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Does pro-cyclical fiscal policy lead to more income inequality? An empirical analysis for sub-saharan Africa

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Abstract

Despite progress in some cases, many Sub-Saharan Africa (SSA) countries are not currently on track to achieve their Millennium Development Goals, particularly those related to poverty and income inequality. This situation is associated to procyclical fiscal policy highlighted in previous literature. This paper examines whether procyclical fiscal policy leads to more income inequality and therefore employs panel data techniques with heterogeneous slope (Mean Group model) covering 30 Sub-Saharan Africa countries over the period from 1985 to 2012. Our results confirm that, not only pro-cyclical fiscal policy is the norm in SSA economies, but also the effect of pro-cyclical fiscal policy on income inequality depends on the type of expenses: pro-cyclical public investment leads to more income inequality, contrary to pro-cyclical government consumption expenditures.

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1. Introduction

In recent years, fiscal policy stance in developing countries has attracted substantial attention from academic public and international organizations. Most of studies have shown that fiscal policy is pro-cyclical in these countries, that is said they raise (lower) spending and lower (raise) tax rates in good (bad) times. However, as argued by McManus and Ozkan (2012), previous studies focused on the sources of pro-cyclical fiscal policy and potential consequences of such seemingly sub-optimal policies have been largely ignored. Although there is few studies on Sub-saharan African countries, Thornton (2008) shown that government consumption is more pro-cyclical in those African countries that are more reliant on foreign aid inflows and that are less corrupt. Diallo (2008) focuses on the role of democratization to explain the difference in cross-country fiscal policy stance. By illustrating stylized facts in Botswana and Nigeria, he employs fiscal Taylor rule and system GMM to explore the implications of political changes on the cyclical properties of fiscal policy. He highlights that democratic institutions are associated to countercyclical fiscal policies and restraints on the executive branch are found to be the key factor that explains why democracies can better smooth business cycles than autocracies. Lledó, Yackovlev, and Gadenne (2009) investigate the cyclical patterns of government expenditures in sub-Saharan Africa since 1970 and show that changes in political institutions have no impact on pro-cyclicality. Furthermore, they found that pro-cyclicality of fiscal policy is obvious in SSA countries, but it has declined in recent years. Mpatswe, Tapsoba and York (2012) apply the system and difference GMM techniques on panel data of 44 SSA countries over the period of 1980-2008 and show that fiscal policies in SSA are strongly pro-cyclical. Their findings are consisting to government consumption, public investment and total public expenditures.

However, to the best of our knowledge, there is no study that tackles the consequences of pro-cyclical fiscal policies in Sub-Saharan African countries. As for other regions, Aghion and Marinescu (2007) shown that a more countercyclical budget deficit is positively correlated with growth in the OECD countries. These results are consistent with McManus and Ozkan (2012) that found that fiscally pro-cyclical countries have lower rates of economic growth, higher rates of output volatility and higher rates of inflation. In contrast to the two previous studies, we aim to look at the effect of pro-cyclical fiscal policy on income inequality. Indeed, income inequality is a pronounced and worsening problem in SSA countries. According to African Development Bank, Africa is not only the poorest regions in the world, but also the world's second most inequitable region after Latin America. Furthermore, inequalities have not diminished over time. In 2010, six out of the 10 most unequal countries worldwide were in Sub- Saharan Africa. Given the fact that fiscal policy is important for allocating resources by tax policies and resources allocated through expenditure policies, it turns out that imprudent pro-cyclical fiscal policy can hurt the poor. If government increases expenditures for richest people in order to encounter top class demands in good times or decreases social expenditures in downturns, that can increase income inequality. As highlighted by the International Monetary Fund (2014), fiscal policy is powerful enough to influence macroeconomic expansion and contraction and to affect intergenerational transfers through debt, social security, taxation on extractable resources and pollution, and subsidies and expenditures on mitigation and adaptation.

Our results confirm that fiscal policy is overwhelmingly pro-cyclical in SSA economies, with public investment more responsive to economic fluctuations. Furthermore, we found that the effect of pro-cyclical fiscal policy on income inequality depends on the type of expenses: public investment pro-cyclicality leads to more income inequality, contrary to pro-cyclical government consumption expenditures.

2- Data and identification strategy

An annual panel dataset consisting of 30 SSA countries from 1985 to 2012 is constructed from a variety of sources. Variables of primary interest in the model include the presence of real general government consumption growth, public investment growth, real GDP growth drawn from *United Nations data* website (the base year is 2005), and gini index from Standardizing the World Income Inequality Database (SWIID). We take the advantage of a recently-compiled cross-country dataset that distinguishes market (before taxes and transfers) inequality from net (after taxes and transfers) inequality. In this study, we consider the net income inequality index. Concerning the measure of fiscal policy, we prefer growth rates of government spending that correspond to policy instruments rather than fiscal outcomes such as primary balance, tax revenue and other fiscal variables that are endogenous.

As for the identification model, the strategy is in two stages. In the first step, we estimate time-varying cyclicality coefficients for fiscal policy by following Aghion and Marinescu (2007), while in the second step we link pro-cyclical fiscal policy to income inequality by using Mean Group technique (Pesaran and Smith (1995)).

To obtain time-varying cyclicality coefficients for fiscal policy by individual African economy, we estimate the following equation:

$$\Delta LogF_{it} = \alpha_{it} + \beta_{it}\Delta LogY_{i,t} + \varphi_{it} \qquad (1)$$

Where Δ indicates the annual change in the variable, $i= 1, 2, ..., N$ is the country index; $t=1, 2, ...,T$ is the time index; $Log(F)$ represents the log of real fiscal variable (general government consumption, or public investment); $Log(Y)$ stands for real GDP, and φ represents error terms. In line with Aghion and Marinescu (2007), the coefficient β_{it} is then allowed to be country specific and time varying. By applying the first difference transform to the data, we are in effect using deviations from fixed long-run trends of our variables, ruling out any structural relationship between F and Y which is linear and time invariant. The cyclical characterization of fiscal policy depends on the sign and statistical significance of the coefficient β_{it}: if it is positive, the 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.
Subsequently, we present the econometric technique to estimate the coefficients β_{it}. To this end, we follow Aghion and Marinescu (2007) by using local Gaussian-weighted OLS to estimate equation (1). This technique determines the time-varying cyclicality coefficient for country i at year t by using all observations and assigning greater weights to those observations closest to the reference year. The least squares estimation procedure considers all points in a local neighborhood but allows for discrimination among the observations. The motivation behind this technique is to gain more accuracy at the reference year than the 10-rolling-window ordinary least squares.

The second stage of the process is to examine whether fiscal policy cyclicality explains income inequality. Then, we use the time-varying cyclicality coefficients obtained from equation (1) and we implement Mean Group technique to perform our analysis. This technique allows the slope coefficients to differ across panel members and opens up a further dimension of inquiry, namely, the analysis of the patterns and the ultimate source of this parameter heterogeneity.

Specifically, we estimate the following equation:

$$Gini\_net_{it} = \theta_{it} + \pi_i \hat{\beta}_{it} + \gamma_i t + \omega_{it} \quad (2)$$

Where $Gini\_net_{it}$ denotes the net Gini coefficient obtained from SWIID, π_i is the country-specific slope on the observable regressor, $\hat{\beta}_{it}$ is cyclicality coefficient obtained from equation (1) and ω_{it} stands for the error term. We also include linear trend "$\gamma_i t$" to capture time-variant unobservables.

3- Descriptive statistics and Results

3.1 Descriptive statistics

We first present the descriptive statistics and some figures of the cyclicality coefficients generated in equations (1) and Gini index. Table I summarizes key results and we can observe that many SSA countries have carried out pro-cyclical government consumption (678 times out of 840; i.e β_C>0). Furthermore, among them, government consumption spending responds more than proportionately to output fluctuations in around half of the cases (i.e., β_C>1 in 294 times out of 840). In contrast, SSA countries have conduct counter-cyclical fiscal policy or at least satisfactory in only 19.29 percent of cases (β_C<0).

Table I: Descriptive statistics

Variable	Obs.	Mean	Std. Dev.	Min	Max
β_C	840	0.693	1.484	-7.612	5.461
β_C>0	678 (80.71%)	1.14	0.982	0	5.462
β_C>1	294	1.937	1.005	1	5.462
β_C<0	162 (19.29%)	-1.738	1.738	-7.612	-0.0008
β_I	834	1.879	2.165	-6.764	9.48
β_I>0	747 (89.57%)	2.281	1.822	0	9.48
β_I>1	557	2.852	1.775	1.0003	9.48
β_I<0	87(10.43%)	-1.578	1.759	-6.764	-0.0005
Gini_net	607	44.045	9.904	15.37	67.547

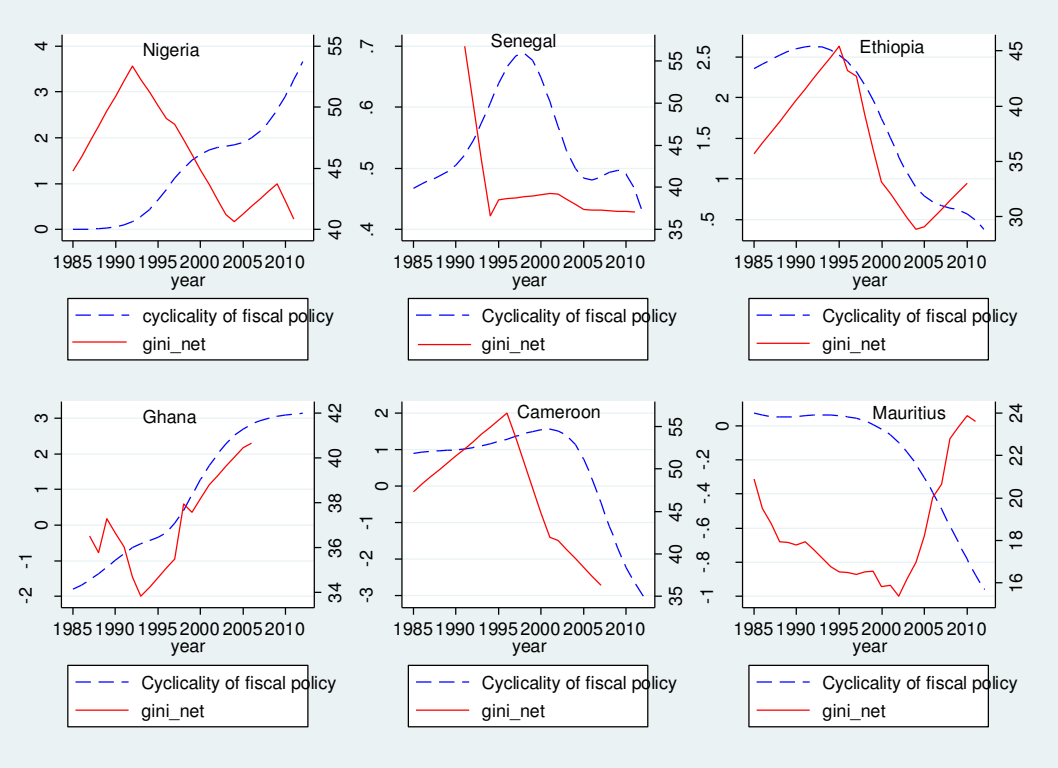
Source: Authors' calculations. β_C refers to government consumption expenditures and β_I to public investment.

As for public investment cyclicality, table I shows this type of fiscal policy was pro-cyclical in 89.57 percent of cases (i.e β_I>0) and counter-cyclical in 10.43 percent of cases (i.e β_I<0). However, we observe that public investment is more pro-cyclical and volatile than government consumption. Given the importance of public investment for health and education in SSA countries, they can encounter problems if there are times when public investment expenditures scale down.

Now, we plot the time-varying cyclicality coefficients of government consumption expenditures and Gini index for Nigeria, Senegal, Ethiopia, Ghana, Cameroon and Mauritius (See below, figure 1). Figure 1 highlights that each country has experienced different evolution patterns of the cyclicality coefficients of government consumption spending and ODA.

While pro-cyclicality of fiscal policy has dropped over the years for Senegal, Ethiopia, Cameroon and Mauritius, it has increased for Ghana and Nigeria. This finding is consistent with what Frankel, Vegh and Vuletin (2012) found by dividing their sample (1960-2009) into two sub-samples (1960-1999 and 2000-2009). As for Gini index, we can see that although the cyclicality coefficient has slowly dropped for Nigeria, Senegal, Ethiopia and Cameroon, it remains very high (more than 30 in most of selected countries). Globally, the cyclicality of government consumption expenditures and Gini index have the same patterns in Senegal, Ethiopia, Ghana ad Cameroon (increasing for Ghana and decreasing for the others).

Figure 1: Time-varying cyclicality of government consumption expenditures and Gini index between 1985 and 2012.



3.2 Estimate results

3.2.1 Baseline results

We turn now to estimate results obtained from equation (2)'s regression. Note that we focus on coefficients associated to fiscal policy cyclicality coefficients (government consumption expenditures and public investment). Results are reported in table II and the summary in table III. From the outset, we observe that the effect of fiscal policy pro-cyclicality on income inequality index depends on the type of expenses. Indeed, the associated coefficient to government consumption expenditures pro-cyclicality is most of times negative and significant (15 cases out of 24 where the coefficients are significant) and positive and significant for public investment (15 cases out of 25). This is said public investment cyclicality creates more income inequality than government consumption expenditures pro-

cyclicality. Furthermore, the effect of public investment on income inequality is more pronounced in downturns (66.67 % of cases).

Table II: Baseline results

	Government consumption expenditures			Public investment		
	All	Good times	Bad times	All	Good times	Bad times
Angola	-1.463***	-1.46***		0.668***	0.689***	
	(0.193)	(0.203)		(0.235)	(0.253)	
Burundi	0.986	1.157	1.338	-0.448***	-0.429***	-0.49***
	(0.634)	(1.067)	(1.216)	(0.077)	(0.143)	(0.098)
Burkina Faso	-0.28***	-0.28***		-0.754***	-0.754***	
	(0.026)	(0.026)		(0.129)	(0.129)	
Botswana	0.326***	0.328***		0.184***	0.184***	
	(0.027)	(0.027)		(0.017)	(0.017)	
Central African Rep.	-0.21***	-0.248***	0.034***	-0.127***	-0.183***	0.017***
	(0.034)	(0.036)	(0.001)	(0.037)	(0.053)	(0.001)
Côte d'Ivoire	-0.45***	-0.457***	-0.514***	0.063**	0.046	0.189
	(0.027)	(0.039)	(0.023)	(0.026)	(0.029)	(0.13)
Cameroon	0.099**	0.082	-0.041***	0.32**	0.243	-0.079***
	(0.042)	(0.051)	(0.008)	(0.128)	(0.16)	(0.02)
Cape Verde	0.189**	0.189**		-0.454***	-0.454***	
	(0.08)	(0.08)		(0.045)	(0.045)	
Ethiopia	0.3***	0.308***	0.303***	-0.557***	-0.634***	-4.391***
	(0.029)	(0.039)	(0.007)	(0.104)	(0.085)	(0.17)
Ghana	0.108***	0.108***		0.028***	0.028***	
	(0.021)	(0.021)		(0.005)	(0.005)	
Guinea	0.0011	0.001		0.0037	0.003	
	(0.012)	(0.012)		(0.01)	(0.01)	
Gambia	-0.572***	-0.572***		0.141**	0.141**	
	(0.187)	(0.187)		(0.065)	(0.065)	
Guinea-Bissau	-0.591***	-0.596***		-1.842	-2.248	
	(0.143)	(0.123)		(2.831)	(2.861)	
Kenya	-0.116	-0.134		0.21***	0.221***	
	(0.115)	(0.119)		(0.036)	(0.038)	
Leshoto	-0.143***	-0.143***		-0.179***	-0.179***	
	(0.016)	(0.016)		(0.018)	(0.018)	
Madagascar	-0.122***	-0.144***	-0.0015	0.027***	0.031***	0.0008
	(0.04)	(0.045)	(0.087)	(0.007)	(0.007)	(0.014)
Mali	-0.124	-0.127		-0.061	-0.062	
	(0.092)	(0.102)		(0.042)	(0.046)	
Mozambique	0.231***	0.231***		-0.132**	-0.131**	
	(0.073)	(0.073)		(0.053)	(0.053)	
Mauritius	-0.768***	-0.768***		0.086***	0.086***	

	(0.046)	(0.046)		(0.011)	(0.011)	
Malawi	-0.03	-0.024	-0.059	0.81***	0.634**	1.614***
	(0.035)	(0.037)	(0.13)	(0.23)	(0.267)	(0.381)
Namibia	-0.051	-0.536		0.058***	0.032*	
	(0.567)	(0.35)		(0.021)	(0.018)	
Niger	0.435**	0.447*		0.941***	0.984***	
	(0.199)	(0.229)		(0.184)	(0.194)	
Nigeria	-0.165***	-0.129**	-0.291***	0.193***	0.184***	0.433***
	(0.046)	(0.052	0.01	0.028	0.036	0.003
Rwanda	0.352***	0.352***	-2.4**	0.169	0.124	0.862***
	(0.058)	(0.062)	(0.926)	(0.313)	(0.346)	(0.007)
Senegal	-0.877***	-0.485**		-0.266***	-0.144**	
	(0.239)	(0.235)		(0.07)	(0.073)	
Sierra Leone	0.093***	0.098***	0.055***	0.041***	0.041***	0.056***
	(0.017)	(0.022)	(0.003)	(0.011)	(0.014)	(0.002)
Swaziland	-0.048***	-0.048***		-0.009	-0.009	
	(0.006)	(0.006)		(0.015)	(0.015)	
Tanzania	-0.069***	-0.069***		-0.053***	-0.053***	
	(0.003)	(0.003)		(0.009)	(0.009)	
Uganda	-0.127*	-0.127*		-0.048***	-0.048***	
	(0.072)	(0.072)		(0.015)	(0.014)	
Zambia	-0.055***	-0.053***	-0.09***	0.051***	0.049*	0.05***
	(0.01)	(0.011)	(0.01)	(0.017)	(0.027)	(0.005)

The table reports regression coefficients associated to $\hat{\beta}$(fiscal policy cyclicality coefficients) from estimates of equation (2) and in parenthesis the associated standard errors.
Good times refer to positive economic growth, while bad times refer to economic downturns.
***p<0.01, significant at 1% ; **p<0.05, significant at 5%; *p<0.10, significant at 10%

Table III: summary of baseline results

		Government consumption expenditures			Public investment		
		All	Good times	Bad times	All	Good times	Bad times
Mean		-0.104	-0.103	-0.151	-0.031	-0.053	-0.158
Standard deviation		0.451	0.457	0.88	0.493	0.541	1.511
Maximum		0.986	1.157	1.338	0.941	0.984	1.614
Minimum		-1.463	-1.46	-2.4	-1.842	-2.248	-4.391
Number of times π>0	Significant	9	8	3	15	13	6
	Insignificant	2	3	1	2	4	3
Number of times π<0	Significant	15	15	5	10	10	3
	Insignificant	4	4	2	3	3	0

3.2.2 Robustness checks

- **Testing for additional controls on baseline specification**

We add further controls in the baseline specification in order to take into account other variables likely to affect income inequality. These additional controls are trade openness, the level of development, urbanization rate and inflation rate. Trade openness is the sum of exports and imports expressed in percentage of GDP, whereas the level of development is measured as the traditional logarithm of GDP per capita. All these data come from World Development Indicators (World Bank). We include these variables in equation (2) and then estimate by using the Mean Group method. As we are interesting in the effects of fiscal policy pro-cyclicality, we report in table IV the coefficients associated to this variable and table V for the summary of these coefficients. It is worth noting that when we control for all these variables, there are insufficient observations to run downturn equations. Results show that government consumption pro-cyclicality is negatively associated with income inequality in the most of cases where the coefficients are significant (16 against 6), contrary to public investment behavior that leads more to income inequality (11 cases against 7 for significant coefficients). Furthermore the effect of government consumption is most pronounced in upturns (19 against 4), while the case of public investment is somehow mixed (9 out of 16).

Table IV: Robustness: Controlling for trade openness, level of development, urbanization rate and inflation rate

	Government consumption expenditures		Public investment	
	All	Good times	All	Good times
Angola	-0.849***	-0.74***	-0.58***	-0.621
	(0.147)	(0.15)	(0.215)	(0.458)
Burundi	1.212**		-0.267	
	(0.486)		(0.41)	
Burkina Faso	-0.269**	-0.269**	-0.208	-0.208
	(0.112)	(0.112)	(0.36)	(0.36)
Botswana	0.181**	0.181**	0.071	0.071
	(0.082)	(0.082)	(0.055)	(0.055)
Central African Republic	-0.179***	-0.191***	-0.095**	-0.131***
	(0.049)	(0.047)	(0.037)	(0.047)
Côte d'Ivoire	-0.394***	-0.381***	0.184***	0.201***
	(0.023)	(0.035)	(0.033)	(0.047)
Cameroon	-0.0016	-0.067***	-0.018	-0.222***
	(0.016)	(0.012)	(0.049)	(0.081)
Cape Verde	0.112	0.112	-0.637***	-0.637***
	(0.193)	(0.193)	(0.071)	(0.071)
Ethiopia	0.066	0.052	-0.257***	-0.151*
	(0.075)	(0.086)	(0.084)	(0.088)
Ghana	0.039	0.039	0.014	0.014
	(0.032)	(0.032)	(0.01)	(0.01)

Guinea	0.021	0.021	-0.028	-0.028
	(0.015)	(0.015)	(0.019)	(0.019)
Gambia	-2.524***	-2.523***	1.038*	1.038*
	(0.434)	(0.434)	(0.548)	(0.548)
Guinea-Bissau	-1.007***	-0.956***	-2.29	-2.42
	(0.161)	(0.139)	(3.842)	(4.231)
Kenya	-0.114*	-0.122*	0.161**	0.218**
	(0.068)	(0.074)	(0.077)	(0.086)
Leshoto	-0.135***	-0.135***	-0.28***	-0.28***
	(0.021)	(0.021)	(0.029)	(0.029)
Madagascar	-0.161**	-0.16*	0.045***	0.047***
	(0.067)	(0.083)	(0.009)	(0.011)
Mali	0.488**	0.471**	0.072	0.067
	(0.198)	(0.197)	(0.088)	(0.091)
Mozambique	0.173	0.173	0.081	0.082
	(0.66)	(0.66)	(0.053)	(0.053)
Mauritius	-0.707***	-0.707***	0.08***	0.08***
	(0.065)	(0.065)	(0.011)	(0.011)
Malawi	-0.248***	-0.24***	0.711**	0.584
	(0.024)	(0.025)	(0.317)	(0.362)
Namibia	-1.089*	-1.038*	0.05	0.067
	(0.616)	(0.62)	(0.068)	(0.068)
Niger	-0.918	-0.784	0.776*	0.995*
	(0.601)	(0.687)	(0.401)	(0.521)
Nigeria	-0.166***	-0.173***	0.236***	0.224***
	(0.048)	(0.061)	(0.047)	(0.057)
Rwanda	0.224***	-0.212***	-0.181	-0.231*
	(0.047)	(0.042)	(0.154)	(0.132)
Senegal	-0.305	-0.347*	-0.05	-0.076
	(0.24)	(0.185)	(0.102)	(0.083)
Sierra Leone	0.215***	0.257***	0.13**	0.14
	(0.043)	(0.065)	(0.054)	(0.086)
Swaziland	-0.078***	-0.078***	0.034*	0.034*
	(0.018)	(0.018)	(0.018)	(0.018)
Tanzania	0.26***	0.26***	-0.064**	-0.064**
	(0.055)	(0.055)	(0.026)	(0.026)
Uganda	-0.463*	-0.463*	-0.086***	-0.086***
	(0.273)	(0.273)	(0.022)	(0.022)
Zambia	-0.058***	-0.058***	0.094***	0.104***
	(0.016)	(0.019)	(0.021)	(0.024)

The table reports regression coefficients associated to $\hat{\beta}$(fiscal policy cyclicality coefficients) from estimates of equation (2) and in parenthesis the associated standard errors. Note that estimating for bad times does not work. Good times refer to positive economic growth, while bad times refer to economic downturns.
***p<0.01, significant at 1% ; **p<0.05, significant at 5%; *p<0.10, significant at 10%

Table V : Summary : Robustness : Controlling for trade openness, level of development, urbanization rate and inflation rate

		Government consumption expenditures		Public investment	
		All	Good times	All	Good times
Mean		-0.223	-0.278	-0.042	-0.041
Standard deviation		0.638	0.567	0.545	0.582
Maximum		1.212	0.471	1.038	1.038
Minimum		-2.524	-2.523	-2.29	-2.42
Number of times $\pi>0$	Significant	6	4	11	9
	Insignificant	5	5	5	7
Number of times $\pi<0$	Significant	16	19	7	8
	Insignificant	3	1	7	6

- **Testing for alternative measure of business cycle**

Up to now, we used real annual GDP growth both in SSA countries to measure cyclicality of government consumption spending and public investment. However, in previous literature some authors have used output gap instead of GDP growth (Aghion and Marinescu 2008, Frankel, Vegh and Vuletin 2012). The output gap is estimated as the log deviation from a Hodrick-Prescott trend. The smoothness parameter of the filter is set to 6.25 as suggested by Ravn and Uhlig (2002) for annual data. Then, we estimate equation (1) to generate cyclicality coefficients by using the local Gaussian-weighted OLS method and equation (2) by using the Mean Group approach. Results are presented in table VI for coefficients associated with government expenses in each country and table VII for the summary. We find that once again, pro-cyclical government consumption does not lead to more income inequality in most countries (12 out of 19 cases where the coefficients are significant) and this finding holds also in bad times (16 out of 23 cases). In economic upturns, results are mixed. We find that government consumption pro-cyclicality is positively associated with income inequality in 9 countries and negatively correlated with income inequality also in 9 countries. Angola appears to be the country where government consumption behavior leads to more income inequality, contrary to Mauritius where government consumption behavior dampens income inequality. As for public investment, we find that contrary to previous findings, it is more negatively associated with income inequality. Indeed, results show that public investment pro-cyclicality is positively (negatively) associated with income inequality in 7 countries (9 countries). However, when we divide the sample into two subsamples (upturns and downturns), table VII sheds light that the number of cases where coefficients are positive and significant outnumbers the one for negative and significant coefficients in upturns (8 against 6), contrary to downturns (9 against 10). Once again, Angola is the country where public investment leads to more income inequality (the coefficient is 1.168), whereas such effect is more dampened in Mozambique (the coefficient is -1.002).

Table VI: Robustness: Using output gap as measurement of business cycle

	Government consumption expenditures			Public investment		
	All	Good times	Bad times	All	Good times	Bad times
Angola	3.396***		2.075***	1.168***		0.756***
	(0.776)		(0.102)	(0.136)		(0.052)
Burundi	-0.512***		-0.461***	-0.374***		-0.157
	(0.038)		(0.076)	(0.081)		(0.158)
Burkina Faso	-0.304***	-0.245***	-0.291***	0.076	0.389***	0.294
	(0.033)	(0.037)	(0.044)	(0.231)	(0.123)	(0.407)
Botswana	-0.141	-0.338***	0.249**	-0.364**	-0.779***	0.384*
	(0.097)	(0.023)	(0.108)	(0.177)	(0.056)	(0.233)
Central African Rep.	-0.256***	0.0522***	-0.251***	0.054	0.039***	0.068
	(0.061)	(0.004)	(0.09)	(0.086)	(0.008)	(0.104)
Côte d'Ivoire	-0.306***	-0.204**	-0.361***	-0.094*	0.353	-0.031
	(0.06)	(0.101)	(0.024)	(0.056)	(0.354)	(0.075)
Cameroon	0.471***	0.187***	0.996***	0.283**	0.109	0.263
	(0.061)	(0.061)	(0.064)	(0.137)	(0.085)	(0.492)
Cape Verde	0.076	-1.734	-0.057***	-0.27	-0.88	-0.052***
	(0.331)	(4.007)	(0.009)	(0.176)	(0.658)	(0.0023)
Ethiopia	0.02	0.127***	-0.057			
	(0.082)	(0.03)	(0.122)			
Ghana	0.149***	-0.43**	-0.008	0.031***	0.237*	-0.025*
	(0.032)	(0.209)	(0.052)	(0.006)	(0.135)	(0.014)
Guinea	-0.013	0.094***	-0.428***	0.082	0.105*	0.826**
	(0.045)	(0.024)	(0.096)	(0.092)	(0.056)	(0.32)
Gambia	-0.557	0.473	-2.981**	-0.102	-0.012	-0.395***
	(0.617)	(2.222)	(1.142)	(0.068)	(0.176)	(0.063)
Guinea-Bissau	0.198	-0.046	-1.803***	-0.202*	0.011	-1.642***
	(0.232)	(0.27)	(0.244)	(0.107)	(0.039)	(0.557)
Kenya	0.014	0.0024	0.078	0.146***	0.026	0.145***
	(0.083)	(0.032)	(0.138)	(0.022)	(0.048)	(0.031)
Leshoto	0.343***	0.791***	-0.023	0.048	0.066*	-0.085***
	(0.052)	(0.102)	(0.056)	(0.031)	(0.037)	(0.014)
Madagascar	-0.1***	-0.027	-0.352***	0.031	-0.008	-0.267*
	(0.032)	(0.025)	(0.039)	(0.032)	(0.029)	(0.155)
Mali	0.436***	0.428***	0.467***	-0.037	-0.039	1.38***
	(0.035)	(0.069)	(0.046)	(0.034)	(0.031)	(0.294)
Mozambique	0.104***	0.156**		-1.002**	-0.773	
	(0.038)	(0.069)		(0.464)	(0.53)	
Mauritius	-0.875***	-0.317	-0.958***	0.203***	0.173***	0.256***

	(0.254)	(0.411)	(0.248)	(0.016)	(0.026)	(0.028)
Malawi	-0.032	0.012	-0.135***	0.096**	0.061	0.198***
	(0.043)	(0.044)	(0.044)	(0.045)	(0.045)	(0.042)
Namibia	-0.316***	-0.902	-0.345***	0.071	0.453***	0.014
	(0.108)	(0.716)	(0.095)	(0.048)	(0.044)	(0.076)
Niger	0.357		0.3	-0.158		-0.154
	(0.232)		(0.27)	(0.129)		(0.143)
Nigeria	-0.068***	-0.105***	-0.16***	0.026	-0.025	0.608
	(0.024)	(0.034)	(0.023)	(0.071)	(0.105)	(1.134)
Rwanda	0.736***	0.898***	0.587***	0.553***	0.664***	0.412***
	(0.046)	(0.111)	(0.049)	(0.043)	(0.107)	(0.041)
Senegal	0.157	0.069**	0.486	-0.407	-0.16**	-0.628
	(0.231)	(0.028)	(0.532)	(0.323)	(0.078)	(0.557)
Sierra Leone	-0.342***	-0.486***	-0.824***	-0.18*	-0.165	-0.42***
	(0.071)	(0.059)	(0.041)	(0.093)	(0.138)	(0.025)
Swaziland	-0.095***	-0.081***	0.458*	-0.094***	-0.08***	-0.45*
	(0.015)	(0.007)	(0.272)	(0.011)	(0.007)	(0.242)
Tanzania	0.014	-0.031**	0.066***	0.0122	-0.03*	0.07***
	(0.019)	(0.016)	(0.017)	(0.019)	(0.016)	(0.02)
Uganda	-0.082***	-0.05	-0.164**	-0.081***	-0.058**	-0.117**
	(0.031)	(0.033)	(0.064)	(0.026)	(0.026)	(0.048)
Zambia	-0.205***	-0.168**	-0.229***	-0.416***	-0.202***	-0.48**
	(0.014)	(0.085)	(0.021)	(0.082)	(0.029)	(0.22)

The table reports regression coefficients associated to $\hat{\beta}$(fiscal policy cyclicality coefficients) from estimates of equation (2) and in parenthesis the associated standard errors. Note that estimating for bad times does not work. Good times refer to positive economic growth, while bad times refer to economic downturns.
***p<0.01, significant at 1% ; **p<0.05, significant at 5%; *p<0.10, significant at 10%

Table VII: Summary: Robustness : Using output gap as measurement of business cycle

		Government consumption expenditures			Public investment		
		All	Good times	Bad times	All	Good times	Bad times
Mean		0.075	-0.069	-0.142	-0.031	-0.0202	0.027
Standard deviation		0.708	0.4965	0.859	0.361	0.353	0.548
Maximum		3.396	0.898	2.075	1.168	0.664	1.38
Minimum		-0.875	-1.734	-2.981	-1.002	-0.88	-1.642
Number of times $\pi>0$	Significant	7	9	7	7	8	9
	Insignificant	7	3	3	8	5	5
Number of times $\pi<0$	Significant	12	9	16	9	6	10
	Insignificant	4	6	3	5	7	4

4. Conclusion

In this paper, we empirically tested whether pro-cyclical fiscal policy leads to more income inequality. To hold pro-cyclical fiscal policy as sub-optimal first needs to study its effect on economic and social outcomes, for example income inequality that is worsening in SSA countries. To this end, we employed panel data with heterogeneous slope techniques (Mean Group model) covering 30 SSA countries over the period from 1985 to 2012. We found that pro-cyclicality of fiscal policy is the norm in SSA countries, and public investment is more responsive to economic cycles than government consumption expenditures. Furthermore, our results suggest that the effect of pro-cyclical fiscal policy on income inequality depends on the type of expenditures: public investment pro-cyclicality leads to more income inequality, contrary to government consumption expenditures pro-cyclicality. Given the fact that in SSA countries, poorest people are excluded from accessing public sector and therefore they do not benefit from government consumption expenditures, our results call for prudent fiscal policies. Then, in economic downturns periods, government can cut on its consumption expenditures (for examples subsidies) and invests where poor people can more benefit (education, health, etc).

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