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ARTICLES IN THIS ISSUE

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Festschrift for Raul V. Fabella

This special edition of the *Philippine Review of Economics* honors Dr. Raul V. Fabella in his 70th year and recognizes his invaluable contribution to the economics discipline and profession. This edition comprises 13 articles from his colleagues and several generations of former students inspired or mentored by Dr. Fabella who are themselves making their mark in economics. The broad spectrum of topics covered—agricultural economics, competition policy, contract theory, game theory, history of economic thought, international economics, issues in productivity, growth and development, monetary policy, political economy and rent-seeking, public economics, and the theory of teams—are issues that Dr. Fabella himself has written on or taught his students during his long, productive years as a Professor of Economics at the UP School of Economics, nurturing an "oasis of excellence" in his spheres of influence, as well as advocated as a roving academic in his later years, endeavoring to engage policymakers and the public in general, in pursuit of welfare-improving changes for a better Philippines.

The wide gamut of topics in this issue is a testament to Dr. Fabella's eclectic intellectual interests yet unwavering devotion to upholding a high standard of academic excellence. As his biographical sketch at the National Academy of Science and Technology summarizes:

> Fabella's very development as a scholar and intellectual leader presents numerous paradoxes: a classicist turned mathematical economist; a rational-choice theorist who derives material and metaphor from both history and physics; a solitary thinker who agonizes over pedagogy; a pure theorist immersed in policy-debate; an inherently shy, private man who must deal with crowds. His career displays to the fullest the range of issues – from the mathematical to the moral – that economists can and must confront if they are to attain to that "cool head and warm heart" that was Marshall's ideal. A classicist, however, might simply recall Terentius: *Homo sum: humani nil a me alienum puto*.

Indeed, to Dr. Fabella, nothing related to human behavior is outside his interest. At 70 years of age, National Scientist of the National Academy of Science and Technology (Philippines) and Professor Emeritus at the University of the Philippines, he is yet to reach the zenith of his intellectual verve: Fabella the economist is transfiguring into Fabella the social scientist – one to whom *homo economicus* is no longer the norm, but the exception in the vast complexity of human interactions in society. It is thus unlikely that this will be the last festschrift in his honor.

Sarah Lynne S. Daway-Ducanes
Emmanuel S. de Dios

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Revisiting the aid-growth nexus in light of the Sachs-Easterly debate

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In light of the renewed interest on the aid-growth connection spurred by the recent Sachs-Easterly debates, this note revisits the aid-growth nexus, hypothesizing that aid impacts on growth nonlinearly and that its particular effect conditions on the quality of policies and governance. Using the dynamic panel estimation method, Two-step system generalized method of moments, on more recent data involving an unbalanced panel of 106 countries for the period 1989-2013, we verify some key findings in the aid-growth literature. In particular, aid's effect on growth is subject to diminishing returns, indicating that there are absorptive capacity constraints that may hinder the effectiveness of aid. However, these absorptive capacity constraints may be relaxed in environments of good governance and policy, enabling aid to have a positive impact on growth.

JEL classification: C14, C23, F35, O11, O19
Keywords: aid, policy, governance, diminishing returns to aid, growth

1. Introduction

The recent series of fierce debates between Jeffrey Sachs and William Easterly is stirring renewed interest in the aid-growth nexus.[1] Riding on the documented successes of his "Millennium Villages" in Sub-Saharan Africa, Sachs ([2005],[2014]) advocates "quality aid" as a "tool for development" to fill in the "financing gap" and fund the appropriate technological "fixes" with which funding-scarce economies can escape the poverty trap. On the other side of the debate, Easterly ([2005], [2006], [2013]) is quite sceptical of the existence of a poverty trap and of employing aid as a panacea for the woes of the developing world, citing instances where aid failed to promote growth and poverty alleviation due to improper implementation and the creation of perverse incentives.

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[1] The debate has reached more publicly accessible media such as *The Washington Post*, *Los Angeles Times Foreign Aid Faceoff*, *Reason*, *Foreign Policy* and Twitter.

Underlying this polarized public debate is an equally polarized body of empirical evidence. Indeed, the aid-growth nexus has been both widely contested and widely confirmed. From "aid down the rat hole" [Boone 1994] to "aid effectiveness conditional on good policy" [Burnside and Dollar 1997], to "aid effectiveness subject to diminishing returns" [Hansen and Tarp 2001], to the plethora of auxiliary macro and micro econometric studies[2] that sprang up in the late 1990s to the early 2000s to the Sachs-Easterly debates of late, little has yet been settled. Empirical papers have inconsistent results due to the varying regression methods used to arrive at causality, as well as due to using wider and longer cross-country panel datasets (an advantage of more recent studies). Papers such as Arndt et al. [2015a], Galiani [2016], and Temple and Van de Sijpe [2017] explicitly show how varying empirical methods and datasets can arrive at inconsistent conclusions on the effect of aid on growth.

A proper empirical strategy is key to what usually hinders the causal measure with "naïve" regression methods. There are issues that need to be addressed, such as the commonly known unobserved time-varying factors affecting both aid and growth, the simultaneity effect of aid and growth, and selection bias given, for example, how more multilateral aid donors choose to grant aid to countries with better established measures of rule of law in recent years [Dollar 2006]. It is in this context that this paper joins the fray in revisiting the aid-growth macro-nexus by employing the two-step system generalized method of moments on 106 countries for the period 1989-2013. We find that aid's positive impact on growth is subject to diminishing returns, indicating the existence of absorptive capacity constraints that may hinder aid's effectiveness in spurring long-run growth. However, these constraints may not be binding in environments with good policies and governance. Indeed, for our particular sample of countries, we find that aid has a positive and significant total marginal effect on growth beginning from the 75th percentile values of the policy and governance measures.

These results are in line with Sachs [2014], who asserts that "[aid] works best in conjunction with sound economic policies, transparency, good governance, and the effective deployment of new technologies". It is only in low-quality policy environments that Easterly's "curse of aid" sets in: aid flows that exceed a certain threshold become even inimical to growth, in line with the diminishing returns hypothesis. These results are also consistent with the narratives found in the literature: high aid flows in "bad" policy environments can generate conflicts of interest and policies that harm growth (e.g., Yiew and Lau [2018]). Moreover,

[2] As early as 1987, Mosley et al. coined the term, "macro-micro paradox" in reference to the inharmonious findings regarding aid effectiveness at the macro and micro levels. The puzzle is that while there are countless success stories involving specific aid-financed programs, aid does not seem to make a dent on macroeconomic growth. The case of Malawi can be an example, with micro research showing that aid has increased the income of households, although analysis on the macro level does not show the same positive effect [Dreher and Lohmann 2015].

high aid flows in these policy environments are also found to create a culture of aid dependence: aid as a means of alleviating poverty becomes a substitute for genuine reforms that could have generated long-run growth and development.

It is in light of these results that perhaps the Sachs-Easterly dispute can find a happy medium. The message is not for aid to altogether cease from flowing into "bad" policy environments. Rather, perhaps, aid should first target policy and institutional reforms, so that aid targeted towards growth-enhancing activities can work unimpeded.

The rest of the paper is organized as follows: Section 2 revisits the cross-country literature on the aid-growth linkage. Section 3 discusses the methodology and data. Section 4 presents the results. Finally, Section 5 concludes.

2. Revisiting the cross-country aid-growth literature

The late 1990s to the early 2000s witnessed an upsurge in the volume of literature regarding aid effectiveness. The bulk of the analyses examined the impact of foreign aid on economic growth in the context of cross-country analyses. In accordance with the results obtained, four non-overlapping strands in the empirical literature of aid have emerged. The first strand asserts that aid per se does not influence growth but that it does promote growth conditional on a good policy environment. The second strand finds no positive effect of aid on growth. The third strand challenges the results of the first and second strands and makes a case for the unqualified effectiveness of aid on growth, albeit subject to diminishing returns. Lastly, the fourth strand discusses the effectiveness of aid in countries with good governance. We discuss each of these strands in turn.

2.1. The first strand: aid effectiveness conditional on good policy

The first strand begins with the controversial papers of Burnside and Dollar ([1997], [2000]), which report that aid alone, is not a significant factor in promoting growth. But when aid (defined as Effective Development Assistance (EDA), which is the grant component of Official Development Assistance (ODA) is interacted with a composite index of three macroeconomic variables (inflation, budget deficit, and trade openness), it unveils a positive and significant coefficient, implying that aid raises growth provisional on the existence of good macroeconomic policies in the recipient country.

Collier and Dollar [2002], Collier and Dehn [2001], Burnside and Dollar [2004], and Cordella and Dell'Ariccia [2003],[3] to name a few, confirm the positive significance of the coefficient of this aid-policy interaction term. Collier and Dehn [2001] incorporate terms-of-trade shocks into the Burnside-Dollar (BD,

[3] Cordella and Dell'Ariccia [2003] use the dataset of BD but use ICRG for policy and decompose aid flows into those that go into support of government budget or into specific projects.

hereafter) specification and find that the aid-policy term is significant even when the outliers previously excluded were reintroduced into the sample. Burnside and Dollar [2004] confirm the aid-policy-growth nexus using new data for the 1990s, adopting the policy index developed by Kaufmann, Kraay and Zoido-Lobaton [1999]. This policy index compiles, by standardizing and averaging, all the institutional variables available in the late 1990s. The patent corollary was that to be most effective, aid should be directed "selectively" to economies with good policies. This stems from the claim that policy is exogenous to aid, and thus, good policies should remain steadfast amidst the surge of aid flows.

2.2. The second strand: "aid down the rat hole"

The second strand is mainly spun from the studies of Boone ([1994], [1996]). According to Boone [1994], "aid is down the rat hole", as he finds that aid does not raise investment but is instead siphoned off into consumption expenditures. Boone [1996] finds that 75 percent of total aid receipts finances public consumption, while the remaining 25 percent is transferred towards the private consumption of an elite group. Many studies quote and interpret Boone's findings mainly in the light of Barro-type models, which uphold investment as the main determinant of growth: failure to increase investment implies failure to increase growth.

On the negative end of the spectrum of aid effectiveness fall the works of Guillamont and Chauvet [2001] and Djankov, Montalvo, and Reynal-Querol [2006]. The former estimates a significantly negative coefficient for the interaction term between aid and policy when an interaction term for aid and vulnerability is included. Likewise, the latter reports that Official Development Assistance (ODA) is both directly and indirectly detrimental to growth and that the harmful effect of grants on growth is more acute. Aid's indirect depressing effect on growth works through its increasing effect on government consumption while reducing total investment as a share of GDP. Djankov et al. [2006] refer to this detrimental effect of aid on growth as the "curse of aid".

With reference to the first strand, Easterly, Levine and Roodman [2004] show that the significance of the aid-policy interaction term is not robust to alternative specifications including the BD specification, using the Centre for Global Development dataset that spans the period 1970-1997. Similarly, Rajan and Subramanian [2008] find no robust evidence for either a positive or negative, conditional or unconditional relationship between aid and growth, after correcting for the bias that both weaker and stronger growth rates can attract aid inflows. However, papers that followed Rajan and Subramanian, employing varying empirical strategies and longer period panel datasets, mostly show a positive effect of aid on growth (Arndt et al.[2010]; Minoiu and Reddy [2010]; Clemens et al. [2012]; Bruckner [2011]; Arndt [2015b]) with exception to Nowak-Lehmann et al. [2012] showing an insignificant to minute negative effect. These papers somehow add to the confusion of how aid relates to growth but may also serve as a direction to finally arrive at a consensus with "newer" regression methods and richer datasets.

2.3. The third strand: aid subject to diminishing returns

A third wave of studies finds evidence for the unconditional effect of aid on growth, although this effectiveness is subject to diminishing returns. These studies report a significantly positive coefficient of aid, with a significantly negative coefficient for the aid-squared term. This diminishing effect of aid on growth is largely explained as a consequence of the fungibility of aid, limited absorptive capacities and the vulnerability to "Dutch Disease" of developing countries (Feyzioglu et al. [1998]; Rajan and Subramanian [2005]; Riddell [2007]). In particular, Lensink and White [2001] find that the diminishing returns to aid set in at high levels of aid inflows.

Other representative works are of those by Muhleisen et al. [1995], Durbarry et al. [1998] and Hansen and Tarp [2000, 2001], and Lensink and White [2001]. Hansen and Tarp [2000], in particular, attribute the significance of BD's aid-policy term to a possible misspecification problem, as the aid-policy term and the aid-squared term can be proxies for each other.

Moreover, Alvi, Mukherjee and Shukrallah [2008] find empirical evidence for the effectiveness of aid in spurring growth within an "economically relevant" policy range and that this efficacy is subject to diminishing returns. They explored the nonlinearities in the aid-policy-growth relationship using a semiparametric approach. While their results show that aid only positively affects growth above a certain threshold level of policy, the significance of aid and policy in the growth equation cannot be determined within their semiparametric framework.

2.4. The fourth strand: aid effectiveness mediated by good governance

There are also discussions that good governance due to sound institutions is a prerequisite for aid to effectively increase growth. This was one insight in the Dollar and Pritchett [1998] report, which was followed by other papers such as those of Lessmann and Markwardt [2012] and Herzer and Morrisey [2013]. In particular, Herzer and Morrissey [2013] find that cross-country differences in the estimated long-run aid effects on output are mainly due to cross-country differences in law and order, religious tensions, and government size. Dollar and Levin [2006] also show cases where certain countries with sound institutions lead make better use of aid. The policy implication is in line with Svensson [2000] and Tavares [2003], who argue for a level of selectivity by granting aid to less corrupt countries.

It is, however, important to note that aid may also make better governance, given the results of Tavares [2003] that aid decreases corruption, and Alesina and Weder [2002] that organizations tend to select countries with less corruption as recipients of aid. As in the aid-policy-growth nexus, such selectivity may incentivize countries to improve and enhance institutions and policies that are coincidentally growth-enhancing in order to qualify for aid. Thus, endogeneity issues must also be accounted for in the regression strategy.

3. Methodology and data

In line with the literature, we test four hypotheses involving the aid-growth nexus:

- Hypothesis 1: Aid per se has no significant effect on growth.
- Hypothesis 2: Aid, conditional on good policy, has a positive effect on growth.
- Hypothesis 3: Aid's effect on growth is subject to diminishing returns.
- Hypothesis 4: Aid's effect on growth is mediated by good governance.

To test these hypotheses and to better address endogeneity issues, we use a dynamic panel data estimation method known as the two-step system generalized method of moments (two-step system-GMM) to estimate the following model (see Roodman [2009]) for a discussion of the advantages of this method in dealing with cross-country panel data):

$$y_{it} = \alpha y_{it-1} + \beta_1 Aid_{it} + \beta_2 Aid_{it} * Policy_{it} + \beta_3 Aid_{it}^2 + \beta_4 Aid_{it} * Governance_{it} + \gamma X_{it} + \delta Z_{it} + \varepsilon_{it}, \quad (1)$$

where y_{it} is real GDP per capita growth of country i in period t; Aid_{it} is defined as net official development assistance as a percentage of GDP of country i in period t; $Policy_{it}$ is the policy index of country i in period t – to be discussed in further detail below; $Governance_{it}$ is the institutional quality index of country i in period t – also to be discussed in further detail below; X_{it} is a vector of controls for country i in period t – also to be discussed in further detail below; Z_{it} is a vector of exogenous determinants; and ε_{it} is the error term, which contains the unobserved fixed-country effect.

The vector of control variables, X_{it}, includes the following:

- The policy index, $Policy_{it}$ is constructed using principal components analysis (PCA) on the budget balance, inflation and the de facto trade openness index (sum of volume of exports and volume of imports as a percentage of GDP). We use these three variables in accordance with Burnside and Dollar (2000). See the Appendix for further details on the implementation of PCA.
- The institutional quality index, $Governance_{it}$, is constructed using PCA on the World Governance Indicators, consisting of measures for government effectiveness, political stability and absence of violence, regulatory quality, rule of law and voice and accountability. See the Appendix for further details on the implementation of PCA.
- Part of X_{it} is Fixed capital formation (as % GDP), which is asserted as the main driver of growth in neoclassical growth theories (as early as Solow [1956] and Swan [1956]).
- Another component of X_{it} is Foreign Direct Investment (FDI) defined as the percentage share in GDP of the net inflows of FDI. FDI inflows present an additional source of funding for domestic capital accumulation and is also identified as a channel through which more recent technology and best practices may be transferred to the recipient economy (see De Mello [1999], Li and Liu [2005]).

- Another control variable, the Financial Development Index is lifted from the International Monetary Fund's (IMF's) Financial Development indicators. The index is constructed using financial institutions and financial markets sub-indices, which are, in turn, constructed using measures for financial depth, access, and efficiency (see Svirydzenka [2016] for further details). The literature is mixed regarding the effect of financial development on growth. (see Beck, Levine and Loayza [2000], Calderon and Liu [2003], Daway-Ducanes and Gochoco-Bautista [2019], De Gregorio and Guidotti [1995], Hansen et al. [2011], among others).
- A final country control variable is Ethnic Fractionalization and Terrorism Attacks, which is included in accordance with Burnside and Dollar [2002]. These serve as proxies for lack of peace and order, which Adam Smith contends are essential to growth. Ethnic Fractionalization is defined in terms of the probability that an individual belongs to different ethnic groups. Terrorism Attacks is included as a proxy for political assassinations, which is included in Burnside and Dollar, but for which more recent data are not available.

The vector of exogenous determinants, Z_{it}, includes the following:

- Tropical Area is the percentage share of country i's land area that is in the tropical zone. Tropical Area is expected to have a negative coefficient in line with Sachs [2001], who observes that countries closer to the tropical zone tend to grow slower than countries farther from the zone primarily due to the prevalence of disease and other ecological barriers in the former that inhibit growth.
- Region dummies are in accordance with World Bank definitions for East Asia and the Pacific (EAP), Central Asia (CA), Latin America and the Caribbean (LAC), Middle East and North Africa (MENA), South Africa (SA) and Sub-Saharan Africa (SSA).
- Period dummies are included to account for the effects of macroeconomic fluctuations on trend. Each period is an average of five years, as is usual in growth literature, to mitigate the effects of short-run business cycles on the estimates.

To test Hypothesis 1, we set $\beta_2 = \beta_3 = \beta_4 = 0$. To test Hypothesis 2, we set $\beta_3 = \beta_4 = 0$. To test Hypothesis 3, we set $\beta_2 = \beta_4 = 0$. To test Hypothesis 4, we set $\beta_2 = \beta_3 = 0$. Finally, to compute the average and marginal effects of aid on real GDP per capita growth, we run the full model (i.e., Equation (1)).

3.1. Summary statistics

Table 1 below shows the summary statistics of the sample used in the estimations. There are 293 observations from 106 countries for the period 1989-2013 (see the Appendix for the list of countries and the corresponding number of observations). While the rest of the other variables have observations for the period 2014-2018, Ethnic fractionalization only has observations until 2013, thereby restricting the sample size.

Aid (% GDP), which has a mean of 4.35 percent and a median of 1.40 percent, ranges from -0.11 percent (a net donor country) to 51.07 percent. *Policy*, which has a mean of -0.08 and a median of -0.25, ranges from -1.58 to 4.66. *Governance*, which has a mean of -0.24 and a median of -0.14, ranges from -2.22 to 2.20. It is only from the 75th percentile that both *Policy* and *Governance* start having positive values.

TABLE 1. Summary statistics

Determinant	Obs.	Mean	Std. dev.	Min.	Max
Real GDP per capita growth	293	2.93	3.37	-9.28	28.50
Aid (% GDP)	293	4.35	6.22	-0.11	51.07
Policy	293	-0.08	0.77	-1.58	4.66
Governance	293	-0.24	0.70	-2.22	2.20
Fixed capital formation (% GDP)	293	22.54	7.01	3.87	57.71
FDI (% GDP)	293	3.93	5.50	-3.98	69.52
Financial development	293	0.24	0.15	0.00	0.80
Ethnic fractionalization	293	0.48	0.26	0.01	0.89
Terrorist attacks	293	22.34	84.53	1.00	1252.00
Ethnic frac.*Terrorist attacks	293	13.13	60.90	0.02	928.98
Tropical area	293	0.51	0.47	0.00	1.00
Region dummies					
EAP	293	0.02	0.15	0.00	1.00
CA	293	0.06	0.25	0.00	1.00
LAC	293	0.19	0.39	0.00	1.00
MENA	293	0.13	0.33	0.00	1.00
SA	293	0.06	0.24	0.00	1.00
SSA	293	0.27	0.45	0.00	1.00
Period dummies					
1994-1998	293	0.26	0.44	0.00	1.00
1999-2003	293	0.25	0.43	0.00	1.00
2004-2008	293	0.26	0.44	0.00	1.00
2009-2013	293	0.24	0.43	0.00	1.00

4. Results

Columns 1 to 6 in Table 2 present the results from the two-step system-GMM estimation. Column 1 estimates the model to test for Hypothesis 1 (where $\beta_2 = \beta_3 = \beta_4 = 0$ in Equation (1)), while column 2 shows the results for the model to, testing Hypothesis 2 (where $\beta_3 = \beta_4 = 0$). Column 3 shows estimates for Hypothesis 3 (where $\beta_2 = \beta_4 = 0$), and Column 5 is an additional regression estimation which includes the interaction term between *Aid* and *Governance* variables ($\beta_2 = \beta_3 = 0$). Column 6 gives the estimation for the full model specified in Equation (1).

Column 1 shows that *Aid* has a negative coefficient, but this is not significant even at the 10 percent level. This implies that aid per se does not have a significant effect on growth in line with Rajan and Subramanian [2008]. Including the *Aid*Policy* interaction term, Column 2 shows that aid has a negative and significant effect on growth (at the 1 percent level of significance), but that a better a policy environment mitigates this negative effect in accordance with Burnside and Dollar [2002]. The *Aid*Policy* interaction term is positive and significant (at the 1 percent level of significance). Including instead the *Aid*-squared term, Column 3 shows that aid has a negative and significant effect (at the 5 percent level of significance), but the coefficient of the *Aid*-squared term is not significant. However, including *Aid*, *Aid*Policy* along with the *Aid*-squared term (Column 4), we find that aid's positive effect is conditional on a conducive (or positive) policy environment (significant at the 1 percent level of significance). Moreover, aid has a diminishing effect on growth, as evidenced by the now negative and significant (at the 1 percent level of significance) *Aid*-squared coefficient. Column 5, which instead has the *Aid*Governance* interaction term, shows that aid's effect on growth is mediated by better governance quality, since the *Aid*Governance* coefficient is positive and significant (at the 10 percent level of significance).

Running the full model (Column 6), the coefficients of *Aid*, *Aid*Policy*, *Aid*-squared, and *Aid*Governance* are all significant (at least at the 10 percent level of significance) and have the expected signs. Table 3 presents the total marginal effects of aid on growth evaluated at different percentiles of aid, policy and governance. Row (1) in Table 3 shows the total marginal effects of aid on growth when *Aid* and *Governance* are set at their respective median levels and *Policy* is allowed to vary from its 1st to 99th percentile values. The critical value of *Policy* is -0.81 (when *Aid* and *Governance* are evaluated at their respective median levels), indicating that *Policy* should exceed this critical value in order for aid to have a positive total marginal effect on growth. Indeed, the total marginal effect of aid on growth only becomes positive at the 25th percentile *Policy* value, which exceeds the critical *Policy* value. However, it is only beginning at the 75th percentile value of *Policy* that the positive total marginal effect of aid on growth becomes significant (at least at the 5 percent level of significance).

Row (2) in Table 3 shows the total marginal effects of aid on growth evaluated at different percentile values of *Aid* (% GDP) and at the median levels of *Policy* and *Governance*. The critical value of *Aid* is 11.18 percent of GDP, indicating that *Aid* (% GDP) has to exceed this value for diminishing returns to aid to start setting in. This starts occurring at the 90th percentile of *Aid*. However, it is only at the 99th percentile of *Aid* that aid has a negative and significant effect (at the 5 percent level) on growth, implying that at such high aid flows and median levels of *Policy* and *Governance*, absorptive capacity is not sufficient for aid to have a positive impact on growth.

Row (3) in Table 3 shows the total marginal effects of aid on growth evaluated at different percentile values of *Governance* and at the respective median levels of *Aid* and *Policy*. The total marginal effect of aid on growth is negative and significant (at the 1 percent level) up to the 10th percentile value of *Governance*, but becomes positive and significant (at the 1 percent level) from the 75th percentile up.

Row (4) in Table 3 presents the total marginal effects of aid on growth with *Aid*, *Policy* and *Governance* evaluated at the same (respective) percentile values from 1 percent to 99 percent. As in Row (3), the total marginal effects of aid on growth are negative and significant (at the 1 percent level of significance) when evaluated up to the respective 10th percentile values of *Aid*, *Policy* and *Governance*, but become positive and significant (at the 1 percent level of significance) beginning from the 75th percentile onwards. These results suggest that, at least for this particular sample of countries, good policy and governance environments are crucial determinants in achieving a positive effect of aid on growth.

Among the other control variables, fixed capital formation (% GDP) and FDI (% GDP) are robustly significant (at least at the 10 percent level of significance) and have the expected effects on growth. These results highlight the vital role that capital – whether domestic or foreign sourced – plays in spurring long-run growth, in accordance with standard growth theory. While financial development has a consistently negative sign, this is not significant. Its negative association with growth is likely due to the observation that countries that have more developed financial systems are also more developed economies, which tend to grow more slowly than less developed economies, in accordance with Convergence Hypotheses.

In terms of the exogenous determinants, it is worth noting that real GDP per capita growth is robustly higher in EAP and lower in LAC and MENA than in the rest of the world (excluding CA, SA and SSA). Moreover, over the last two decades from 1994 to 2013, there has been an improvement in the average real GDP per capita growth over that in the period 1989-1993.

4.1. Post-estimation diagnostics

All the two-step system-GMM results pass the post-estimation diagnostic tests mentioned in Roodman [2009]. The coefficients of the lagged dependent variable, real GDP per capita growth, are less than the corresponding OLS estimates and greater than the fixed-effects (FE) estimates. In every regression, the number of instruments does not exceed the number of countries. Moreover, in every regression, we cannot reject the null hypothesis of no serial correlation of order two at least at the 10 percent level of significance; neither can we reject (at least at the 10 percent level of significance) the Hansen test's null hypothesis of the validity of the over-identifying restrictions.

TABLE 2. Growth and aid: Two-Step System GMM results

Determinants	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**
Real GDP per capita growth (-1)	0.09***	0.09***	0.09***	0.09***	0.08***	0.10***
Aid (% GDP)	-0.02	-0.13***	-0.04**	0.06	0.02	0.10***
Aid*Policy		0.04***		0.09***		0.07***
Aid-squared			0.0002	-0.01***		-0.002*
Aid*Governance					0.04*	0.14***
Other controls						
Policy	0.05	-0.20*	0.002	-0.63***	-0.16***	-0.75***
Governance	-0.38	-0.03	-0.15	-0.57*		-0.90***
Fixed capital formation (% GDP)	0.12***	0.06***	0.06***	0.10***	0.07***	0.07***
FDI (% GDP)	0.05***	0.09***	0.07***	0.10***	0.07***	0.11***
Financial development	-0.60	-2.93***	-2.35***	0.39	-0.16	-0.12
Ethnic fractionalization	-0.99	-1.95***	-1.36***	0.19	-1.82***	0.72
Terrorism attacks	0.01	0.01*	0.01**	-0.01	0.01*	0.003
Ethnic fractionalization*Terrorist attacks	-0.01	-0.01*	-0.01*	0.01	-0.01	-0.003
Tropical area	-0.67**	-0.03	-0.39**	-0.48*	-0.58***	-1.09***
Region dummies						
EAP	0.64	1.38*	1.90***	0.31	0.85***	1.24*
CA	0.30	0.62***	0.25	0.27	0.25	-0.52**
LAC	-0.93***	-1.78***	-1.58***	-1.92***	-1.14***	-1.88***
MENA	-2.40***	-2.43***	-2.63***	-2.55***	-2.91***	-2.85***
SA	-1.22***	-0.98***	-1.21***	-1.83***	-1.18***	-2.06***
SSA	-1.29***	-1.03***	-1.70***	-1.62***	-1.42***	-1.94***
Period dummies						
1994-1998	1.14	3.39***	3.14***	1.01	2.34***	1.74***
1999-2003	1.52**	3.87***	3.52***	1.38*	2.78***	2.13***
2004-2008	2.97***	5.58***	5.42***	2.96***	4.63***	3.89***
2009-2013	0.64	3.17***	2.96***	0.31	2.00***	1.36*
Number of observations	293	293	293	293	293	293
Number of countries	106	106	106	106	106	106
Number of instruments	83	92	101	88	106	97
Arellano-Bond AR(2) test (p-value)	0.14	0.12	0.12	0.13	0.13	0.13
Hansen test (p-value)	0.56	0.37	0.63	0.29	0.68	0.44

Robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1

TABLE 3. Total marginal effects of aid on growth

Percentile	1%	5%	10%	25%	50%	75%	90%	95%	99%	Mean
Aid (% GDP)	-0.02	0.01	0.07	0.30	1.39	6.70	12.89	15.54	31.50	4.35
Policy	-1.26	-0.99	-0.86	-0.63	-0.25	0.29	0.93	1.15	2.42	-0.08
Governance	-1.90	-1.37	-1.15	-0.63	-0.27	0.21	0.66	0.99	1.47	-0.24
Total marginal effect of aid on growth (coefficients and column based on Table 2)										
Column (6): 0.10 + 0.07*Policy - 2*0.002*Aid + 0.14*Institutions										
Percentile	**1%**	**5%**	**10%**	**25%**	**50%**	**75%**	**90%**	**95%**	**99%**	**Mean**
Evaluated at different										
(1) Policy percentiles	-0.03	-0.01	-0.004	0.01	0.04	0.08**	0.12***	0.14***	0.23***	0.05
(2) Aid percentiles	0.04	0.04	0.04	0.04	0.04	0.02	-0.01	-0.02	-0.08**	0.03
(3) Governance percentiles	-0.19***	-0.11***	-0.08**	-0.01	0.04	0.10***	0.17***	0.22***	0.28***	0.04
(4) Aid, Policy, Governance percentiles	-0.25***	-0.16***	0.12***	-0.03	0.04	0.12***	0.21***	0.26***	0.35***	0.04

*** significant at the 1%; ** significant at the 5%; and * significant at the 10%.

5. Conclusion

We set out to revisit the aid-policy-growth nexus using the two-step system GMM on more recent data involving 106 countries for the period 1989-2013. We find that both aid's effect on long-run growth is subject to diminishing returns, but this effect is mitigated by good policy and governance. For our particular sample of countries, good governance appears to be the more important factor, since the total marginal effect of aid on growth only becomes positive and significant when governance is at least at its 75th percentile value, in line with Sachs's assertions. However, at lower governance percentiles (even coupled with higher policy percentile values), the "curse of aid" sets in, which is consistent with Easterly's view.

The latter finding is in tandem with what policy papers for the multilateral aid donors such as the World Bank and IMF find. In particular, high aid flows into "bad" policy environments can generate conflicts of interest and policies that can harm growth. Moreover, high aid flows in these policy environments are also found to create a culture of aid dependence: aid as a means of alleviating poverty becomes a substitute for genuine reforms that could generate growth and development. In such "bad" policy environments, this paper takes the stance that the policy implication is not to stop aid to poor economies altogether. Rather, the policy implication might first take the form of aid being targeted to build "good" policy and governance environments conducive to growth, so that *aid that targets growth* can work, as intended.

Perhaps, the Sachs-Easterly dispute need not be as black-and-white as is commonly perceived.

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Appendix

Estimation of the Policy Index and Institutional Quality Index using the Principal Components Analysis (PCA)

Corresponding values for the Policy Index and Institutional Quality Index are generated using the Principal Components Analysis method in Stata, where the command code "pca" is used on the cross-country panel dataset.

For the Policy Index, the variables for Budget Balance, Inflation, and Trade Volume are used. The command "pca [list of variables]" is entered on Stata, followed by the command "rotate", and then "predict policyindex" to generate the estimates from the PCA.

For the Institutional Quality Index, the variables from the WGI on government effectiveness, political stability and absence of violence, regulatory quality, rule of law and voice and accountability were used. The same commands, "pca [list of variables]" and rotate were used, followed by the "predict iqi" to generate the estimates for the Institutional Quality Indices.

This method is defined in the Stata Manual.[4]

List of countries (with number of observations per country) included in the estimations

The countries included in the sample (with the corresponding number of observations) are Albania (3), Algeria (2), Angola (2), Armenia (4), Azerbaijan (4), Bahrain (3), Bangladesh (4), Belarus (4), Benin (2), Bhutan (2), Bolivia (4), Bosnia and Herzegovina (2), Botswana (1), Brazil (4), Bulgaria (3), Burkina Faso (1), Burundi (4), Cambodia (3), Central African Republic (1), Chad (1), Chile (4), China (4), Colombia (4), Congo, Democratic Republic (2), Congo, Republic (3), Costa Rica (2), Cote d'Ivoire (2), Croatia (3), Czech Republic (3), Dominican Republic (2), Ecuador (4), Egypt (4), El Salvador (1), Estonia (1), Eswatini (3), Ethiopia (1), Gabon (1), Gambia (2), Ghana (1), Guatemala (4), Guinea (2), Guinea-Bissau (3), Guyana (3), Honduras (4), Hungary (3), Indonesia (4), Iran (2), Israel (3), Jamaica (2), Jordan (4), Kazakhstan (4), Kenya (4), Korea (3), Kuwait (3), Kyrgyz Republic (4), Lao PDR (2), Latvia (2), Lebanon (1), Lesotho (2), Liberia (2), Libya (1), Madagascar (4), Malawi (1), Malaysia (3), Mali (3), Mauritania (2), Mexico (4), Moldova (3), Morocco (4), Myanmar (2), Namibia (1), Nepal (4), Niger (4), Nigeria (4), Pakistan (4), Panama (3), Paraguay (3), Peru (4), Philippines (4), Poland (2), Romania (2), Russian Federation (3), Rwanda (1), Saudi Arabia (4), Senegal (4), Serbia (2), Singapore (1), Slovak Republic (2), Slovenia (2), Solomon Islands (1), South Africa (4), Sri Lanka (4), Sudan (4), Syria (2), Tajikistan (3), Tanzania (4), Thailand (4), Timor-Leste (1), Togo (2), Tunisia (4), Turkey (4), Uganda (4), Ukraine (4), Uruguay (2), Venezuela (1), Vietnam (2).

[4] Source: https://www.stata.com/manuals13/mvpcapostestimation.pdf

TABLE A1. Aid and growth: OLS, FE and Two-Step System-GMM results

VARIABLES	(1) OLS	(2) FE	(3) Two-step System-GMM	(4) OLS	(5) FE	(6) Two-step System-GMM	(7) OLS	(8) FE	(9) Two-step System-GMM	(10) OLS	(11) FE	(12) Two-step System-GMM	(13) OLS	(14) FE	(15) Two-step System-GMM	(16) OLS	(17) FE	(18) Two-step System-GMM
Real GDP per capita growth (-1)	0.12	0.04	0.09***	0.12*	0.04	0.08***	0.12	0.05	0.09***	0.12	0.06	0.09***	0.13*	0.06	0.10***	0.13*	0.05	0.10***
Aid (% GDP)	0.01	0.21**	-0.03	-0.01	0.21**	-0.15***	0.04	0.35*	0.02	0.03	0.33***	0.04**	0.10	0.37**	0.18**	0.10	0.38**	0.13**
Aid*Policy				0.03*	0.02	0.06***							0.05**	0.04	0.08***	0.05***	0.03	0.08***
Aid-squared							-0.001	-0.005	-0.002**				-0.004	-0.001	-0.007***	-0.004	-0.006	-0.008***
Aid*Governance										2.60	18.02**	6.12***	0.50	18.86*	5.02***			
Policy	-0.10	0.91	0.17	-0.28	0.58	-0.21	-0.10	1.11	-0.03	-0.10	1.24*	-0.05	-0.41	0.66	-0.77***	-0.41	0.66	-0.51***
Governance	0.35	1.01	0.14	0.41	1.01	0.38**	0.32	1.03	-0.05	0.22	-0.01	-0.24*	0.30	-0.06	-0.22***	0.32	1.03	0.03
Fixed capital formation (% GDP)	0.06	0.04	0.11***	0.05	0.04	0.04***	0.06	0.04	0.07***	0.05	0.05	0.06***	0.05	0.04	0.06***	0.05	0.04	0.07***
FDI (% GDP)	0.06	0.11**	0.05***	0.06	0.13**	0.11***	0.06	0.08	0.09***	0.06	0.07	0.09***	0.07*	0.11*	0.11***	0.07*	0.11	0.10***
Financial development	-5.69**	0.82	-2.65*	-5.93***	0.85	-3.48***	-5.38**	-0.13	-1.70*	-5.20**	-0.37	-1.90**	-4.78**	-0.51	-0.69	-4.81**	-0.25	-0.85
Ethnic fractionalization	1.15	-14.57	-1.37*	0.97	-14.87	-3.00***	1.14	-14.35	-1.63***	1.11	-14.27	-1.20***	0.82	-14.81	-0.59	0.82	-14.77	-1.52*
Terrorism attacks	0.01	0.002	0.01	0.01	0.001	0.01	0.01	-0.001	0.003	0.01	-0.001	0.0001	0.01	0.001	0.003	0.01	-0.0002	0.005
Ethnic fractionalization*Terrorist attacks	-0.01	0.002	-0.01	-0.01	0.001	-0.01	-0.01	0.004	-0.003	-0.01	0.003	0.0003	-0.01	0.001	-0.004	-0.01	0.002	-0.01
Tropical area	-0.61		-0.44	-0.54		0.12	-0.63		-0.33**	-0.66		-0.42***	-0.56		-0.62***	-0.56		-0.30
Region dummies																		
EAP	3.47**		1.79**	3.34**		1.77***	3.44**		1.87***	3.40**		2.12***	3.09**		1.38***	3.10**		1.47*
CA	0.21		0.54**	0.23		0.77***	0.16		0.32**	0.13		-0.08	0.05		-0.34	0.05		0.16
LAC	-1.77***		-1.17***	-1.93***		-1.99***	-1.73***		-1.39***	-1.72***		-1.54***	-1.89***		-1.85***	-1.90***		-1.60***
MENA	-2.25***		-2.10***	-2.30***		-2.66***	-2.25***		-2.44***	-2.29***		-2.54***	-2.34***		-2.63***	-2.33***		-2.36***
SA	-1.07		-0.62**	-1.11		-0.36	-1.10		-0.98***	-1.10		-1.08***	-1.24*		-1.81***	-1.24*		-1.23***
SSA	-2.79***		-1.02**	-2.72***		-0.47	-2.80***		-1.55***	-2.78***		-1.78***	-2.72***		-2.04***	-2.72***		-1.40***
Period dummies																		
1994-1998		-0.69	1.87**		-0.71	4.45***		-0.90	2.64***	0.00	-0.81	2.66***		-0.88	2.14***		-0.96	2.03***
1999-2003	0.75*	0.40	2.35***	0.76*	0.40	4.81***	0.75*	0.22	3.13***	0.75*	0.27	3.03***	0.73*	0.23	2.58***	0.73*	0.19	2.49***
2004-2008	2.86***	1.86***	3.97***	2.86***	1.87***	6.78***	2.85***	1.83***	5.04***	2.86***	1.88***	5.00***	2.83***	1.89***	4.51***	2.83***	1.84***	4.34***
2009-2013	0.38		1.66*	0.39		4.59***	0.37		2.49***	0.38	0.00	2.51***	0.33	0.00	1.99**	0.33		1.91***
2014-2018			0.00			0.00			0.00	0.00	0.00	0.00	0.00	0.00	0.00			0.00
Constant	2.64	7.25		2.89	7.37		2.51	7.18	2.15	7.14			2.54	7.35		2.54	7.34	
Number of observations	293	293	293	293	293	293	293	293	293	293	293	293	293	293	293	293	293	293
Number of countries	106	106	106	106	106	106	106	106	106	106	106	106	106	106	106	106	106	106
R-squared	0.353	0.295		0.358	0.296		0.354	0.299	0.35	0.31			0.36	0.32		0.363	0.301	
Root MSE	2.81	2.32		2.81	2.32		2.81	2.32		2.81	2.29		2.80	2.30		2.80	2.32	
Number of instruments			83			92			101			101			97			88
Arellano-Bond AR(2) test (p-value)			0.13			0.11			0.12			0.12			0.12			0.12
Hansen test (p-value)			0.51			0.40			0.56			0.66			0.48			0.33

Robust standard errors in parenthesis*** p<0.01, ** p<0.05, * p<.01

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