Cyclical fiscal policy in developing countries: the case of Africa

Fabrizio Carmignani[*]

School of Economics, University of Queensland

Abstract. The paper documents three pieces of empirical evidence on fiscal policy in Africa. First, a bigger government increases the volatility of output growth. Second, fiscal policy has substantially Keynesian effects. Third, fiscal policy instruments in Africa behave either pro-cyclically or a-cyclically, but practically never counter-cyclically. Taken together, these three findings imply that fiscal policy does not contribute to output stabilization. Quite the contrary, in several African countries fiscal policy is a source of volatility. Given the large development costs of volatility, ways to encourage the adoption of a counter-cyclical fiscal policy stance are then discussed.

1. Introduction

The purpose of this paper is to study whether or not fiscal policy has contributed to the stabilization of output growth volatility in African countries. The analysis is articulated in two steps. The first step is the analysis of the macroeconomic effects of fiscal policy to understand whether or not they are of a Keynesian nature. The second step is the characterization of the cyclical behaviour of fiscal policy in terms of the correlation between policy instruments and output fluctuations. This two-step approach builds on a simple theoretical view: if fiscal policy has Keynesian effects, then it must be run counter-cyclically to stabilise output growth. On the contrary, were the effects of fiscal policy of a non-Keynesian nature, then output growth stabilization would be better pursued through a pro-cyclical stance. The bulk of the evidence provided in the paper indicates that: (i) in Africa, fiscal policy has prevalently Keynesian effects at both normal and non-normal fiscal times, but (ii) countries tend to adopt a pro-cyclical or an a-cyclical fiscal policy stance; thus implying that fiscal policy is not stabilizing.

Developing countries are generally characterised by a relatively large volatility of output growth in comparison to industrial economies. Table 1 documents this simple stylised fact. The table reports the standard deviation of per-capita GDP growth and per-capita private consumption growth in a number of country groups over two consecutive periods of time. On average, in low and middle income countries output growth volatility is 50% higher than in high income countries. Moreover, low and middle income countries do not seem to have experienced the same sharp decrease in volatility that instead has taken place in high income economies over time. The difference between the two groups is even more striking when

looking at private consumption growth volatility: the standard deviation in low and middle income countries together is on average twice as much as the standard deviation in high income countries. With respect to specific geographical groups, it appears that Africa is the region with the highest average volatility of both per-capita income growth and private consumption growth.

INSERT TABLE 1 ABOUT HERE

There is now a growing consensus that volatility has undesirable development effects. A number of papers estimate large welfare costs of output volatility (see, for instance, Van Wincoop, 1994, Campbell, 1998, Campbell and Cochrane, 2000, Loayza et al. 2007). While this result is not always consensual[1], a rather voluminous body of empirical evidence points to a growth-reducing effect of volatility (see Ramey and Ramey, 1995; Martin and Rogers, 2000; Fatas, 2002; Hnatvoska and Loyaza, 2005). Kose et al. (2005) suggest that the relationship between volatility and long-term growth remains negative, albeit less strong, even in the globalization era. In a similar vein, Aghion et al. (2005) develop a theoretical model to show that under conditions of financial underdevelopment (where firms are subject to tight borrowing constraints in recessions), macroeconomic volatility reduces productivity growth by preventing firms from investing in technology and innovation in the face of idiosyncratic liquidity shocks. In a developmental perspective, volatility can be particularly bad for poverty reduction. Its effects are in fact likely to be asymmetric between the poor and the rich as the former have less means to smooth consumption and stabilize living standards across cyclical phases.

---

[1] See for instance Lucas (1987) and Otrok (2001). Pallage and Robe (2003) however stress that even though under specific model assumptions the welfare costs of output fluctuations might be of a second-order in industrial economies, they are significantly higher in developing countries.

Stabilisation must therefore come as a policy priority in developing countries, even more so in Africa where volatility is on average higher, growth more fragile, and poverty deeper than elsewhere. Stabilisation in turn requires two complementary courses of actions. One involves the design of structural reforms to address the root causes of volatility. In the case of Africa, this would mean reducing the dependence on primary commodity exports (in order to reduce country's vulnerability to international price shocks) and promoting more stable socio-political conditions. The other course of actions concerns the setting of macroeconomic policy in response to cyclical fluctuations; that is, how macroeconomic instruments are used to absorb volatility. This paper looks at this second aspect. Its specific focus on the fiscal dimension of macroeconomic policy has a twofold motivation. First, several African countries have adopted fixed exchange rate regimes, thus somewhat loosing control over monetary policy for domestic stabilisation purposes. Second, and perhaps more importantly, fiscal policy is a key policy tool that governments can use to mobilize domestic resources and allocate them to the pursuit of socio-economic development objectives.

The rest of the paper is organised as follows. Section 2 briefly sets the paper in the context of the existing literature and outlines the empirical approach. Section 3 estimates the marginal effect of fiscal policy variables on per-capita private consumption growth as a means to determine the nature (Keynesian vs. non-Keynesian) of fiscal policy effects. Section 4 looks at the cycles of output and their correlation with fiscal policy instruments to determine whether fiscal policy is conducted pro-cyclically or counter-cyclically. Section 5 takes stock of the results of the previous two sections to discuss policy design in Africa. Section 6 concludes and sets the lines of future research. The Appendix provides a description of the variables used in the empirical analysis, a list of countries in the sample, and some additional econometric results not reported in the main text.

2. Overview of the issue

2.1 *A bird-eye view of some relevant literature*

In the textbook Keynesian view, a fiscal stimulus (i.e. an increase in expenditure and/or a decrease in taxation leading to a deterioration of the overall budget balance) increases private consumption and output. As a consequence, fiscal policy should be run counter-cyclically to reduce output volatility. Support for this view comes from the findings of Gali (1994) and Fatas and Mihov (2001) who document empirically a robust negative correlation between government size and output volatility in OECD economies. Andres et al. (2008) rationalize this negative correlation in a model with nominal rigidities and rule-of-thumb consumers.

The Keynesian view however does not go unchallenged. Prompted by the findings of Giavazzi and Pagano (1990 and 1996), some papers have formalized the possibility that fiscal policy has non-Keynesian effects (see for instance Blanchard, 1990; Sutherland 1997; and Giavazzi et al. 2000). In this type of models, a fiscal expansion is contractionary because it reduces household's private consumption. The transmission mechanism may work through the expectation that taxes will increase in the future and/or via the wealth effect associated with the upward adjustment of interest rates. In both cases, the likelihood that fiscal policy has non-Keynesian effects increases at non-normal fiscal times; that is, at times when the change in the overall budget balance is significantly larger than average.

Of course, if fiscal policy had non-Keynesian effects, then it should be run pro-cyclically (and not counter-cyclically) to stabilize output fluctuations. In fact, some recent empirical evidence on both industrial and developing economies suggests that non-Keynesian effects tend to be the exception rather than the rule and that in general private consumption positively responds to an increase in government expenditure (see for instance, Van Aerle and Garretsen, 2003; Schlarek, 2007, and Carmignani, 2008). Gali et al. (2007) account for this evidence in a dynamic optimizing sticky price models with rule-of-thumb consumers.

In spite of the fact that fiscal policy seems to have predominantly Keynesian effects, the available evidence suggests that in practice countries quite often take a pro-cyclical stance. This seems to be particularly the case in developing economies (see Kamisky et al. 2004 and Iltzezki and Vegh, 2008). Two main explanations have been put forward for this sub-optimal cyclical pattern of fiscal policy. One has to do with the supply of credit (see again Kamisky et al. 2004). When going through a recession, countries' access to credit is severely restricted, so that they cannot run deficits and have to cut on expenditures. On the contrary, when economic conditions improve, easily available credit is used to finance larger expenditures. The other explanation emphasizes political-economy channels. In this respect, Alesina et al. (2008) argue that voters demand higher spending at times of economic boom in order to starve a Leviathan government. The resulting equilibrium yields a pro-cyclical pattern of fiscal policy instruments.

In spite of the relevance of these issues for policymakers, there is little research that systematically focuses on the case of African countries. The empirical results obtained from large samples of developing countries may not necessarily apply to Africa for two reasons. One is that those samples of developing countries typically include very few African

economies (and usually, they include only the most advanced of African economies, hence neglecting the many least developed countries in the region). The other reason is that in general structural economic relationships in African countries tend to be different from those that characterize the rest of the developing world. This is very evident, for instance, from the literature on the empirics of growth: even after controlling for a myriad of structural factors, the dummy variable for Africa tends to remain negative and statistically highly significant. From a policymaking perspective, it is therefore important to provide evidence that is region-specific, if not country specific. Diallo (2008) makes an important step in this direction, showing that democracy is conducive to a counter-cyclical fiscal policy stance in Africa.

Against this background, the paper looks at cyclical fiscal policy in an African perspective. Its value added relative to the existing literature is as follows. First, in assessing whether fiscal policy has Keynesian or non-Keynesian effects, the paper provides a systematic structural comparison of African vis-à-vis other developing countries. The paper therefore addresses the issue of whether or not there is a systematic structurally different behaviour between African and the other developing countries. Second, in studying the cyclical behaviour of fiscal policy, the paper provides both continental-wide empirical evidence and country-specific evidence. In this way, it avoids inappropriate generalizations across heterogeneous countries. Third, the paper makes use of a composite methodological approach, including output volatility regressions, private consumption regressions, and business cycle analysis. In this sense, it brings together complementary strands of applied economic research. Finally, in discussing the results of the empirical analysis, the paper emphasizes a few channels and factors that may make policy modelling in Africa different from other developing countries.

Some stylised facts and empirical strategy

Table 2 summarises some stylised facts on the relationship between government size and output volatility. The table shows the estimated coefficient of government consumption (here used as a proxy of government size) in a regression of real GDP growth volatility (measured by the five-year standard deviation of the annual growth rate of GDP per-capita and aggregate GDP). The p-value associated with each estimated coefficient is reported in brackets. The regression makes use of annual data over the period 1990-2007 for two samples of countries: one includes 83 developing countries; the other is limited to 34 African countries. All data are taken from the World Development Indicators of the World Bank (2008 issue). The beginning of the sample period is set to 1990 because prior to that year, fiscal data on African countries are less widely available. Government consumption is expressed in percent of GDP.

INSERT TABLE 1 ABOUT HERE

Columns 1 and 4 report simple OLS estimates from regressing output volatility on a constant and government consumption. The coefficients on government consumption are positive and statistically highly significant, suggesting that in both samples of countries a bigger government increases output volatility. Of course, government consumption is likely to be endogenous to volatility. For instance, Rodrik (1998) argues that in more volatile countries, government consumption works as a risk-insurance mechanism. Therefore, higher volatility could cause a bigger government through a demand-side effect. Columns 2 and 5 therefore re-estimate the simple regression of columns 1 and 4, but using lagged values of government consumption as instruments. The estimated coefficients increase in both samples, remaining

always highly significant in statistical terms. It is worth noting that the marginal effect of an increase in government size on volatility is slightly higher in Africa than in the full group of developing countries.

There are clearly other factors that determine output volatility in addition to government consumption. Accordingly, columns 3 and 6 show the estimated coefficients of government consumption when controlling for the following other determinants of volatility: the exports plus imports ratio to GDP, the index of capital account liberalization of Chinn and Ito (2007), the log per-capita GDP, and the credit provided by the banking sector in percent of GDP. These controls are meant to account for the impact on volatility of international trade and financial integration, economic development, and the depth of financial intermediation[2]. Government consumption and all of the other controls are instrumented by their own lagged values. It can be seen that in both samples the evidence of a positive effect of government size on volatility is confirmed. The marginal effect is now sharply higher in Africa than in the sample of all developing countries[3].

There are therefore two main stylised facts that can be extracted from the evidence reported in table 2. First, in both groups of countries, the relationship between government size and output volatility is positive. This result is in sharp contrast with the findings of Gali

---

[2] This list of controls is not meant to be exhaustive. Other possible explanatory variables include the type of exchange rate regime, the quality of institutions and the effectiveness of checks and balances in fiscal policy making, and the institutional arrangements concerning the independence of the central bank. Moreover, in order to provide a more comprehensive measure of external risk, the indicator of international trade integration might be interacted with a measure of volatility of terms of trade. Some of these additional regressors are in fact collinear with the set of four controls used in columns 3 and 6. Their inclusion in the regression then implies that coefficients are less precisely estimated. However, when the regression is re-estimated to include all of the additional regressors, the central message of the table does not change: the estimated coefficient of government consumption remains positive and statistically significant at usual confidence levels.

[3]The table does not report the estimated coefficients on the other four control variables. These are available upon request from the author.

et al. (1994) and Fatas and Mihov (2001), which are however obtained for samples of OECD economies. In other words, the negative relationship between government size and output volatility observed in OECD economies cannot be generalized to developing countries[4]. Second, the slope of the relationship is steeper in Africa than in other developing countries. That is, even if the sign of the relationship is the same in Africa and elsewhere, African countries are structurally different from other developing countries in the sense that they are characterized by a higher elasticity of output volatility with respect to government size.

The positive relationship between government size and output volatility may indicate either that fiscal policy has Keynesian effects and is used pro-cyclically or that it has non-Keynesian effects and is used counter-cyclically. For policy design, it is important to understand which of the two alternatives is true. This however cannot be done within the context of a reduced form, single equation model. A two-step empirical strategy is more appropriate. In the first step (Section 3), the nature (Keynesian vs. non-Keynesian) of fiscal policy is assessed by estimating a simple consumption function. The estimated equation will be specified so to allow for structural differences between Africa and other developing countries. In the second step (Section 4), the cyclical behaviour of fiscal policy is evaluated by looking at the co-movements between fiscal policy instruments and business cycle indicators. This exercise will look at each African country individually and summary statistics will be presented for the African continent as a whole. .

3. The macroeconomic effects of fiscal policy

3.1 *Empirical model*

---

[4] This is in line with the findings of Koskela and Viren (2003).

As outlined in the previous section, models yielding non-Keynesian effects of fiscal policy share a common prediction: the response of private consumption to a fiscal expansion is negative. This prediction can be further qualified by stressing that the effects of fiscal expansions on private consumption might be non-linear: positive (and hence Keynesian) at normal fiscal times and negative (and hence non-Keynesian) at non-normal fiscal times; that is, at times when the fiscal stimulus is significantly above average.

To test this empirical prediction, Giavazzi and Pagano (1996) propose the estimation of a consumption function of the following type:

$$(1) \quad \Delta c_{it} = \alpha_0 + \alpha_1 c_{it-1} + \beta X + \delta Z_{it} D_{it} + \gamma Z_{it} (1 - D_{it}) + \eta_{it}$$

where c is the log of per-capita household consumption expenditure, X is a set of control variables, Z is a set of fiscal policy variables, D is a dummy variable taking value 1 if year t in country i is a year of non-normal fiscal times, η is an error term, Δ is the difference operator, and α_0, α_1, β, δ, and γ are the parameters to be estimated.

In equation (1), the interaction between the fiscal variables Z and the dummy variable D captures possible non-linear effects of fiscal policy by allowing the elasticity of consumption to differ between normal and non-normal fiscal times. For practical purposes, non-normal fiscal times are defined in terms of the size of the change in the overall budget balance. In the full sample of developing countries, the average change in the budget balance (after the exclusion of outliers) is around 0.15 percentage points of GDP, with a standard deviation of just below 2. Based on these summary statistics, a threshold of 2 percentage

points of GDP is used to separate normal from non-normal fiscal times. The dummy variable D therefore takes value 1 in country i at year t if in that year the overall budget balance changes by more than 2 percentage points[5].

The vector of controls X includes the annual change in log per-capita income and the lagged value of log per-capita income. Two different specifications of the set of fiscal variables will be used. The baseline specification uses the overall budget balance in percent of GDP as aggregate indicator of the fiscal policy stance. The extended specification instead uses both government expenditure and tax revenues in percent of GDP to capture effects stemming from the two sides of the budget. To allow for richer dynamics the model specification includes both the annual change and the lagged value of each fiscal policy variable. Letting y be the log of real per-capita GDP, b the overall budget balance in percent of GDP, g government expenditure in percent of GDP, and r tax revenues in percent of GDP, the baseline and the extended specification can then be respectively written as:

$$(2) \quad \Delta c_{it} = \alpha_0 + \alpha_1 c_{it-1} + \beta_1 y_{it-1} + \beta_2 \Delta y_{t-1} + (\delta_1 \Delta b_{it} + \delta_2 b_{it-1}) D_{it} +$$
$$+ (\gamma_1 \Delta b_{it} + \gamma_2 b_{it-1})(1 - D_{it}) + \eta_{it}$$

$$(3) \quad \Delta c_{it} = \alpha_0 + \alpha_1 c_{it-1} + \beta_1 y_{it-1} + \beta_2 \Delta y_{t-1} + (\delta_1 \Delta g_{it} + \delta_2 g_{it-1} + \delta_3 \Delta r_{it} + \delta_4 r_{it-1}) D_{it} +$$
$$+ (\gamma_1 \Delta g_{it} + \gamma_2 g_{it-1} + \gamma_3 \Delta r_{it} + \gamma_4 r_{it-1})(1 - D_{it}) + \eta_{it}$$

As discussed in Giavazzi and Pagano (1996), the distributed lag specification of equations (2) and (3) nests many of the specifications that have been used in the literature,

---

[5] Of course, one might wonder how sensitive results are to changes in this definition. This issue is discussed later on. However, it is worth anticipating that the qualitative flavour of the results is robust to different definitions.

including both Euler-type specifications and error-correction correction models (see also Blinder and Deaton, 1986). In the baseline specification, negative values of δs and/or γs are indicative of Keynesian effects of fiscal policy: an increase in the budget balance (that is, a fiscal contraction) decreases private consumption. In the extended specification, Keynesian effects are identified by positive coefficients on g and Δg and/or negative coefficients on r and Δr: higher expenditure and/or lower taxes (that is, a fiscal expansion) increase private consumption.

3.2 *Results*

The results from estimating the consumption functions (2) and (3) are reported in Table 3. For each set of estimates the table reports: (i) the estimated coefficients on the control variables y_{t-1}, c_{t-1}, and Δy_t; (ii) the estimated coefficients on the fiscal variables at normal fiscal times (when the dummy variable D takes value zero, that is when Δb_{it} is in absolute value smaller than 2); and (iii) the estimated coefficients on the fiscal variables at non normal fiscal times (when the dummy variable D takes value one, that is when Δb_{it-1} is in absolute value larger than 2). In addition, the table reports the number of observations in the unbalanced panel. Data are taken from the World Development Indicators of the World Bank (2008 issue) and from the Government Finance Statistics of the International Monetary Fund (2008 issue). A detailed definition of the variables can be found in the appendix, together with the list of countries in the sample. The sample period is 1990-2007. Estimation in columns 1, 2, 3, and 4 is by feasible GLS to account for the presence of cross-section heteroskedasticity. In columns 5 and 6 estimation is instead by instrumental variables in order to control for possible endogeneity of some of the regressors (see below). Finally, White robust coefficient covariances and standard errors are always computed.

Column 1 presents the baseline model (2) estimated on the full sample of all developing countries. Only the lagged value of the budget balance at non-normal fiscal times displays a statistically significant coefficient. Its sign is consistent with the idea that fiscal policy has Keynesian effects: a lower balance (i.e. a higher deficit) accelerates private consumption growth. In column 2, the baseline specification is re-estimated on the sample of only African countries. There is now evidence that fiscal policy has Keynesian effects at both normal and non-normal fiscal times: the negative coefficient on Δb_t means that a fiscal expansion increases private consumption growth.

Columns 3 and 4 present the extended specification estimated on all developing countries and on African countries respectively. In the case of all developing countries, it is confirmed that fiscal policy has significant effects on private consumption only at non-normal fiscal times. These effects are however of a Keynesian nature: higher expenditure and lower taxes increase private consumption growth. In the case of African countries, fiscal policy affects private consumption at both normal and non-normal fiscal times, mainly through the change in government expenditure. The positive coefficient on Δg_t again indicates that these effects are of a Keynesian nature.

In columns 5 and 6, the baseline model is re-estimated on the African sample using instrumental variables (results for the extended model are available from the author upon request). The variables that can be suspected of being endogenous are the growth rate of per-capita GDP (Δy_t) and the change in the budget balance (Δb_t). In fact, the Hausman test

(Davidson and McKinnon, 1993) reveals that only Δy_t is certainly endogenous, while for Δb_t results are more ambiguous. Nevertheless, in column 5 both variables are treated as endogenous. In this case, the list of instruments includes: all of the exogenous variables, lagged values of the two endogenous variables, country fixed effects, and two indicators of institutional quality. The country fixed effects are country's legal origin and country's latitude. The institutional variables are the quality of the polity and an index of effectiveness of checks and balances in policymaking (see Appendix for detailed definition). The country fixed effects are likely to be good instruments for the growth of per-capita GDP, while the quality of the polity and the index of checks and balances are potentially good instruments for the change in fiscal policy variables (see Persson and Tabellini, 2003 and 2004). The logic for introducing these additional instruments is to increase the number of over-identifying restrictions. This in turn makes it possible to test the validity of the choice of instruments through a Sargan test (Newey and West, 1989). The J-statistic of the Sargan test is 4.39. The null hypothesis that over-identfying restrictions are valid cannot be rejected at usual confidence levels. The estimated coefficients on the fiscal variable again provide evidence of Keynesian effects at normal fiscal times. On the contrary, there is no significant evidence of non-Keynesian effects at non-normal fiscal times.

In column 6, only the growth rate of per-capita GDP is treated as endogenous. The variable Δb_t is therefore instrumented by itself. The J-statistic is 3.31[6] and again the null hypothesis of the test of overidentfying restrictions is not rejected at usual confidence levels. The results strongly support the view that fiscal policy in Africa has Keynesian effects: the coefficients on the fiscal variable are all negative and statistically significant in three cases out of four.

---

[6] The fact that the J-statistic is lower when Δb_t is treated as exogenous is coherent with the result of the Hausman test that Δb_t might effectively be exogenous to Δc_t.

A final issue concerns the robustness of the above results. The following sensitivity checks have been run and the full set of results is available upon request. First, the threshold for the identification of non-normal times has been changed. Higher thresholds cause coefficients of fiscal variables at non-normal fiscal times to be less precisely estimated, probably because of the reduction in the number of observations that qualify as non-normal fiscal times. The sign of the coefficient is however the same as in Table 3. Lower thresholds instead strengthen the statistical significance of coefficients at non-normal fiscal times in both groups of countries. Overall, changing the definition of non-normal fiscal times does not seem to change the evidence on the nature of fiscal policy effects. Second, different categories of expenditure have been used in the extended specification. While the definition of expenditure used in Table 3 includes all type of government spending (hence current plus capital expenditure), using only expenses for operating activities and/or public consumption in a stricter sense does not alter the results. Finally, even though the Hausman test clearly rejects the hypothesis that lagged levels of fiscal policy variables are endogenous to current private consumption growth, the baseline model has been re-estimated treating b_{t-1} in addition to Δb_t and Δy_t as endogenous. Again, results are remarkably similar to those in columns 5.

4. The cyclical behaviour of fiscal policy

The evidence produced in Section 3 clearly rejects the idea that fiscal policy has non-Keynesian effects in developing countries in general, and in Africa in particular. On the contrary, there is quite robust evidence that effects are of a Keynesian nature. This implies that to stabilize output volatility, fiscal policy ought to be run counter-cyclically. In order to

see whether or not this is the case in African countries, the present section looks at the co-movements between indicators of business cycle and a fiscal policy instrument.

4.1 *Statistical methodology*

Let y_t be a business cycle indicator. Given that the analysis will be conducted at country-level, the subscript i can be omitted. Also, let z_t be a fiscal policy instrument. Making use of time-series observations, the correlation coefficient between these two variables can be computed as a measure of the intensity of their co-movements. The cyclical characterisation of fiscal policy then depends on the sign and statistical significance of the correlation coefficient: if it is positive, then fiscal policy is pro-cyclical; if it is negative, then fiscal policy is counter-cyclical; and if the coefficient is insignificant, then fiscal policy can be classified as a-cyclical.

The implementation of this simple methodology requires however to address three issues. First, correlations calculated on the levels of the two series would not be very informative. In fact, both series (and all macroeconomic time series in general) incorporate two types of dynamics: (i) a long-term trend dynamic and (ii) a short term cyclical dynamic around the trend. The assessment of the cyclical behaviour of fiscal policy must focus on the second dynamic. To this purpose, one could compute the correlation between annual growth rates of the two variables. This would correspond to a classical notion of business cycles, whereby recessions are identified by periods of decrease in the level of real output and expansions by periods of increase in the level of real output. An alternative approach is to make use of a statistical procedure to decompose the original time series in trend and cycle and then study the correlation between the cycle components of the series. This approach

corresponds to a notion of cycles in deviation, where a recession is identified by a decrease in the value of the cyclical component of output and an expansion by an increase in the cyclical component of output. To be pragmatic, this section presents results from both approaches. For the second approach, the Hodrick-Prescott (HP) filter (Hodrick and Prescott, 1997) is used to decompose the series in trend and cyclical component[7].

The second issue concerns the possible existence of lags in the response of fiscal policy to business cycle fluctuations. Policymakers might not immediately perceive a change in the business cycle phase and/or it might take time to change the fiscal policy stance to adjust to the new phase (i.e. the fiscal policy formation process may have to go through lengthy parliamentary discussions). Contemporaneous correlations between the two variables therefore need to be complemented by lagged correlations. Therefore, in addition to the correlation between y_t and z_t, the one-year lagged correlation between y_t and z_{t+1} is also computed.

The final issue relates to the choice of the variables. For the business cycle indicator y_t the obvious choice is the log of real GDP. Alternative indicators that have been used in the literature, such as industrial production, are not always available for African countries. Moreover, given the production structure of many African countries, looking only at industrial production to identify the business cycle might be too restrictive. For the fiscal policy indicator z_t, Kamisky et al. (2004) suggest looking at instruments more than outcomes. In his analysis of African countries, Diallo (2008) uses total government expenditure and current government expenditure. In this paper, the choice is constrained by the need to

---

[7] The algorithm of Ravn and Uhlig (2002) is applied to determine the smoothing parameter of the HP filter. Using an alternative popular filter such as the Baxter-King band-pass filter (Baxter and King, 1999) does not produce any significant change in the results.

maximise the number of observations available for each country, given that – as already stressed – correlation are computed for each individual African country. It turns out that the series of public consumption are the longest available on average. Therefore, public consumption is taken to represent the fiscal policy instrument z_t

To sum up, for each African country for which at least 20 annual observations on public consumption are available over the period 1960-2007, four correlation coefficients are computed: (i) $\rho_{y,z}^{(1)}$ is the contemporaneous correlation between the growth rate of real GDP and the growth rate of public consumption, (ii) $\rho_{y,z+1}^{(1)}$ is the one-year lagged correlation between the growth rate of real GDP in year t and the growth rate of public consumption in year $t + 1$, (iii) $\rho_{y,z}^{(2)}$ is the contemporaneous correlation between the HP de-trended series of the real GDP and the HP de-trended series of public consumption, and (iv) $\rho_{y,z+1}^{(2)}$ is the one-year lagged correlation between the HP de-trended series of real GDP at time t and the HP de-trended series of real GDP at time $t + 1$.

4.2 *Results*

There are 37 African countries for which 20 or more annual observations on public consumption are available. The four correlation coefficients and their degree of statistical significant computed on the basis of a two-tailed t-test are reported in Appendix table A1 for each of these 37 countries. The distribution of each of correlation coefficient over the full sample of 37 African countries is plotted in Figure 1[8]. The summary statistics of these four distributions are instead reported in Table 4 below. Table 4 also reports, for each group of

---

[8] In each panel of the figure, the base of a column identifies a range of values for the correlation coefficient and the height of the column gives the number of countries with correlation coefficient falling within that range.

correlation coefficients, the number of countries with a positive and significant statistical correlation and of those with a negative and significant statistical correlation.

INSERT TABLE 4 AND FIGURE 1 ABOUT HERE

The following interesting patterns emerge from the analysis Table 4 and the Figure 1. First, average correlation coefficients are always positive, suggesting that fiscal policy is not, on average, counter-cyclical in Africa. On the contrary it tends to be pro-cyclical. Second, contemporaneous correlations are on average higher than lagged correlations. This is important since it may indicate that countries tend to correct the fiscal policy stance over time. As discussed in the next section, a possible interpretation of this finding is that countries do not have enough statistical information to know in which cyclical phase they are at time t. However, in year $t + 1$, when more statistical information becomes available, they are better able to observe the cyclical phase. Hence, they can adjust the fiscal policy instrument accordingly. Third, the distributions of contemporaneous correlations have long right tails, while the distributions of lagged correlations have long left tails. This statistical difference is coherent with the observation that lagged correlations are a bit less pro-cyclical than contemporaneous correlations. Fourth, the cyclical behaviour of fiscal policy does differ across countries to some considerable extent. This is evident from the fact that the peaks of the distributions are rather flat (relative to the normal distribution) while standard deviations are quite large. Fifth, out of a total of 148 correlation coefficients (four coefficients for each of the 37 countries), only two are significantly negative. These are the lagged correlations of Guinea-Bissau. In other words, evidence of a counter-cyclical response of fiscal policy to output fluctuations is limited to one country (Guinea-Bissau) and even in that country only to lagged correlations. Moreover, in that country, contemporaneous correlations are strongly

positive, so that overall one cannot unambiguously conclude that Guinea-Bissau runs a counter-cyclical fiscal policy. All of the other African countries examined here certainly do not run fiscal policy counter-cyclically.

Based on the quantitative evidence reported in table A1 in the appendix, Table 5 classifies the 37 African countries according to the cyclical behaviour of their fiscal policy. Countries with three or four positive and significant correlation coefficients are classified as 'pro-cyclical'. Countries with only two positive and significant correlation coefficients (the other two being insignificant) are classified as 'weakly pro-cyclical'. Countries with only one or none significant correlation coefficient are classified as 'a-cyclical'. Using these definitions and criteria, six countries can be identified as running a pro-cyclical fiscal policy. Eleven countries are instead in the category of weakly pro-cyclical fiscal policy. Out of these eleven, six (Algeria, Botswana, Madagascar, Morocco, Rwanda, Senegal) appear to correct the fiscal policy stance after one year. Finally, fiscal policy seems to be substantially a-cyclical in nineteen countries. In a large subgroup of fourteen countries, none of the four correlation coefficients passes the statistical significance test. In theory, countries with two or more negative and significant correlation coefficients should be classified as '(weakly) counter-cyclical'. However, with the possible exception of Guinea-Bissau, none of the other 36 countries has negative and significant correlation coefficients. As already mentioned, Guinea-Bissau is an ambiguous case. Its two positive contemporaneous correlations would put it in the group of weakly pro-cyclical. But its two negative lagged correlations would identify it as a weakly counter-cyclical country. Therefore, in the table, Guinea-Bissau is left out of any other category.

5. Policy discussion

The empirical evidence of this paper provides the following picture. In spite of the fact that it has Keynesian effects, fiscal policy in Africa is not run counter-cyclically, but it is often pro-cyclical. This cyclical behaviour of fiscal policy instruments translates into a positive correlation between government size (as for instance measured by the GDP share of government consumption) and output growth volatility. In other words, fiscal policy seems to add to other structural factors – such as the heavy exposure to international commodity prices volatility and the unstable socio-political conditions – to increase volatility in African economies. Given the damaging impact of volatility in a developmental perspective, the lack of a systematic counter-cyclical fiscal policy in African countries configures as a major policy failure. The purpose of this section is to review some of the reasons that, within the specific context of Africa, might contribute to explaining why countries do not adopt such a counter-cyclical stance.

As discussed already in Section 2, two factors that are often mentioned to explain the pro-cyclical behaviour of fiscal policy in developing countries are: (i) the pro-cyclical pattern of international capital flows and credit and (ii) political-economic interactions between citizens and the fiscal authorities. Both seem to be relevant in Africa, but some qualifications and extensions might be in order. With respect to the first factor (the pro-cyclicality of capitals and credit), the issue in Africa is essentially one of limited policy space for fiscal authorities. Low incomes (and hence a small tax base) coupled with a large informal sector and inefficient tax administrations imply a high dependence of African countries on external resources to finance expenditure. The pro-cyclical pattern of external resources then makes it very difficult for the average African country to run fiscal policy counter-cyclically. Furthermore, in several countries, the fiscal policy space is further constrained by the

adoption of fiscal rules that set target levels for the overall deficit and/or specific budget components. Many of the regional economic communities existing in Africa make use of these rules to drive the process of economic integration. In the case of the two CFA monetary unions, convergence criteria on fiscal policy variables are part of a formal multilateral surveillance framework, similar in spirit to the agreements disciplining convergence in the European Monetary Union. The problem with these rules, as for instance discussed in Manasse (2007), is that they often prevent policymakers from adopting a counter-cyclical stance and actually encourage a pro-cyclical stance. Therefore, while some restrictions to discretionarity might help African countries to consolidate their public finances, specific attention must be given to how these rules are designed. One possibility is to make use of cyclically adjusted variables in writing the rules. Alternatively, threshold values for fiscal variables could be defined as moving averages over periods of (say) three years rather than as targets to be met annually. In practical terms, the experience of Chile (as for instance documented in Garcia et al. 2005) might provide some useful insights on the efficient design of fiscal rules.

The second factor, namely political-economic interactions, is also likely to be relevant in Africa. However, the formalization proposed by Alesina et al. (2008) of political-economic equilibrium with a Leviathan government implies a type of strategic interaction between politicians and voters that may not be fully representative of the African political context. Woo (2008) proposes a political mechanism where social polarization determines coordination failures in fiscal-policy making, thus leading to a pro-cyclical (inefficient) fiscal policy stance. This mechanism is probably better suited to represent the reality of a larger number of African countries. An implication of Woo's argument is that stronger democratic

processes would be conducive to a more counter-cyclical fiscal policy stance. This conclusion is clearly supported by the recent empirical findings reported by Diallo (2008).

There are two additional recommendations on how fiscal policy could be made more counter-cyclical in Africa. One concerns the use of automatic stabilizers. In most African countries, the substantial ineffectiveness of formal social safety networks implies that automatic stabilizers are weak. However, automatic stabilizers are an important component of a counter-cyclical fiscal policy stance as they increase expenditure at times of recession. Strengthening automatic stabilizers would therefore contribute to reducing the degree of pro-cyclicality or a-cyclicality of fiscal policy. The other recommendation stems from the observation that at least some of the countries in the sample tend to correct their fiscal policy stance after one year. As already noted, this lagged adjustment could be the consequence of the policymakers' uncertainty about the cyclical phase the country is going through. In order to reduce this uncertainty, countries should invest more in the production and monitoring of statistical data for business cycle analysis. In this way, with the technical assistance of international partners to set-up appropriate statistical methodologies, African countries will be able to improve their understanding of cyclical fluctuations.

6. Conclusions

This paper presented three pieces of empirical evidence on fiscal policy in African countries. First, there is a positive relationship between government size and output volatility. This positive relationship exists in the sample of all developing countries, but it seems to be quantitatively stronger in Africa than elsewhere. Second, there is no evidence of non-Keynesian effects in Africa and in the whole of developing countries. In fact, the estimates

point to Keynesian effects in Africa, especially at normal fiscal times. Third, fiscal policy instruments in Africa do not have a counter-cyclical behaviour. The sample of African countries examined is in fact split in almost two equally large subgroups: one where fiscal policy is pro-cyclical or weakly pro-cyclical and one where fiscal policy is substantially a-cyclical. Taken together, these three pieces of evidence convey the following message: in spite of the Keynesian nature of its effects, fiscal policy is not run counter-cyclically, which means that it does not contribute to the stabilization of output volatility. On the contrary, to the extent that it is run pro-cyclically, fiscal policy causes greater output growth volatility. Given the development costs of volatility, the lack of a counter-cyclical fiscal policy stance configures as a major policy failure. The paper then identifies some factors that could explain why fiscal policy is not counter-cyclical in Africa and how to address them. The design of new fiscal rules, the strengthening of democratic institutions, and the improvement of the empirical and statistical knowledge needed to understand business cycles are examples of interventions that will encourage the adoption of a counter-cyclical fiscal policy stance.

Two main directions of future research on this topic can be identified at this stage. First, one might want to explore in a more systematic fashion what determines the probability of a country running a pro-cyclical fiscal policy. Using for instance the taxonomy of table 5, one can construct a limited dependent variable that takes value 1 for pro-cyclical and weakly pro-cyclical countries and zero otherwise. Then probit and logit analysis can be used to regress this binary dependent variable on the characteristics of the various African countries. The exercise could be extended to non-African countries, so that the sample would also include countries that effectively run fiscal policy counter-cyclically. In this case, the dependent variable could be coded as a trichotomous variable and multinomial logit could be applied.

Second, different methodologies to characterise the cyclical behaviour of fiscal policy instruments could be explored. For instance, one could construct a chronology of turning points of the relevant business cycle and fiscal policy indicators and then calculate how many times the two series are in the same phase. While the basic result that fiscal policy is not conducted counter-cyclically would most likely be confirmed, the chronologies would offer additional insights on the factors and events that make fiscal policy pro-cyclical.

Table 1: Volatility of output and consumption growth in selected country groups

	Per-capita output growth volatility		Per-capita private consumption growth volatility	
	1961-1983	1984-2006	1961-1983	1984-2006
Africa	5.864	5.204	8.463	8.138
E. Asia and Pacific	5.952	4.223	3.849	4.923
L.America and Caribbean	4.967	3.796	8.743	6.882
South Asia	3.910	2.916	5.545	4.599
Low income countries	5.394	5.205	8.058	8.397
Middle income countries	5.725	5.555	7.434	7.057
High income countries	4.334	3.140	3.832	3.836

Notes: For each country groups and each sub-period, volatility is computed as the average of the standard deviation of per-capita income growth and per-capita private consumption growth in each country of the group over each sub-period.

Table 2.Estimated coefficient of government size in output volatility regressions

Sample	Dependent variable is: volatility of per-capita output growth			Dependent variable is: volatility of aggregate output growth		
	Column 1 OLS	Column 2 IV	Column 3 IV (with controls)	Column 4 OLS	Column 5 IV	Column 6 IV (with controls)
Africa	0.037 (0.000)	0.043 (0.000)	0.050 (0.000)	0.030 (0.000)	0.042 (0.000)	0.057 (0.000)
N.Obs	229	190	179	229	190	180
All dev. Countries	0.027 (0.000)	0.036 (0.000)	0.015 (0.012)	0.032 (0.000)	0.040 (0.000)	0.0175 (0.000)
N.Obs	823	706	590	823	706	599

Notes: The set of controls includes: exports and imports in percentage of GDP, an index of capital account liberalization borrowed from Chinn and Ito (2007), credit supplied by the banking sector in percent of GDP, and per-capita income. All regressions also include a constant term. In IVestimation, regressors are instrumented by their own lagged values. For each estimated coefficient, the table also shows the associated p-value (in brackets) and the number of observations available for estimation. Standard errors and covariances are corrected for White cross-section heteroscedasticity.

Table 3. Regression results

	Column 1 LS	Column 2 LS	Column 3 LS	Column 4 LS	Column 5 2SLS	Column 6 2SLS
Constant	-0.503	-3.554	0.821	-3.028	-2.801	-2.696
c_{t-1}	-2.586***	-1.659	-2.110***	-1.347	-1.051	-4.154
y_{t-1}	2.556***	2.050	1.865***	1.761	1.355	4.179
Δy_t	0.808***	0.789***	0.846***	0.809***	0.819***	0.851***

Fiscal variables in normal fiscal times: D = 0 (|Δb_t| < 2)

	Column 1 LS	Column 2 LS	Column 3 LS	Column 4 LS	Column 5 2SLS	Column 6 2SLS
Δb_t	-0.064	-0.804***			-1.036***	-3.337***
b_{t-1}	-0.030	-0.165			-0.197*	-0.426**
Δg_t			-0.014	0.074*		
g_{t-1}			-0.004	0.026		
Δr_t			0.014	-0.017		
r_{t-1}			0.039	-0.041		

Fiscal variables in non-normal fiscal times: 1- D = 0 (|Δb_t| > 2)

	Column 1 LS	Column 2 LS	Column 3 LS	Column 4 LS	Column 5 2SLS	Column 6 2SLS
Δb_t	0.001	-0.085***			-0.504	-0.850
b_{t-1}	-0.141***	-0.062			-0.214	-0.648**
Δg_t			-0.016	0.0158**		
g_{t-1}			0.072**	-0.039		
Δr_t			-0.107***	-0.011		
r_{t-1}			-0.105**	0.015		
N.Obs	701	194	699	194	181	146

Note: The dependent variable is always the growth rate of private per capita consumption. Estimation methodologies are described in the text. For variables description and sources see Appendix 2. Full sample estimates in columns 1 and 3; African sample estimates in columns 2, 4, 5, and 6 *, **, *** denote statistical significance of estimated coefficients at 10%, 5%, and 1% confidence level respectively.

Table 4. Summary statistics of distributions of correlation coefficients in the African sample

|	$\rho_{y,z}^{(1)}$	$\rho_{y,z+1}^{(1)}$	$\rho_{y,z}^{(2)}$	$\rho_{y,z+1}^{(2)}$
Mean	0.212	0.128	0.222	0.178
Median	0.147	0.109	0.203	0.201
Maximum	0.807	0.437	0.734	0.647
Minimum	-0.139	-0.281	-0.129	-0.335
Std. Deviation	0.235	0.196	0.224	0.236
Skewness	0.745	-0.220	0.328	-0.110
Kurtosis	2.681	2.13	2.205	2.500
Pro-cyclical	13	8	16	13
Counter-cyclical	0	1	0	1

Note: Pro-cyclical (counter-cyclical) is the number of correlation coefficients in each distribution that are positive (negative) and statistically significant at usual confidence levels.

Table 5. Classification of African countries according to the cyclical behavior of fiscal policy

Behavior	Countries	Total
Pro-cyclical behavior		**6**
- 4 *positive correlation coefficients*	Cameroon, Cote d'Ivoire, Gabon	3
- 3 *positive correlation coefficients*	Chad, DRC, Ethiopia	3
Weakly pro-cyclical behavior		**11**
- 2 *positive correlation coefficients*		
i. both contemporaneous	Algeria, Botswana, Madagascar, Morocco, Rwanda, Senegal	6
ii. both lagged	Guinea, Malawi	2
iii. one contemporaneous and one lagged	Benin, South Africa, Uganda	3
A-cyclical behavior		**19**
- 1 *positive correlation coefficient*		
i. contemporaneous	Zambia	1
ii. lagged	Lesotho, Mauritius, Mozambique, Namibia	4
- No significant correlation coefficient	Kenya, Burkina F., Cape Verte, Comoros, Egypt, Gambia, Ghana, Mali, Mauritania, Seychelles, Sudan, Swaziland, Togo, Tunisia, Zimbabwe	14
Others (ambiguous)	Guinea-Bissau	**1**

Notes: the classification is based on the correlation coefficients reported in Table A1.

Figure 1. Distribution of correlation coefficients in the African sample
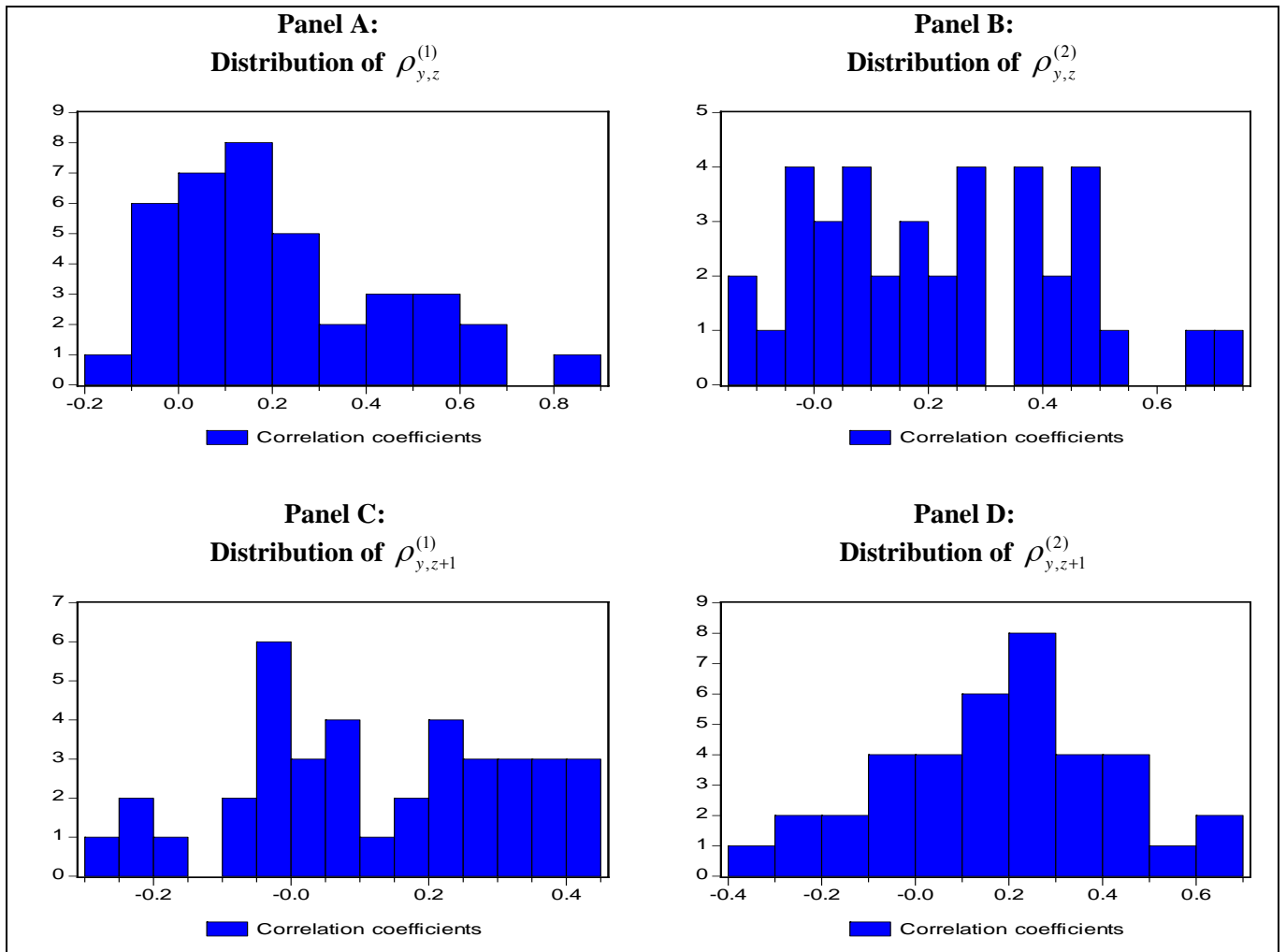
Notes : The base of each column identifies a range for the correlation coefficients. The height of each column gives the number of countries with correlation coefficients within the identified range. Thus, for instance, in panel A, the second column from the left means that there are six countries with contemporaneous correlation between the growth rates of the two series falling within the range -0.1 and 0.0.

Appendix

Table A1. : Cyclicality of fiscal policy in African countries

	Growth rates		Cyclical components	
	$\rho^{(1)}_{y,z}$ (column I)	$\rho^{(1)}_{y,z+1}$ (column II)	$\rho^{(2)}_{y,z}$ (column III)	$\rho^{(2)}_{y,z+1}$ (column IV)
Algeria	0.674***	-0.006	0.659***	0.060
Benin	0.070	0.096	0.391***	0.369**
Botswana	0.330*	0.249	0.374**	0.156
Burkina Fasu	0.104	0.092	0.080	-0.031
Cameroon	0.249*	0.352**	0.439***	0.537***
Cape Verte	0.185	0.027	0.292	0.029
Chad	-0.139	0.343**	0.485***	0.647***
Comoros Is.	0.088	0.026	0.186	0.180
Cote d'Ivoire	0.807***	0.330**	0.734***	0.381***
DRC	0.494***	0.306**	0.282*	0.230
Egypt	-0.062	-0.090	0.055	-0.096
Ethiopia	0.409**	0.257	0.466**	0.469**
Gabon	0.554***	0.430***	0.539***	0.408***
Gambia	-0.020	-0.001	-0.129	-0.202
Ghana	0.154	0.052	0.017	0.048
Guinea	0.052	0.389*	0.220	0.423*
Guinea-Bissau	0.572***	-0.281*	0.391**	-0.335**
Kenya	0.217	-0.011	0.028	-0.137
Leshoto	-0.029	0.218	0.166	0.273*
Madagascar	0.533***	-0.154	0.473***	0.206
Malawi	-0.063	0.362**	0.000	0.279*
Mali	0.148	-0.220	-0.037	-0.030
Mauritania	0.125	-0.033	-0.092	-0.152
Mauritius	-0.033	0.298	0.168	0.619***
Morocco	0.356**	0.063	0.443***	0.218
Mozambique	0.269	0.276	0.241	0.442**
Namibia	0.008	-0.012	0.113	0.323*
Rwanda	0.607***	-0.014	0.493***	0.197
Senegal	0.277*	-0.087	0.288**	0.188
Seychelles	0.099	0.437	-0.040	0.226
South Africa	0.450***	0.402***	0.134	0.115
Sudan	0.101	-0.232	-0.011	-0.088

Table continued next page

Table A1 : cont.

	Growth rates		Cyclical components	
	$\rho^{(1)}_{y,z}$ (column I)	$\rho^{(1)}_{y+1,z}$ (column II)	$\rho^{(2)}_{y,z}$ (column III)	$\rho^{(1)}_{y+1,z}$ (column IV)
Swaziland	0.012	0.184	0.051	0.149
Togo	-0.065	0.205	0.096	0.212
Tunisia	0.076	0.122	-0.036	0.076
Uganda	0.226	0.240	0.351*	0.396**
Zambia	0.146	0.196	0.250*	0.213
Zimbabwe	0.101	0.039	-0.103	-0.223

Notes: The table reports bilateral correlation coefficients between output GDP and government consumption. Columns I and II report correlations of growth rates of the two variables; Column I is the contemporaneous correlation and Column II is the correlation with fiscal policy lagged by one year. Columns III and IV report correlations of the HP-filtered cyclical components of the two variables; Column III is the contemporaneous correlation and Column IV is the correlation with fiscal policy lagged by one year. The overall assessment is based on the joint consideration of the four coefficients (see also text for details). Only countries for which more than 20 annual observations on both variables are available are included in the table.

Variables description and data sources

Name (and symbol used in the paper)	Description	Source
Per-capita output growth volatility	Five year standard deviation of the annual growth rate of per-capita GDP at constant market prices	Computed from WDI data
Per-capita private consumption growth volatility	Five year standard deviation of the annual growth rate of per-capita private consumption. Per-capita private consumption is defined as household final consumption expenditure and includes the market value of all goods and services, including durable products (such as cars, washing machines, and home computers), purchased by households. It excludes purchases of dwellings but includes imputed rent for owner-occupied dwellings. It also includes payments and fees to governments to obtain permits and licenses.	Computed from WDI data
Aggregate output growth volatility	Five year standard deviation of the annual growth rate of aggregate GDP at constant market prices	Computed from WDI data
Lagged per-capita private consumption (c_{t-1})	One year lagged value of per-capita private consumption.	WDI
Lagged per-capita output (y_{t-1})	One year lagged value of per-capita GDP at constant market prices.	WDI
Per-capita output growth (Δy_t)	Annual growth rate of per-capita GDP at constant market prices.	WDI
Change in overall budget balance (Δb_t)	Annual change in overall budget balance in percent of GDP. Overall budget balance is revenues (including grants) minus expense, minus net acquisition of nonfinancial assets. Positive values indicate fiscal contractions (i.e. a tighter fiscal policy stance). Negative values indicate fiscal expansions (i.e. a more expansionary fiscal policy stance).	Computed from data in WDI and GFS
Lagged overall budget balance (b_{t-1})	One year lagged budget balance in percent of GDP	WDI and GFS

Name (and symbol used in the paper)	Description	Source
Change in government expenditure (Δg_t)	Annual change in government expenditure in percent of GDP. Government expenditure is cash payments for operating activities of the government plus acquisition of nonfinancial asssets	WDI and GFS
Lagged government expenditure (g_{t-1})	One year lagged value of government expenditure in percent of GDP	WDI and GFS
Change in tax revenues (Δr_t)	Annual change in total tax revenues in percent of GDP. Tax revenues include taxes on income, profits, and capital gains, taxes on payroll and workforce, taxes on property, taxes on goods and services, and taxes on international trade.	WDI and GFS
Lagged tax revenues (r_{t-1})	One year lagged value of tax revenues in percent of GDP	WDI and GFS
Contemporaneous correlation of growth rates of aggregate output and government consumption ($\rho_{y,z}^{(1)}$)	Correlation coefficient between the growth rate of aggregate GDP in year t and the growth rate of government consumption in year t	Computed from data in WDI and GFS
Lagged correlation of growth rates of aggregate output and government consumption ($\rho_{y,z+1}^{(1)}$)	Correlation coefficient between growth rate of aggregate GDP in year t and growth rate of government consumption in year $t+1$	Computed from data in WDI and GFS
Contemporaneous correlation of cyclical components of aggregate output and government consumption ($\rho_{y,z}^{(2)}$)	Correlation coefficient between the cyclical component of aggregate GDP in year t and the cyclical component of government consumption in year t. Cyclical components are obtained from the Hodrick-Prescott filter.	Computed from data in WDI and GFS
Lagged correlation of cyclical components of aggregate output and government consumption ($\rho_{y,z+1}^{(2)}$)	Correlation coefficient between the cyclical component of aggregate GDP in year t and the cyclical component of government consumption in year $t+1$. Cyclical components are obtained from the Hodrick-Prescott filter.	Computed from data in WDI and GFS
Government consumption	General government final consumption expenditure. It includes all government current expenditures for purchases of goods and services	WDI and GFS

Name (and symbol used in the paper)	Description	Source
Trade openness	Exports plus imports in percent of GDP	WDI
Capital account liberalization	Index of capital account liberalization.	Chinn and Ito (2007)
Credit by banking sector	Domestic credit provided by the banking sector in percent of GDP. It includes all credit to various sectors on a gross basis, with the exception of credit to the central government, which is net.	WDI
Non-normal fiscal times	Dummy variable taking value 1 in year t if the annual change in the overall budget balance in that year is greater than 2 percentage points of GDP in absolute value.	Computed from data in WDI and GFS.
Polity	Aggregate index of quality of the polity. It therefore ranges from +10 (corresponding to strongly democratic countries) to -10 (corresponding to strongly autocratic countries).	Polity IV database
Checks and balances	Institutionalized constraints on the decision-making powers of the chief executives.	Polity IV database
Legal origin	Dummy variable taking value if the commercial code or the company law of the country has its origin in the English Common Law	La Porta et al. (1999)
Latitude	Absolute value of the latitude of the country, scaled to take value between 0 and 1.	La Porta et al. (1999)

Notes: Sources are as follows:
1. WDI is the World Development Indicators of the World Bank, 2008 issue
2. GFS is the Government Finance Statistics of the International Monetary Funds, 2008 issue
3. Chinn and Ito (2007) is Chinn, M. and Ito, H. 2007. A New Measure of Financial Openness. Forthcoming Journal of Comparative Policy Analysis. The database is available on line at: http://www.ssc.wisc.edu/~mchinn/research.html
4. Polity IV database is Polity IV Project: Political Regime Characteristics and Transitions, 1800-2007 Monty G. Marshall and Keith Jaggers, Principal Investigators,George Mason University and Colorado State University; Ted Robert Gurr, Founder University of Maryland. The database is available on line at http://www.systemicpeace.org/polity/polity4.htm
5. La Porta et al. (1999) is La Porta R., Lopez-de-Silanes F., Shleifer A., Vishny R., 1999. The Quality of Government. Journal of Law, Economics, and Organizations, 15, 222-279.

List of countries included in the regressions of tables 2 and 3

Albania, Algeria, Angola, Argentina, Armenia, Azerbaijan, Bahanas, Bangladesh, Barbados, Belarus, Benin, Botswana, Brazil, Bulgaria, Burkina Faso, Burundi, Cambodia, Cameroon, Cape Verde, Central African Republic, Chad, Chile, China, Colombia, Comoros, Congo, Congo Dem. Rep., Costa Rica, Cote d'Ivoire, Croatia, Cuba, Cyprus, Czech Republic, Djibouti, Ecuador, Egypt, El Salvador, Equatorial Guinea, Eritrea, Estonia, Ethiopia, Fiji, Gabon, Gambia, Georgia, Ghana, Grenada, Guam, Guatemala, Guinea, Guinea-Bissau, Haiti, Honduras, Hong-Kong, Hungary, India, Indonesia, Iran, iraq, Jamaica, Jordan, Kazakhstan, Kenya, South Korea, Laos, Latvia, Lesotho, Liberia, Libya, Lithuania, Macedonia, Madagascar, Malawi, Malaysia, Mali, Malta, Mauritania, Mauritius, Mexico, Micronesia, Moldova, Mongolia, Morocco, Mozambique, Myanmar, Namibia, Nepal, Nicaragua, Niger, Nigeria, Oman, Pakistan, Panama, Papua New Guinea, Paraguay, Peru, Philippines, Poland, Puerto Rico, Qatar, Romania, Russia, Rwanda, Samoa, Sao Tome et Principe, Saudi Arabia, Senegal, Serbia, Seychelles, Sierra Leone, Singapore, Slovakia, Slovenia, Somalia, South Africa, Sri Lanka, Sudan, Swaziland, Syria, Tajikistan, Tanzania, Thailand, Timor l'Este, Togo, Trinidad and Tobago, Tunisia, Turkey, Turkmenistan, Uganda, Ukraine, United Arab Emirates, Uruguay, Uzbekistan, Venezuela, Vietnam, Yemen, Zambia, Zimbabwe.

List of References

Aghion , P., Angeletos, M., Banarjee, A., Manova K., 2005. Volatility and Growth: Credit Constraints and Productivity-Enhancing Investment. NBER Working Paper 11349.

Alesina, A., Campante, F., Tabellini, G., 2008. Why is Fiscal Policy Often Pro-Cyclical ? Journal of the European Economic Association, 6, 1006-1036.

Andres, J., Domenech, R., Fatas, A., 2008. The Stabilising Role of Government Size. Journal of Economic Dynamics and Control, 32, 571-593.

Baxter, M., King, R., 1999. Measuring Business Cycles: Approximate Band-Pass Filters For Economic Time Series. Review of Economics and Statistics, 81, 575-593.

Blanchard, O., 1990. Comment on Giavazzi and Pagano. NBER Macroeconomics Annual 1990. NBER, Cambridge.

Blinder, A., Deaton, A., 1986. The Time Series Consumption Function Revisited. The Brookings Papers on Economic Activity 2, 465-511.

Carmignani, F., 2008. The impact of fiscal policy on private consumption and social outcomes in Europe and the CIS. Journal of Macroeconomics 30, 575-598

Chinn, M., Ito, H., 2007. A New Measure of Financial Openness. Forthcoming Journal of Comparative Policy Analysis.

Davidson, R., MacKinnon, J., 1993. Estimation and Inference in Econometrics. Oxford Unviersity Press.

Diallo O., 2008. Tortuous road toward countercyclical fiscal policy: Lessons from democratized sub-Saharan Africa. Journal of Policy Modelling, in press.

Fatas, A., 2002. The effects of business cycles on growth. In N. Loayza and R. Soto (editors) Economic Grwoth: Sources, Trends and Cycles, Central Bank of Chile. Santiago del Chile.

Fatas, A., Mihov, I., 2001. Government size and automatic stabilizers: International and intranational evidence. Journal of International Economics 55 (2001), pp. 3–28

Galí, J., 1994. Government size and macroeconomic stability. European Economic Review 38, 117–132.

Gali J., Lopez-Salido, D.,Valles, J., 2007. Understanding the Effects of Government Spending on Consumption. Journal of the European Economic Association, 5, 227-270.

Garcia, M., Garcia, P., Piedrabuena, B., 2005. Fiscal and Monetary Policy Rules: The Recent Chilean Experience. Central Bank of Chile Working Papers 340.

Giavazzi, F. and Pagano, M., 1990. Can Severe Fiscal Contractions be Expansionary? Tales of Two Small European Countries. NBER Macroeconomics Annual 1990. NBER, Cambridge.

Giavazzi, F., Pagano, M., 1996. Non-Keynesian Effects of Fiscal Policy Changes: international Evidence and the Swedish Experience. Swedish Economic Policy Review., 75-111.

Giavazzi, F., Jappelli, T., Pagano, M., 2000. Searching for non-linear effects of fiscal policy: evidence from industrial and developing countries. European Economic Review, 44, 1259-1289.

Hnatkovska, V., Loayza, N., 2005. Volatility and Growth. In J. Aizenman and B. Pinto: Managing Economic Volatility and Crisis: A Practitioner's Guide, Cambridge University Press.

Hodrick, R., Prescott, E., 1997. Postwar U.S. Business Cycles: An Empirical Investigation. Journal of Money, Credit, and Banking, 29, 1-16.

Itzezki, I., Vegh, C., 2008. Pro-cyclical fiscal policy in developing countries: truth or fiction. NBER Working Paper, 14191.

Kaminsky G., Reinhart, C., Vegh, C., 2004. When It Rains, It Pours: Pro-Cyclical Capital Flows and Macroeconomic Policies. NBER Macroeconomic Annuals.

Kose, A.Y., Prasad, E., Terrones, M., 2005. Growth and Volatility in an Era of Globalization. IMF Staff Papers, 52, 31-63.

Lucas, R.J., 1987. Models of Business Cycles. Basil Blackwell, New York.

Manasse, P., 2007. Deficit Limits and Fiscal Rules for Dummies. IMF Staff Papers, 54, 455-473.

Martin, P., Rogers, C., 2000. Long-Term Growth and Short-Term Economic Instability. European Economic Review, 44, 359-381.

Newey, W., West, K., 1987. Hypothesis Testing with Efficient Method of Moments Estimation. International Economic Review 28, 777-787.

Otrok, C., 2001. On Measuring the Welfare Costs of Business Cycles. Journal of Monetary Economics, 47, 61-92.

Pallage, S., Robe, M., 2003. On the Welfare Costs of Economic Fluctuations in Developing Countries. International Economic Review, 44, 677-698.

Persson, T., Tabellini, G., 2003. The Economic Effects of Constitutions. The MIT Press.

Persson, T., Tabellini, G., 2004. Constitutional Rules and Fiscal Policy Outcomes," American Economic Review. 94, 25-45.

Ramey, G., Ramey, V., 1995. Cross-Country Evidence on the Link Between Volatility and Growth. American Economic Review, 85, 1138-1151.

Ravn M., Uhlig H., 2002. On Adjusting the Hodrick-Prescott Filter for the Frequency of Observations. Review of Economics and Statistics, 84, 371-375.

Rodrik D., 1998. Why Do More Open Economies Have Bigger Governments? The Journal of Political Economy, 106, 997-1032.

Schlarek, A., 2007. Fiscal Policy and Private Consumption in Industrial and Developing Countries. Journal of Macroeconomics, 29, 113-154.

Sutherland, A., 1997. Fiscal Crises and Aggregate Demand: Can high Public Debt Reverse the Effects of Fiscal Policy?. Journal of Public Economics, 65, 239-57.

Van Aerle, B., Garretsen, G., 2003. Keynesian, non-Keynesian or no effects of fiscal policy change? The EMU case. Journal of Macroeconomics, 25, 635-640.

Woo, J. 2008. Why Do More Polarized Countries Run More Pro-Cyclical Fiscal Policy? The Review of Economics and Statistics, forthcoming.