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Aid Allocation Volatility to Small Island States

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Abstract

Aid is an important resource for developing countries. Many small island states (including those in the Pacific) are highly reliant on aid to supplement meagre government resources and other foreign capital inflows. This paper investigates the conditional volatility of aid (for bilateral aid disaggregated into sector aid and programme aid, and multilateral aid) to small island states using an econometric framework. In addition, year-on-year changes in aid allocation are also considered for both changes in aid allocations from major donors to the Pacific as well as for changes in aid receipts in 16 Pacific island countries. The entire sample of countries under consideration includes 44 aid-receiving (small island) states from the regions of

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Keywords: aid volatility, small island states

JEL classification: F35

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Asia-Pacific, Africa and the Americas over the period 1973 to 2004. This paper finds that past aid flows are correlated with present aid flows and that volatility on both sector and programme aid in the Americas and Asia-Pacific region are characterized by a higher degree of volatility than in the African region. An important result of the analysis is that shocks to bilateral aid result in the persistence of volatility for a number of years before stabilizing. This evidence of persistence in volatility, whereby the past levels of volatility influence the degree of volatility that can be expected in the future, implies a certain degree of predictability in the conditional volatility of bilateral aid. The paper also finds that on average multilateral aid is not only considerably more volatile than the bilateral aid, but it is also more unpredictable.

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1 Introduction

Aid is an important resource for developing countries. Many small island states, including those in the Pacific, are highly reliant on aid to supplement meagre government resources and other foreign capital inflows. Aid donors to these states are limited and dominated by a handful of countries. Consistent and reliable aid allocations from these donors are therefore desirable as it is becoming increasingly evident that high volatility in aid has a deleterious effect on economic growth and poverty alleviation (see Gemmell and McGillivray 1998; Lensink and Morrissey 2001; Bulir and Hamann 2001, 2003; Levin and Dollar 2005; Fielding and Mavrotas 2005).

The analysis of aid volatility has evolved from the aid effectiveness literature. This research is concerned with identifying factors which affect the stability of aid flows and the impact that this has on economic growth and poverty alleviation. It is important to note that various terms are used within the literature (such as variability, volatility and (un)predictability) to describe the phenomena of year-on-year changes in aid allocations (see for example, Hudson and Mosley 2006; Eifert and Gelb 2006; Arellano et al. 2006; Bulir and Hamann 2001). Although these terms are sometimes used interchangeably, the concepts of aid variability and volatility are usually used with negative connotations where any variability/volatility is perceived as detrimental. Conversely, the notion of 'aid (un)predictability' is associated with the idea that not all changes in aid inflows are unfavourable, so as long as they are anticipated/predictable. In this paper, we seek to reconcile the terminology used in the literature. We use the term (conditional)[1] volatility to describe the degree to which aid allocations vary on a year-by-year basis. We adopt the viewpoint that while high volatility is undesirable, low volatility represents periods of relatively stable (and thus predictable) aid inflows. Therefore, it is the degree to which aid allocations vary that is potentially of concern, not the existence of aid volatility per se.

This paper investigates year-on-year changes in aid allocation to small island states for the period 1973 to 2004. Small island states have been excluded from previous aid volatility studies. It is presumed this exclusion has been driven by significant data constraints. For example, within this paper, whilst 46 small islands states were identified as receiving aid during this period, simple estimates of population and gross domestic product (GDP) for Niue and Tokelau were not available. Given the size and capacity of these countries, it is not surprising that more sophisticated data (concerning trade openness, political freedom, imports, exports, etc.) also do not exist. Thus, excluding Niue and Tokelau, the sample of countries under consideration includes 44 aid-receiving small island states from the regions of Asia-Pacific, Africa and the Americas. Two exercises are undertaken to consider aid variation. The first employs a set of econometric techniques to both derive and model the conditional aid volatility. In light of the work of Fielding and Mavrotas (2005), which indicates the importance of disaggregating aid flows, we also examine the volatility of two different types of bilateral aid, namely the sector and programme aid, in addition to multilateral aid. The purpose of this exercise is primarily to examine whether there are extended periods of high (low) volatility in aid inflows to small island countries. The second is an analytical narrative of year-on-year variation of aid allocations to Pacific island countries by five major donors (Australia, France, Japan, UK and US) and of aid receipts to 16 Pacific

1 Conditional on an information set.

island countries. The purpose of this exercise is to illustrate the aid volatility experienced within the Pacific as data for these countries are extremely constrained.

The remainder of the paper is set out as follows. The relevant literature is summarized in section 2. Section 3 contains the first approach, including a brief description of our dataset, the econometric methodology and our empirical findings. Section 4 contains the discussion of year-on-year variations before various policy implications are noted in section 5. The paper is concluded in section 6.

2 Relevant literature

Investigating year-on-year changes in aid allocation is an important aspect of improving aid effectiveness, as 'aid uncertainty is consistently and significantly negatively related to growth, and this result is robust' (Lensink and Morrissey 2001: 16). Yet despite this importance, the literature on aid allocation remains relatively contained to a small number of papers and empirical studies.

Using a sample of 45 developing countries, Gemmell and McGillivray (1998) first identified that unpredicted shortfalls in aid frequently resulted in reductions in government spending, often resulted in increases in taxes, and were occasionally followed by both. These fiscal adjustments were costly, swift (and possibly inefficient), but were necessitated by the unexpected and unplanned reduction in aid disbursement by donors.

Using a dataset of 75 developing countries (including a subset of 36 African countries) for the period of 1975-95, Lensink and Morrissey (2001) examine the instability and uncertainty of aid and the impact that these have on economic growth. They argue that it is the stable, and predictable, aid flows that promote economic growth and not the level of aid *per se*, and observe the externalities associated with uncertainty to be higher than those associated with overall instability of aid. Their results imply that highly volatile aid, rather than achieving the intended effect of encouraging economic growth, actually impedes it by making it harder 'for recipients to predict future aid inflows that may permit more investment and better fiscal planning (2001: 16).

Bulir and Hamann (2003) have undertaken an analysis of variance of aid flows for 72 countries from 1975 to 1997. They find that aid is generally substantially more volatile than fiscal revenue and that those countries more dependent on aid also experience higher aid volatility. They further note that aid and domestic revenue move in the same direction. Bulir and Hamann conclude that both donors and recipients can reduce volatility by increasing compliance with programme objectives, improving programme design and enhancing cooperation and coordination amongst donors (see Hudson and Mosley 2006 for an alternative view).

More recently, using the coefficient of variation Vargas Hill (2005) reviews the aid volatility for 112 recipient countries between 1975 and 2002. Her general finding that 'aid cannot be predicted reliably on the basis of commitments' (2005: 8) supports the need highlighted previously by Bulir and Hamann (2003) that donors must take responsibility for volatility alongside recipients.

Difficult partnership countries are the focus of Levin and Dollar (2001). These specific countries (defined as those countries in the bottom two quintiles of the World Bank's Country Policy and Institutional Assessment ranking) are heavily reliant on aid to balance budgets and/or provide basic services. Reflecting the earlier findings of Gemmell and McGillivray (1998), Levin and Dollar (2005: 2) find that for the period 1992-2002, 'aid flows to difficult partnership countries are more volatile than those to other aid recipients'. Levin and Dollar define aid volatility by measuring the coefficient of variation. Levin and Dollar also produce a predictor of aid flows and find that certain countries ('aid darlings') receive more aid than is expected and other countries ('aid orphans') receive far less—around 40 per cent less than would be predicted by their policy and institutional strengths. The reasons for such volatility are borne by the recipient country: 'Donors react to improvements or deteriorations in recipient countries' policy climate and… to countries coming out of conflict by increasing or decreasing aid' (Levin and Dollar 2005: 23).

Finally, Fielding and Mavrotas (2005: 2) define volatility as 'the variance of that part of movement in aid that are orthogonal to the information set'. However, unlike previous studies, Fielding and Mavrotas distinguish between different types of aid, namely sector and programme aid in order to determine specifically volatility in different aid types. For 66 recipient countries over the period 1973-2002, they find that the macro stability in recipient countries (i.e., low inflation) reduces both sector and programme aid volatility and with sector aid in particular, lower volatility is associated with robust political institutions. Overall, Latin American recipient countries experience less sector aid volatility then recipients from other regions. However, countries that receive aid from one or two single donors have greater volatility than those whom receive aid from a wide variety of donors.

As noted, small islands states (particularly those from the Pacific) have been excluded from these empirical studies, presumably due to the data constraints faced for these countries.

3 Econometric analysis

3.1 Data

Our dataset consists of information on 44[2] small island countries from three regions, Asia-Pacific (18),[3] Americas (20) and Africa (6), for the period from 1973-2004. Data were collected from a variety of sources. Data for both bilateral and multilateral aid commitments were taken from the Creditor Reporting System database of the OECD's Development Assistance Committee. Multilateral aid was not disaggregated, however bilateral aid data were divided into sector aid and programme aid (emergency aid was excluded as this is volatile by its very definition). Sector and programme aid account for

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2 As noted, we did not have data on GDP or population for two Asia-Pacific countries (Niue and Tokelau) even though they did receive aid during this period. They therefore had to be dropped from the subsequent analysis of bilateral aid. In case of the multilateral aid, we also had no data for Palau and Singapore.

3 Sixteen of the 18 countries were located in the Pacific, with Singapore and the Maldives being the only Asian small island countries. (East Timor is considered a Pacific island country.)

over 90 per cent of total bilateral aid flows to these small island states. Sector aid is that aid allocated specifically to sectoral activities, such as water, education, health, civil society, governance, transport, agriculture, tourism, etc. Sector aid is the largest component of total bilateral aid flows and accounts for over two-thirds of total bilateral aid flows. Programme aid is allocated for general development purposes without specific sector allocation. Programme aid may or may not have restrictions on its specific use and includes development activities such as general budget support, food aid, and food security assistance. For these small island states, programme aid accounted for just less than one-quarter of total bilateral aid flows for the entire period 1973 to 2004. Multilateral aid was around one-third of the value of sector and programme aid for all small island states, and about 20 per cent of sector and programme aid for Pacific island states. The other data (population and gross domestic product (GDP) were taken from the UN statistical database. All aid data and GDP are reported in 2003 US dollars.

We construct our aid variables using GDP.[4] Therefore, the aid of type *j* received by country *i* in period *t*, as a proportion of that country's GDP at time *t*, is:

$$z_{it}^{j} = AID_{it}^{j} / GDP_{it}$$
$$j = \{SECTOR, PROGRAM, MULTILATERAL\}; i = 1...N; t = 1973,...2004$$

The descriptive statistics associated with the aid variables are shown in Tables A1-A3 in Appendix A. We find that our aid variables lack the symmetry required for a variance-based measure to be meaningful (see Fielding and Mavrotas 2005: 5). For most of the countries, and for both types of aid, the skewness is well above the desired value of zero. Thus, consistent with Fielding and Mavrotas (2005) we apply the following:

$$y_{it}^{j} = \ln\left[\left(\sum_{t} z_{it}^{j} / T\right) + z_{it}^{j}\right]$$

The descriptive statistics associated with the transformed variables are given in Tables A4-A6 in Appendix A. As indicated by the skewness statistics, the variables overall appear to be approximately symmetric with the skewness for the majority of countries being in the acceptable range.[5]

4 Fielding and Mavrotas (2005) suggest that remittances to certain countries (they proffer Swaziland as an example) are substantial relative to domestic production, thus making GNI a better representative of a country's available resources. However, this practice is not replicated within the wider literature (see Bulir and Hamann 2001, 2003; Vargas-Hill 2005; Levin and Dollar 2005; Alesina and Dollar 2000). Within this study, GDP is used as data because GNI for all countries across the period of study are not available. Indeed, a comparison between GDP and GNI (when it does exist) indicates the two figures are relatively similar. For example, the average correlation coefficient across all countries is 0.98 (whilst the range was 0.88 to 1.00), the average standard deviation is 4.2 and the average coefficient of variation is 0.042. Thus, when there is significant difference between GDP and GNI due to remittances (for example with Kiribati) the ratio between GDP and GNI remains relatively constant.

3.2 Methodology

We use an econometric model to extract a measure of aid volatility from our aid series y_{it}^{j}. We opt for a panel specification which allows us to fully exploit the structure of our dataset whereby we have observations over time for a number of different countries. The methodology that we use is based upon and broadly consistent with the autoregressive conditional heteroscedasticity (ARCH) framework used in financial econometrics for the modelling of return volatility (see Engle 1982). In our case, the ARCH framework cannot be implemented directly on a country-by-country basis given the small number of observations available for each small island state in our dataset. Thus, we utilize a two-step modelling process.

We begin by specifying a theoretical model for the conditional variance of aid. If we were to directly follow the ARCH framework in a panel setting, we would extend the typical dynamic panel specification to allow for time-varying variance and model the following:

$$y_{it}^{j} = \beta_0 + \delta_1 y_{it-1}^{j} + \delta_2 y_{it-2}^{j} + .. + \delta_p y_{it-p}^{j} + W_{it-1}\beta + \alpha_i + \sigma_{it}^{j} e_{it}^{j} \quad (1)$$

$$(\sigma_{it}^{j})^2 = \gamma_0 + \gamma_1 (\varepsilon_{it-1}^{j})^2 + ... + \gamma_k (\varepsilon_{it-k}^{j})^2 + X_{it}\theta + \eta_i \quad (2)$$

where $\varepsilon_{it}^{j} = \sigma_{it}^{j} e_{it}^{j}$ is the shock to aid of type *j* in country *i* at time *t* and (1) and (2) represent the specifications for the mean and the conditional variance of the aid series, respectively.

The specification given by (1) allows us to remove the autocorrelation from the aid series y_{it}^{j} through *p* lags of aid, $y_{it-1}^{j} ... y_{it-p}^{j}$; the influences of some country specific characteristics such as GDP and population, via W_{it-1}, as well as the impacts of the unobserved country-specific heterogeneity, α_i. By conditioning on the information set ($y_{it-1}^{j} ... y_{it-p}^{j}; W_{it-1}$), we isolate the 'pure' shocks to aid which then allows us to model the conditional aid volatility through the second specification. This specification, given by (2), postulates that the conditional variance of aid depends on the past values of the squared shocks, impacts of country characteristics contained in X_{it} and the effects of country specific heterogeneity, η_i. It should be noted that this implies that while the shocks to aid are random and should not be serially correlated, autocorrelation is not precluded in the squared shock series.

A problem that we have is that the model given by (1) and (2) cannot be estimated directly in its current form. To make the model operational, we will have to use a proxy for the unobservable conditional variance of aid and estimate the two equations separately. Following the ARCH framework and assuming that $(\sigma_{it}^{j})^2 - (\varepsilon_{it}^{j})^2 = v_{it}^{j}$, then (2) can be re-written as:

$$(\varepsilon_{it}^{j})^2 = \gamma_0 + \gamma_1 (\varepsilon_{it-1}^{j})^2 + ... + \gamma_k (\varepsilon_{it-k}^{j})^2 + X_{it}\theta + \eta_i + v_{it}^{j} \quad (3)$$

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5 As indicated by the skewness test and the associated p-value.

Thus, (2) translates into a model for the squared shocks $(\varepsilon_{it}^{j})^2$ which are unbiased estimates of the conditional variance of aid, $(\sigma_{it}^{j})^2$ and can be obtained from (1). Therefore, the residuals $\hat{\varepsilon}_{it}^{j}$, obtained by estimating (1), will proxy for the 'pure' shocks to aid, ε_{it}^{j}, whereas the squared residuals, $(\hat{\varepsilon}_{it}^{j})^2$, will represent a measure of aid volatility of country *i* in time period *t*. These will then be used to estimate (3).

Our specification for the conditional volatility not only indicates that volatility is time-varying but also explicitly assumes that it is autocorrelated. In other words, we postulate that the level of aid volatility in any given period depends on the level of volatility in the past periods. In the financial econometrics literature this impact of the past values is viewed and interpreted as an indicator of persistence in volatility. The estimated coefficient(s), attached to the lag(s) of the squared shocks, provide information on how long it takes for the impact of a shock to aid to disappear. This gives an indication as to whether there are extended periods of high (low) volatility and provides further information regarding approximately how long these are expected to last.

3.3 Extracting conditional aid volatility

In order for our model to be valid, the variables are precluded from being unit root processes. Thus, prior to estimation it was necessary to conduct the group unit root test (see Im, Pesaran and Shin 2003) on our aid variables, the logarithm of GDP and population. In case of both the sector and programme aid variables, the test (including an intercept and no trend) leads to a strong rejection of the null hypothesis that the variables are unit root processes. The test statistics for sector, programme and multilateral aid variables were -5.18, -5.29 and -18.99, respectively. We also rejected the null hypothesis of a unit root for the logarithm of population. Unsurprisingly however, the group test on the logarithm of GDP (with both an intercept and trend) resulted in a test statistic of 1.01 and indicated the presence of a unit root. As a result, the GDP variable had to enter our model in first differences. Therefore the empirical specification of (1) is given by:

$$y_{it}^{j} = \beta_0 + \delta_1 y_{it-1}^{j} + \delta_2 y_{it-2}^{j} + .. + \delta_p y_{it-p}^{j} + \beta_1 \Delta \ln GDP_{it-1} + \beta_2 \ln POP_{it-1} + \alpha_i + \varepsilon_{it}^{j}$$

where $\Delta \ln GDP_{it-1}$ represents the percentage change in GDP going from year *t*-2 to *t*-1 and $\ln POP_{it-1}$ is the lag of the logarithm of population. All other variables are as defined previously.

The model was estimated using the Blundell-Bond estimator (Blundell and Bond 1998). Note that the effect of population was found to be highly insignificant in all specifications and thus this variable was excluded. The results for both bilateral and multilateral aid are given in Table 1.

We find that three lags of the dependent variable are needed to sufficiently capture the dynamics of the series for both types of bilateral aid. Multilateral aid however, shows more dependency on past aid allocations requiring an extra lag to encapsulate the autocorrelation in the series. The results overall suggest that higher amounts of aid allocated in the past also lead to higher allocations in the present. As expected, growth in GDP decreases the amount received in terms of both types of bilateral aid, but particularly in the case of sector aid. Interestingly, the impact of a 1 per cent increase in GDP completely offsets the effect of growth in sector aid allocations over the previous three periods. Conversely, the impact of growth in GDP is found to have a statistically insignificant effect on the multilateral aid allocations. It is possible that multilateral aid allocations are determined more by political considerations at the international level than humanitarian need, hence the insignificant effect of GDP growth.

Table 1
Estimation results

Variable	Coefficient	Standard error	P-value
	Sector aid		
Lag 1	0.3344	0.0909	0.0000
Lag 2	0.3319	0.0589	0.0000
Lag 3	0.2386	0.0525	0.0000
ΔlnGDP	-0.8892	0.2642	0.0010
Constant	-0.2645	0.3449	0.4430
Hansen test	40.690		0.3960
Arellano-Bond tests for autocorrelation in d($\varepsilon_{it}^{sector}$)			
AR(1)	-3.5300		0.0000
AR(2)	-0.4300		0.6650
AR(3)	-0.6600		0.5060
AR(4)	0.0200		0.9810
	Programme aid		
Lag 1	0.3984	0.0688	0.0000
Lag 2	0.2911	0.0608	0.0000
Lag 3	0.2372	0.0533	0.0000
ΔlnGDP	-0.5473	0.2977	0.0660
Constant	-0.1816	0.1944	0.3500
Hansen test	38.000		0.5150
Arellano-Bond tests for autocorrelation in d($\varepsilon_{it}^{programme}$)			
AR(1)	-4.0200		0.0000
AR(2)	0.5200		0.6020
AR(3)	-1.7800		0.0750
AR(4)	0.9900		0.3240
	Multilateral aid		
Lag 1	0.2261	0.1167	0.0530
Lag 2	0.2277	0.0859	0.0080
Lag 3	0.1748	0.0786	0.0260
Lag 4	0.2389	0.0812	0.0030
ΔlnGDP	-0.3247	0.2603	0.2120
Constant	-0.5485	0.5644	0.3310
Hansen test	39.460		0.3180
Arellano-Bond tests for autocorrelation in d($\varepsilon_{it}^{sector}$)			
AR(1)	-3.3900		0.0010
AR(2)	0.0100		0.9940
AR(3)	-0.2500		0.8030
AR(4)	-1.0900		0.2750

Source: Authors' own estimates.

Table 2
Estimated average conditional volatility

Country	Average conditional aid volatility		
	Multilateral	Programme	Sector
Anguilla	0.6150	0.1626	0.2724
Antigua & Barbuda	0.4987	0.2417	0.2535
Aruba	0.6806	0.4023	0.4464
Bahamas	0.9498	0.7780	0.8374
Barbados	0.2356	0.1500	0.1628
Belize	0.3619	0.2019	0.2274
Cape Verde	0.2578	0.0660	0.1014
Comoros	0.3181	0.1358	0.1672
Cook Islands	0.6157	0.3017	0.2563
Cuba	0.5553	0.1905	0.2611
Dominica	0.3074	0.1079	0.1918
Dominican Republic	0.2424	0.0841	0.1219
East Timor	0.4342	0.0475	0.1481
Fiji	0.3889	0.1042	0.1194
French Polynesia	0.6182	0.1697	0.2123
Grenada	0.1953	0.1633	0.1620
Guinea-Bissau	0.3123	0.1106	0.1207
Guyana	0.3566	0.1583	0.1525
Haiti	0.1924	0.0687	0.0801
Jamaica	0.1503	0.0501	0.0762
Kiribati	0.3975	0.1922	0.2538
Maldives	0.4571	0.0957	0.1556
Marshall Islands	0.4159	0.1364	0.2511
Mauritius	0.1889	0.0927	0.0957
Micronesia	0.5922	0.1708	0.2560
Montserrat	0.4998	0.1432	0.1678
Nauru	0.1093	0.4286	0.3580
Netherlands Antilles	0.3582	0.2434	0.2516
New Caledonia	0.7032	0.1474	0.1561
Palau	–	0.1590	0.2335
Papua New Guinea	0.1419	0.0534	0.0701
Samoa	0.2062	0.0931	0.1221
Sao Tome & Principe	0.3053	0.1275	0.2048
Seychelles	0.3880	0.0757	0.0976
Singapore	–	0.3489	0.3661
Solomon Islands	0.5577	0.1923	0.2098
St Kitts-Nevis	0.5683	0.1371	0.1786
St Lucia	0.4905	0.2980	0.3831
St Vincent & Grenadines	0.2717	0.1755	0.1570
Suriname	0.2765	0.1694	0.1260
Tonga	0.3241	0.1205	0.1597
Trinidad & Tobago	0.2506	0.2966	0.3367
Tuvalu	0.6445	0.2043	0.2916
Vanuatu	0.3226	0.0961	0.1342

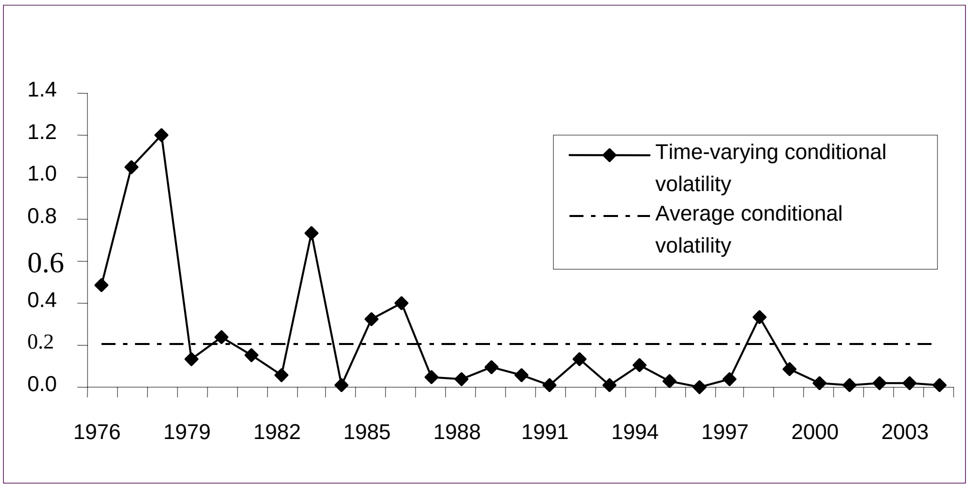
Source: Authors' own estimates.

The diagnostics associated with the estimated models indicate that there has been no violation of the dynamic panel assumptions. The Hansen test of over-identifying restrictions suggests that there is no endogeneity bias present in the models which means that the effects of the included regressors have not been under or over estimated. The Arellano-Bond autocorrelation test on the other hand indicates that there is no serial correlation in the error term ε_{it}^{j} (Arellano and Bond 1991).[6] This is essential to our analysis, given that we require that pure shocks be random and not be correlated.

The estimates of the average conditional volatility ($\sum_t (\hat{\varepsilon}_{it}^{j})^2 / T$) for the small island states in our sample are given in Table 2.

In the next step of our exercise, we model the extracted conditional volatility and retain the panel structure of the data. It is important to note that our methodology could accommodate country or donor characteristics *if* these were readily available for the small island states. The approach that we adopt stems from the notion that conditional volatility is time-varying. To illustrate this, consider the graph given in Figure 1, which plots the extracted conditional volatility for Belize versus its time average. As can be seen, there are considerable fluctuations in volatility over time. The graphs associated with the remaining countries for all three types of aid are given in Appendix B.

Figure 1
Conditional (programme) aid volatility - Belize



Source: Authors' own estimates.

3.4 Modelling conditional aid volatility

The conditional aid volatility models for the three different types of aid were estimated using the Blundell-Bond estimator and the results are provided in Table 2. There is some evidence (Fielding and Mavrotas 2005) to show that certain regions are more susceptible to higher volatility, therefore we include regional indicators for whether the

6 The fact that there is autocorrelation of order 1 does not violate any assumptions. The test itself is performed on the differenced error term d(ε_{it}^{j}) = ε_{it}^{j} - ε_{it-1}^{j} and therefore serial correlation of order 1 is to be expected since d(ε_{it}^{j}) = ε_{it}^{j} - ε_{it-1}^{j} and d(ε_{it-1}^{j}) = ε_{it-1}^{j} - ε_{it-2}^{j} share a common term.

country is in the Asia-Pacific region, Africa or the Americas as controls. The diagnostics show that the models are well-specified. For sector and programme aid, we find significant regional effects which may perhaps be capturing certain donor-related characteristics.[7] For instance, the two major donors to countries in the Asia-Pacific region are Australia (which on average was responsible for over 60 per cent of aid flows over the total period) and Japan (averaging 14 per cent). There are only three other donors to the Pacific of any note—the UK, France and the US (all averaging less than 10 per cent of aid flows between 1973 and 2004). Whereas the small island countries in the Americas are far more likely to be dependent on aid from the US, those located in the African region have a stronger reliance on EU countries (see Vargas Hill 2005).

As can be seen from Table 4, we find that relative to the African countries, those in the Americas and the Asia-Pacific region are characterized with a higher degree of volatility in both types of bilateral aid. Certainly given the heavy reliance on Australia and Japan (both being responsible for three-quarters of total aid to the Pacific for the period 1973 to 2004), this higher level of volatility is in line with the results of Fielding and Mavrotas (2005). However, the regional effects are found to be statistically insignificant in the model for the conditional volatility of multilateral aid.

Our results furthermore show that multilateral aid is, on average, considerably more volatile than the two types of bilateral aid. This is given by the estimated constants which imply that the average conditional volatility of multilateral aid is three times that of programme aid and 2.5 times that of sector aid. Multilateral aid allocations are about one-third of sector and programme bilateral aid allocations over the whole of the small islands states (and just over 20 per cent of sector and programme bilateral aid allocations for Pacific island states).

We also find evidence of autocorrelation and thus of persistence in volatility of sector and programme aid. This implies the presence of 'volatility clustering' where large changes in allocations of bilateral aid persist for a certain period of time, after which they are followed by a period of stable inflows. As can be seen from Table 3, both types of bilateral aid are characterized by approximately the same degree of persistence in volatility. In other words, the amount of time that it takes for the aid inflow to stabilize after a shock is the same for both sector and programme aid. While the degree of persistence that we observe is fairly small relative to that typically found for a financial time series, it does suggest that the effects of shocks to bilateral aid last for some time.

The timeframe itself can be analysed using an impulse response function, which charts the impact of a past shock on the level of volatility going k periods into the future. The impulse response function associated with volatility of sector aid is given in Figure 2. It should however, be noted that since we find the same level of persistence in volatility both types of bilateral aid, the impulse response function given by Figure 2 is also reflective of the process for the programme aid. Figure 2 shows that the effect of a shock decreases dramatically after the first year. However it does not disappear completely until after 4-5 years. In other words, our analysis suggests that if or when the small island states experience periods of highly volatile (bilateral) aid, these tend to last up to 4-5 years before stabilizing. Given the evidence in the literature regarding the

7 Historical, political and geographical relationships to aid allocation are explored in further detail in Alesina and Dollar (2000).

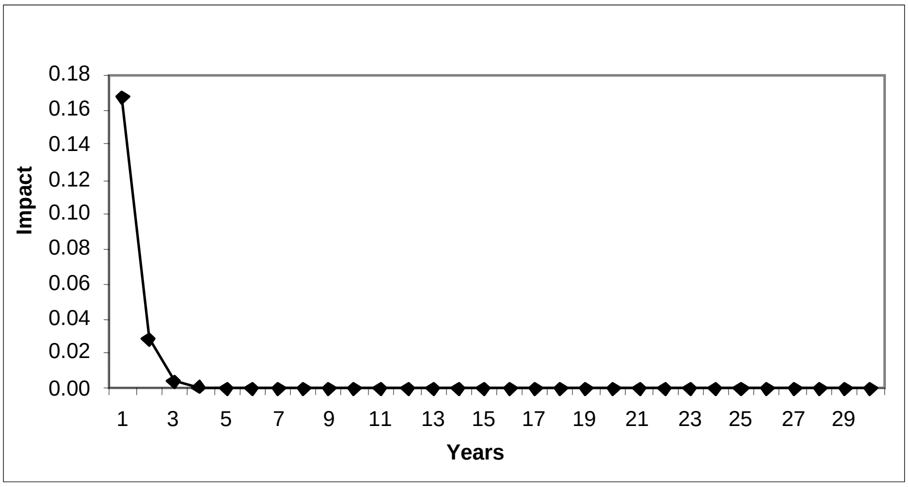
detrimental effect of fluctuating aid allocations, experiencing 4 to 5 years of unstable aid can potentially have staggering effect on a country's growth and development.

Table 3
Estimation results

Variable		Coefficient	Standard error	P-value
		Sector aid – conditional volatility		
Lag 1		0.1673	0.0591	0.0050
Region				
	Asia-Pacific	0.0730	0.0229	0.0010
	Americas	0.0801	0.0300	0.0080
Constant		0.0964	0.0141	0.0000
Hansen test		39.39		0.4980
Arellano-Bond tests for autocorrelation in d(v_{it}^{sector})				
AR(1)		-3.3500		0.0000
AR(2)		1.6000		0.1100
AR(3)		-1.3700		0.1710
AR(4)		-0.0300		0.9800
		Programme aid – conditional volatility		
Lag 1		0.1612	0.0398	0.0000
Region				
	Asia-Pacific	0.0586	0.0231	0.0110
	Americas	0.0809	0.0371	0.0110
Constant		0.0800	0.0125	0.0000
			0.0177	0.0000
Hansen test		39.20		0.5060
Arellano-Bond tests for autocorrelation in d($v_{it}^{programme}$)				
AR(1)		-2.9500		0.0030
AR(2)		1.3800		0.1690
AR(3)		0.2200		0.8240
AR(4)		-0.3100		0.7590
		Multilateral aid – conditional volatility		
Lag 1		0.0859	0.0685	0.2090
Region				
	Asia-Pacific	0.1118	0.0685	0.1030
	Americas	0.0958	0.0559	0.0870
Constant		0.2591	0.0389	0.0000
Hansen test		37.35		0.4990
Arellano-Bond tests for autocorrelation in d($v_{it}^{programme}$)				
AR(1)		-3.2300		0.0010
AR(2)		-0.5200		0.6050
AR(3)		0.7300		0.4660
AR(4)		-1.0800		0.2790

Source: Authors' own estimates.

Figure 2
Impulse response function: sector aid



Source: Authors' own estimates.

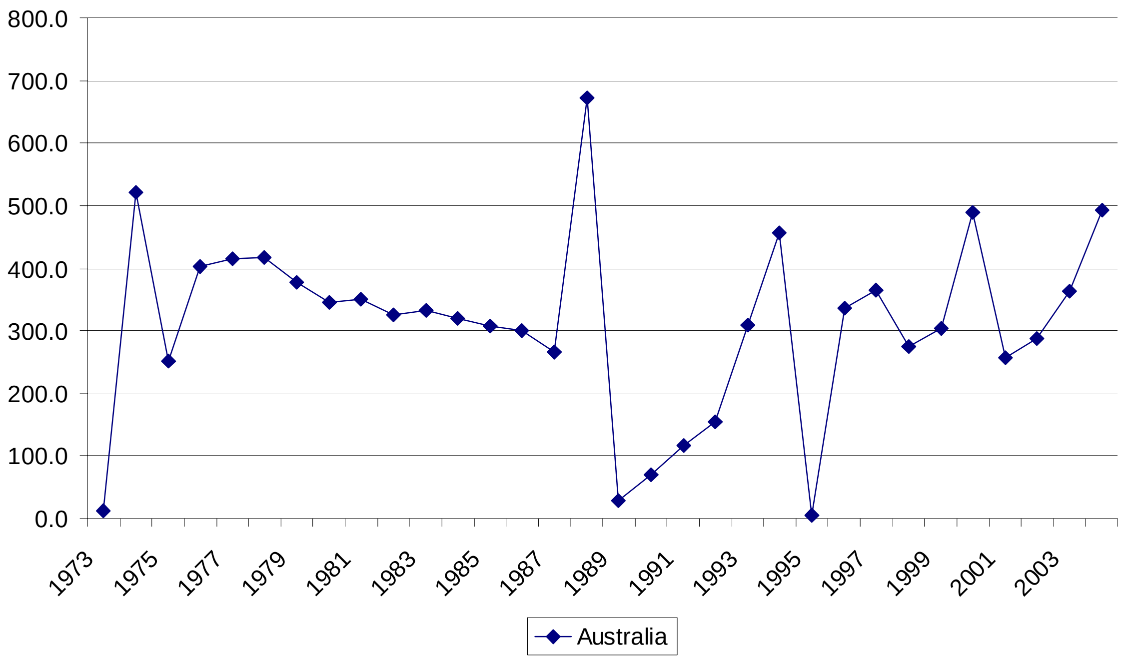
Persistence should not necessarily be viewed as a negative characteristic of conditional volatility. From a recipient's viewpoint, the fact that past values affect the future levels of volatility implies a degree of predictability in bilateral aid inflows to small island states. Although as shown, the periods of high volatility are likely to persist, they can be anticipated once a large change in aid allocations occurs. In terms of the multilateral aid however, the results show no evidence of a significant persistence of volatility. Even though this implies that a large variation in aid inflow does not necessarily signal a period of high volatility, it also means that multilateral aid allocations are more unpredictable. In other words, a stable flow in one period does not necessarily imply that a stable flow in the next period as well.

4 Analytical narrative of year-on-year variations in the Pacific

Due to data constraints, specific analysis of aid allocation and aid volatility based on the previous methodology is not possible solely for the Pacific region. However, we believe that there is some value in further illustrating the variation in aid allocation and aid receipts by considering simple year-on-year variations. This analytical narrative discusses various features of year-on-year variation of aid allocations by the five major donors to the Pacific (Australia, Japan, France, UK and US) and the experiences of 16 Pacific island aid recipient countries.

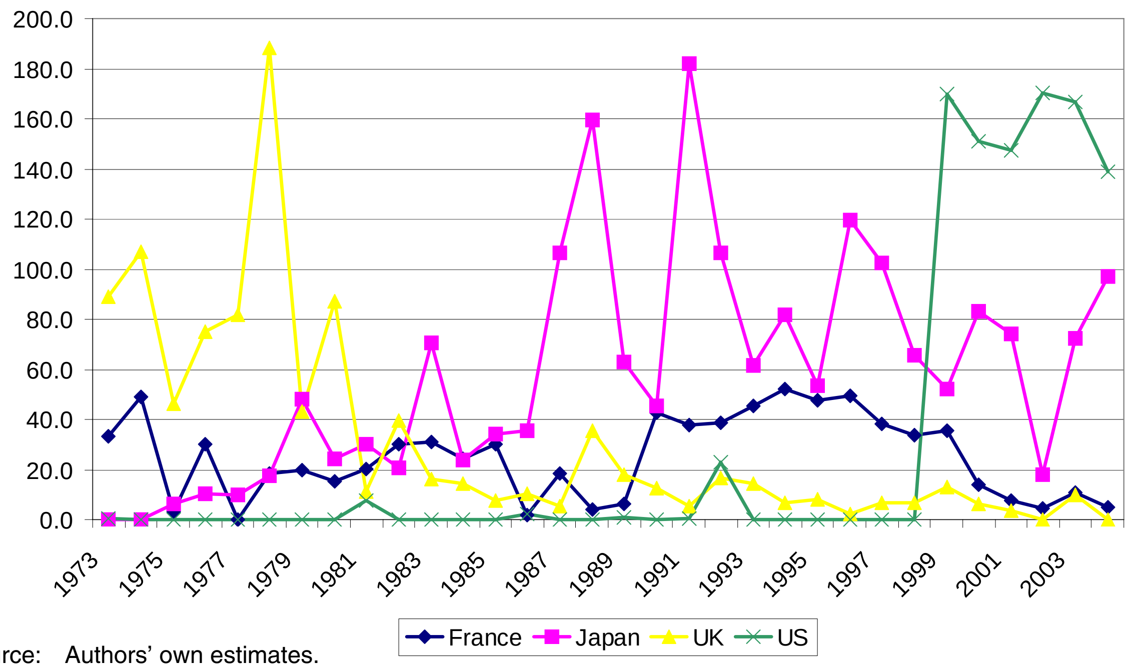
Australia is the largest single donor to the Pacific region, allocating on average over 60 per cent of total aid for the period 1973 to 2004. Australia's largest year-on-year variation for total aid to the Pacific region occurred between 1994-96 when total aid fell from US$456 million (in 2003 prices) to just US$6 million in 1995 before jumping again to US$337 million (an increase of nearly 5,400 per cent!) (see Figure 3). There was a similar dramatic increase in 1974 when aid to the Pacific increased from US$13 million to US$520 million—this was largely due to impending independence of Papua New Guinea (PNG) and most probably reflects a change in accounting for assistance to PNG rather than an absolute increase in assistance. Other than this initial increase in

Figure 3
Australian aid allocation to the Pacific region, 1973-2004 (US$2003, m.)



Source: Authors' own estimates.

Figure 4
Japanese, French, UK and US aid allocation to the Pacific region, 1973-2004 (US$2003, m.)



Source: Authors' own estimates.

total aid to the region, year-on-year variations in the Australian aid allocation to the Pacific were quite low (changes was limited to less than 10 per cent) for the decade 1977 to 1986. However, for the period 1987 to 2004, Australian aid (both sector and programme) to the Pacific varied greatly from year to year. For instance, aid fell from US$672 million to US$28 million between 1988 and 1989 and reduced by one-half and one-quarter in 1998 and 2001, respectively. Excluding these dramatic falls (and immediate increases in subsequent year), aid from Australia to the Pacific still fluctuated on average by 55 per cent each year for the period 1987 to 2004.

Year-on-year variations of total aid from France, Japan and UK were of similar magnitude to Australia (see Figure 4). For instance, France virtually cut all its aid to the Pacific in 1975, 1977, 1986 and 1988—with resumption of aid in the intermediate years. However, French aid has recently steadily reduced and is now at around 10 per cent of the aid provided to the region three decades ago (in real terms). The average year-on-year variation for French aid to the Pacific (excluding the period to 1979 in which French aid was characterized by its on-off allocation) was, as with Australian aid, around 55 per cent. On three occasions, Japanese aid to the Pacific was cut by between half and three-quarters from one year to the next, with the average year-on-year variation between 1974 and 2004 being 77 per cent. The UK has reduced its aid to the Pacific from 1980s to the present. The average aid allocation for the period 1973 to 1982 (whilst the UK still allocated a reasonable level of aid to the Pacific) was around US$80 million and year-on-year variation during this period averaged just below 40 per cent. The UK allocated an average of only US$10 million between 1983 and 2004. The US did not allocated significant aid to the Pacific until 1999, after which it average an allocation of US$158 million, with a small year-on-year variation of less than 10 per cent.

Table 4
Coefficient of variation of aid allocated by major donors to Pacific island countries, 1973-2004

Country	Total bilateral aid	Sector aid	Programme aid
United States	2.034261	2.506224	0.534433
United Kingdom	1.343141	1.3726	0.780617
Japan	0.766809	0.799708	2.959481
France	0.650288	0.67085	NA
Australia	0.482856	1.090147	0.920026

Source: Authors' own estimates.

Table 5
Coefficient of variation of total aid received by Pacific island countries, 1973-2004

Country	CV for 1973-2004
Palau	1.958279
Micronesia	1.785031
Nauru	1.472914
Cook Islands	0.993695
Kiribati	0.904458
East Timor	0.897083
French Polynesia	0.808023
Marshall Islands	0.803424
Solomon Islands	0.719717
Fiji	0.677183
Tuvalu	0.659515
Tonga	0.591064
New Caledonia	0.585015
Vanuatu	0.578391
Samoa	0.531411
Papua New Guinea	0.46392

The United States and United Kingdom display the greatest level of volatility of total aid allocations to the Pacific for the period 1973 to 2004, whereas Australia, France and Japan show the lowest volatility over this time. However, in sector aid allocations, Australia's volatility increases but Japan and France's levels remain at similar levels. Again, the US and UK display similarly high levels of volatility to that of total aid. However, for programme aid, only Japan has a high level of coefficient of variation and this is largely because of its spasmodic allocation of programme aid.

While volatility of aid allocations from Australia, Japan and France to the Pacific as a whole may be at reasonable levels, this may betray higher levels of volatility within the region for specific countries. Allocations of aid internally to the Pacific may be much higher as aid allocations to Pacific countries vary greatly on a year to year basis. For example, Australia (or Japan or France) may transfer aid from one country another, year by year, whilst keeping the total allocation to the region relatively stable. This is better illustrated in Table 5.

In terms of aid receipts in the Pacific, the country that recorded the single greatest year-on-year variation was Nauru in 1994, whose aid receipts increased nearly 80,000 per cent (from US$0.05 million to US$39 million—and back again to US$0.04 million in

Table 6
Reduction in aid receipts of Pacific countries

Country	Reduction of more than 90% of aid receipts	Reduction of between 75-90% of aid receipts	Reduction of between 50-75% of aid receipts
Cook Islands	1984, 1986	1979, 1988, 1989, 1991, 1993	1997, 2000
East Timor			
Fiji		1976, 1979, 1989	1997, 1999, 2000
French Polynesia			1975, 1978, 1988, 1989
Kiribati	1992	2002	1974, 1978, 1984, 1986, 1994, 1998
Marshall Islands	1998		
Micronesia	1995, 1998		1993
Nauru	1995	1997, 1999, 2000	
New Caledonia	1975, 1977, 1986	1988	
Palau		1998, 2000	
Papua New Guinea	1995	1989	1975, 2001
Samoa		1974, 1982	1976, 1986, 1991, 1996
Solomon Islands	1975	1979, 1985	1981, 1983, 1995, 1997, 2001
Tonga		1998	1979, 1984, 1985, 1989
Tuvalu		1989, 1997, 2000	1979, 1987, 2002
Vanuatu		1975, 1990	1981, 1984, 1995, 1997, 1999

Australia). Other extraordinary one-off increases included a 40,000 percentage increase in Micronesia's aid receipts from 1998 to 1999 (following an almost cessation of aid to Micronesia in 1998). As was the case with Papua New Guinea (PNG) in 1974, total aid to the newly independent Eat Timor increased dramatically in 1998 and 1999—from US$0.01 million in 1997 to US$221 million in 1999.

On 17 separate occasions (between 1974 and 2004), a Pacific island country had its total aid receipts reduced by over 90 per cent (see Table 6). On another 27 instances, Pacific island countries had their aid receipts reduced by between 75 to 90 per cent, and on 41 further occasions, the aid receipts were reduced by between 50 and 75 per cent from the proceeding year. Indeed, in only three years (1980, 2003, and 2004) has a fall in total aid receipts of more than 50 per cent not been experienced by any Pacific country. (In 1980, Samoa's total aid was reduced by 41 per cent, in 2003 PNG's total aid was cut by a quarter, and in 2004 Vanuatu's total aid was reduced by 46 per cent).

5 Policy implications

Aid volatility occurs when a recipient country receives differing levels of aid from year to year. The conclusions of the aid volatility literature are relatively clear and robust—large year-on-year changes in aid flows have deleterious effects on economic growth and poverty alleviation Lensink and Morrissey (2001). This paper finds that for the 44 small island states analysed, bilateral aid volatility in one year has a persistent effect in future years and that volatility in the Pacific is widespread. Further, multilateral aid is more volatile than both sector (2.5 times more) and programme (3 times more) aid allocations. These findings have important policy implications.

Shocks to aid flows are not isolated. The impacts of a single shock carry forward and affect aid allocations for the following four to five years. Therefore aid receipts bounce around following an aid shock and if another aid shock follows within this period, the inconsistency of aid flows continues to be exacerbated. While all regions analysed were susceptible to aid volatility, the Asia-Pacific and Americas regions were characterized by a higher degree of volatility than Africa. This, however, was particularly evident in the Pacific, with a large number of examples in which aid allocation virtually ceased from one year to the next before being re-established at previous levels a year later. This staccato effect is quite the opposite of stable aid flows suggested by the literature as being beneficial for aid recipients. Both donors and recipients (especially for the Asia-Pacific and Americas regions) must work in cooperation to reduce aid shocks and seek a more consistent flow of aid to achieve more optimal outcomes. This also means that aid allocation must be considered at the country level, rather than at a region level so not to mask intraregional volatility.

Consideration of the causes of aid volatility is therefore very important. Aid volatility has been analysed (in the same vein as the general aid effectiveness literature) by focusing on factors exogenous to the donor country. For example, Fielding and Mavrotas (2005) suggest that the size of aid flows, per capita income, institutional quality, and the governing policy regime may all affect the uncertainty of aid flows. Levin and Dollar (2005: 6) use a similar approach, 'aid flows to DPCs (difficult partnership countries) are more volatile than those to other aid recipients; however, this volatility is explained by the more unstable political climate of DPCs and its greater preponderance for vacillation between conflict and peace'. Aid volatility is therefore again being explained by factors exogenous to the donor. In this way, recipient countries are (implicitly) being held responsible for aid volatility.

Whilst recipient countries can make themselves attractive (or unattractive) to donors, the ultimate decision on aid allocation lies solely with donors—not recipients. Ultimately, aid volatility is therefore a function of the decisions taken by donors in committing and then disbursing their aid. Analysing aid volatility by focussing on factors that are exogenous to the donor might therefore be insufficient. It may be that factors endogenous to the donor might offer greater explanation of aid volatility. Levin and Dollar's (2005: 23) claim of donors always acting 'rationally' in determining aid and reacting 'to improvements or deteriorations in recipient countries' policy climate and, as we discussed before, to countries coming out of conflict by increasing or decreasing aid allocations' must be questioned.

Certainly a wider[8] explanation of the unpredictability of aid flows should be sought in which its responsibility is not laid at the feet of whom it may not belong—the poor. Determining if particular donors are predictably unpredictable in their aid disbursements is required to develop this aid volatility literature. Following this, a study of factors endogenous to donors may be useful to gain additional information than that that may be gained on aid volatility by seeking explanations solely through factors exogenous to donors. Acknowledgement of this imperative exists within the Rome Declaration of Aid Harmonization in 2003 and the Paris Declaration of Aid effectiveness in 2005. As Fielding and Mavrotas (2005) finally note, the speedy implementation of these initiatives is required to improve aid effectives, and as this paper highlights, this includes Small island countries.

6 Conclusion

This paper has investigated the variations in sector and programme aid allocated to 44 small island states over the period 1973 to 2004. Two exercises were undertaken to understand this variation. First, an econometric technique was applied to all 44 countries. This approach found that past aid flows are correlated with present aid flows so that aid shocks result in the persistence of volatility for a number of years before stabilizing, and that volatility on both sector and programme aid in the Americas and Asia-Pacific region are characterized by a higher degree of volatility than small islands states in the African region. Second, an analytical narrative of year-on-year variation of aid allocations to the Pacific region was undertaken. This analysis considered aid allocation of the five largest aid donors to the Pacific as well as the experiences of 16 aid-receiving Pacific island countries. This methodology illustrated the staccato characteristics of aid flows to this region.

This paper argues that greater consideration of variable endogenous to the aid donor must be considered to explain aid variations. Aid is more effective if its flows are certain. Small island countries have not experienced this certainty over the past three decades. Donors and recipients must work together to reverse this experience.

8 See Fielding, McGillivray and Torres (2006).

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Appendix Table A1
Descriptive statistics – original aid data

Sector Aid	Mean	Median	Max	Min	Std dev.	Skew.	Kurt.	JB Stat	P-value	N
Nauru	0.0084	0.0000	0.1574	0.0000	0.0286	4.6670	24.5603	735.9594	0.0000	32
Barbados	0.0061	0.0013	0.0750	0.0001	0.0138	4.1365	20.7112	509.5032	0.0000	32
Mauritius	0.0169	0.0124	0.1134	0.0005	0.0199	3.7237	18.6194	399.2391	0.0000	32
Bahamas	0.0001	0.0000	0.0015	0.0000	0.0003	3.6808	17.4620	351.1255	0.0000	32
Kiribati	0.2188	0.1450	1.4470	0.0120	0.2604	3.4634	16.6942	314.0136	0.0000	32
Trinidad & Tobago	0.0017	0.0005	0.0156	0.0000	0.0031	3.3767	14.6446	241.6041	0.0000	32
St Lucia	0.0003	0.0002	0.0019	0.0000	0.0004	3.1592	14.6028	232.7288	0.0000	32
Palau	0.0270	0.0000	0.2899	0.0000	0.0604	3.0720	12.7587	177.3065	0.0000	32
Singapore	0.0365	0.0024	0.3808	0.0000	0.0871	2.9846	10.9801	132.4163	0.0000	32
Montserrat	0.2154	0.0546	1.7469	0.0000	0.3668	2.7364	10.9672	124.5679	0.0000	32
Micronesia	0.0457	0.0000	0.3953	0.0000	0.0865	2.4505	9.5294	88.8694	0.0000	32
Antigua & Barbuda	0.0178	0.0085	0.1044	0.0000	0.0283	2.3505	7.2682	53.7550	0.0000	32
Aruba	0.0018	0.0000	0.0140	0.0000	0.0039	2.1834	6.4459	41.2583	0.0000	32
Anguilla	0.0569	0.0389	0.2944	0.0000	0.0707	2.1247	7.4979	51.0519	0.0000	32
St Kitts-Nevis	0.0133	0.0059	0.0785	0.0000	0.0202	2.1051	6.4488	39.4919	0.0000	32
Belize	0.0402	0.0224	0.2033	0.0030	0.0487	2.0999	6.4050	38.9768	0.0000	32
Marshall Islands	0.0625	0.0000	0.4737	0.0000	0.1159	2.0890	6.7424	41.9473	0.0000	32
Fiji	0.0122	0.0094	0.0500	0.0001	0.0100	2.0051	7.6141	49.8295	0.0000	32
St Vincent & Grenadines	0.0301	0.0223	0.1495	0.0000	0.0339	1.9421	6.7564	38.9311	0.0000	32
Cape Verde	0.1113	0.1025	0.4009	0.0000	0.0726	1.8978	9.1279	69.2763	0.0000	32
Grenada	0.0298	0.0206	0.1149	0.0003	0.0295	1.7549	5.2716	23.3045	0.0000	32
Comoros	0.0996	0.0799	0.3931	0.0000	0.0904	1.7465	5.8869	27.3808	0.0000	32
Dominican Republic	0.0092	0.0070	0.0310	0.0028	0.0066	1.7439	5.5641	24.9861	0.0000	32
East Timor	0.4577	0.5469	0.5949	0.0050	0.2079	-1.7308	4.4503	4.1083	0.1282	7
Samoa	0.1564	0.1137	0.5335	0.0206	0.1302	1.6736	5.1558	21.1345	0.0000	32
Tonga	0.1001	0.0872	0.3539	0.0000	0.0697	1.5759	6.5416	29.9694	0.0000	32
Vanuatu	0.0805	0.0750	0.2673	0.0083	0.0549	1.5084	5.7309	22.0793	0.0000	32
Sao Tome & Principe	0.0314	0.0269	0.1298	0.0000	0.0296	1.5080	5.4527	20.1494	0.0000	32

Appendix Table A1 continues

Appendix Table A1 (con't)
Descriptive statistics – original aid data

Sector aid	Mean	Median	Max	Min	Std dev.	Skew.	Kurt.	JB Stat	P-value	N
Tuvalu	0.3156	0.2094	1.1429	0.0000	0.2977	1.4142	4.3571	13.1218	0.0014	32
Netherlands Antilles	0.0154	0.0021	0.0788	0.0000	0.0216	1.3927	3.9814	11.6284	0.0030	32
Cook Islands	0.0307	0.0247	0.1191	0.0000	0.0316	1.3306	4.5155	12.5041	0.0019	32
Jamaica	0.0165	0.0109	0.0500	0.0014	0.0125	1.3071	3.7718	9.9064	0.0071	32
Papua New Guinea	0.0323	0.0221	0.1081	0.0013	0.0277	1.1710	3.5193	7.6731	0.0216	32
Seychelles	0.0480	0.0326	0.1591	0.0000	0.0446	1.1557	3.3325	7.2703	0.0264	32
Solomon Islands	0.5279	0.3528	1.6657	0.0130	0.4179	1.0173	3.1707	5.5582	0.0621	32
Guyana	0.0809	0.0641	0.2472	0.0037	0.0702	0.9715	3.0994	5.0471	0.0802	32
Haiti	0.0525	0.0496	0.1268	0.0135	0.0231	0.9360	4.7499	8.7553	0.0126	32
Guinea-Bissau	0.1739	0.1449	0.4370	0.0000	0.1138	0.8120	3.3215	3.6541	0.1609	32
Suriname	0.0481	0.0359	0.1660	0.0000	0.0485	0.8097	2.5368	3.7823	0.1509	32
Cuba	0.0008	0.0004	0.0030	0.0000	0.0009	0.7795	2.5799	3.4760	0.1759	32
New Caledonia	0.0086	0.0088	0.0292	0.0000	0.0073	0.7004	3.2826	2.7227	0.2563	32
Dominica	0.0555	0.0400	0.1446	0.0052	0.0408	0.6872	2.2656	3.2378	0.1981	32
Maldives	0.0504	0.0454	0.1367	0.0000	0.0371	0.6079	2.5887	2.1966	0.3334	32
French Polynesia	0.0066	0.0068	0.0202	0.0000	0.0057	0.5978	2.6317	2.0867	0.3523	32

Appendix Table A2
Descriptive statistics – original aid data – PROGRAMME AID

Programme aid	Mean	Median	Max	Min	Std dev.	Skew.	Kurt.	JB Stat	P-value	N
Barbados	0.0068	0.0019	0.0751	0.0001	0.0138	4.0125	20.0047	471.4105	0.0000	32
Mauritius	0.0199	0.0150	0.1271	0.0016	0.0223	3.6120	18.0468	371.4571	0.0000	32
Seychelles	0.0959	0.0549	0.8039	0.0004	0.1502	3.5684	16.7973	321.7327	0.0000	32
Kiribati	0.2572	0.1844	1.4647	0.0280	0.2594	3.2911	15.8544	278.0801	0.0000	32
Trinidad & Tobago	0.0018	0.0009	0.0156	0.0000	0.0032	3.1075	12.9309	182.9978	0.0000	32
Aruba	0.0038	0.0000	0.0418	0.0000	0.0089	2.9834	12.0742	157.2588	0.0000	32
Singapore	0.0366	0.0024	0.3814	0.0000	0.0872	2.9812	10.9663	132.0183	0.0000	32
St Kitts-Nevis	0.0232	0.0081	0.1939	0.0003	0.0418	2.8657	11.0337	129.8543	0.0000	32
Bahamas	0.0002	0.0000	0.0015	0.0000	0.0003	2.8549	10.7940	124.4628	0.0000	32
Nauru	0.0674	0.0000	0.7083	0.0000	0.1531	2.7520	10.9145	123.9112	0.0000	32
Montserrat	0.3086	0.0946	2.2513	0.0024	0.4756	2.5678	10.0313	101.0841	0.0000	32
St Vincent & Grenadines	0.0436	0.0305	0.2461	0.0010	0.0496	2.4198	9.8564	93.9091	0.0000	32
Cook Islands	0.0513	0.0322	0.3074	0.0000	0.0698	2.3346	8.1003	63.7525	0.0000	32
Palau	0.0454	0.0000	0.3857	0.0000	0.0896	2.2550	7.9083	59.2427	0.0000	32
St Lucia	0.0004	0.0003	0.0019	0.0000	0.0004	2.2243	8.8906	72.6529	0.0000	32
Antigua & Barbuda	0.0203	0.0108	0.1047	0.0000	0.0290	2.0909	6.1236	36.3264	0.0000	32
Fiji	0.0135	0.0104	0.0509	0.0034	0.0099	1.9957	7.6266	49.7813	0.0000	32
Grenada	0.0446	0.0280	0.2025	0.0027	0.0441	1.9601	6.6947	38.6913	0.0000	32
Anguilla	0.0896	0.0487	0.4085	0.0000	0.1021	1.7054	5.3501	22.8745	0.0000	32
Suriname	0.0777	0.0520	0.3611	0.0022	0.0807	1.6982	6.0366	27.6752	0.0000	32
Samoa	0.1646	0.1168	0.5516	0.0210	0.1310	1.6973	5.3275	22.5877	0.0000	32
Haiti	0.0717	0.0651	0.1893	0.0259	0.0321	1.6079	6.9169	34.2446	0.0000	32
Dominican Republic	0.0118	0.0093	0.0354	0.0029	0.0087	1.5435	4.4322	15.4401	0.0004	32
Marshall Islands	0.1185	0.0000	0.6062	0.0000	0.2102	1.5165	3.5591	12.6831	0.0018	32
Micronesia	0.0986	0.0000	0.5144	0.0000	0.1784	1.5030	3.5038	12.3861	0.0020	32
Cape Verde	0.1729	0.1678	0.5526	0.0000	0.1000	1.5008	7.8805	43.7719	0.0000	32
Belize	0.0534	0.0306	0.2087	0.0031	0.0549	1.4779	4.0734	13.1853	0.0014	32
Comoros	0.1195	0.0922	0.3931	0.0098	0.0923	1.4037	4.7809	14.7376	0.0006	32

Appendix Table A2 continues

Appendix Table A2 (con't)
Descriptive statistics – original aid data – PROGRAMME AID

Programme aid	Mean	Median	Max	Min	Std dev.	Skew.	Kurt.	JB Stat	P-value	N
Tonga	0.1150	0.0947	0.3716	0.0000	0.0733	1.3175	5.7429	19.2893	0.0001	32
Vanuatu	0.1229	0.1072	0.3458	0.0184	0.0674	1.2636	5.4528	16.5374	0.0003	32
East Timor	0.5707	0.6251	0.8631	0.0055	0.2772	-1.2609	3.6397	1.9742	0.3727	7
Guyana	0.1240	0.0985	0.4799	0.0039	0.1127	1.2327	4.3913	10.6845	0.0048	32
Solomon Islands	0.6893	0.5034	2.0610	0.0603	0.5764	1.2097	3.4472	8.0711	0.0177	32
Tuvalu	0.4428	0.4017	1.4273	0.0000	0.3634	1.1466	3.8113	7.8895	0.0194	32
Netherlands Antilles	0.0183	0.0052	0.0788	0.0000	0.0234	1.0920	2.9179	6.3687	0.0414	32
Jamaica	0.0313	0.0211	0.1010	0.0020	0.0223	1.0219	3.8870	6.6190	0.0365	32
Guinea-Bissau	0.2740	0.2238	0.7969	0.0026	0.1827	0.9931	3.7431	5.9961	0.0499	32
Sao Tome & Principe	0.0440	0.0375	0.1336	0.0000	0.0320	0.7929	3.3139	3.4846	0.1751	32
New Caledonia	0.0087	0.0092	0.0293	0.0000	0.0073	0.6641	3.2668	2.4470	0.2942	32
Maldives	0.0579	0.0518	0.1427	0.0000	0.0378	0.5418	2.6065	1.7722	0.4123	32
French Polynesia	0.0076	0.0081	0.0203	0.0000	0.0062	0.5167	2.4487	1.8291	0.4007	32
Cuba	0.0011	0.0011	0.0032	0.0000	0.0010	0.4253	1.8661	2.6788	0.2620	32
Dominica	0.0877	0.0824	0.1866	0.0079	0.0484	0.2471	2.0802	1.4538	0.4834	32
Papua New Guinea	0.0706	0.0688	0.1461	0.0038	0.0331	0.1428	3.0806	0.1174	0.9430	32

Appendix Table A3
Descriptive statistics – original aid data – MUTILATERAL AID

Multilateral aid	Mean	Median	Max	Min	Std dev.	Skew.	Kurt.	JB Stat.	P-value	N
Anguilla	0.0046	0.0000	0.0395	0.0000	0.0106	2.2953	6.7491	46.8393	0.0000	32
Antigua & Barbuda	0.0012	0.0004	0.0080	0.0000	0.0022	2.1440	6.2449	38.5553	0.0000	32
Aruba	0.0003	0.0000	0.0045	0.0000	0.0010	3.5659	14.4851	243.6943	0.0000	32
Bahamas	0.0001	0.0000	0.0015	0.0000	0.0003	2.8293	10.6175	120.0628	0.0000	32
Barbados	0.0033	0.0006	0.0246	0.0000	0.0058	2.3833	8.0558	64.3745	0.0000	32
Belize	0.0044	0.0016	0.0196	0.0000	0.0055	1.2755	3.8395	9.6166	0.0082	32
Cape Verde	0.0579	0.0567	0.3029	0.0000	0.0561	2.5727	12.4183	153.5737	0.0000	32
Comoros	0.0663	0.0466	0.2123	0.0000	0.0629	0.8857	2.7816	4.2478	0.1196	32
Cook Islands	0.0127	0.0000	0.0780	0.0000	0.0221	1.7572	5.0004	21.8028	0.0000	32
Cuba	0.0002	0.0000	0.0009	0.0000	0.0003	1.2771	3.0254	8.6995	0.0129	32
Dominica	0.0292	0.0247	0.1046	0.0000	0.0297	0.7569	2.5664	3.3060	0.1915	32
Dominican Republic	0.0049	0.0023	0.0289	0.0000	0.0074	2.3416	7.6914	58.5888	0.0000	32
East Timor	0.0567	0.0672	0.1309	0.0026	0.0429	0.4461	2.3630	0.3505	0.8392	7
Fiji	0.0032	0.0012	0.0213	0.0000	0.0047	2.2882	8.3795	66.5106	0.0000	32
French Polynesia	0.0003	0.0000	0.0030	0.0000	0.0006	2.8017	11.9917	149.6661	0.0000	32
Grenada	0.0140	0.0120	0.0444	0.0000	0.0116	0.6150	2.7134	2.1268	0.3453	32
Guinea-Bissau	0.1150	0.0862	0.3837	0.0000	0.1048	1.2899	3.9519	10.0814	0.0065	32
Guyana	0.0642	0.0344	0.3497	0.0000	0.0776	1.8245	6.8757	37.7817	0.0000	32
Haiti	0.0320	0.0265	0.1149	0.0000	0.0269	1.3850	4.7549	14.3374	0.0008	32
Jamaica	0.0051	0.0058	0.0105	0.0000	0.0034	-0.0713	1.8069	1.9251	0.3819	32
Kiribati	0.0481	0.0227	0.2673	0.0000	0.0650	1.7885	5.6956	26.7481	0.0000	32
Maldives	0.0194	0.0081	0.0774	0.0000	0.0239	1.0706	3.0943	6.1251	0.0468	32
Marshall Islands	0.0191	0.0000	0.1684	0.0000	0.0416	2.1887	7.0082	46.9682	0.0000	32
Mauritius	0.0054	0.0025	0.0393	0.0000	0.0077	2.9340	12.9743	178.5597	0.0000	32
Micronesia	0.0068	0.0000	0.1289	0.0000	0.0253	4.0803	19.0140	430.7242	0.0000	32
Montserrat	0.0127	0.0000	0.2072	0.0000	0.0412	3.9330	17.8600	376.9252	0.0000	32
Nauru	0.0051	0.0000	0.1630	0.0000	0.0288	5.3882	30.0323	1129.1630	0.0000	32
Netherlands Antilles	0.0018	0.0001	0.0253	0.0000	0.0047	4.2356	21.2862	541.5271	0.0000	32
New Caledonia	0.0004	0.0000	0.0029	0.0000	0.0008	1.8037	5.3276	24.5752	0.0000	32

Appendix Table A3 continues

Appendix Table A3 (con't)
Descriptive statistics – original aid data – MUTILATERAL AID

Multilateral aid	Mean	Median	Max	Min	Std dev.	Skew.	Kurt.	JB Stat.	P-value	N
Papua New Guinea	0.0095	0.0094	0.0259	0.0000	0.0067	0.4500	2.6320	1.2606	0.5324	32
Sao Tome & Principe	0.0252	0.0116	0.1152	0.0000	0.0297	1.5295	4.6707	16.1976	0.0003	32
Seychelles	0.0119	0.0036	0.1099	0.0000	0.0250	3.1770	12.1042	164.3443	0.0000	32
Solomon Islands	0.2166	0.0995	1.4397	0.0000	0.3323	2.5588	9.0702	84.0504	0.0000	32
St Kitts-Nevis	0.0015	0.0000	0.0100	0.0000	0.0029	1.7557	4.7423	20.4868	0.0000	32
St Lucia	0.0001	0.0001	0.0006	0.0000	0.0001	1.5573	5.7057	22.6955	0.0000	32
St Vincent & Grenadines	0.0199	0.0126	0.0927	0.0000	0.0245	1.3216	4.0638	10.8238	0.0045	32
Suriname	0.0085	0.0037	0.0447	0.0000	0.0117	1.9017	5.6963	28.9816	0.0000	32
Tonga	0.0352	0.0248	0.1283	0.0000	0.0342	0.9635	3.2266	5.0198	0.0813	32
Trinidad & Tobago	0.0012	0.0004	0.0138	0.0000	0.0026	3.8582	18.4370	397.1237	0.0000	32
Tuvalu	0.0513	0.0028	0.4612	0.0000	0.1005	2.5325	9.8659	97.0596	0.0000	32
Vanuatu	0.0287	0.0156	0.1238	0.0000	0.0327	1.1573	3.6729	7.7466	0.0208	32
Samoa	0.0857	0.0554	0.2954	0.0000	0.0840	1.1332	3.1557	6.8815	0.0320	32

Appendix Table A4
Descriptive statistics – transformed aid data – SECTOR AID

Sector aid	Mean	Median	Max	Min	Std dev.	Skew.	Sk-test	P-value	Kurt.	JB Stat	P-value	N
Nauru	-4.4855	-4.7849	-1.7970	-4.7849	0.6646	2.7019	6.2398	0.0000	10.1370	106.8505	0.0000	32
Barbados	-4.6435	-4.8993	-2.5114	-5.0786	0.5752	2.0360	4.7019	0.0000	7.3354	47.1690	0.0000	32
Singapore	-2.9261	-3.2479	-0.8739	-3.3103	0.6532	2.0043	4.6288	0.0000	6.0850	34.1155	0.0000	32
Bahamas	-8.6657	-9.0416	-6.4136	-9.0416	0.6676	1.8555	4.2851	0.0000	5.6302	27.5856	0.0000	32
Trinidad & Tobago	-5.9136	-6.1414	-4.0590	-6.4038	0.5507	1.7620	4.0691	0.0000	5.9751	28.3589	0.0000	32
Palau	-3.2153	-3.6114	-1.1491	-3.6114	0.6645	1.6490	3.8082	0.0001	4.7904	18.7763	0.0001	32
Aruba	-5.9316	-6.3063	-4.1477	-6.3063	0.6957	1.6208	3.7432	0.0002	4.0839	15.5779	0.0004	32
Mauritius	-3.4807	-3.5304	-2.0383	-4.0543	0.3908	1.5652	3.6146	0.0003	6.8526	32.8549	0.0000	32
Antigua & Barbuda	-3.5184	-3.6389	-2.1028	-4.0312	0.5386	1.4983	3.4602	0.0005	4.5643	15.2356	0.0005	32
Kiribati	-0.9249	-1.0124	0.5103	-1.4664	0.4050	1.4672	3.3884	0.0007	6.0591	23.9586	0.0000	32
Belize	-2.6386	-2.7715	-1.4127	-3.1432	0.4457	1.4372	3.3191	0.0009	4.1781	12.8671	0.0016	32
Montserrat	-1.0445	-1.3095	0.6741	-1.5355	0.5726	1.3848	3.1980	0.0014	4.1133	11.8796	0.0026	32
St Kitts-Nevis	-3.8061	-3.9524	-2.3883	-4.3207	0.5447	1.3523	3.1231	0.0018	3.8069	10.6219	0.0049	32
St Lucia	-7.5069	-7.5841	-6.1204	-8.1020	0.4091	1.3123	3.0307	0.0024	5.4024	16.8805	0.0002	32
Marshall Islands	-2.3428	-2.7719	-0.6233	-2.7719	0.6591	1.2887	2.9761	0.0029	3.2783	8.9602	0.0113	32
Micronesia	-2.6584	-3.0847	-0.8187	-3.0847	0.6643	1.2380	2.8590	0.0042	3.2160	8.2361	0.0163	32
Dominican Republic	-4.0495	-4.1274	-3.2150	-4.4272	0.3022	1.1422	2.6378	0.0083	3.6033	7.4435	0.0242	32
Samoa	-1.2275	-1.3090	-0.3711	-1.7313	0.3479	1.0312	2.3815	0.0172	3.3051	5.7958	0.0551	32
Grenada	-2.9108	-2.9885	-1.9332	-3.5032	0.4040	1.0130	2.3395	0.0193	3.3875	5.6733	0.0586	32
Fiji	-3.7795	-3.8381	-2.7782	-4.4013	0.3427	0.9209	2.1267	0.0334	3.8704	5.5330	0.0629	32
East Timor	-0.1196	0.0045	0.0512	-0.7708	0.2934	-1.8708	-2.0207	0.0433	4.7752	5.0022	0.0820	7
Anguilla	-2.3054	-2.3455	-1.0459	-2.8656	0.4916	0.8412	1.9426	0.0521	3.2785	3.8772	0.1439	32
St Vincent & Grenadines	-2.9264	-2.9510	-1.7173	-3.5048	0.4598	0.8064	1.8622	0.0626	3.1841	3.5130	0.1727	32
Comoros	-1.6922	-1.7181	-0.7079	-2.3069	0.3838	0.7907	1.8259	0.0679	3.2565	3.4218	0.1807	32
Netherlands Antilles	-3.6749	-4.0455	-2.3625	-4.1764	0.5954	0.7876	1.8189	0.0689	2.1538	4.2633	0.1186	32
Jamaica	-3.4689	-3.5956	-2.7110	-4.0220	0.3344	0.7686	1.7749	0.0759	2.7488	3.2345	0.1984	32
Tuvalu	-0.5496	-0.6448	0.3774	-1.1531	0.4153	0.5806	1.3408	0.1800	2.7553	1.8776	0.3911	32
Seychelles	-2.4349	-2.5194	-1.5749	-3.0374	0.4193	0.5650	1.3048	0.1920	2.2728	2.4076	0.3000	32
Vanuatu	-1.8744	-1.8612	-1.0561	-2.4211	0.3067	0.5622	1.2984	0.1942	3.2191	1.7498	0.4169	32

Appendix Table A4 continues

Appendix Table A4 (con't)
Descriptive statistics – transformed aid data – SECTOR AID

Sector aid	Mean	Median	Max	Min	Std dev.	Skew.	Sk-test	P-value	Kurt.	JB Stat	P-value	N
Papua New Guinea	-2.8185	-2.9128	-1.9634	-3.3946	0.3886	0.5554	1.2826	0.1996	2.3912	2.1391	0.3432	32
Tonga	-1.6589	-1.6752	-0.7897	-2.3017	0.3144	0.4757	1.0987	0.2719	3.3169	1.3410	0.5115	32
Solomon Islands	-0.0138	-0.1272	0.7855	-0.6147	0.3662	0.4741	1.0949	0.2735	2.2256	1.9985	0.3682	32
Sao Tome & Principe	-2.8603	-2.8451	-1.8251	-3.4623	0.4224	0.4319	0.9974	0.3186	2.6913	1.1218	0.5707	32
Cook Islands	-2.9009	-2.8958	-1.8987	-3.4832	0.4674	0.4048	0.9348	0.3499	2.2771	1.5706	0.4560	32
Guyana	-1.9045	-1.9312	-1.1143	-2.4693	0.4075	0.3593	0.8298	0.4067	2.0674	1.8483	0.3969	32
Suriname	-2.4589	-2.4778	-1.5416	-3.0355	0.4850	0.3115	0.7194	0.4719	1.7103	2.7355	0.2547	32
Cuba	-6.5636	-6.6840	-5.5605	-7.1177	0.5221	0.3082	0.7118	0.4766	1.5447	3.3305	0.1891	32
Dominica	-2.2616	-2.3495	-1.6090	-2.8031	0.3560	0.2470	0.5705	0.5683	1.9626	1.7603	0.4147	32
Cape Verde	-1.5469	-1.5429	-0.6691	-2.1958	0.2974	0.2118	0.4891	0.6248	4.5165	3.3056	0.1915	32
Haiti	-2.2770	-2.2819	-1.7191	-2.7183	0.2138	0.1313	0.3031	0.7618	3.4089	0.3148	0.8544	32
New Caledonia	-4.1521	-4.0520	-3.2751	-4.7563	0.4347	-0.0947	-0.2188	0.8268	1.9649	1.4765	0.4780	32
Maldives	-2.3609	-2.3465	-1.6762	-2.9884	0.3707	-0.0526	-0.1215	0.9033	2.2254	0.8147	0.6654	32
French Polynesia	-4.4133	-4.3108	-3.6177	-5.0146	0.4396	-0.0120	-0.0277	0.9779	1.7765	1.9967	0.3685	32
Guinea-Bissau	-1.1062	-1.1433	-0.4928	-1.7494	0.3217	0.0018	0.0041	0.9967	2.7677	0.0720	0.9647	32

Appendix Table A5
Descriptive statistics – transformed aid data – PROGRAMME AID

Programme aid	Mean	Median	Max	Min	Std Dev.	Skew.	Sk-test	P-value	Kurt.	JB Stat	P-value	N
Singapore	-2.9215	-3.2444	-0.8722	-3.3066	0.6528	1.9976	4.6132	0.0000	6.0606	33.7718	0.0000	32
Aruba	-5.2162	-5.5825	-3.0878	-5.5825	0.6864	1.7952	4.1458	0.0000	4.9804	22.4176	0.0000	32
Barbados	-4.5123	-4.7451	-2.5017	-4.9753	0.5597	1.7693	4.0859	0.0000	6.4368	32.4434	0.0000	32
Bahamas	-8.4021	-8.7904	-6.3902	-8.7904	0.6701	1.7151	3.9608	0.0001	4.8106	20.0585	0.0000	32
St Kitts-Nevis	-3.2774	-3.4653	-1.5275	-3.7497	0.5615	1.7086	3.9458	0.0001	5.1252	21.5913	0.0000	32
Trinidad & Tobago	-5.7902	-5.8920	-4.0484	-6.2982	0.5346	1.6645	3.8440	0.0001	5.4677	22.8959	0.0000	32
Seychelles	-1.8007	-1.8921	-0.1055	-2.3400	0.4843	1.6453	3.7996	0.0001	6.0765	27.0570	0.0000	32
Nauru	-2.3339	-2.6969	-0.2540	-2.6969	0.7036	1.6413	3.7905	0.0002	4.2225	16.3606	0.0003	32
Mauritius	-3.3109	-3.3537	-1.9171	-3.8386	0.3840	1.4268	3.2951	0.0010	6.4171	26.4270	0.0000	32
Palau	-2.6875	-3.0932	-0.8415	-3.0932	0.6788	1.3977	3.2280	0.0012	3.4592	10.7009	0.0047	32
Antigua & Barbuda	-3.3650	-3.4721	-2.0798	-3.8996	0.5142	1.3729	3.1705	0.0015	4.0253	11.4537	0.0033	32
Kiribati	-0.7413	-0.8174	0.5434	-1.2548	0.3633	1.3628	3.1472	0.0016	5.9853	21.7876	0.0000	32
Montserrat	-0.6577	-0.9084	0.9399	-1.1680	0.5392	1.3224	3.0541	0.0023	3.9484	10.5264	0.0052	32
Micronesia	-1.9028	-2.3171	-0.4895	-2.3171	0.6826	1.2652	2.9219	0.0035	2.8450	8.5696	0.0138	32
Marshall Islands	-1.7069	-2.1326	-0.3219	-2.1326	0.6697	1.2523	2.8921	0.0038	2.8668	8.3880	0.0151	32
Cook Islands	-2.4224	-2.4840	-1.0255	-2.9710	0.4974	1.1971	2.7646	0.0057	3.9820	8.9288	0.0115	32
Grenada	-2.5035	-2.6226	-1.3980	-3.0505	0.3963	1.0712	2.4738	0.0134	3.5927	6.5883	0.0371	32
Fiji	-3.6606	-3.7338	-2.7422	-4.0775	0.3056	1.0494	2.4234	0.0154	3.9311	7.0286	0.0298	32
Dominican Republic	-3.7975	-3.8596	-3.0535	-4.2160	0.3140	1.0406	2.4032	0.0163	3.2295	5.8458	0.0538	32
Samoa	-1.1713	-1.2681	-0.3338	-1.6842	0.3344	1.0158	2.3459	0.0190	3.4373	5.7584	0.0562	32
St Vincent & Grenadines	-2.5489	-2.6029	-1.2391	-3.1121	0.4402	0.9992	2.3074	0.0210	3.8152	6.2104	0.0448	32
Belize	-2.3366	-2.4769	-1.3388	-2.8735	0.4299	0.9208	2.1264	0.0335	2.7662	4.5946	0.1005	32
St Lucia	-7.2509	-7.3509	-6.0786	-7.8476	0.3991	0.9129	2.1083	0.0350	3.7467	5.1884	0.0747	32
Anguilla	-1.8393	-1.9782	-0.6970	-2.4121	0.4714	0.8132	1.8781	0.0604	2.8872	3.5440	0.1700	32
East Timor	0.0985	0.1789	0.3603	-0.5512	0.3029	-1.6057	-1.7343	0.0829	4.2514	3.4647	0.1769	7
Haiti	-1.9628	-1.9887	-1.3431	-2.3268	0.2042	0.7174	1.6568	0.0976	4.2660	4.8822	0.0871	32
Netherlands Antilles	-3.4765	-3.7479	-2.3315	-3.9996	0.5691	0.6645	1.5346	0.1249	1.8647	4.0736	0.1304	32
Suriname	-1.9654	-2.0445	-0.8237	-2.5264	0.4437	0.6601	1.5243	0.1274	2.8043	2.3747	0.3050	32
Solomon Islands	0.2487	0.1761	1.0117	-0.2882	0.3734	0.6499	1.5009	0.1334	2.4800	2.6133	0.2707	32

Appendix Table A5 continues

Appendix Table A5 (con't)
Descriptive statistics – transformed aid data – PROGRAMME AID

Programme aid	Mean	Median	Max	Min	Std dev.	Skew.	Sk-test	P-value	Kurt.	JB Stat	P-value	N
Papua New Guinea	-1.9862	-1.9706	-1.5292	-2.5990	0.2481	-0.6221	-1.4366	0.1508	3.5188	2.4227	0.2978	32
Comoros	-1.4927	-1.5531	-0.6682	-2.0459	0.3454	0.5789	1.3369	0.1813	2.8717	1.8092	0.4047	32
Guyana	-1.4823	-1.5028	-0.5042	-2.0565	0.4178	0.4047	0.9346	0.3500	2.2570	1.6095	0.4472	32
Jamaica	-2.8271	-2.9496	-2.0223	-3.4029	0.3352	0.3874	0.8946	0.3710	2.2084	1.6359	0.4413	32
Tuvalu	-0.1946	-0.1691	0.6260	-0.8147	0.3819	0.3219	0.7433	0.4573	2.5760	0.7922	0.6729	32
Vanuatu	-1.4364	-1.4695	-0.7578	-1.9566	0.2579	0.2877	0.6643	0.5065	3.4972	0.7709	0.6801	32
Tonga	-1.5143	-1.5624	-0.7203	-2.1632	0.2981	0.2826	0.6526	0.5140	3.1799	0.4690	0.7910	32
Dominica	-1.7783	-1.7713	-1.2933	-2.3474	0.2833	-0.1911	-0.4414	0.6589	2.1579	1.1404	0.5654	32
Guinea-Bissau	-0.6515	-0.6975	0.0685	-1.2851	0.3188	0.1784	0.4120	0.6803	2.8406	0.2036	0.9032	32
Maldives	-2.2073	-2.2101	-1.6065	-2.8486	0.3302	-0.1284	-0.2966	0.7668	2.4680	0.4653	0.7924	32
New Caledonia	-4.1366	-4.0247	-3.2690	-4.7423	0.4319	-0.1271	-0.2934	0.7692	1.9575	1.5351	0.4641	32
Cape Verde	-1.0990	-1.0765	-0.3208	-1.7548	0.2776	-0.1114	-0.2573	0.7970	4.5752	3.3744	0.1850	32
French Polynesia	-4.2703	-4.1572	-3.5794	-4.8812	0.4181	-0.1067	-0.2464	0.8053	1.9214	1.6119	0.4467	32
Cuba	-6.2115	-6.1309	-5.4423	-6.7935	0.4709	0.0688	0.1588	0.8738	1.4347	3.2920	0.1928	32
Sao Tome & Principe	-2.4938	-2.5073	-1.7283	-3.1245	0.3598	0.0133	0.0308	0.9754	2.4044	0.4740	0.7890	32

Appendix Table A6
Descriptive statistics – transformed aid data

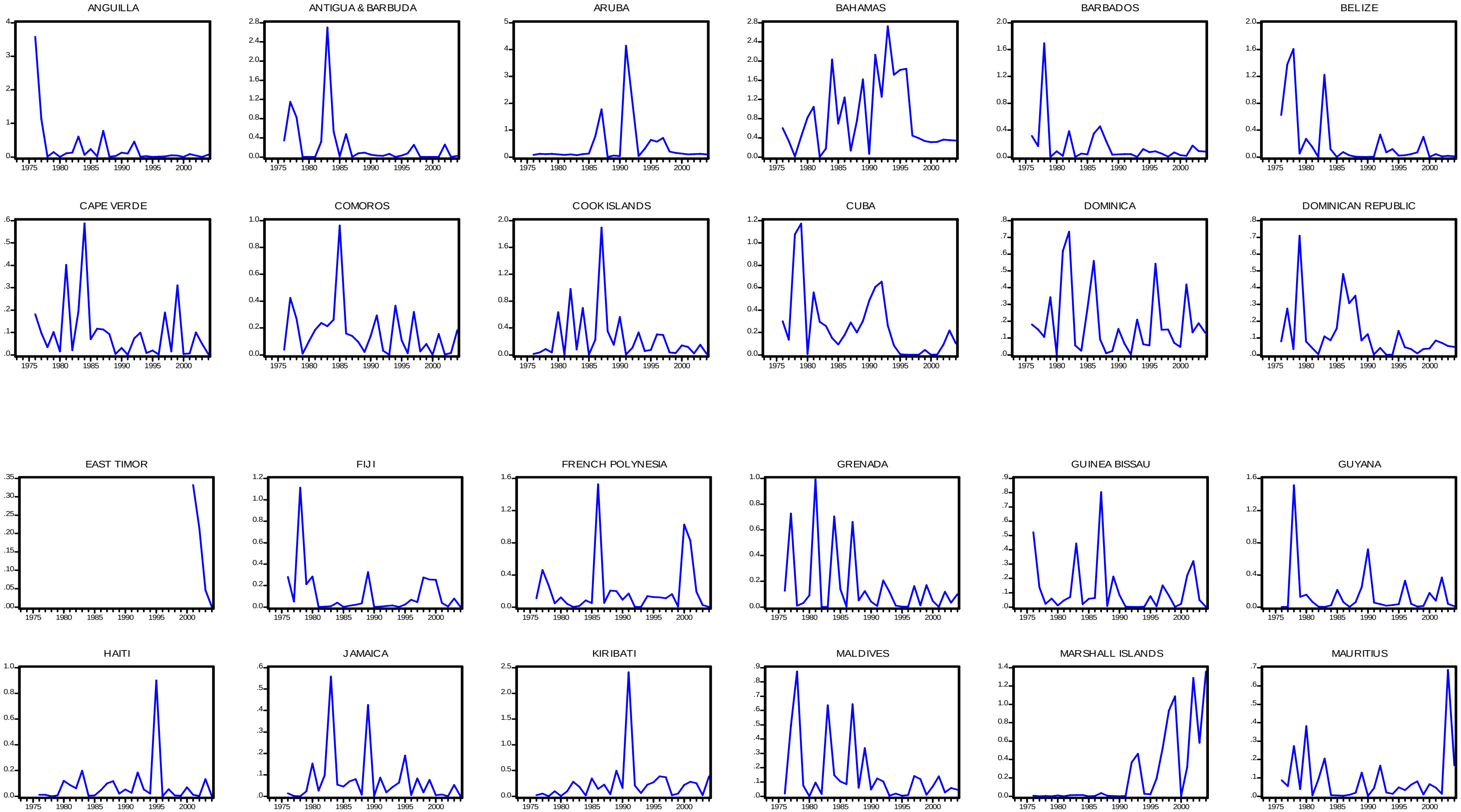
	Mean	Median	Max	Min	Std dev.	Skew.	Sk-test	P-value	Kurtosis	JB Stat.	P-value	N
Marshall Islands	-5.1702	-5.2795	-1.7830	-5.2795	0.6181	5.3882	12.4434	0.0000	30.0323	1129.163	0.0000	32
Kiribati	-4.7718	-4.9931	-1.9976	-4.9931	0.6947	3.1729	7.3276	0.0000	11.7681	156.1988	0.0000	32
Aruba	-7.7878	-8.0830	-5.3458	-8.0830	0.6781	2.6954	6.2248	0.0000	9.2992	91.6534	0.0000	32
Maldives	-4.0698	-4.3635	-1.5145	-4.3635	0.6762	2.6869	6.2052	0.0000	9.5471	95.6573	0.0000	32
Mauritius	-5.9187	-6.2643	-3.6082	-6.3190	0.6221	2.0891	4.8246	0.0000	7.5086	50.3794	0.0000	32
Seychelles	-3.9792	-4.1688	-2.1052	-4.4324	0.5826	1.9949	4.6070	0.0000	6.5712	38.2284	0.0000	32
Tonga	-6.2902	-6.4653	-4.1997	-6.7403	0.5831	1.9742	4.5591	0.0000	6.8996	41.0619	0.0000	32
Anguilla	-5.0315	-5.3852	-3.1227	-5.3852	0.6962	1.8952	4.3767	0.0000	4.9958	24.4667	0.0000	32
Bahamas	-8.4635	-8.8296	-6.4043	-8.8296	0.6912	1.7317	3.9993	0.0001	4.7593	20.1213	0.0000	32
Haiti	-3.5972	-3.9567	-1.6737	-3.9567	0.7141	1.5972	3.6887	0.0002	3.8632	14.5996	0.0007	32
Antigua & Barbuda	-6.2858	-6.4626	-4.6876	-6.7342	0.6231	1.4784	3.4142	0.0006	4.0202	13.0448	0.0015	32
Barbados	-5.2275	-5.5491	-3.5783	-5.7020	0.5935	1.4146	3.2669	0.0011	4.0117	12.0370	0.0024	32
Tuvalu	-2.5512	-2.9169	-0.6686	-2.9708	0.6620	1.3907	3.2118	0.0013	3.5681	10.7457	0.0046	32
Solomon Islands	-1.0055	-1.1523	0.5046	-1.5297	0.5272	1.3585	3.1372	0.0017	4.4209	12.5339	0.0019	32
St Kitts-Nevis	-6.1047	-6.5044	-4.4663	-6.5044	0.6925	1.3431	3.1017	0.0019	3.0996	9.6339	0.0081	32
Dominican Republic	-4.7941	-4.9260	-3.3857	-5.3169	0.5329	1.2976	2.9966	0.0027	4.0718	10.5114	0.0052	32
Micronesia	-7.3109	-7.7453	-5.6982	-7.7453	0.6600	1.2144	2.8044	0.0050	2.9058	7.8766	0.0195	32
Jamaica	-4.6735	-4.8448	-3.1075	-5.2186	0.5025	1.1589	2.6764	0.0074	4.1546	8.9405	0.0114	32
New Caledonia	-7.5185	-7.9583	-5.7075	-7.9813	0.6207	1.1583	2.6749	0.0075	3.4608	7.4382	0.0243	32
St Vincent & Grenadines	-4.2317	-4.4035	-2.9341	-4.7675	0.5225	1.1514	2.6590	0.0078	3.2814	7.1759	0.0277	32
Comoros	-3.9267	-4.3648	-2.3999	-4.3648	0.6604	1.1327	2.6159	0.0089	2.7759	6.9097	0.0316	32
Netherlands Antilles	-5.2416	-5.4471	-3.7119	-5.7579	0.5519	1.1139	2.5724	0.0101	3.3833	6.8130	0.0332	32
Cook Islands	-8.2204	-8.6574	-6.8572	-8.6574	0.6730	1.0225	2.3613	0.0182	2.2438	6.3382	0.0420	32
Guinea-Bissau	-2.5027	-2.6485	-1.1538	-3.0335	0.5417	0.8901	2.0556	0.0398	2.7936	4.2825	0.1175	32
Sao Tome & Principe	-3.1202	-3.3008	-1.9635	-3.6804	0.4988	0.7325	1.6915	0.0907	2.5031	3.1905	0.2029	32
Fiji	-2.1912	-2.3171	-0.8822	-2.7462	0.5102	0.6614	1.5273	0.1267	2.5202	2.6397	0.2672	32
Belize	-4.8865	-5.1086	-3.7268	-5.4199	0.5534	0.5994	1.3843	0.1663	2.0010	3.2470	0.1972	32
Samoa	-1.8639	-1.9587	-0.9648	-2.4566	0.4397	0.5970	1.3787	0.1680	2.2073	2.7387	0.2543	32
Trinidad & Tobago	-3.3799	-3.4289	-2.1838	-3.9184	0.5454	0.5728	1.3227	0.1859	2.0827	2.8715	0.2379	32

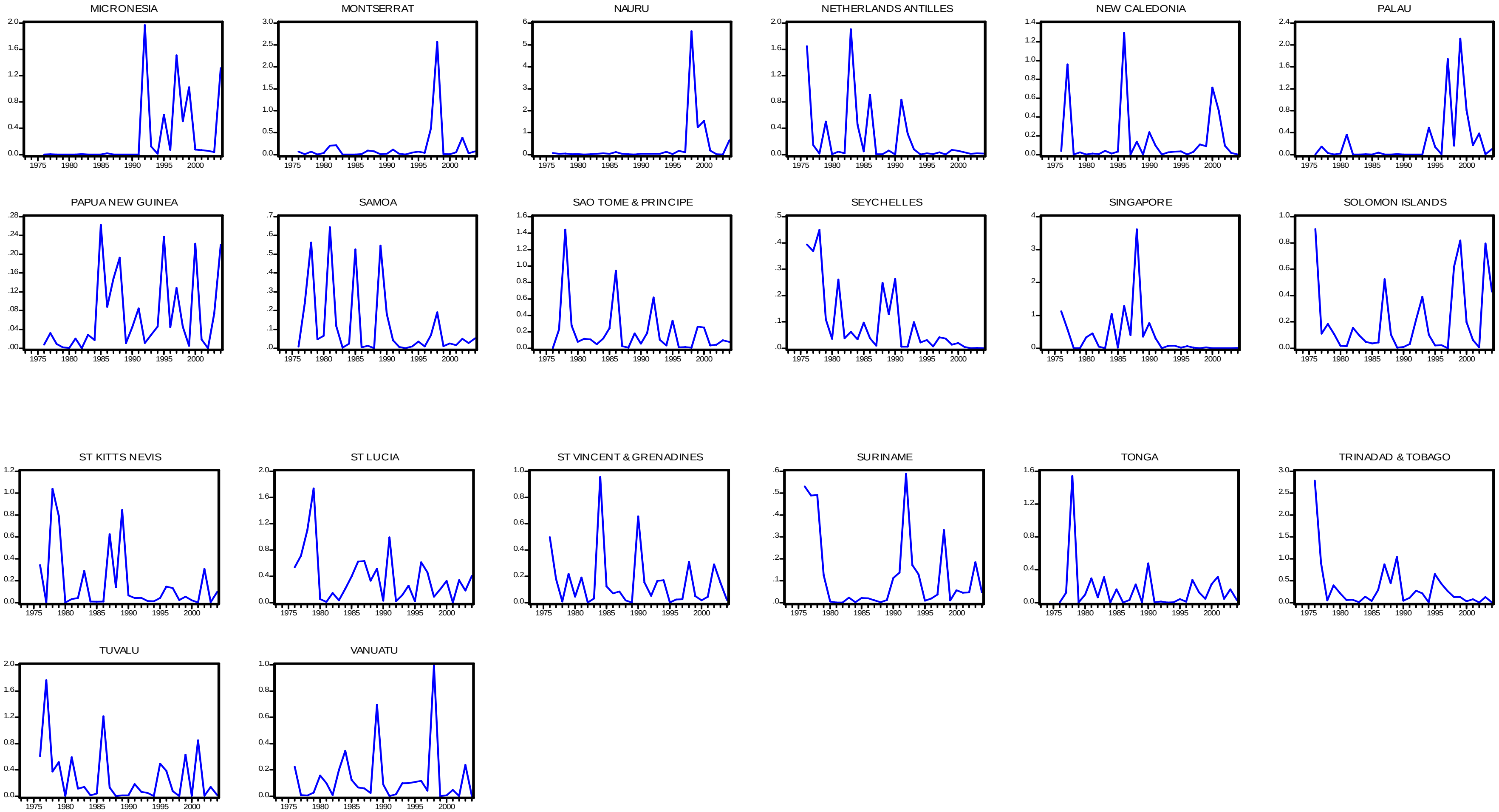
Appendix Table A6 continues

Appendix Table A6 (con't)
Descriptive statistics – transformed aid data

	Mean	Median	Max	Min	Std dev.	Skew.	Sk-test	P-value	Kurtosis	JB Stat.	P-value	N
East Timor	-1.5556	-1.6034	-0.6957	-2.1628	0.4094	0.5046	1.1653	0.2439	2.5835	1.5893	0.4517	32
Guyana	-3.4112	-3.6022	-2.3348	-3.9407	0.5663	0.4880	1.1269	0.2598	1.7861	3.2346	0.1984	32
Grenada	-4.6512	-4.5182	-4.1596	-5.2738	0.3722	-0.4532	-1.0466	0.2953	1.8414	2.8850	0.2363	32
Vanuatu	-2.9984	-3.1171	-1.8807	-3.5520	0.5239	0.4486	1.0361	0.3002	1.9245	2.6158	0.2704	32
Nauru	-2.2421	-2.1673	-1.0194	-2.8495	0.4063	0.4438	1.0248	0.3054	3.8452	2.0027	0.3674	32
French Polynesia	-2.8231	-2.8397	-1.9181	-3.4427	0.3804	0.4209	0.9720	0.3311	2.8495	0.9749	0.6142	32
St Lucia	-8.4845	-8.3991	-7.2936	-9.0474	0.5055	0.4188	0.9673	0.3334	2.2721	1.6421	0.4400	32
Cape Verde	-2.1210	-2.1813	-1.2779	-2.7131	0.4509	0.3180	0.7344	0.4627	1.8967	2.1623	0.3392	32
Suriname	-2.7580	-2.8124	-1.8105	-3.3455	0.4616	0.2849	0.6578	0.5106	1.9384	1.9354	0.3800	32
Cuba	-2.9603	-2.9202	-2.0112	-3.5321	0.4983	0.2284	0.5274	0.5979	1.6480	2.7152	0.2573	32
Montserrat	-4.0216	-3.9688	-3.3402	-4.6535	0.3611	-0.1839	-0.4246	0.6711	2.1131	1.2290	0.5409	32
Dominica	-2.2389	-2.0878	-1.6731	-2.8238	0.3877	-0.1246	-0.1346	0.8930	2.0222	0.2970	0.8620	7
Papua New Guinea	-3.6573	-3.6488	-2.8405	-4.2677	0.4166	-0.0062	-0.0143	0.9886	1.8792	1.6752	0.4327	32

Estimates of conditional sector aid volatility

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SEYCHELLES
SINGAPORE
SOLOMON ISLANDS
ST KITTS NEVIS
ST LUCIA
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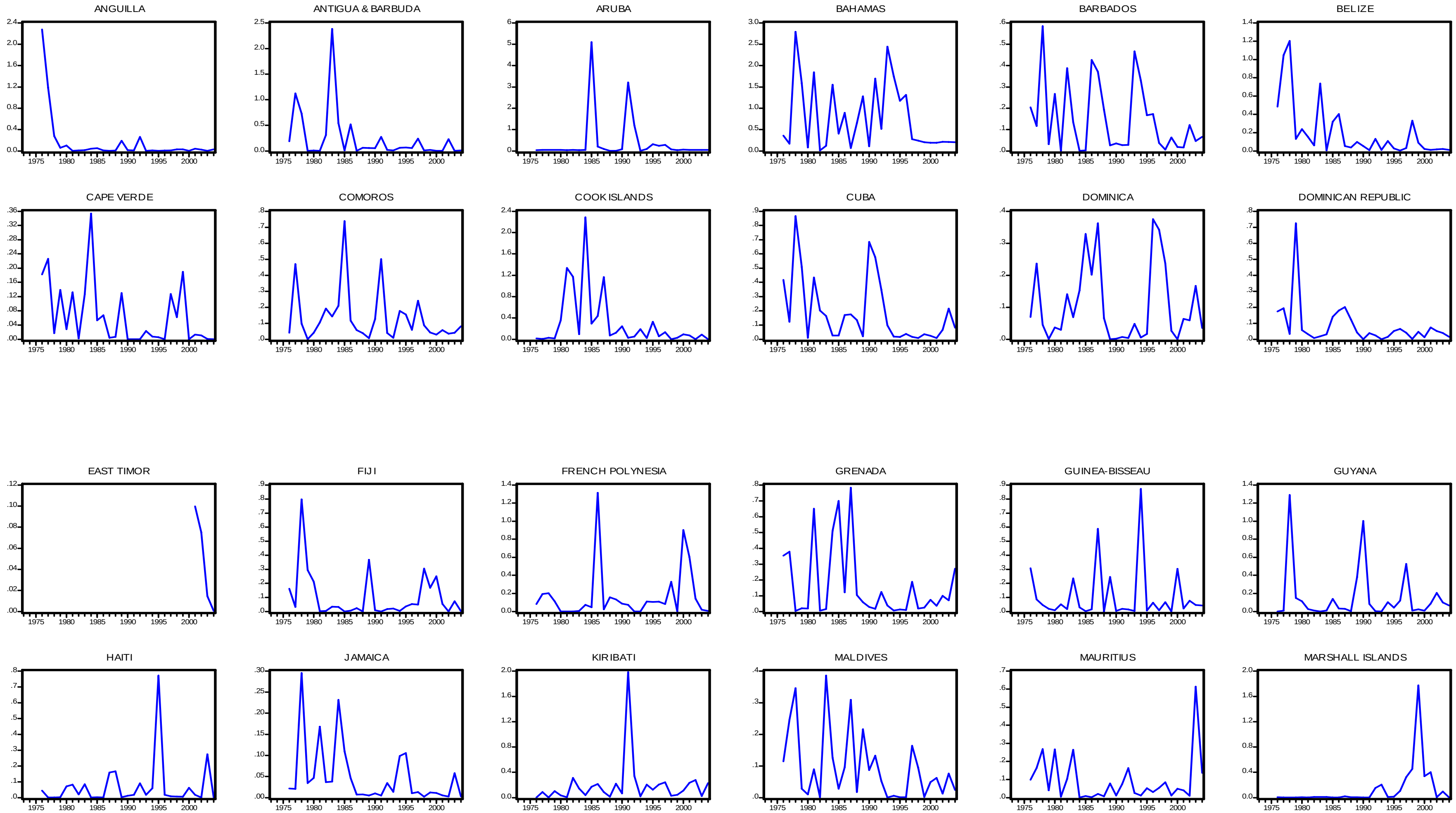
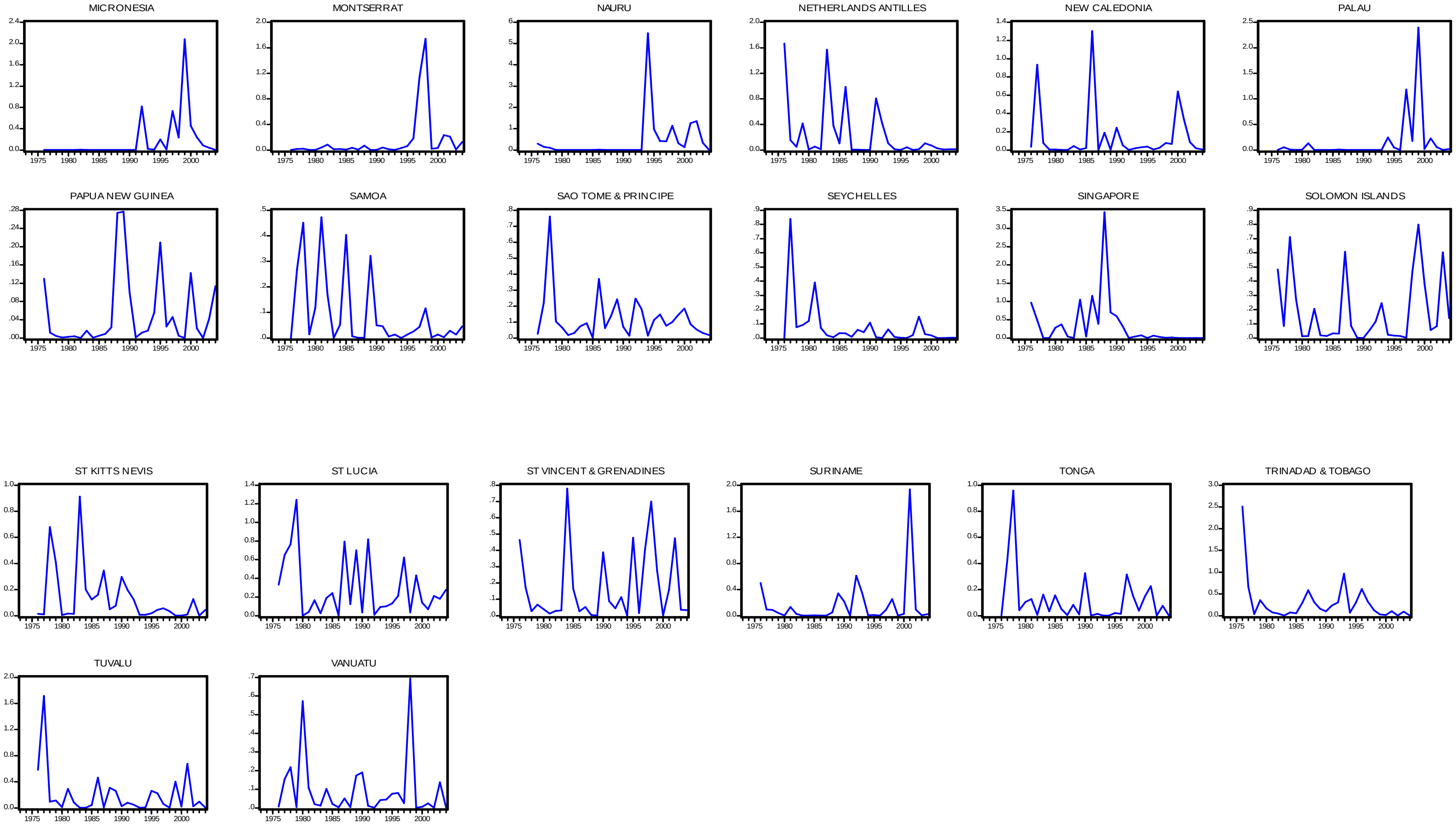
SURINAME
TONGA
TRINADAD & TOBAGO
TUVALU
VANUATU

Estimates of conditional programme aid volatility

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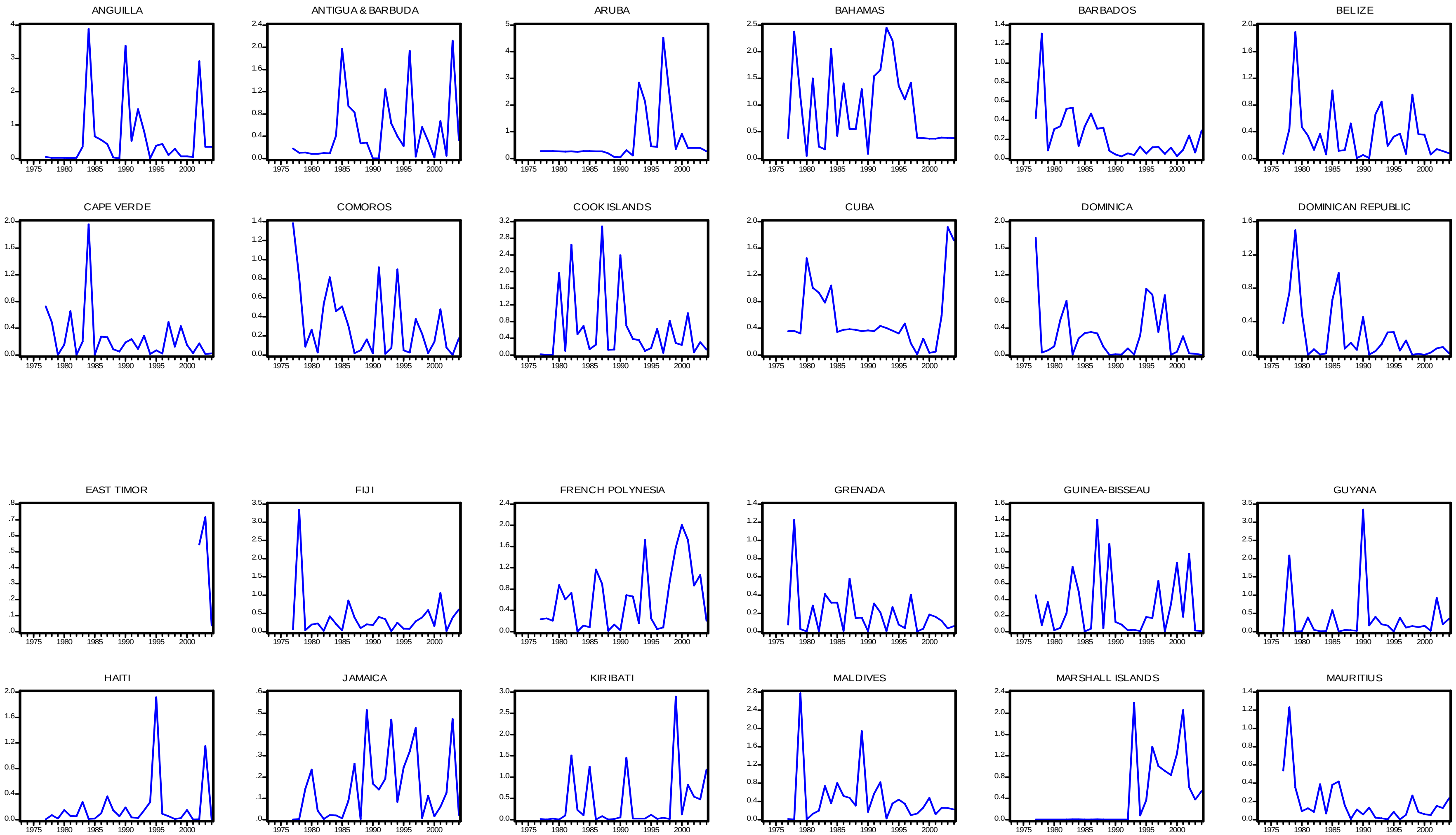
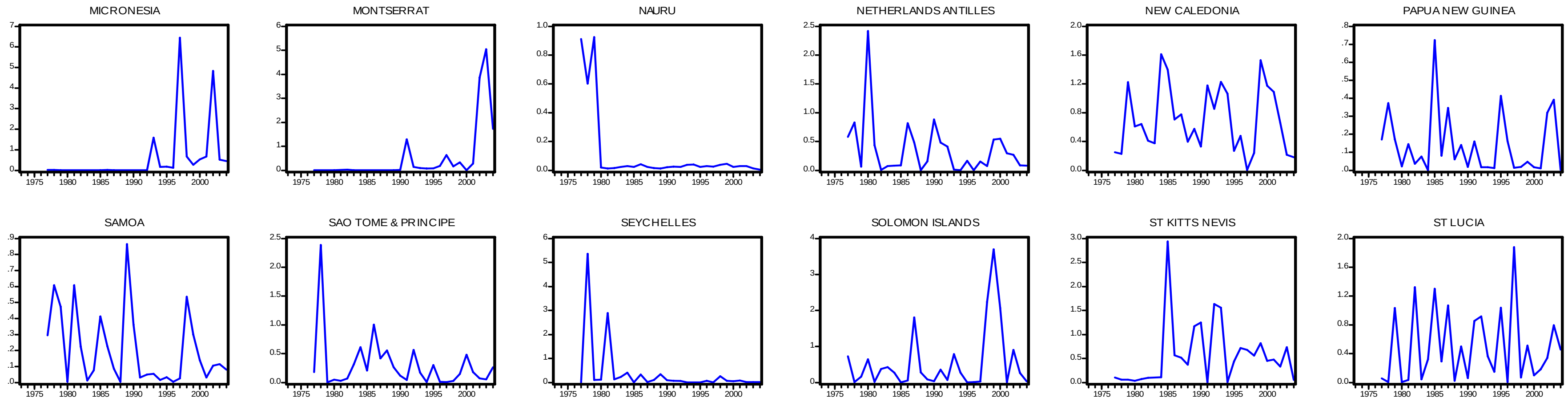
TRINADAD & TOBAGO
TUVALU
VANUATU

Estimates of conditional multilateral aid volatility

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