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Does political stability improve the aid-growth relationship? A panel evidence on selected Sub-Saharan African countries

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Abstract

Significant ambiguity still surrounds the aid-growth relationship despite fifty years of research on the subject. For the case of Sub-Saharan Africa (SSA), a possible reason for the lack of consensus is that until recently the influence of political stability on the aid-growth relationship had been largely ignored despite its relevance for the region. Further, although overlooked by the literature, the Instrumental Variable (IV) technique, the preferred treatment method of endogeneity in aid-growth relationships, may be ineffective in eliminating endogeneity bias because typical instruments for aid are neither sufficiently exogenous nor strong. Using a dataset of 31 SSA countries from 1984-2007, we re-visit the question of whether aid can spur growth in SSA using first-differencing (FD) to eliminate unobserved effect endogeneity while focusing on the role of political stability on the aid-growth relationship in SSA. Results suggest aid promotes growth conditional on political stability in SSA and that First Differencing (FD) eliminates a substantial amount of the endogeneity bias. Our results demonstrate the pertinence of a stable political environment to attaining the UN's Millennium Development Goals (MDGs) for SSA countries since these goals inherently assume that aid can promote growth.

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1. Introduction

Despite repeated warnings by economists of its futility, the developed world still provides lots of aid to SSA to spur economic growth (Leeson, 2008; Arndt, Jones and Tarp, 2010). SSA has absorbed almost one trillion nominal aid dollars over the last fifty years but the growth record has been unimpressive (Mayo, 2009 and Easterly, 2006). The insistence of developed countries to bestow aid on SSA is not so confounding if one considers that ambiguity still surrounds the effect of foreign aid on growth (Naito, 2010 and Bruckner, 2011). In particular, estimation of the aid-growth relationship is fraught with different kinds of endogeneity problems (Rajan and Subramanian, 2008; Bruckner, 2011 and Minoiua, and Reddyb, 2010). Further, since SSA has been racked by political instability, a question emerges about the effect of political stability on the aid-growth relationship in the region. Given the uncertainty about the effect of aid on growth, and the possible consequences of political stability on the aid-growth relationship, this paper seeks to: (1) empirically determine if aid and growth are related using recent SSA data, and (2) identify the effects of political stability on the aid-growth relationship in SSA after accounting for possible endogeneity bias.

The article contributes to the literature in three main ways. First, it focuses on the SSA region and employs recent data in estimating the effect of political stability on the aid-growth relationship. Second, it uses a dependable measure of political stability constructed with Political Risk Service (PRS)'s ICRG dataset to identify the effect of political stability on the aid-growth relationship in SSA. Finally the possibility of endogeneity bias is addressed: The current literature treatment of endogeneity with IV is criticized while FD is justified and employed in estimation of the aid-growth regression. Aid is found to be positively and significantly related to growth in SSA conditional on political stability after minimizing endogeneity bias. This result confirms Islam's (2005) finding that aid promotes growth in stable but not in unstable LDCs.

2. Literature Review

There are valid theoretical arguments as to why the effect of aid on growth might be positive, negative, linear, nonlinear or even ambiguous (Easterly, 2006 Hansen and Tarp, 2001). On one hand, "Gap theory" contends that aid promotes growth by augmenting the investment and foreign exchange needed for production and growth (Chenery and Strout, 1966). On the other hand, countries that receive aid might consume it, leading to aid-dependence (Bauer,

1984, 1991and 2000; Mayo, 2009; Rajan, and Subramanian, 2011; Arndt, Jones and Tarp, 2010). Clearly, aid might hurt or promote growth, so the effect of aid on growth remains an empirical question (Rajan and Subramanian, 2008 and Bruckner, 2011). Comprehending the exact relationship between aid and growth is, however, crucial to SSA countries and donors as they seek to realize the UN's MDGs because the MDGs inherently posit that aid is growth-promoting. The stated aim of the MDGs is to halve severe $1/day poverty between 1990 and 2015 using aid as one strategy (Sachs, 2005 and Collier, 2007) so it's vital to ascertain with a reasonable degree of confidence how aid affects growth in SSA.

Entangled in the debate on how aid affects growth are differences in the structure of the economic model, the context under which aid is effective, the econometric procedures employed and the data used. In particular, the effect of aid on growth is likely to be context-specific therefore identifying the salient features of the context received a lot of attention in the literature. Burnside and Dollar (2000) (henceforth BD (2000)) identified good macroeconomic policy as the salient contextual condition for aid to promote growth. They found that the aid-growth relation is positive for countries that maintain sound economic policies but negative for countries with inappropriate policies, basing their result on a positive and significant interaction term involving aid and policy. BD (2000) included a dummy for SSA which proved negative and significant in aid-growth regressions, indicating that the aid-growth effect may be different for SSA. This point is noteworthy as effective policy might be insufficient to guarantee the efficacy of aid in promoting growth in SSA. Not surprisingly, the contention that aid promotes growth given good policy has been successfully challenged in the literature. For example, Easterly, Levine and Roodman (2004) showed that the positive aid effect given good policy disappears when either more time series data or different countries are used in the data set. In contrast, Islam (2005) finds that the aid-growth relationship must be conditioned on political stability, not macroeconomic policy as political stability is the more pertinent determinant of the efficacy of aid in stimulating growth.

Like Islam (2005), our objective is to investigate whether political stability influences the aid-growth relationship. However, we limit our dataset to SSA because this is our region of interest. We employ a unique measure of Political Stability (henceforth, PS) constructed from a dataset of political stability tracked by Political Risk Service (PRS) to investigate the effect of political stability on the aid-growth relationship. We also address two types of

endogeneity also identified by Hansen and Tarp (2001): (i) simultaneity (caused by feedback from growth to aid) and (ii) unobserved effects endogeneity caused by correlation between latent, time-invariant country-specific effects in the error matrix and the matrix of right hand side variables. Both types of endogeneity can cause bias in OLS estimation of aid-growth relationships so their deleterious effects need to be properly mitigated. While the aid-growth literature only now focuses on reducing bias due to unobserved effect endogeneity, it abounds with attempts to control simultaneity bias using IV. There is however limited literature that focuses on evaluating whether the typical instruments for aid used in IV estimation of aid-growth regressions satisfy the exogeneity and strength criteria defined for valid instrumental variables analysis (Deaton, 2008). This research will help close that literature gap. For example, population and rainfall may be endogenous in the growth equation for SSA countries. Therefore, in contrast to the IV treatment of the endogeneity of aid by Islam (2005), Bruckner (2001), Acemoglu (2001) and majority of the aid literature, typical instruments for aid are actually invalid instruments for aid. Colonial legacy (Islam 2005), however, can be argued to be an exogenous instrument since it is not determined by contemporaneous economic performance. However, it's not excludable; that is it belongs to the true model and should enter the growth equation as an explanatory variable and not as an instrument.

3. Empirical Model

The model used in this paper is a modified version of Islam's (2005) empirical aid-growth model which was derived from Solow's (1956) theoretical growth model and is standard in the aid-growth literature. Following Islam (2005), aid is hypothesized to affect growth through its effect on savings and investment. Political stability affects the aid-growth link through its effect on the ability of a nation's citizens to accumulate capital, save, invest and innovate. In particular a stable political environment can lead to effective economic policies and correct investment decisions both of which can spur growth. In a stable political environment aid is then just new capital and should logically contribute to growth (Hansen and Tarp, 2001). The effects of political stability on the aid-growth relationship can thus be captured in the empirical model by the interaction between political stability and aid. The empirical growth model employed is presented in (1)-(3) and used to investigate the relationship between economic growth and foreign aid, as well as the effects of political stability on the aid-growth relationship in SSA.

$$(1)\ GROWTH_{it} = \gamma_0 + \gamma_{AID}\, AID_{it-1} + \gamma_{SAID}\, AID^2_{it-1} + \gamma_{PS}\, PS_{it-1} + \gamma_{AIDPS}\, AIDPS_{it-1} + Z_{it}{}'\gamma_Z + \varepsilon_{it}$$

$$(2)\ \varepsilon_{it} = \varepsilon_i + \nu_{it}$$

$$(3)\ \nu_{it} \sim N(0, \sigma^2)$$

GROWTH is GDP per capita growth, AID, is foreign aid or Overseas Development Assistance (ODA), AID^2 is the square of AID, PS is political stability, PS^2 is the square of political stability, AIDPS is the interactions of PS with AID, and γ_0 is the overall constant. The vector Z includes variables that control for initial conditions affecting growth, and recent literature provides guidance for their selection (Islam, 2005). Z contains variables such as initial level of income (represented by initial GDP or IGDP), standard deviation of aid (STAID), level of education (PRIM), quality of institutions (represented by international country risk guide (ICRG)'s quality of bureaucracy and democratic accountability variables, BQUAL and DACC), government consumption as a portion of GDP (GCONS), and the money supply as proportion of GDP or (M_2). Different from Islam (2005) but consistent with Rajan, and Subramanian (2011), Arndt, Jones and Tarp (2010) and Minoiua and Reddyb (2010), we explicitly specify the unobserved effects which are likely correlated with the explanatory variables in the error term. Thus, ε_{it} is a composite error consisting of a country-specific component, ε_i and an *iid* error term, ν_{it} which has variance σ.[2] We include a set of time dummies, one for each four-year period, to account for potential cyclical effects such as downturns in the world economy that may affect the aid-growth relationship.

The sign of the relationship between aid and growth remains an empirical question and may depend on the countries examined (Easterly, 2003). Political stability is expected to positively promote growth. While quality of institutions, level of education and the money supply variables are expected to be positively related to growth, government consumption and the standard deviation of aid are expected to be negatively correlated with growth. Initial GDP will also likely reduce growth as dictated by conditional convergence (Barro, 1996). Following Easterly, Levine, and Dollar (2004) the square of aid is also included as a regressor in the growth equation to account for other possible types of non-linearity.

4. Data Description and Summary Statistics

The aid data are from *SourceOECD* while the political stability data are from the Political Risk Service (PRS). The growth data and the remainder of the data are from the World Development Indicators (WDI) of the World Bank, the Penn World Tables, and the World Banks' Africa Database CD. The data come from 31 SSA countries for which data were available, range from 1984 to 2007 and cover six four-year periods (i.e. 1984-1987 to 2004-2007). Apart from possible sample selection bias that may emerge since not all SSA countries are included in the dataset, there are also missing observations leading to an unbalanced panel.

It is also plausible that countries with worse institutions (or more likely to be afflicted by war) are less likely to have good quality data so they manifest as missing data in the sample. Such countries are perhaps also more likely to have a zero aid-growth relationship; so their absence would bias OLS results up. Note, however, that the included SSA countries are spread within the SSA region and there is no evidence of a well-defined data generating process by which the SSA countries were picked therefore sample selection bias is unlikely to be severe. With regards to missing data, of the 186 observations, 90 % of the data have complete sets of observations so the missing data problem will have limited consequence in OLS estimation even if more data is lost through lagging or first differencing.

Table 1. Descriptive Statistics of Key Variables.

Variable	Description	Mean (SD)	Min (Max)
Growth in per cap GDP (GROWTH)	Based on real GDP per capita in constant US dollars.[a]	0.400 (4.760)	-14.08 (32.13)
Initial GDP (IGDP) * $ 100 000 000	Real GDP per capita in the last year preceding the period for which the growth rate is calculated.[a]	688.929 (937.94)	56.52 (4599)
Aid (AID)	Net Oversees Development Assistance (ODA) disbursements as a percentage of GDP.[b&c]	0.1914 (0.2520)	0.001 (1.70)
Primary Schooling (PRIM)	Years of primary education.[a]	6.1621 (0.7100)	4.00 (8.00)
Financial Depth (M2)	Money and quasi-money (M2) as a percentage of GDP. [a]	25.0366 (35.04)	-8.10 (368.4)
Life Expectancy (LE	Life expectancy at birth, total (years).[a]	46.2442 (12.491)	10.00 (63. 06)
Political Stabilty (PS)	This is an assessment both of the government's ability to carry out its declared program(s), and its ability to stay in office. [f]	6.8130 (2.4091)	1.70 (10.700)
Government Consumption (GCONS)	Gov consumption expenditure as a % of GDP. [a]	15.3340 (6.454)	5.9 (50.1)
Time Dummies	Each Dummy takes a value of 1 for particular period and 0 otherwise. The six 4-year time periods starts from 1984-1987 and end with 2004-2007. [e]		0.00000 (1.000)
Standard Deviation of Aid	Square root of the variance of Aid	1.52 (0.0002)	0.17 (0.2)
Investment profile (INVPROF)	Assessment of factors affecting risk to investment not covered by other political risk components. Ranges from 0-12. 12 is very low risk and 0 is high risk. [f]	5.7790 (2.0743)	0.500 (10.80)
Democratic Accountability	This is a measure of how responsive government is to its people. The minimum is 0 and represents the highest risk. The maxmum is 6 and represents lowest risk. [f]	2.605 (1.1236)	0.200 (5.60)
Bureaucratic Quality (BQUAL)	This is a measure of the quality of the bureaucracy. Ranges from 0-4 with 4 being the lowest risk.[f]	1.4130 (1.025)	0.000 (4.00)

Sources. [a] World Development Indicators; [b]OECD-DAC's online Source OECD database; [c]World Bank's Africa Database C; [d]Sachs and Warner (1995); [e]Constructed variable; [f]International Country Risk Guide (ICRG) of Political Risk Services (PRS) and [g]Defined in detail in text.

Table 1 on the previous page contains definitions and descriptive statistics of variables based on six four-year observations and provides detailed information about data sources and transformations of key variables used in the growth regression in (1). The conversion of the annual data into four year periods is consistent with the time it takes for aid to manifest into growth (Moreira, 2005; Clemens, Radelet and Bhavnani, 2004). Correlations between the main explanatory variables used in the analysis are presented in Table 2 on the next page. The correlations between the variables are low, typically less than 0.4, indicating that multicollinearity is not severe and should not distort statistical inference. Aid is negatively correlated to political stability and initial GDP, respectively (-0.19) and (-0.24), implying aid is not systematically allocated to politically stable countries.

Table 2. Correlation Matrix of Selected Explanatory Variables.

	IGDP	Aid	POL	PS	PRIM	M2	BQUAL	DACC	LE	GCONS	INVPROF
IGDP	1										
AID	-0.197	1									
POL	-0.064	0.364	1								
PS	-0.009	-0.248	0.082	1							
PRIM	0.032	0.207	-0.028	0.091	1						
M2	0.303	0.129	0.199	-0.107	0.422	1					
BQUAL	0.368	-0.24	0.003	0.004	-0.097	0.1412	1				
DACC	0.116	-0.17	-0.019	0.307	-0.026	-0.191	0.204	1			
LE	-0.055	0.132	-0.087	-0.236	0.214	0.104	0.328	-0.063	1		
GCONS	0.061	0.111	0.228	-0.319	-0.305	0.167	-0.026	-0.086	-0.135	1	
INVPROF	0.052	-0.164	0.178	0.696	0.091	-0.056	0.1042	0.4819	-0.288	-0.208	1

Figure 1 provides a plot of the measure of PS against growth rates. The PS measure is an assessment of the quality of governance, the government's ability to carry out its declared program (s) and its ability to stay in office. The rating is the sum of three subcomponents, each with a maximum score of four points and a minimum score of zero points. The subcomponents of the PS measure are government unity, legislative strength and popular support. For each subcomponent, a score of four points equates to very low risk and a score of zero points to very high risk. As a consequence of how its subcomponents are defined,

a PS score of twelve points equates to very low risk (stable) and zero points to very high risk (unstable).

The PS measure was constructed using data from PRS's International Country Risk Guide (ICRG) dataset which covers 182 countries from 1980-2008 and is widely considered by political science researchers as the most reliable and comprehensive data on political stability available. The PS measure makes sense for the principal argument of this paper since good governance, and a lack of conflict reflected in government unity, legislative strength and popular support contributes to growth by making aid more effective. The sub-components of the PS capture the milder forms of political stability which likely affect the aid-growth relationship even in the absence of catastrophic events such as wars making the PS measure the best one for our purposes. Further, note that although the ICRG data has been widely used in the literature on corruption and governance, (see La Porta, Lopez-de-Silanes and Shleifer, (1997)) its use is not as widespread in the aid and growth literature. The popularity of the ICRG data has, however, increased recently as Knack and Keefer (2001) and Brautigam and Knack (2004) both employed PRS's ICRG data to study the impacts of aid on institutions and governance in SSA while Rajan and Subramanian, 2008, Arnd et al 2010, and Minoiu and Reddy, 2010) employ the measure in aid-growth regressions. These authors reported that the political stability measures provided meaningful and intuitive findings. It is also noteworthy that the PRS data accurately captures changes in historical political stability among countries and over time as will be explained. Further, other more "recent" governance indicators e.g. Mo Ibrahim's index of governance provide rankings of countries which are consistent with the political stability measure used in this study providing some comfort that our measure is accurate. A final attribute of the PRS's ICRG dataset is that it provides the widest range of stability data both in terms of the number of SSA countries available and years covered and uses a well documented and reliable method where country experts rate countries over time and is thus a perfect fit for our purposes.

Figure 1. Growth Vs Political Stability, all SSA Countries, 1984-2007.

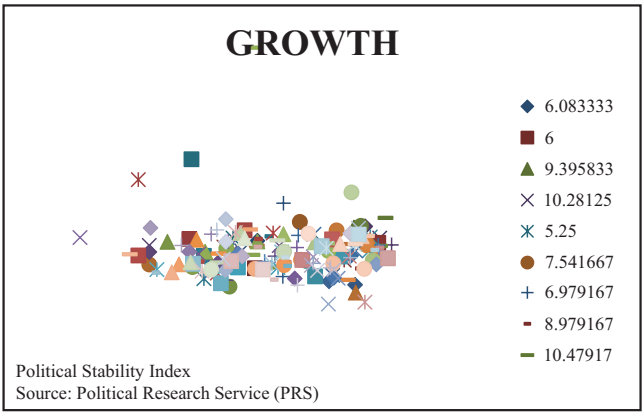


Figure 2. Political Stability for the Most Stable SSA Countries, 1984-2007.

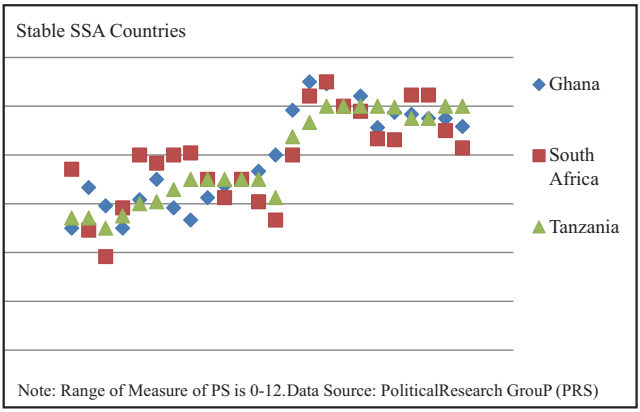


Figure 3. Political Stability for the Least Stable SSA Countries, 1984-2007

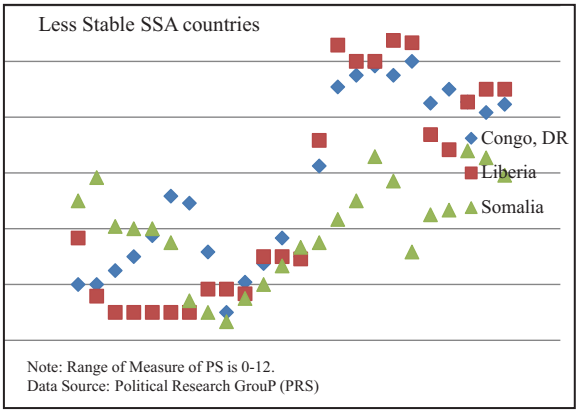


Figure 4. Political Stability for SSA Countries, 2004-2007.

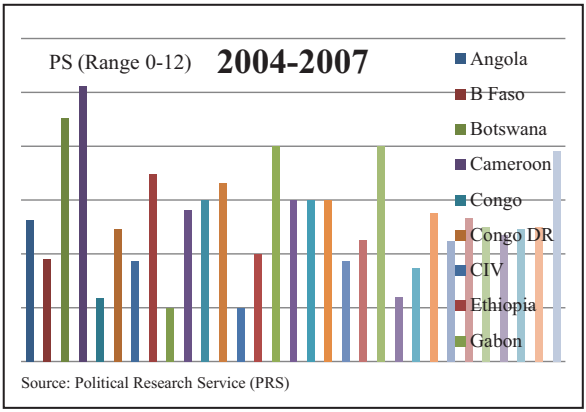
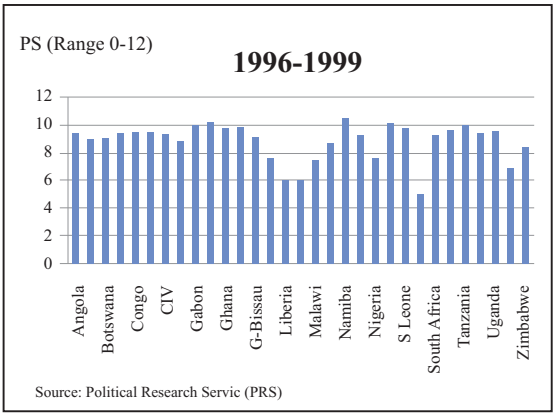


Figure 5. Political Stability for SSA Countries, 1996-1999.



Figures 2-5 shows that the measure of PS is a credible measure of political conditions. For each country, there is variation in the PS measure over time, and for each period, there is variation across countries in the PS measure. Figures 2 and 3 demonstrate that there is variation over time in the measure of PS not only for the most stable SSA countries like Ghana, South Africa and Tanzania, who have average PS values greater then 6.8 (the mean PS), but also for the least stable SSA countries like Congo (DRC), Somalia and Liberia for which average PS is less than 6.8 or the mean PS. For both the least stable and the most stable set of countries (Figure 2 and 3), the bulk of the high PS numbers is concentrated at the end of the data range, while the opposite holds true for the low PS numbers. This indicates a general rise in political stability of the SSA region more recently for the least stable countries and is consistent with observation. Further, the PS index values appear to correspond to perceptions of the political situation for the SSA countries over time. For example, Liberia has higher PS score for 2003-2007 than for 1996-1999, when it was still plagued by conflict and uncertainty. Figures 4 and 5 illustrate that for each year there is heterogeneity in the score of PS for SSA countries. Visual inspection of Figures 4 and 5 reveals that for the countries that are neither the least stable nor the most unstable, political stability has declined from 1999-2007, but only very slightly. The appendix contains the list of the SSA countries used in the research.

5. Methods

The empirical growth model in (1) is applied to thirty-one SSA countries from 1984-2007. Before estimating (1), the annual data were converted to four-year averages, because one-year intervals are too short to capture growth rates (Deaton, 2008).

The possibility that endogeneity bias may arise from different sources (simultaneity or unobserved effects), the small size of our sample, and the lack of valid instruments for the potentially endogenous aid and political stability variables posed peculiar econometric challenges for the estimation of the growth equation. A small sample size typically causes problems in estimation of the aid-growth relation because the traditional IV estimation techniques used to correct for endogeneity bias such as two-stage least square (2SLS) produces inconsistent estimates when the sample size is small (Woolridge, 2002). Further, Durbin-Wu-Hausman tests of endogeneity have low power in finite samples and may not detect endogeneity bias even when it is present. Even when the number of observations is sufficient, which would normally make traditional IV estimates consistent, traditional IV-type regressions are of little use in correcting endogeneity bias specifically in aid-growth regressions (Deaton, 2008). This is because in the context of SSA, none of the "standard" instruments for aid in the literature such as population (see BD, 2000), rainfall, (see Acemoglu, 2001), colonial legacy (see Islam, 2005 and Acemoglu, 2001), and primary exports and rainfall (see Bruckner, 2011) satisfies a major requirement for instrument validity: zero correlation between the instrument and the error term (exogeneity). The aid-literature has paid even less attention to evaluating whether the "standard" set of instruments for aid is sufficiently strong. This may be because most of the significant contributions to the aid literature occurred in the twentieth century while the literature on weak instrument (see Stock and Yogo (2005)) emerged more recently. Further, when instruments are weak, IV estimation is inconsistent (Bound, Jaegger and Baker, 1993). We therefore drop instrumental variable (IV) analysis as a strategy for mitigating simultaneity bias.

Unobserved effects such as cultural norms and historical tensions that affect growth also affect aid, political stability and policy, so that unobserved effects may account for a considerable portion of the total endogeneity bias. These unobserved effects can be removed by first differencing (FD). If such a strategy eliminates endogeneity bias we should notice corrected signs and stronger statistical significance of coefficients and better fit of the FD model relative to

OLS. Further, we lag the endogenous variables so that they are predetermined in the aid equation to reduce the possibility of simultaneity. Given sufficient data, GMM is the optimal estimation method because it treats both unobserved endogeneity and simultaneity endogeneity (Hansen and Tarp, 2001). However, although we did perform such GMM estimations in previous versions of this paper we do not rely on results of the GMM dynamic panel model because it is likely fraught with finite sample bias since our dataset is small. Our current strategy of lagging AID, PS and AIDPS and estimating by FD eliminates all the unobserved endogeneity and is the correct estimation method. Residual simultaneity may persist however despite lagging PS, AID and AIDPS. Fixed-Effects (FE) is not applicable here, because the data is not strictly exogenous.

Islam (2005) and Burnside and Dollar (2000) treat simultaneity with IV and find no significant simultaneity bias since estimates of aid are the same as OLS in magnitude but Aguir (2011) using rainfall and primary exports as instruments for aid concludes that simultaneity biases his estimates upwards in IV estimation. In comparison, Hansen and Tarp (2001) and Dalgard and Hansen (2003) both use GMM and find contrasting results. While the former notes differences between GMM and OLS estimates, the latter does not find any differences so the controversy about the effect of endogeneity (direction and size) persists.

6. Discussion of Results

The empirical strategy was executed to (i) identify and quantify the effect of foreign aid on growth in SSA (ii) to determine if political stability influences the aid-growth relationship, and (iii) to address any endogeneity problems that emerge. The main results of estimation of the growth equation (1) are presented in Table (3) on the next page. Columns 1 and 2 of Table 3 display results of estimation of equation (1) respectively by OLS, and FD. In contrast, columns 3 and 4 of Table 3 contain the same regressions in columns 1 and 2 but with the PS dropped to evaluate how important the influence of political stability is to the aid -growth relationship. Finally note that $AID_{t-1,}$ PS_{t-1} and $AIDPS_{t-1}$ are lagged in the FD estimations (columns 2 and 4) but not in the OLS regressions (columns 1 and 3). This means for the FD estimations (but not the OLS regressions), $AID_{t-1,}$ PS_{t-1} and $AIDPS_{t-1}$ are pre-determined in the growth regression so there is little simultaneity bias. OLS estimation is performed with both lagged and contemporaneous aid, political stability and their interactions (AID_t, PS_t and $AIDPS_t$) but results of only the contemporaneous variables are reported (as there is little difference between the two) to facilitate comparison of our OLS results

with estimated coefficients of the aid-growth relationship in the literature. All regressions in Table 3 are corrected for serial correlation and heteroskedasticity using FGLS.

Table 3. Growth Regression Results.

	(1)	(2)	(3)	(4)
	OLS	FD	OLS	FD
IGDP	-0.0001	-0.003	0.009	-0.001
	(-1.15)	(2.04)*	(-0.39)	(0.97)
AID	12.05	8.066	0.232	5.775
	(2.19)*	(2.62)*	(0.15)	(1.95)
PS	1.084	1.593		
	(4.12)***	(4.94)***		
PRIM	0.098	0.744	0.043	1.299
	(0.22)	(0.25)	(0.09)	(0.45)
M_2	0.049	0.106	0.049	0.108
	(1.64)	(2.51)*	(1.39)	(1.92)
BQUAL	0.727	1.303	0.583	0.99
	(1.61)	(1.98)	(1.37)	(1.41)
DACC	0.253	1.535	0.363	1.102
	(0.77)	(2.13)	(1.1)	(1.51)
GCONS	-0.007	-0.095	-0.004	-0.198
	(-0.18)	(-0.84)	(-0.1)	(1.44)
LE	0.013	0.184	0.024	0.157
	(0.46)	(2.00)*	(0.76)	(1.69)
INVPROF	0.078	0.946	0.483	0.025
	(0.3)	(1.5)	(2.56)*	(0.06)

	(1)	(2)	(3)	(4)
	OLS	FD	OLS	FD
IGDP	-0.0001	-0.003	0.009	-0.001
	(-1.15)	(2.04)*	(-0.39)	(0.97)
AID	8.454	8.066	0.232	5.775
	(2.19)*	(2.62)*	(0.15)	(1.95)
PS	1.084	1.593		
	(4.12)***	(4.94)***		
PRIM	0.098	0.744	0.043	1.299

Note. Each regression included a set of time dummies. Errors are corrected for serial

correlation and heteroskedasticity. The AID, PS and AIDPS variables are all lagged one period in the FD estimations. Three outliers identified in the text, were deleted in each regression. Student t-statistics in parentheses.
* Significant at 10%; ** significant at 5% ***; significant at 1%***

The FD estimations appear to fit the data better than the OLS because their coherence measures such as t-values of individual coefficients are higher than the OLS values irrespective of whether political stability is in the equation or not. The major result of the research as presented in the different Columns of Table 3 is that aid and political stability both positively impact growth in SSA. This is because from Columns 1 and 2 of Table 3, aid, political stability and their interactions are positively related to growth at five percent significance level, respectively, by OLS and FD although the magnitude of the aid coefficient in the FD equation is smaller than in the OLS equation. Most importantly, since AIDPS, the interaction of aid and political stability is also significant, we conclude that conditional on stability aid promotes growth.

The reduction in magnitude of the coefficients on aid for the FD estimate may be explained by the difference in the level of endogeneity treatment that OLS and FD respectively provide. Omitted variable bias, which cannot be reduced by OLS, went down with FD, indicating that unobserved country-specific effects constitute the majority of any possible omitted variable bias. Any remaining bias has to be time-varying as FD removes all time-invariant sources of bias. In the current paper, although I am able to remove the time-invariant unobserved effects by FD, endogeneity bias, albeit very limited, may still exist due to simultaneity despite lagging AID, AIDPS and PS. I seriously evaluated the possibility of endogeneity arising from simultaneity in earlier versions of the paper. In particular, I estimated the aid-growth equations by IV after re-specifying the model as a system of 4-simultaneous equations. Although first stage regression F-statistics and the Stock and Yogo (2005) test suggested the instruments were not very strong, I got very similar results in terms of the signs and magnitudes of the coefficients on (AID_{t-1}, PS_{t-1} and $AIDPS_{t-1}$) to the OLS so simultaneity does not appear to be an issue but unobserved effect endogeneity is an issue. Given sufficient number of observations, a dynamic system GMM will be the best estimator to treat simultaneity concurrently with unobserved effect endogeneity if in fact both simultaneity and unobserved effects endogeneity were really both issues. Contrary to my fears simultaneity is not the issue here so FD suffices. We did perform the system GMM but the results in terms of the magnitude and signs of AID, PS and AIDPS are similar to FD.

For completeness, note that there may still be a simultaneity problem if there are unobserved time-varying country-specific characteristics that influence aid and growth. To account for this issue, in earlier versions of the paper, I used the "random growth" specification (Papke, 1994) that allows for endogeneity to be based on country-specific growth rates. I interacted a trend variable with the country dummies in a LSDV specification to accomplish this. This did not change the OLS results much so it seems that the bias is mainly based on time-invariant variables. Finally, given that the sample size is small which compromised the strength of the instruments for aid in GMM and IV these estimation strategies offer no improvement over FD.

In comparison to results in columns 1 and 2, aid and political stability are insignificant in Columns 3 and 4 where political stability is omitted indicating political stability is an important pre-condition for aid. The majority of the coefficients of the other variables in our model have the expected sign in both OLS and FD estimations, where PS is included, although not many have statistically significant coefficients

To determine the economic relevance of the aid-growth relationship in SSA, we compute the marginal effects (MEs) of growth with respect to aid. The MEs were calculated for the OLS and FD estimations in columns 1 and 2 of Table 3. We obtained a value of 0.12 for the ME of growth with respect to aid using OLS where aid is not lagged so that a one percent increase in aid will lead to a 0.12 percent increase in growth. In other words since AID is scaled by GDP, a $1 increase in aid will lead to a $0.12 increase in GDP. Further, we obtain a value of 0.084 for the same ME using FD where aid is lagged after taking the significant AIDPS in the FD regression into account. In comparison Islam (2005) finds using OLS (and data from all LDCs not just SSA) that a unit increase in aid as a fraction of GDP, increases growth by 0.12 percent for LDCs which agrees with our results.

Decomposition of the Effect of Political Stability on the Aid-Growth Regression: Marginal Effects and Elasticities at different points (0-12) of PS.

To further decompose the effect of PS on the aid-growth relationship, we compute the aid-growth effect at different values of PS. From Figure 6, the marginal effect (ME) of aid on growth computed at the median of growth and aid is positive and rises very gradually at low levels of PS. Keeping in mind that the PS scale is from 0-12 with 12 being most stable, it can be seen that at very high

levels of PS (higher than the mean and median of PS), ME rises precipitously. In fact, AID, AIDPS and PS are all weakly significant below a PS value of 6 at 5% significance level. At PS values greater than 6 (the median of PS), these variables are strongly significant at 5% significance level.

Figure 6. Partial Effects at Different Levels of Political Stability

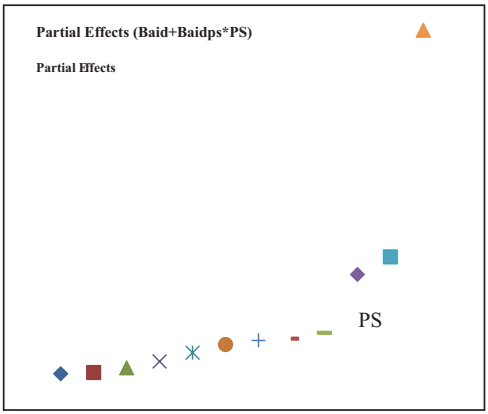


Figure 7. Elasticity at Different Levels of Political Stability

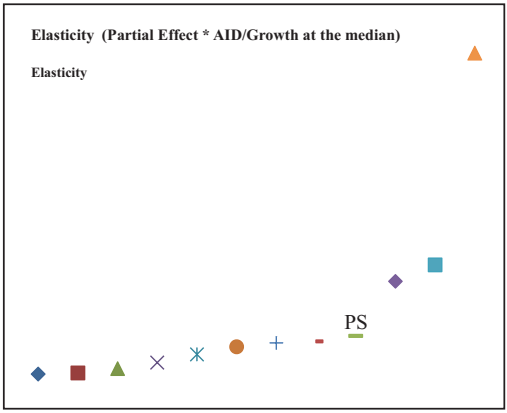


Figure 7, which plots the elasticity of growth with respect to aid against PS, substantiates the point made in figure 6 because it shows that growth is inelastic at low levels of PS but elastic at very high levels of PS. Beyond the relatively high PS value of 10, a one percent increase in aid leads to a greater than one

percent increase in growth. However, the majority of poor SSA countries have PS values lower than 10 which might explain of why the effect of aid on growth is sometimes difficult to discern in SSA.

7. Conclusion

The research objective was to determine the sign and economic relevance of the relationship between aid and growth in SSA and further to investigate the consequence of political stability and economic policies on the aid-growth relationship. The evidence suggests that aid and growth are positively related at the five percent significance level, that political stability has a strong influence on the aid-growth relationship in SSA and that the aid-growth relationship suffers from endogeneity bias caused by unobserved effects. Our results help to clarify why so much aid has done so little good in SSA. Aid is currently given independent of country stability. Based on our findings, aid is more effective at higher levels of stability so reaching the millennium development goals is more likely when aid is provided to stable SSA countries. Aid can prevent starvation in poor unstable SSA countries, but cannot be expected to spur growth there. A policy recommendation of this paper is that the pursuit of political stability and good governance in SSA is not only a worthy objective in itself, but also because stability promotes growth and augments the growth-promoting power of aid. To make the principal results of this research that political stability makes aid more efficient at promoting growth-more meaningful, the determinants of political stability specifically in SSA are good candidates for further research. In particular it will be interesting to investigate how big a role a free press plays in the attainment of political stability. Preliminary evidence (Armah and Amoah, 2010) seem to suggest that in SSA, political stability is fragile in one direction and stable and restrictive in the other direction when the press is restrained. However little empirical evidence is available in the literature to refute or back this claim so more careful research into the problem is needed. Further research is also needed to find out if growth is linked with media freedom in SSA.

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