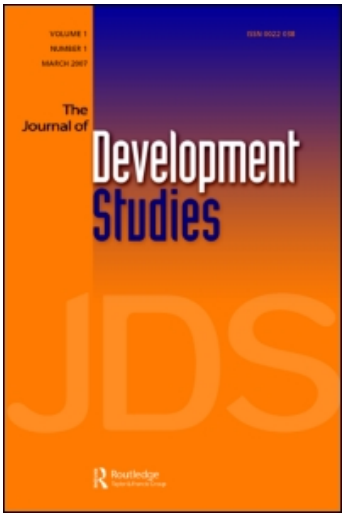

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Aid and Growth in Small Island Developing States

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ABSTRACT *Aid flows to small island developing states (SIDS) are enormous by international standards when compared to the size of their economies. Yet these countries face many severe economic challenges and many have experienced declines in the living standards of their citizens. This paper looks at the impact of aid on what is treated as a necessary precondition for improvements in living standards, typically defined. Specifically, it examines the impact of foreign aid on real per capita income growth in SIDS by econometrically analysing cross-country data for the period 1980 to 2004. A variety of econometric techniques and measures of aid are used. Results suggest that foreign aid is effective at spurring economic growth but with diminishing returns.*

I. Introduction

Achieving higher living standards in small island developing states (SIDS) is particularly challenging. This group of countries is characterised by small domestic markets, high export concentrations, often extreme vulnerability to environmental and economic shocks and high costs of transport to international markets. Social disharmony and tensions are high in some SIDS and some have even experienced civil war. Those located in the Pacific are faring particularly poorly, with living standards having fallen appreciably in many of these countries in recent years. While these factors might provide a case for providing greater international assistance to SIDS, these countries currently receive some of the highest levels of aid in the world relative to the size of their economies and populations. This raises important questions over the effectiveness of foreign aid to SIDS in promoting higher living standards. An evaluation of aid effectiveness in SIDS is therefore timely and pertinent.

Examining the impact of aid on living standards outcomes in recipient countries is no easy task. It is especially difficult for SIDS due to a severe paucity of requisite data. Information on factors such the number of people living in income poverty,

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health and education achievements and access to water and sanitation is such that any rigorous empirical analysis of the impact of aid on living standards in SIDS is simply not feasible. What is more feasible, however, is a cross-country analysis of the impact of aid on real per capita income (economic) growth in these countries. It is well known that economic growth is a necessary (although clearly not sufficient) precondition for improved living standards as described. It can create income-earning opportunities for the poor and lead to larger tax revenues and subsequently higher government expenditures in the social sectors such as health, education and water and sanitation. Many studies point to these relationships (see, for example, Bell and Rich, 1994; Ravallion and Datt, 1994; Ravallion and Chen, 1997; Dollar and Kraay, 2000). An analysis of the link between aid and income growth will at least tell us, therefore, whether aid is effective in spurring a precondition for the improvement in living standards.

Figure 1 below shows that foreign aid flows to SIDS are large and volatile. Foreign aid flows trended up from accounting for an average of 10 per cent of SIDS' GDP in 1980 to over 20 per cent in 1988. Aid flows then followed a downtrend to account for around an average of 13 per cent of GDP in 2004. Aid flows accounted for a particularly high ratio of GDP in SIDS for the years 1994 and 1995. This is largely explained by very high levels of aid provided to Sao Tome and Principe in these years due to civil unrest and a coup (101% and 185% respectively), and Palau following its independence (242% and 149% respectively).

The average per capita income growth rate of SIDS has followed similar trends although average growth was negative for the years 1982 and 2001. This is largely explained by severe economic contractions in 1982 in St Lucia (due to political

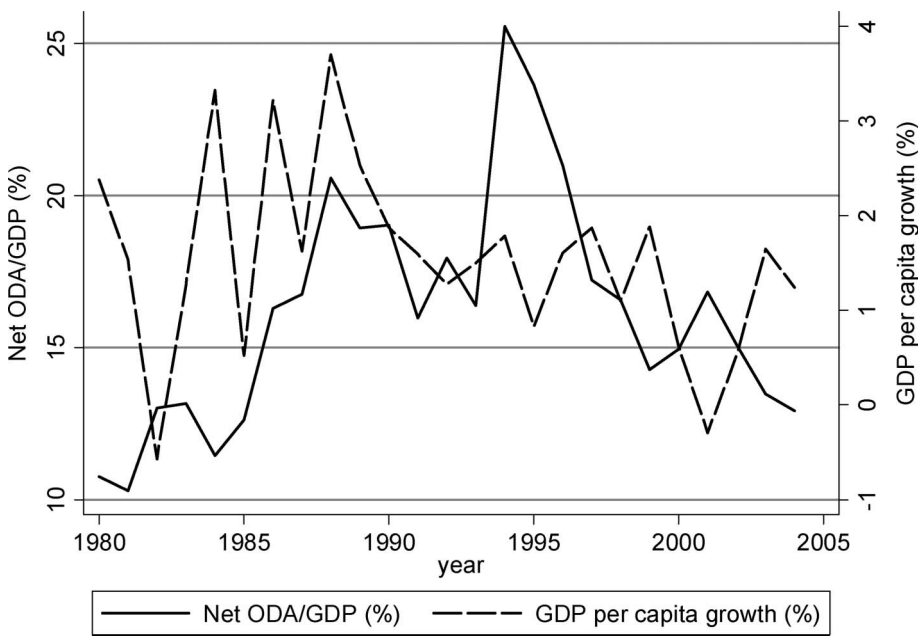

Figure 1. Aid levels and growth rates in SIDS (1980–2004).

instability) and Guyana (due to a sharp contraction in the mining sector) and due to civil unrest in the Solomon Islands in 2001.

This paper provides an econometric analysis of the impact of aid on SIDS real income growth per capita using data for the period 1980 to 2004. While income growth data are far more widely available than living standards data in SIDS, data availability still imposes particular constraints. Econometric models must be relatively parsimonious so that sample sizes are sufficiently large. Econometric analysis of the type conducted for most aid recipients cannot consequently be applied to SIDS. A variety of estimation techniques and measures of aid are employed, therefore, to test for the robustness of the results. Results from the analysis undertaken by this paper suggest that foreign aid is effective at spurring economic growth but with diminishing returns. The finding of diminishing returns, combined with the often very large levels of aid relative to the size of SIDS economies, leads the paper to question whether the aid received by some of these countries is appropriate from an economic growth perspective.

The remainder of this paper is structured as follows. Section II provides a brief summary of the recent literature which has examined aid effectiveness. It identifies four key findings, which are used to justify or inform the econometric analysis conducted later in the paper. Section III provides an overview of the data and methods used in this paper. Section IV presents the results from the empirical analysis and further analysis is undertaken in Section V. Finally, Section VI concludes with the policy implications arising from the research of this paper.

II. Aid Effectiveness Literature

The vast majority of the aid effectiveness literature has evaluated foreign aid by examining its impact on economic growth and on poverty reduction by association. There are four main findings from this literature. Firstly, on average, aid works. That is, there is now an extensive body of recent international research that suggests that foreign aid is effective at spurring economic growth in recipient countries (see McGillivray et al., 2006 for a recent review of numerous studies). The implication is that economic growth would be lower in the absence of foreign aid. The finding that aid spurs growth in recipient countries is confirmed by the few existing studies examining foreign aid effectiveness in selected Pacific countries implying that the poor growth records of many of these countries cannot be attributed to foreign aid (see Gounder, 2001, for the case of Fiji; Gounder, 2002 for the case of the Solomon Islands; Feeny, 2006, for Melanesian countries; Sugden and Pavlov, 2005, for a sample of seven Pacific countries).[1] To the knowledge of the authors of this paper, no study has specifically examined empirically the impact of aid on growth in SIDS.

Secondly, foreign aid works better in some countries or environments than in others with its impact being contingent upon certain factors. Put differently, the impact of an additional dollar varies among countries. This is hardly surprising. These contingencies are empirically captured through the use of multiplicative interactive variables, in which aid interacts with one of more of these factors. There are ongoing debates, however, about precisely the contingency or contingencies that actually matter. Some researchers find it works best in recipients with good economic policies (Burnside and Dollar, 2000, 2004; Collier and Dollar, 2002; Collier and Hoeffler, 2004). Others find

aid works best in countries experiencing adverse trade shocks (Collier and Dehn, 2001), in structurally vulnerable and politically stable countries (Guillaumont and Chauvet, 2001), in more democratic countries (Svensson, 1999; Islam, 2003) or in countries located outside the tropics (Dalgaard et al., 2004).

Thirdly, the type of foreign aid is likely to be important for the impact on economic growth and poverty reduction. Foreign aid comes in many different forms and recent empirical studies have attempted to account for this. Gomanee et al. (2005) examine the mechanisms via which aid should affect growth. Food aid, emergency relief and technical assistance are subtracted from their aid variable, arguing that these forms of assistance will not impact on growth (at least in the short run). They find that aid has a positive impact on growth in Sub-Saharan Africa, through its impact on investment. They also observe that the small marginal effect of aid on growth can largely be attributed to the low productivity of investment in the region. Clemens et al. (2004) disaggregate aid into 'short-impact' and 'long impact' aid variables. Short-impact aid relates to aid flows that can be expected to increase GDP per capita within approximately four years. Clemens et al. (2004) find that the positive impact of short impact aid on growth is found to be about two or three times larger than in studies using aggregate aid. Ram (2003, 2004) provides evidence to suggest that bilateral aid has a positive impact on economic growth while multilateral aid has a negative impact. Feeny (2006) finds that while aid grants have spurred economic growth in Melanesian countries, aid loans have not had any impact. Interestingly, Morrissey et al. (2007) find the same for Kenya.

Fourthly, aid is found to be effective but with diminishing returns. Studies find that foreign aid is effective at spurring economic growth up to a certain threshold of aid. Past this threshold, its impact diminishes or becomes smaller (see for example, Hansen and Tarp, 2000, 2001; Dalgaard and Hansen, 2001; Lensink and White, 2001; Hudson and Mosley, 2001; Clemens et al., 2004; Dalgaard et al., 2004). Intuitively, this makes good sense since there are likely to be limits to the amounts of foreign aid inflows that an economy can efficiently absorb. Absorptive capacity constraints arise for a number of different reasons. High levels of aid place a huge administrative burden on recipients with public sector officials in recipient countries facing negotiation, management and reporting requirements. This is particularly true in the presence of a high level of donor proliferation. Aid volatility can also impact on absorptive capacity as can Dutch disease effects (whereby high levels of aid have an adverse impact on the export competitiveness of developing countries).

Estimates of the level of aid at which its incremental impact on recipient country growth diminishes vary, but on average, this occurs at around 20 per cent of recipient GDP (Feeny and McGillivray, 2008). Very high levels of aid (exceeding twice this level) might not necessarily be effective. In scaling up foreign aid, donors will need to ensure that they provide aid at levels that recipients can effectively absorb from a growth perspective. Testing for diminishing returns assumes great importance given that donors are currently scaling up aid (OECD, 2006).

III. Data and Methods

Studies using cross-county data have been widely criticised. Results can be sensitive to the specification of the model, the time period used and the data employed. By

examining the impact of aid only in SIDS, this paper attempts to circumvent some of the criticisms of cross-country studies by building on the findings presented in Section II above.[2] It adopts a variety of econometric techniques to examine the relationship between aid and growth to test the robustness of the results.

Building on the most recent aid effectiveness literature, the following empirical model is specified:

$$g_i = \beta_0 + \beta_1 a_i + \beta_2 a_i^2 + \beta_3' \Phi_i + \beta_4' Z_i + \mu_i \quad i = 1, \ldots, n \tag{1}$$

where gi is a real growth in GDP per capita, a_i is the ratio of Official Development Assistance (ODA) to GDP, Φ_i is a vector of multiplicative interactions between aid various other variables, and Z_i is a vector of control variables. Subscript i represents the recipient country. The variables interacting with aid include binary regional location dummies, measures of policy, regional location and binary dummies whose values depend on whether country i is classified by the donor community as a fragile state. The vector of additional variables (Z_i) contains measures of ethnic fractionalisation, governance, macroeconomic policy and a dummy variable to capture major natural disasters impacting on the recipient country. The model includes an aid squared variable to capture possible diminishing returns to aid. The expected signs of β_1 and β_2 are positive and negative, respectively. Foreign aid is disaggregated into its various components in some specifications. The data include annual observations for 29 SIDS, covering the period 1980 to 2004. The number of countries included in the sample varies from year to year due to data availability. Many variants of model outlined in (1) are estimated, with each being relatively parsimonious in order to include as many SIDS in the sample as feasible.

Data for SIDS, especially those located in the Pacific, are sparse and often of questionable reliability. This can make the identification of relationships between aid, growth and other variables difficult. Obtaining information on the control variables typically used in aid-growth analysis is a particular problem. Data sources used for the analysis in this paper include the World Bank (2006), the Asian Development Bank (ADB) (2006) and the OECD (2006). The governance variable used in this paper is a composite index of the World Bank's governance indicators. The governance indicators are available for the period 1996 to 2004. They include six dimensions of governance: (i) voice and accountability; (ii) political stability and absence of violence; (iii) government effectiveness; (iv) regulatory quality; (v) rule of law; and (vi) control of corruption. The index is an equally weighted index of the six dimensions of governance. The value of the index for 1996 was used in years prior to 1996. This is justified on the grounds that no other data are available and that the level of governance usually varies very little through time. Macroeconomic policy variables include the annual rate of inflation and the ratio of import and exports to GDP to represent trade.[3] A disaster impact dummy variable was included in recognition of the environmental shocks often faced by SIDS. It takes the value of one for natural disasters which impacted on at least 10 per cent of the recipient's population. This variable was created using the WHO Emergency and Disasters Database. Full details of the data and their sources are provided in Appendix Table A1.

An important issue in any examination of aid effectiveness relates to the endogeneity of the foreign aid variable. This variable can be endogenous if donors

allocate aid among recipients on the basis of the economic growth rates of the latter. In short, aid determines and is determined by recipient growth rates. Studies have in response to this instrumented for aid to obtain more accurate parameter estimates.

However, it is important to note that foreign aid flows are predetermined with respect to the current period. Donors do not have information on current growth rates and therefore allocate their aid based on growth rates at least one year prior to the current year. This means that current aid and current growth will almost certainly not be endogenously related and that, consequently, instrumenting for aid is not necessary if data for single years are used.[4] Second, it might well be the case that the impact of aid on growth is not contemporaneous. Thus, even if donors were able to base current aid on current growth, the aid variable in this scenario is not endogenous.[5] Third, a number of studies averaged data over a four- or five-year period. The reason for this is to lessen the empirical problems associated with large annual fluctuations in economic growth rates. Such a treatment will almost certainly make foreign aid become at least partially endogenous if donors do allocate aid in response (partial or otherwise) to recipient country growth rates and if information time lags do not exceed four or five years.

In view of these responses the approach of this paper is to estimate variants of equation (1) using both annual data and data averaged over four years and in particular using lagged aid as the instrument. For the former, both the ordinary least squares (OLS) and fixed effects (FE) estimation methods are used, which are appropriate if all explanatory variable are exogenous. Alternative estimates are obtained using current and lagged aid data. The disaster impact variable outlined above will be relied on at control for the problem of yearly variations in growth rates. Recognising that this reliance might be excessive, (1) will also be estimated using the generalised method of moments (GMM) approach with four-year average data. GMM uses lagged values as instruments and is preferred over the standard instrumental variables (IV) method commonly used in the aid-growth literature.

Hansen and Tarp (2001) argue that the GMM approach should be preferred since any policy variables in period t are likely to be correlated with shocks in earlier periods, violating the assumption that all variables other than aid are exogenous and not therefore correlated with the error term. Such a correlation implies that an IV approach will yield inconsistent parameter estimates. Moreover the aid effectiveness literature has struggled to find appropriate instruments for foreign aid with the IV approach. Reddy and Minoiu (2006) argue that many studies have used donor interest variables as instruments for foreign aid. Since donor interest variables represent the part of foreign aid which is unlikely to be as effective as foreign aid provided for humanitarian concerns in the recipient, the coefficient on the aid variable in these IV regressions is likely to be biased downwards.

The GMM approach is not subject to these criticisms and it provides estimates that are consistent in the presence of one or more endogenous regressors. It is therefore the preferred approach of this paper when analysing averaged data. The specific variant of GMM used is a two-step system GMM proposed by Blundell and Bond (1998) and extended by Roodman (2005), which is thought to be more efficient than a single-step approach. The Windmeijer (2005) finite sample correction to the two-step covariance matrix is applied.

IV. Results

Results from the estimation of the empirical model using aggregate aid and OLS are presented in Table A2 in the Appendix and are broadly consistent with those from the fixed effects specifications provided in columns (1) to (3) of Table 1 below.

Table 1. Econometric results

	(1) FE	(2) FE	(3) FE	(4) GMM	(5) GMM	(6) GMM	(7) GMM
Constant	−2.511	−3.025	−2.213	−3.208	−3.620	2.107	5.586
	(1.03)	(1.23)	(0.87)	(0.45)	(0.64)	(0.36)	(0.99)
ODA	0.098			0.377	0.447	0.344	0.502
	(1.18)			(2.63)**	(1.89)*	(2.32)**	(2.15)**
ODA Squared	−0.002			−0.005	−0.006	−0.005	−0.007
	(1.51)			(2.50)**	(2.21)**	(2.51)**	(1.96)*
ODA Lagged 1 Year		−0.108	−0.139				
		(1.12)	(1.42)				
ODA Squared Lagged 1 Year		0.001	0.002				
		(1.24)	(1.43)				
ODA Lagged 2 Years		0.241	0.223				
		(2.43)**	(2.26)**				
ODA Squared Lagged 2 Years		−0.003	−0.003				
		(2.77)***	(2.66)***				
ODA-Pacific Interaction					0.007		
					(0.04)		
ODA-Fragility Interaction						−0.027	
						(0.48)	
ODA-High Fragility Interaction							−0.476
							(3.26)***
Ethnic Fractionalisation				−0.177	1.071	−1.146	−0.386
				(0.09)	(0.45)	(0.98)	(0.17)
Inflation	−0.003	−0.008		0.027	0.011	0.802	0.237
	(0.28)	(0.75)		(1.15)	(0.34)	(1.16)	(0.31)
Trade	0.049	0.049		0.055	0.050	0.031	0.031
	(3.36)***	(3.40)***		(1.80)*	(1.76)*	(1.29)	(1.59)
Governance	0.398	0.244	0.665	8.499	7.774	6.513	5.143
	(0.25)	(0.15)	(0.42)	(2.04)*	(1.35)	(1.37)	(1.41)
M2	−0.017	−0.013	−0.012	−0.077	−0.068	−0.139	−0.172
	(0.87)	(0.62)	(0.59)	(0.92)	(1.02)	(1.76)*	(1.94)*
Disaster Impact	−1.866	−1.440	−1.473	−1.152	−3.220	−3.396	−2.375
	(1.99)**	(1.50)	(1.54)	(0.31)	(0.82)	(0.92)	(0.71)
Inflation Lagged 1 Year			0.005				
			(0.49)				
Trade Lagged 1 Year			0.033				
			(2.27)**				
Observations	569	555	561	124	124	124	124
R-squared	–						

Note: (i) year dummies included in equations estimated using OLS and FE; (ii) robust *t*-statistics are shown in parentheses; and (iii) *, ** and *** significant at 10, 5 and 1 per cent levels, respectively

Results from column (1) indicate that aid (in the current year) is not positively associated with economic growth. However, results from column (2) indicate that aid (when lagged two years) is effective at spurring growth but with diminishing returns.[6] The coefficient on the aid variable is positive and the coefficient on the aid squared variable is negative. This is consistent with much of the recent aid effectiveness literature. Results from column (3) confirm the relationship between aid and growth when inflation and trade are also lagged to control for their potential endogeneity.

Results using data averaged over a four-year period are provided in columns (4) to (7). These results have been obtained using GMM. Results again indicate that foreign aid is effective, in that growth would be lower in its absence, but with diminishing returns. For reasons outlined in the recent aid effectiveness literature and discussed above, the results reported in columns (4) to (7) represent the preferred specifications of equation (1). These results are discussed below.

The results shown in columns (1) to (4) have been obtained from an equation with no multiplicative interaction terms. Models estimated correspond to equation (1) but with vector β'_3 restricted to zero. Variants of (1) were estimated with alternative aid-continuous variable interactions. Owing to high levels of multicollinearity variants were estimated with no more than one interaction. Particular attention was given to the well-known and highly controversial aid–policy interaction originally used in the infamous Burnside–Dollar (2000) study and many subsequent studies. The coefficients attached to each of these interactions were all insignificantly different from zero and for this reason are not reported in Table 1.

Results obtained from a variant of (1) with a multiplicative aid–Pacific binary dummy variable are reported in Column (5) of Table 1. This dummy takes the value of one for Pacific SIDS and zero for all other SIDS. Results from this specification (and numerous others not reported here) cannot lead one to conclude that the behavioural relationship between aid and growth is different in Pacific countries than in other SIDS.

Further models were estimated to examine whether the impact of aid differs in so-called fragile states. There are widespread and valid concerns within the international donor community regarding aid effectiveness in fragile states. These states are thought to use aid for development purposes less effectively than other states. A country is classified by this community as a fragile state if it has a critically low World Bank Country Policy and Institutional Assessment (CPIA) score, so low that it falls into the bottom two quintiles of country CPIA scores. A number of SIDS fall into the fragile state category. The exact number varies from period to period. Comoros, Haiti, Sao Tome and Principe and the Solomon Islands belong to this category in the latest period of the sample.

Given this, equation (1) was augmented with a number of other multiplicative variables. The first was obtained by interacting aid and a fragile state dummy. The latter takes the value of one if a SID falls into the bottom two CPIA quintiles or zero if otherwise. Results are shown in Column (6) of Table 1. Results are such that one cannot conclude aid is of differing growth effectiveness in fragile and non-fragile SIDS. The equation was subsequently augmented with a multiplicative interaction between aid and a highly fragile state dummy, which takes the value of one if a SID falls into the bottom CPIA quintile. Results are shown in Column (7). The parameter attached to the aid-highly fragile state interaction is negative and

significant at the 1 per cent level, indicating that the impact of aid in highly fragile SIDS is lower than in all others. While this result should be seen as indicative only since it has been derived from a relatively small sub-sample of highly fragile states, there are clear policy implications. If donors want to increase the level of aid to these countries they need to work closely with them to improve the performance in the policy and institutional areas on which the CPIA scores are based.

Finally, it is worth noting that results across all variants of Equation (1) indicate that trade and the level of governance are important for economic growth in SIDS and there is some evidence that natural disasters impacting on at least 10 per cent of the population have a negative impact on growth rates.[7]

V. Further Analysis

The specification of equation (1) shown in Columns (1) to (4) of Table 1, is:

$$g_i = \beta_0 + \beta_1 a_i + \beta_2 a_i^2 + \beta_4' Z_i + \mu_i \tag{1a}$$

This essentially is (1), but with the vector β'_3 restricted to zero. The level of aid that maximises its contribution to growth according to (1a) is:

$$a_i^* = \frac{-\beta_1}{2(\beta_2)}$$

We term a^*_i as the growth efficient level of foreign aid. The corresponding total contribution of aid to growth is:

$$g_i^a = \beta_1 a_i + \beta_2 a_i^2$$

The specification of (1) shown in Column (7) of Table 1, is:

$$g_i = \beta_0 + \beta_1 a_i + \beta_2 a_i^2 + \beta_3 (a_i \cdot f_i) + \beta_4' Z_i + \mu_i \tag{1b}$$

where f_i is the previously defined highly fragile SIDS binary dummy variable and $\beta_3 < 0$. The main difference between (1) and (1b) is that the former contains a vector of interactions and the latter a single interaction only. It follows that in (1b) β_3 is a single coefficient rather than a vector of coefficients as in (1). The growth efficient level of aid for highly fragile SIDS and growth due to aid in these countries according to 1(a) are, respectively:

$$a_i^{*,f} = \frac{-\beta_1 + \beta_3}{2(\beta_2)} \quad \text{and} \quad g_i^{a,f} = (\beta_1 + \beta_3) a_i + \beta_2 a_i^2$$

Results from specifications in which the coefficients on the aid variables are statistically significant indicate that the growth efficient level of aid, for all SIDS, is where these inflows account for between 30 and 40 per cent of recipient GDP. Rather than rely on one possibly preferred model specification, we assume that the growth efficient level of aid is in between these upper and lower bounds, where it accounts

for 35 per cent of a recipients GDP. Then a_i^* is obtained from the conditional mean which applies across the full sample of SIDS under consideration. As such it applies on average, but for some countries it will be an overestimate and for others an underestimate. This point notwithstanding, it is useful to consider what the total level of ODA to the sample of SIDS under consideration would be if each country received a_i^*. Table 2 provides this information. It shows that the sample of SIDS under consideration received US$ 1.833 billion in ODA during 2004 which accounted for an (unweighted) average of 11.2 per cent of GDP. Total ODA would have come to US$ 22.6 billion had each SIDS received the growth efficient amount of 35 per cent of its GDP.[8] Providing this amount compared to what was actually provided would, on average, have led to a GDP per capita growth gain of 0.8 percentage points. The significance of this information is that it suggests that there is substantial scope (from a growth efficiency perspective) in scaling up ODA to SIDS.

Table 2 makes no distinction between highly fragile and other SIDS. This is because the results discussed above for the former group of countries are indicative only, for the reason stated above. With this caveat in mind, it should be noted in passing that the growth efficient level for highly fragile SIDS, corresponding to the results shown in column (10) of Table 1, is 9 per cent of GDP. This result approximates to the growth efficient level of aid for a larger sample of highly fragile states reported in McGillivray and Feeny (2008).

The estimate of the level of growth efficient aid in SIDS is higher than those consistent with the results of a number of recent aid-growth studies (see Feeny and McGillivray, 2008). This is not surprising. Recent studies have derived their estimates using a sample of all developing countries for which data were available, a much larger sample than that used in the current study. Estimates of growth efficient aid will vary among samples and this highlights the importance of examining the issue using subsets of countries and, if possible, individual case studies. There are three possible explanations for the growth efficient level of aid being higher in SIDS than for larger samples containing SIDS and other developing countries, remembering that the growth efficient level is an average obtained from the sample in question. Firstly, public sector officials in SIDS might face a relatively low administrative burden associated with aid since they are likely to have fewer donors providing them aid. Secondly, in some SIDS, particularly Pacific SIDS, a relatively large proportion of foreign aid bypasses the government budget and therefore further reduces the administrative burden on the recipient country. Thirdly, SIDS

Table 2. Key findings from empirical models

		Number of countries for which $a_i > a_i^*$
ODA (2004, US$ millions)	1,833	
Average ratio of ODA/GDP (%)	11.2	
Growth efficient aid (%)	35	4
Lower Bound a_i^*	30	4
Upper Bound a_i^*	40	3
ODA if all recipients receive a_i^* (US$ millions)	22,600	

are likely to have larger government administrative capacity relative to their GDPs to absorb aid on the grounds that a given minimum scale is required to establish an administration and this is likely to be largely independent of the level of GDP.

Providing a growth efficient level of aid among SIDS that averages 35 per cent of these countries' GDPs does not, however, come without potential downsides over time. Arguably the most obvious downside relates to aid dependency due to potentially negative impacts on public sector fiscal behaviour. Providing up to 35 per cent of GDP in ODA will obviously translate into much larger ratios of ODA to public sector expenditure, often significantly so.[9] Donors would need to very closely monitor the impacts of such ODA levels to ensure that they are not allocated by recipient governments to areas that have low development dividends or lead to declines in taxation effort. The latter outcome is arguably the most worrying. Lower taxation effort in recipient countries might be associated with benefits to the private sector and consumers through lower tax rates and trade-related taxes. But it can also lead to a long-term dependency on aid rather than taxation as a source of revenue and this is counter to some of the most basic principles of overseas development assistance.[10] The incidence of rent seeking and Dutch disease would also need to be monitored very closely.

Table 3. Foreign aid to SIDS

Country	ODA US$m 2004	ODA to GDP (2004, %)
Antigua and Barbuda	1.63	0.2
Belize	7.72	0.7
Barbados	28.81	1.0
Comoros	25.48	6.7
Cape Verde	143.24	14.8
Dominica	29.21	10.8
Dominican Republic	84.54	0.5
Fiji	63.92	2.4
Micronesia, Fed. States	86.31	38.1
Guinea-Bissau	77.04	27.2
Grenada	15.36	3.5
Guyana	134.01	18.4
Haiti	259.64	6.9
Jamaica	83.14	0.8
Kiribati	16.71	27.0
Maldives	27.24	3.7
Marshall Islands	51.09	47.2
Mauritius	32.42	0.6
Palau	19.55	15.4
Papua New Guinea	268.34	6.8
St. Vincent and the Grenadines	10.45	2.6
Sao Tome and Principe	33.41	53.6
Samoa	30.76	8.5
Seychelles	10.33	1.5
Solomon Islands	121.32	50.6
Suriname	23.89	2.2
Tonga	19.26	9.1
Vanuatu	37.74	11.9

Table 2 also indicates that four SIDS received more aid than the growth efficient amount of 35 per cent of GDP. This result is unaffected by using the lower bound threshold and falls to three countries if the upper bound threshold is used. Table 3 elaborates. It shows that in 2004 the Federated States of Micronesia received slightly more aid relative to its GDP than the middle-bound amount, but just under the upper-bound amount, the Marshall Islands, the Solomon Islands and Sao Tome and Principe received well in excess of all estimates of the growth efficient amount in 2004. This observation does not necessarily indicate that aid in 2004 was harmful to the countries that received more than the growth efficient amount. Nor does it necessarily provide a sufficient case for reducing future aid levels. There may be important non-growth considerations which justify the high levels of aid provided to these countries. There might well be very valid developmental reasons other than growth promotion for the scale of 2004 aid allocations to these countries. The observation that a number of SIDS receive far more than the growth efficient benchmark does, however, suggest that the international donor community should closely examine the levels of aid to these countries, seeking to justify whether such levels can be justified.

VI. Conclusion

This paper sought to examine the impact of foreign aid on the economic growth rates of SIDS using data for the period 1980 to 2004. Such an analysis is important given a number of constraints to development faced by these countries and the high levels of aid they receive. The analysis used annual and averaged data and estimated models using a variety of econometric techniques. Various interactions are included in the empirical analysis to examine whether foreign aid is less effective in fragile and highly fragile SIDS.

Results suggest that foreign aid is effective at spurring economic growth but with diminishing returns. The level of foreign aid at which diminishing returns sets in is estimated to be where it accounts for about 35 per cent of a recipient's GDP. Further results suggest that foreign aid is less effective in SIDS which are classified as highly fragile and that these countries face more severely binding absorptive capacity constraints. Overall, results indicate that there is scope to scale up foreign aid to SIDS. However, it must also be recognised that given their small size, any increases in aid can lead to a large increase in the level of aid relative to GDP. This implies that relatively minor increases in aid flows can lead to levels of aid which exceed that at which recipients can utilise aid effectively from a growth perspective.

The paper indentified four SIDS which may be receiving excess aid: Micronesia, the Marshall Islands, the Solomon Islands, and Sao Tome and Principe. From a purely growth perspective these countries are receiving a very high level of support. International donors providing aid to these countries should examine very carefully these levels of aid to ensure there are other developmentally valid criteria for this level of assistance. To a large extent, the high levels of aid provided to Micronesia and the Marshall Islands are explained by the remoteness of these countries and the severe lack of income-earning opportunities. The high levels of assistance to the Solomon Islands, and Sao Tome and Principe are better explained by the international community responding to political instability and civil unrest in these countries.

Further, there are other countries in which the level of assistance they receive requires scrutiny given they have been classified as being 'highly fragile' in recent years. The Comoros suffers from high population density, high levels of unemployment and undiversified exports, while instability in Guinea-Bissau and Haiti ensure that recent growth rates in these highly fragile countries have been very low and aid has been needed to boost their economies.

A caveat is that many of the paper's findings relate to average relationships for SIDS (and fragile SIDS) and there is an obvious need for a greater number of single country case studies in order to try and identify country specific absorptive capacity levels. This responsibility lies primarily with the research community but will rely on improved data availability and reliability, particularly for Pacific countries. This is an area in which national governments, regional organisations and the international donor community should work together to improve.

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Notes

1. Feeny (2006) finds no evidence of foreign aid impacting on the rural sector in Melanesian countries, proxied by agricultural GDP growth. However, foreign aid is found to impact positively on overall economic growth.
2. An alternative approach would have been to take the panel datasets used in recent well cited aid effectiveness studies and augment the empirical model with a SIDS dummy variable and a multiplicative aid–SIDS interaction variable. Problems relating to data availability prevented this exercise. Datasets include only a very small number of SIDS due a paucity of relevant data for these countries.
3. Unlike many previous studies, a country's budget balance is not included since this variable is only available for a small number of SIDS.
4. This argument relies on an absence of temporal persistence in the aid variable. The high degree of volatility of aid to SIDS shown in Figure 1 lends support to the argument.
5. Strictly speaking it will be a lagged or non-contemporaneously endogenous variable, which equates to it being exogenous econometrically. However, it is noted that the aid variable could still be endogenous if there is an omitted variable that is correlated with both aid and growth.
6. This suggests that examining the dynamics of the impact of foreign aid warrants further attention. The dynamics of foreign aid has been largely neglected by the existing aid effectiveness literature.
7. The main results are robust to using disaggregated aid (see Table A3 and A4 in the Appendix). Foreign aid can be disaggregated into aid grants versus aid loans and bilateral versus multilateral aid.

Results using annual data are provided in Table A3 in the Appendix. Again various lags of the aid variables are used. Results indicate that grants and bilateral aid are the categories which spur economic growth in SIDS. These findings are confirmed by results using averaged data and GMM estimations provided in Table A4.

8. Note that if all SIDS received a level of aid which accounted for 35 per cent of their GDP, there would be large absolute dollar increases to the larger SIDS.
9. Government finance statistics are rarely available for SIDS. Analysis of the data that are available for just a few countries over the sample period suggest that aid accounts for an average of 20 per cent of government expenditures in SIDS. However, there is a great deal of variation across countries with aid accounting for just 2.4 per cent of government expenditures in Barbados and as high as 80 per cent of government expenditures in Vanuatu.
10. Feeny (2007) finds that aid has led to lower tax revenues in Melanesian SIDS. Conversely, Clist and Morrissey (2010) find no evidence that aid is associated with lower tax/GDP ratios and indeed there is some evidence that aid encourages tax effort since the mid 1980s.

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Table A1. Variable definitions and sources

Variable	Definition	Source
GDP growth	GDP per capita growth measured in constant local currency units, expressed as a percentage.	World Bank (2006), Asian Development Bank (2006)
Ethnic fractionalisation	Probability that two individuals will belong to different ethnic groups.	Grimes (2000)
ODA	Official Development Assistance (ODA) as percentage of GDP, both expressed in current prices.	OECD (2006)
Pacific	Dummy variable taking the value of one if the country is located in the Pacific or zero if otherwise.	
Fragility	Dummy variable taking the value of one if the country is a fragile state, defined on the basis of it belonging to the bottom two Country Policy and Institutional Assessment (CPIA) quintiles.	World Bank[1]
High fragility	Dummy variable taking the value of one if the country is a highly fragile state, belonging to the bottom Country Policy and Institutional Assessment (CPIA) quintile.	World Bank[1]
Inflation	Annual percentage change in the Consumer Price Index (CPI).	World Bank (2006), Asian Development Bank (2006)
Trade	The sum of imports and exports as a percentage of GDP.	World Bank (2006), Asian Development Bank (2006)
Governance	Average value of the following governance indictors: (i) voice and accountability, (ii) political instability and violence, (iii) government effectiveness, (iv) regulatory burden, (v) rule of law, and (vi) control of corruption.	World Bank (2006)
Disaster impact	Dummy variable taking the value of one for years in which a natural disaster affected more than 10 per cent of the population and zero if otherwise.	Emergencies and natural disasters database (EM-DAT, 2006)
M2	Ratio of M2 money supply to GDP.	World Bank (2006), Asian Development Bank (2006), Sugden and Pavlov (2005)

Notes: [1]Data obtained directly from World Bank staff under a confidential research agreement.

Table A2. Results from OLS estimation

	(1) OLS	(2) OLS	(3) OLS
Constant	3.064 (1.20)	−1.134 (0.53)	−1.339 (0.63)
ODA	0.067 (1.70)*		
ODA squared	−0.001 (1.98)**		
ODA lagged 1 year		0.031 (0.74)	−0.139 (1.63)
ODA squared lagged 1 year		−0.000 (0.64)	0.002 (1.38)
ODA lagged 2 years			0.205 (2.27)**
ODA squared lagged 2 years			−0.003 (1.83)*
Ethnic fractionalisation	−0.549 (0.88)	−0.546 (0.87)	−0.465 (0.75)
Inflation	−0.007 (0.75)	−0.008 (0.79)	−0.008 (0.87)
Trade	0.030 (4.74)***	0.030 (4.69)***	0.030 (4.61)***
Governance	1.945 (3.58)***	1.872 (3.40)***	1.851 (3.35)***
M2	−0.018 (1.37)	−0.017 (1.31)	−0.016 (1.20)
Disaster impact	−1.775 (1.65)*	−1.676 (1.56)	−1.367 (1.23)
Inflation lagged 1 year			
Trade lagged 1 year			
Observations	569	568	555
R-squared	0.18	0.17	0.17

Table A3. OLS results for disaggregated aid

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Constant	3.066	−1.331	3.314	−1.112	2.939	−1.601	3.359	−1.117
	(1.20)	(0.62)	(1.34)	(0.53)	(1.15)	(0.73)	(1.32)	(0.53)
ODA grants	0.079							
	(1.86)*							
ODA grants squared	−0.002							
	(2.67)***							
ODA grants lagged 1 year		−0.168						
		(2.01)**						
ODA grants squared lagged 1 year		0.002						
		(1.34)						
ODA grants lagged 2 years		0.233						
		(2.83)***						
ODA grants squared lagged 2 years		−0.003						
		(2.23)**						
ODA loans			0.167					
			(1.31)					
ODA loans squared			−0.001					
			(0.25)					
ODA loans lagged 1 year				0.138				
				(1.26)				
ODA loans squared lagged 1 year				−0.002				
				(0.56)				
ODA loans lagged 2 years				0.067				
				(0.44)				
ODA loans squared lagged 2 years				−0.009				
				(0.65)				
Bilateral ODA					0.094			
					(1.86)*			
Bilateral ODA squared					−0.002			
					(2.46)**			

(*continued*)

Table A3. (*Continued*)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Bilateral ODA lagged 1 year						0.025		
						(0.23)		
Bilateral ODA squared lagged 1 year						−0.000		
						(0.00)		
Bilateral ODA lagged 2 years						0.082		
						(0.77)		
Bilateral ODA squared lagged 2 years						−0.002		
						(1.58)		
Multilateral ODA							0.051	
							(0.41)	
Multilateral ODA squared							−0.002	
							(0.33)	
Multilateral ODA lagged 1 year								0.001
								(0.01)
Multilateral ODA squared lagged 1 year								−0.009
								(0.72)
Multilateral ODA lagged 2 years								0.048
								(0.31)
Multilateral ODA squared lagged 2 years								0.005
								(0.66)
Ethnic fractionalisation	−0.674	−0.574	−0.539	−0.257	−0.671	−0.630	−0.504	−0.347
	(1.10)	(0.94)	(0.84)	(0.42)	(1.09)	(1.01)	(0.76)	(0.55)
Inflation	−0.008	−0.009	−0.010	−0.008	−0.008	−0.009	−0.008	−0.007
	(0.78)	(0.94)	(0.89)	(0.74)	(0.81)	(0.87)	(0.77)	(0.70)
Trade	0.030	0.030	0.028	0.029	0.031	0.031	0.029	0.030
	(4.67)***	(4.60)***	(4.44)***	(4.55)***	(4.76)***	(4.68)***	(4.66)***	(4.65)***
Governance	1.944	1.830	1.967	1.707	1.979	1.952	1.813	1.635
	(3.60)***	(3.36)***	(3.63)***	(3.26)***	(3.63)***	(3.50)***	(3.37)***	(3.04)***

(*continued*)

Table A3. (*Continued*)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
M2	−0.016	−0.014	−0.015	−0.017	−0.017	−0.015	−0.017	−0.016
	(1.25)	(1.10)	(1.17)	(1.31)	(1.30)	(1.17)	(1.29)	(1.24)
Disaster impact	−1.799	−1.294	−1.621	−1.283	−1.767	−1.431	−1.676	−1.436
	(1.67)*	(1.16)	(1.51)	(1.17)	(1.64)	(1.28)	(1.56)	(1.31)
Observations	569	555	569	555	569	555	569	555
R-squared	0.18	0.17	0.18	0.17	0.18	0.17	0.17	0.17

Note: (i) year dummies included in all equations estimated; (ii) robust *t*-statistics are shown in parentheses; and (iii) *, ** and *** significant at the 10, 5 and 1 per cent levels, respectively.

Table A4. GMM results for disaggregated aid

	(1)	(2)	(3)	(4)
Constant	−0.351	−2.875	−3.871	−3.603
	(0.13)	(0.98)	(1.05)	(0.91)
Ethnic fractionalisation	−0.868	0.393	−1.023	−1.133
	(0.88)	(0.26)	(0.73)	(0.57)
Inflation	0.014	0.022	0.020	0.012
	(0.61)	(1.34)	(0.60)	(0.71)
Trade	0.049	0.031	0.053	0.053
	(1.89)*	(1.25)	(2.78)***	(1.88)*
Governance	4.374	7.199	6.209	0.304
	(1.17)	(1.95)*	(1.51)	(0.06)
M2	−0.077	−0.034	−0.092	0.013
	(1.77)*	(1.08)	(2.04)*	(0.25)
Disaster impact	−1.111	1.691	−3.556	−0.742
	(0.28)	(0.33)	(1.49)	(0.18)
ODA grants	0.277			
	(2.32)**			
ODA grants squared	−0.004			
	(3.27)***			
ODA loans		0.818		
		(2.26)**		
ODA loans squared		−0.019		
		(1.14)		
Bilateral ODA			0.659	
			(2.49)**	
Bilateral ODA squared			−0.011	
			(2.56)**	
Multilateral ODA				−0.301
				(0.72)
Multilateral ODA squared				0.021
				(1.29)
Observations	124	124	124	124

Note: (i) robust *t*-statistics are shown in parentheses; and (ii) *, ** and *** significant at the 10, 5 and 1 per cent levels, respectively.