 from the SITC4 nomenclature
Democracy	Polity4 database, polity2 variable	Difference between a democracy index (0 to 10) and an autocracy index (0 to 10) . See Marshall and Jaggers (2009) for a description of the Polity4 database.
Constraints on the executive	Polity4 database, xconst variable	Extent of institutionalized constraints on the decision making powers of chief executives, from 1 (unlimited authority) to 7 (executive parity or subordination)
Political competition	Polity4 database, polcomp variable	Degree of insitutionalization of political competition combined with the extent of government restriction on political competition, from 1 to 10.
Public external debt	Global Development Finance, World Bank	All public debt to foreign creditors
Inflation	WEO, IMF	Growth in the CPI
IMF program dummy	Strategy, Policy and Review department database, IMF	Equal to 1 if there is an IMF program in place in the country during that year.
HIPC dummy	Strategy, Policy and Review department database, IMF	Equal to 1 at (if until June) and after the year a country reached the decision point to be considered for HIPC Initiative assistance.

C. Descriptive Statistics

Table A.3 : Descriptive statistics of main variables for Sub-Saharan Africa and Other Developing Countries, 1970-2008

	Sub-Saharan Africa			Other Developing Countries		
	Mean	Median	SD	Mean	Median	SD
Real GDP growth	3.39	3.61	6.8	3.78	4.4	6.3
Real growth in central government spending	4.15	3.89	45	4.29	4.27	20.3
Real GDP growth of main trading partners	1.11	0.85	0.89	1.43	1.2	1.23
Growth in terms of trade	-0.48	0	20.7	0.09	0	18.6
Private credit to GDP	33	20.8	71	48.1	41.2	35.8
Real central bank interest rate	-42.8	1.29	749.8	-20.8	1.96	386.9
Net foreign capital flows to GDP	2.97	2.09	13.7	3.32	2.22	43.3
Aid to GDP	11.02	8.16	11.14	6.3	2	13.4
Current account balance to GDP	-5.43	-4.65	12.7	-3.7	-3.1	20.3
Commodity exports to GDP	14.52	10.31	13.2			
Democracy	-2.4	-5	5.9	-0.4	-2	7.35
Constraints on the executive	2.9	3	1.9	3.89	3	2.25
Political competition	3.8	2	3.2	4.8	6	3.5
Public external debt to GDP	58.7	48.1	50	42.9	29.1	66.4
Inflation	50.7	9.27	678.2	57.5	7.9	500.7
IMF program completed	0.06	0	0.22	0.05	0	0.22
IMF program next year	0.07	0	0.25	0.47	0	0.21

D. Financing Constraints and Political Institutions in Good and Bad Times
Table A.4 : Impact of financing constraints and political institutions in good and bad times

Dependent variable : Growth in central government expenditures
Two-step difference-GMM estimates

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
GDP Growth	2.04**	2.53	1.7	2.35**	2.29***	3.04***	3.2***
All variables below are interacted with GDP growth							
Political institutions							
Democracy	-0.26						
Democracy*good times	0.48						
Constraints on the executive		-0.15					
Constraints on the executive*good times		-0.15					
Political competition			0.07				
Political competition*good times			0				
Financing constraints							
Private credit to GDP ratio				0.01			
Private dredit to GDP ratio*bad times				0.01			
Lagged real central bank interest rate					0.00		
Lagged real central bank interest rate*bad times					0.02		
Lagged net capital flows to GDP ratio						-1.58	
Lagged net capital flows to GDP ratio*bad times						2.91	
Lagged aid to GDP ratio							-8.16**
Lagged aid to GDP ratio*bad times							3.8
Observations	1295	1205	1205	1216	1147	1428	1387

 * significant at 10% level; ** significant at 5% level; *** significant at 1% level. 'Good times' is a dummy equal to 1 if growth is above the median for the country over the period considered, and 'bad times' is a dummy equal to 1 if growth is below this median. GDP growth and the lagged dependent variable are instrumented for using lags, and the growth of major trading partners is used as an exogenous instrument. See data appendix for variable description.