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# IMF Working Paper

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## Cyclical Patterns of Government Expenditures in Sub-Saharan Africa: Facts and Factors

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Gadenne*

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## IMF Working Paper

African Department

### Cyclical Patterns of Government Expenditures in Sub-Saharan Africa: Facts and Factors

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Authorized for distribution by Abebe Aemro Selassie

[October] 2009

#### 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, it finds government expenditures to be 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.

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Keywords: Fiscal policy, government expenditures, business cycles, and sub-Saharan Africa

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**Supprimé :** 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 has been on average 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 fiscal procyclicality seems to have increased since 1994 (Du Plessis and Boshoff, 2007; Du Plessis, Smit, and Sturzenegger, 2007). . 8¶

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 Cconstraints 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) focused 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 ... [1]

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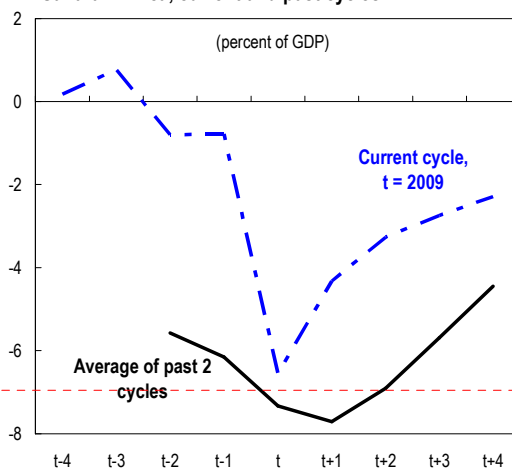
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## I. INTRODUCTION

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); there is some cross-country evidence that, as in other developing countries, fiscal policy in SSA has been mostly procyclical in the past. This has also become a commonly accepted view.

Figure 1: Evolution of the fiscal balance in sub-Saharan Africa, current and past cycles



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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). 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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Supprimé : in macroeconomic performance and structural reforms in developing countries, including SSA, over the last three decades (Table 1).

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**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
<b>Macroeconomic performance</b>				
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
<b>Quality of institutions</b>				
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 cyclicity in SSA have lagged behind the evidence and 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. Most of the econometric studies of the reaction of fiscal policy to the business cycle also ignored the possibility of reverse causality.

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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 (ii) identifying factors underlying changes in cyclicity over time, with reference mainly to macroeconomic and institutional conditions.

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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 cyclicity of fiscal policy. Another policy instrument that may also serve this purpose is government tax rates, but data

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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 cyclicity 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.

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In what follows, ~~Section~~ II reviews the literature on facts and factors ~~related to~~ fiscal cyclicity 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.

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## II. LITERATURE REVIEW

The average cyclicity 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 Ilzetzi 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.

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The literature ~~focusing~~ on the evolution of cyclical fiscal behavior in developing countries, ~~as opposed to static cyclical characteristics~~ 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 become 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;

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Aghion and Marinescu, 2007; and Strawczynski and Zeira, 2009).<sup>2</sup> Strawczynski and Zeira (2007) find that fiscal policy in Israel became less procyclical after 1985 after an economic stabilization program that increased fiscal discipline.

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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 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).

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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).

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A large literature suggests that procyclical fiscal policy is harmful because it tends to exacerbate business cycle fluctuations.<sup>3</sup> The driving assumption for this theory is that countercyclical fiscal expansions do not contract output 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

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<sup>2</sup> 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.

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<sup>3</sup> See Lane (2003a) for a review of neoclassical and Keynesian arguments related to optimal cyclicity in fiscal policy.

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).

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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<sup>4</sup>: 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 prevents fiscal prudence in good times. This in turn jeopardizes fiscal sustainability and creditworthiness, making financing constraints more binding.

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A growing literature on the political economy of fiscal cyclicity 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 procyclicity, 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.

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<sup>4</sup> 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.

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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.

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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.

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### III. EMPIRICAL STRATEGY

#### A. Empirical Model and Identification

We use the following model to define the cyclicity of fiscal policy and how it is affected by different factors:

$$F_{i,t} = \alpha + \beta_{i,t} Y_{i,t} + \theta Z_{it} + e_{i,t} \quad (1)$$

$$\beta_{i,t} = \beta_0 + \beta_1 P_{i,t} \quad (2)$$

$$Y_{i,t} = \phi F_{i,t} + v_{i,t} \quad (3)$$

$$e_{i,t} = \mu_i + \varepsilon_{i,t} \quad (4)$$

where  $F$  and  $Y$  measure the growth in the fiscal variable and output;  $i$  denotes the country and  $t$  the time period. Equation 1 captures a fiscal reaction function whereby fiscal policy responds to contemporaneous output changes; it depends on control variables ( $Z$ )—including the lagged dependent variable—and fiscal shocks ( $e_{i,t}$ ). The cyclicity of fiscal policy is determined by looking at the sign and size of coefficient  $\beta$ : if  $\beta < 0$ , fiscal policy is countercyclical; if  $\beta = 0$  it is acyclical; and if  $\beta > 0$  it is procyclical. Equation 2 allows the degree of cyclicity to vary by country and over time depending on a series of factors  $P$ . Equation 3 allows for an effect of fiscal policy on output. Equation 4 allows the fiscal shock to be decomposed between a country-specific term ( $\mu_i$ ) and a residual random term ( $\varepsilon_{i,t}$ ).

We estimate equation 1 using different econometric methods. The appropriate identification of  $\beta$  hinges on addressing the endogeneity bias stemming from two separate issues: (i) the reverse causality between output growth and fiscal policy illustrated in equation 2, and (ii) the correlation between output growth and unobserved country-specific effects on fiscal policy formalized in equation 4. In line with the recent literature, we address both sources of endogeneity bias using both difference (Diff-) and System (Sys-) GMM

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estimators (Arellano and Bond, 1991). Both methods allow us to circumvent reverse causality by instrumenting GDP growth. Internal instruments—past values of the explanatory variables—are obvious candidates (Gali and Perotti, 2003; Lane, 2003), and taking first differences of equation 1, makes them exogenous to the error term if there is no serial correlation. The more recent literature suggests tackling the problem by using an external instrument for GDP growth. We follow Jaimovich and Panizza (2007) and Ilzetzki and Végh (2008) in including the (export) weighted average of GDP growth in a country’s trading partners in our instrument set to increase its correlation with GDP growth.

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To ensure that our choice of instruments is appropriate we report p-values for the Hansen overidentification test of the orthogonality restrictions and the Arellano-Bond (1991) test for autocorrelation in first differences to check the absence of serial correlation. We choose Diff-GMM as our preferred specification because it imposes fewer restrictions on the correlation between the instruments and the error term.<sup>5</sup>

Another 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.<sup>6</sup> 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 relationship 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 linear Wagner’s Law effect.<sup>7</sup> We

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<sup>5</sup> Sys-GMM has better finite sample properties than Diff-GMM (see Roodman, 2006). This improvement, however, comes at the cost of an additional assumption: it requires that changes in the instrumenting variables not be correlated with the fixed effect.

<sup>6</sup> We explain below why we do not filter out the trend from GDP growth and our fiscal variable.

<sup>7</sup>  $F_{i,t}$  in (1) can be decomposed into a long run trend  $F^*$ , which is a function of the GDP trend growth, ( $F^* = \lambda Y^*$ ), and a cyclical component, which responds to the output cycle, ( $F_{i,t} - F^* = \beta(Y_{i,t} - Y^*)$ ). Taking first differences of (1) including this decomposition (but excluding the vector of controls  $Z_{i,t}$  gives us  $\Delta F_{i,t} = (\lambda - \beta)\Delta Y^* + \beta\Delta Y_{i,t} + \Delta \varepsilon_{i,t}$ , which is equivalent to  $\Delta F_{i,t} = \beta\Delta Y_{i,t} + \Delta \varepsilon_{i,t}$  if  $\Delta Y^* = 0$ .

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.

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Our strategy proceeds in two stages: First, we assume away the role of factors in driving the evolution of procyclicality in SSA (i.e.  $\beta_1=0$  in (2)). The focus is thus on deriving some basic stylized facts by benchmarking average procyclicality in SSA over the entire sample period (magnitude) and by decade (evolution) against advanced economies and other developing countries. Next, we analyze factors that may explain the variations in procyclicality in SSA countries over time. This is done by allowing  $\beta_1$  to differ from zero and interacting GDP growth with variables  $P$ , which are potential determinants of the degree of procyclicality. By taking first differences in equation 2 (i.e.  $\Delta\beta_{i,t} = \beta_1\Delta P_{i,t}$ ), it is easy to see that a decrease in procyclicality will depend on the values estimated for  $\beta_1$  and changes in the factor itself: decreases in the factor will decrease procyclicality if  $\beta_1 > 0$ ; decreases in the factor will increase procyclicality if  $\beta_1 < 0$ .

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## 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.<sup>8</sup> Appendix 1 gives more details on the variables used. We use growth in real central government spending as our dependent variable. 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

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<sup>8</sup> Iltzetki and Vegh (2008) argue that quarterly 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.

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.

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**In choosing** variables used as factors **that may** explain changes in cyclical patterns over time.

- We look at the role of political institutions in cyclical fiscal behavior using the Polity 4 dataset on political regimes (see Marshall and Jagers, 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, external, and those affecting sustainability and stabilization perception. Domestic financial restrictions **are** 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 use the debt-to-GDP ratio and the inflation **rate** to capture sustainability and stabilization concerns. 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.

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

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## IV. RESULTS

### A. Key Facts

Our estimates indicate that fiscal policy in 1970–2008 is procyclical in SSA. Table 2 shows that regardless of the specification used, our estimate of the cyclical coefficient  $\beta$  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.

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**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*** (6.3)	2.21 (1.23)	1.54*** (4.04)
Other Developing Countries	0.68*** (6.15)	1.25* (1.87)	1.16** (2.41)
Advanced Economies	-0.18 (0.29)	-1.85 (0.78)	-0.36 (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). 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, the growth of trading partners weighted by exports and past values of the lagged dependant variable .

Our models improve on the OLS with fixed effects estimates (Table 2, column 1) by addressing reverse causality (column 2) and country-specific heterogeneity and allowing for arbitrary heteroskedasticity of the error term (column 3). Unlike Jaimovich and Panizza (2007) but like Ilzetzki and Végh (2008), we find that coefficients of the 2SLS estimates are larger than the OLS coefficients for both developing countries and SSA. This finding suggests that the reverse causality effect of fiscal policy on output growth is actually negative in these countries (it is, as expected, positive for advanced economies, though the coefficient is very imprecisely estimated). Our preferred estimation method—(two-step) Diff-GMM—yields results (column 3) that are fairly similar to the 2SLS estimates but more precise. For all developing countries the estimated elasticity of government spending with respect to output growth is higher than 1. 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.

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We run a series of tests (see Table 3, columns 1, 4, and 7 for our baseline specification) to address the potential pitfalls with Diff- and Sys-GMM, namely instrument

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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 difference equations 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.

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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 cyclicity 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 gives the results obtained by including control variables for common shocks (rises 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 none is 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 cyclical coefficients change a little but stay in the 1.5–2 range for SSA and the 1.1–1.2 range for other developing countries. Columns 3, 6, and 9 present estimated coefficients obtained using the Sys-GMM method as a further robustness check; they are very close to our preferred Diff-GMM estimates.

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One further issue is that our external instrument may not be valid for low-income countries in some circumstances. In particular, the (export) weighted average of GDP growth in a country's trading partners could have an indirect effect on fiscal policy by increasing exports, which may in turn raise tax revenues. The quasi-disappearance of export taxes over

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the period we are considering (Keen and Mansour, 2009), however, should make this effect quantitatively unimportant, and we control for it directly by including terms of trade shocks in all our specifications. ~~Also, when we run regressions using only internal instruments, the~~ results ~~(are available upon request)~~ are very similar to the ones obtained using our preferred

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instrument set.

**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	1.54*** (4.04)	2.09*** (4.09)	1.47*** (3.64)	1.16** (2.41)	1.16** (2.6)	1.11** (2.53)	-0.36 (0.64)	1.35 (0.91)	-0.15 (0.27)
Terms of trade growth	0.32 (1.25)	0.74** (2.61)	0.25 (1.11)	-0.13 (0.64)	-0.09 (0.5)	-0.19 (0.97)	-0.34 (0.66)	-3.18 (1.01)	-0.47 (0.84)
Lagged growth in government spending	-0.02 (0.1)	-0.16 (1.18)	-0.03 (0.17)	-0.06 (0.59)	0.19* (1.72)	-0.05 (0.54)	-0.17*** (4.88)	-0.49*** (9.31)	-0.13*** (3.81)
Growth in the price of oil		-0.07 (0.51)			-0.08 (0.79)			-0.24 (1.28)	
Growth in commodity prices		-0.66 (1.64)			0.05 (0.81)			-0.26 (0.9)	
Democracy		0.03 (1.62)			0.04 (1.12)			0.26 (1.06)	
Trade openness		0.01 (0.03)			0.01 (0.98)			-0.05 (0.95)	
Dependency ratio		0.99 (0.76)			-0.91 (0.66)			12.7 (1.57)	
Urban population ratio		1.68 (0.99)			-3.07 (1.12)			7.36 (0.89)	
Observations	1464	938	1507	2734	1546	2824	1088	670	1152
Arellano-Bond test for AR(1)	0.001	0.000	0.001	0.006	0.033	0.005	0.249	0.266	0.245
Arellano-Bond test for AR(2)	0.232	0.917	0.207	0.810	0.260	0.820	0.573	0.279	0.663
Hansen test	0.515	0.798	0.627	0.217	0.655	0.297	0.605	0.888	0.683
Sargan test	0.374	0.985	0.341	0.00	0.006	0.00	0.409	0.004	0.253

\* 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. 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 the growth of major trading partners, 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; we find no evidence that there has been a shift toward more countercyclicality, unlike Aghion and Marinescu (2007), who concentrate on a smaller sample of OECD countries. We also find that fiscal policy was acyclical through the 1970s and 1980s in non-SSA developing countries but has been increasingly procyclical ever since.

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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 significant, and increasing. For 2000–08, this coefficient falls to the point that it is lower than that for other developing countries. 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 seems to indicate 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.

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**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	-1.53	1.83***	2.1***	1.48**
Other developing countries	1.9	-0.03	1.17*	1.73***
Advanced economies	-0.08	0.09	-0.07	0.04

\* 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 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. Instruments in column (3) are past values of real GDP growth, the growth of trading partners weighted by exports 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.<sup>9</sup>

### 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).<sup>10</sup> 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).<sup>11</sup> 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.

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

<sup>9</sup> Difficulties in properly measuring automatic stabilizers and policy formulation and implementation capacity in SSA prevented us from looking at technical, structural, and administrative factors.

<sup>10</sup> The effect of democracy itself on procyclicality may, however, be ambiguous; see Alesina, Campante and Tabellini (2008).

<sup>11</sup> 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.

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**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	2.27**	2.53	2.05	0.1
	(2.99)	(0.98)	(1.28)	(0.07)
<i>All variables below are interacted with GDP growth</i>				
<b>Political institutions</b>				
Democracy	0.1			
	(0.39)			
Degree of constraints on the executive		-0.19		
		(0.24)		
Degree of political competition			-0.02	
			(0.05)	
Commodity exports to GDP ratio				7.8
				(1.62)
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, and the respective factor itself. 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.

into that coefficient.<sup>12</sup> 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.

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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.<sup>13</sup> Our result provides some support (though, only marginal on a statistical sense) for SSA countries that higher volatility

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<sup>12</sup> 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.

<sup>13</sup> 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.

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 cyclicity; 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 seem to be statistically significant in decreasing procyclicality either. On the other hand, 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.

This is particularly interesting given the fact that net capital flows are consistently found to be procyclical in developing countries, even though 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.

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**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	2.39*** (2.76)	2.35*** (4.43)	3.1*** (3.47)	3.33*** (4.13)	3.09*** (4.0)
<i>All variables below are interacted with GDP growth</i>					
<b>Financing restrictions</b>					
Private credit to GDP ratio	0.01 (0.34)				
Lagged real central bank interest rate		-0.00 (0.03)			
Lagged net capital flows to GDP ratio			-1.89 (1.45)		
Lagged aid to GDP ratio				-7.90* (1.80)	-8.46* (1.90)
HIPC decision point reached					2.43 0.46
Observations	1216	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 respective factor itself. Equation (5) includes all controls in (4) plus a HIPC dummy. 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.

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 and holds even among countries that have reached the HIPC initiative decision point (Table 6, column 5).<sup>14</sup> However, Chauvet and Guillaumont (2008) find that (i) aid has had a stabilizing effect on countries vulnerable to external shocks because it is less procyclical than exports, and (ii) more important for our purpose, the procyclicality of aid flows has declined since the 1990s,

<sup>14</sup> 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 GDP, was interacted with GDP growth.

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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.

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## Macroeconomic Stability and Fiscal Space

We now turn to the role of key macroeconomic 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.

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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.

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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, which Heller (2005) understands as the availability of budgetary room so that a government can use resources for a desired purpose without prejudicing its fiscal sustainability. 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 cyclicity (column 1).<sup>15</sup> We find some evidence, however, that a smaller (lagged) external debt-to-GDP ratio appears to significantly diminish procyclicality over the period (columns 2 and 3), and that in part this may be due to debt relief for HIPC countries (column 4).<sup>16</sup> 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, unduly constraining the choices available to policymakers.

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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 5) that the impact of public external debt is affected very little and remains significant, but the remaining factors lose significance. This suggests that even for a given level of access to international financial resources, including debt relief, countries with less debt are more likely to have less

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<sup>15</sup> 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.

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<sup>16</sup> External public debt indeed diminishes procyclicality but the impact is not statistically significant in a specification where debt is also included as a control (Table 7, column 2). However, external public debt becomes significant at the 10 percent level once external debt is replaced by the HIPC dummy as a control for level declines in external debt (Table 7, column 3). That combined with very stable coefficients in both specifications (range from 3 to 3.2) seems to indicate that multicollinearity (by increasing standard errors) may be playing a role in dumping the statistical significance of the external debt coefficient.

procyclical fiscal policies, possibly because for them bringing debt down to a more sustainable level is less of a policy constraint.

**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)	(8)
GDP Growth	1.68*** (3.57)	0.09 (0.06)	0.27 (0.22)	2.32** (2.97)	0.11 (0.04)	1.20 (1.12)	2.83*** (3.46)	1.77** (1.93)
<i>All variables below are interacted with GDP growth</i>								
<b>Fiscal space</b>								
Lagged inflation	0.00 (0.43)							
Lagged public external debt to GDP ratio		3.20 (1.32)	3.01* (1.84)		3.35* (1.70)			
HIPC decision point reached				-3.43** (2.10)	2.88 (0.74)			
<b>Fiscal space and financing conditions</b>								
Lagged net capital flows to GDP ratio					8.34 (0.92)			
Lagged aid to GDP ratio					-7.98 (0.71)			
<b>Impact of IMF programs</b>								
IMF program						2.65* (1.84)		
IMF program completed							-0.23 (0.19)	
IMF program about to start								2.06 (0.74)
Observations	1464	1291	1291	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, lagged growth in central government spending, and the respective factor itself. Equation (3) uses the same controls as equation (2) except for external public debt, which is replaced by the HIPC dummy. 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, hopefully they 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 have an IMF program because it has very little access to financial markets and is in a fragile macroeconomic

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condition (why it needed an IMF program in the first place)—both characteristics that we have shown promote procyclicality.

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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 1). 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 falls short of statistical significance.

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Similarly, we find that a country that will start an IMF program in the next year has more procyclical policies, which suggests that countries do request a program when they have no fiscal flexibility, but the coefficient is far from significant.

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### Discussion: Explaining the Evolution of Procyclicality

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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 cyclicity 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 cyclicity parameter over time based on their median value for each period.<sup>17</sup> The predicted parameters (Table 8) reveal that the public external debt-to-GDP seems to be central. Although factors that proxy for financing restrictions in particular show little improvement over the period, the evolution of public external debt mirrors that of the cyclicity 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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<sup>17</sup> This is done by predicting the value of the cyclicity parameter,  $\beta$ , for each decade using the estimated values for  $\beta_0$  and  $\beta_1$  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 $\beta$	Median	Predicted $\beta$	Median	Predicted $\beta$	Median	Predicted $\beta$
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  $\beta$ " is the value taken by the cyclicity 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 cyclicity across countries and over time. We find that **in SSA** fiscal policy is strongly procyclical, with an elasticity of government spending to output growth above one (more than in other developing countries), but procyclicality **seems to have** been declining in 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 **find** tentative evidence 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.

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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.

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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. Strengthening public financial and debt management and medium-term fiscal frameworks would also be crucial to ensure that debt being built up currently is sustainable and also to help enforce fiscal restraint in good times. 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.

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Our analysis suggests useful avenues for future research:

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- 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.

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- 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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- Similarly, future econometric studies should look at the role of technical and administrative constraints and the effectiveness of automatic stabilizers in reducing fiscal procyclicality in the region.

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- Our study purposely does not consider the other side of the relationship between fiscal policy and growth: the role of fiscal multipliers. This is an area that deserves attention—there has been hardly any systematic analysis of the size and determinants of fiscal multipliers in SSA.

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- Finally, an immediate extension of our analysis would be to assess how changes in procyclicality affect output volatility and growth.<sup>18</sup>

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Work in all these areas would clarify how in the future fiscal policy can better serve the growth and stabilization goals of sub-Saharan Africa.

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<sup>18</sup> Aguion and Marinescu (2007) have done that for advanced economies.



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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
Benin	Albania	Libya
Botswana	Algeria	Lithuania
Burkina Faso	Antigua and Barbuda	Macedonia
Burundi	Argentina	Malaysia
Cameroon	Armenia	Maldives
Cape Verde	Azerbaijan	Mauritania
Central African Republic	Bahamas	Mexico
Chad	Bahrain	Montenegro
Comoros	Bangladesh	Morocco
Democratic Republic of Congo	Barbados	Myanmar
Republic of Congo	Belarus	Nepal
Côte d'Ivoire	Belize	Nicaragua
Equatorial Guinea	Bhutan	Oman
Eritrea	Bosnia	Pakistan
Ethiopia	Brazil	Panama
Gabon	Brunei Darussalam	Papua New Guinea
Gambia	Bulgaria	Paraguay
Ghana	Cambodia	Peru
Guinea	Chile	Philippines
Guinea-Bissau	China	Poland
Kenya	Colombia	Qatar
Lesotho	Costa Rica	Russia
Liberia	Croatia	Samoa
Madagascar	Djibouti	Saudi Arabia
Malawi	Dominica	Serbia
Mali	Dominican Republic	Solomon Islands
Mauritius	Egypt	Sri Lanka
Mozambique	El Salvador	St. Kitts and Nevis
Namibia	Estonia	St. Lucia
Niger	Fiji	St. Vincent & Grenadines
Nigeria	Georgia	Sudan
Rwanda	Grenada	Suriname
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 imports
Trade openness	WEO, IMF	Sum of total exports and imports 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 institutionalization 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***
<i>All variables below are interacted with GDP growth</i>							
<b>Political institutions</b>							
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				
<b>Financing constraints</b>							
Private credit to GDP ratio				0.01			
Private credit 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.



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 has been on average 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 fiscal procyclicality seems to have increased since 1994 (Du Plessis and Boshoff, 2007; Du Plessis, Smit, and Sturzenegger, 2007). ..... 8

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) focused 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 sub-Saharan African countries, does. .... 10