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VOLATILITY AND BUSINESS CYCLE PROPERTIES OF FOREIGN FINANCIAL AID INTO DEVELOPING COUNTRIES

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ABSTRACT

The objective of this study is to investigate the volatilities and business cycle characteristics of three components of foreign financial aid into developing countries, namely emergency, program and project aid from the viewpoint of both recipients and donors. Results show that emergency aid inflows are more volatile than both program and project aid in both African and non-African countries and program aid is found to be more volatile than project aid in both subsamples. Although the volatility of total aid inflows is lower than component-wise volatilities, it is still higher than the volatility of GDP for recipient countries. The volatility of donors' total aid outflows is also found to be greater than the volatility of their GDP. Results further showed that total aid is acyclical for the African countries in the sample. The same finding applies to emergency aid, project aid, and program aid. For the non-African countries, project aid inflows were found to be procyclical. Emergency aid and program aid were acyclical while total aid inflows to the countries outside Africa were found to be procyclical/acyclical. The final result that emerged from the analysis is that donors give foreign aid in an acyclical fashion to the recipients in the sample.

Keywords: Foreign financial aid, developing countries, business cycle, volatility
JEL Classification: F35, F40, F44

1. INTRODUCTION

The objective of the present study is to investigate the volatilities and the cyclical behaviors of three components of foreign financial aid (namely emergency, program and project aid) flows into the developing countries from the standpoint of both recipient countries and donor countries. The issue is significant because these empirical characteristics are important in explaining the impact of foreign aid on the welfare of the countries and on their financial and economic development. Although it is well established that high volatility of aid can be very welfare-reducing, not much attention has been paid to the cyclical behavior of foreign aid. Also, the different business cycle characteristics of different aid components have not been analyzed separately in the foreign financial aid literature.

The remainder of the paper is organized as follows. Section 2 provides a review of literature on foreign financial aid. Section 3 discusses the data employed in this study and the methodology. Empirical findings are provided on Section 4. The final section concludes.

2. LITERATURE REVIEW

The majority of the academic studies on foreign aid focused the effect of foreign financial aid levels on the economic growth rates in recipient countries. In terms of their findings, these studies can be grouped into three categories. The first group contains studies which demonstrated a significant positive relationship between foreign financial aid and growth in recipient countries (Dalgaard et al., 2004; Dalgaard & Hansen,

2001; Dayton-Johnson & Hoddinott, 2003; Durbarry et al. 1998; Economides et al., 2008; Gounder, 2001, 2002; Hadjimichael et al., 1995; Hansen & Tarp, 2001; Hudson & Mosley, 2001; Lu & Ram, 2001; Svensson, 1999). In the second group, several researchers claimed that there is no significant relationship between foreign aid levels and growth rates of recipients (Boone, 1994, 1996; Easterly, 1999; Mosley et al., 1987; Singh, 1985). This could be due to the crowding out of private saving and higher public consumption levels caused by foreign aid (Jepma, 1997). Finally, studies in the third group found that several characteristics of recipient countries such as institutional quality, inflation, budget balance or exports, moderate foreign aid-growth relationship (Burnside & Dollar, 2000, 2004; Collier & Dehn, 2001; Collier & Dollar, 2002; Kudlyak, 2002).

The literature also contains studies which argued that it is not the level but the volatility of foreign aid that matters. In one such study, Lensink and Morrissey (2000) found that there is no significant relationship between foreign aid level and growth if uncertainty of aid is controlled for. The authors further demonstrated that uncertainty about foreign aid has a negative impact on growth in recipient countries. The finding that the volatility of foreign aid reduces its benefits for recipients was supported by several other studies including Arellano at al. (2005), Pallage and Robe (2003), Pallage at al., (2004), and Torsvik (2005). Similarly, Gemmell and McGillivray (1998) found that decreases in foreign aid levels caused higher taxes and/or lower public spending in the recipient countries.

Although there is a voluminous literature on foreign aid effectiveness, the cyclical properties of foreign aid received relatively less attention. In their study, Pallage and Robe (2000) investigated the business cycle characteristics of foreign aid for the period between 1969 and 1995. They found that for recipient countries in their sample, aid flows were highly procyclical, meaning that when the economic activity is high in the recipient country, foreign aid inflows are also high. The authors further found that volatility of foreign aid was higher than the volatility of the recipients' GDP, which in turn was more volatile than the donors'. In another study, Hamann and Bulir (2001) examined the volatility and the cyclical behavior of foreign financial aid between 1975-1997 and found that aid is significantly more volatile compared to domestic revenues. They also found that aid is procyclical, and the procyclicality of aid together with high aid volatility tends to reduce welfare in recipient countries. Furthermore, Barrett (2001) examined U.S. food aid and could not find a relationship between food aid and fluctuations in per capita food availability in the recipient country. Later on, Gupta et al. (2004) found that food aid is overwhelmingly acyclical across all regions.

As is clear from the preceding discussion, although there is a large literature on the effectiveness of foreign financial aid, the issue of volatility and cyclical properties of foreign aid flows received relatively less attention. The present study will attempt to complement the literature on the business cycle properties of foreign financial aid.

3. DATA AND METHODOLOGY

The cyclical behavior of various components of foreign aid received by developing countries for the period between 1990 and 2004 is analyzed from the viewpoint of both the recipients and donors. The aid data is obtained from the Organization for Economic Cooperation and Development (OECD) Creditor Reporting System (CRS) database, which is a major source of information on the sectoral and geographical distribution of official development assistance (ODA). As the CRS database has data for the years between 1990 and 2004, the business cycle characteristics of various components of aid is investigated during this period. The recipient countries are chosen according to data availability. Thus, the sample of recipient countries consists of 56 countries, 33 of which are located in Africa. The donors in the sample are chosen from OECD countries that are members of the Development Assistance Committee (DAC). Due to the lack of sufficient data, three of them are excluded from the sample.

Using aggregate aid in examining the cyclicality and volatility of aid is problematic due to the different characteristics of various components of aid. Certain kinds of aid display by definition more volatility than the others, such as emergency aid, which is given in times of disasters. Therefore, a high volatility of aid may be due to a change in the composition of aggregate aid rather than a real volatility in aid flows. Also, a positive correlation among various components of foreign aid may cause a high volatility in the aggregate aid although individual components display low volatility in themselves. To overcome this problem, three major categories

of foreign aid, namely project aid, program aid and emergency aid, are investigated in terms of their volatility and cyclicality. The remaining aid components do not lie in the scope of this paper. The project aid is defined as aid tied to specific investment projects. The program aid is defined as aid given for any purpose. The emergency aid is defined as aid given in times of disasters.

The CRS database comprises data on ODA categorized by the sector of destination of individual aid activities. Aid for social infrastructure, economic infrastructure, agriculture and multi sector are categorized as the project aid. Commodity aid/general program assistance is categorized as the program aid. Emergency assistance is categorized as emergency aid. The aid disbursements in CRS database namely ODA/OA grants, ODA/OA grants like, ODA/OA loan and equity investments are added up in order to get the total ODA figure. The aid data is annual and in current US dollars.

For the recipients' side, annual aid data (for each of the three components) is first converted into per capita terms using population figures obtained from World Development Indicators (WDI) database. Then, per-capita-aid series are deflated using the Implicit Import Deflator (base year is 2000), computed using the data on WDI database. GDP series for recipient countries are also obtained from WDI database and are transformed into constant US dollars in per capita terms using the same technique.

For donors' side, annual aid figures are first converted into local currency using the foreign exchange rates data from OECD Statistical Compendium and then transformed into per capita terms and deflated using the local GDP deflator of each donor retrieved again from OECD Statistical Compendium. Annual GDP data of donors are in current local currency and obtained from OECD Statistical Compendium. GDP series are converted into constant (2000 prices) local currency in per capita terms using the same technique as employed in transforming aid series of donors.

Business cycles are defined as the deviations of output from trend (Kydland & Prescott, 1990; Lucas, 1977). Therefore, when dealing with cyclical properties of foreign aid, aid and GDP series are detrended using the Hodrick and Prescott (1980) filter which extracts the growth component x^g and the cyclical component $x^c = x - x^g$ of any series x, by minimizing the following loss function (Gupta et al., 2004; Pallage & Robe, 2001).

$$\sum_t x_t^{c^2} + \lambda \sum_t \left(\left(x_{t+1}^g - x_t^g \right) - \left(x_t^g - x_{t-1}^g \right) \right)^2$$

The smoothing constant λ is chosen to be 100 which is conventional for annual data. The logarithms of the series are used, as percentage deviations from the trend are of concern.

To find out the cyclical properties of various aid components, the correlations between the cyclical components of aid and GDP are calculated. A negative correlation means that aid flows are countercyclical whereas a positive correlation means aid flows are procyclical. In case of procyclicality, the correlations between the GDP series and aid series shifted backward (aid leads GDP) and forward (aid lags GDP) for one year are also calculated to identify when the highest correlation with the current period appears (Pallage & Robe, 2001).

4. FINDINGS AND DISCUSSIONS

Over the period 1990-2004, the following findings are identified: First, foreign aid components such as project, program and emergency aid are not found to be an important component of recipient countries' income. In Africa, the average fraction of all three components of aid to GDP is 1.92% and outside of Africa this fraction is even smaller, 0.82% (See Table 1).

Donors, on average, give 0.0355% of their GDP as aid (total of project, program and emergency aid) to the recipients in the sample during the period 1990-2004. They give almost half of this amount to African countries. The most generous donor in the sample is Japan who gives on average 0.0955% of its GDP as foreign aid (See Table 2).

According to Table 3, which displays the volatility of cyclical component of GDP, recipient countries' GDP is much more volatile than that of donors. It is also shown that African recipients' GDP volatility is higher than that of the non-African recipients. The volatilities are calculated as the standard deviations of the cyclical components. For the African countries in the sample, the volatility of GDP is 11.1% on the average over the years 1990-2004. For the non-African countries, this figure is 8.4% and for donors it is 1.95% on the average.

Table 4 shows that aid flows (all three components separately) are more volatile than GDP series. The volatility of emergency aid flows on average is 169% for African and 176% for non-African countries. For program aid, the volatility of aid series is 126% for African and 99% for non-African sample on the average. The volatility of project aid on the average is 61% for African and 53% for non-African recipients. Emergency aid is more volatile than both program and project aid in both African and non-African countries as expected, and program aid is found to be more volatile than project aid in both subsamples. For the African subsample, the volatility of aid total of these three components is 65%, which is much lower than the volatilities of emergency and program aid. For non-African recipients in the sample, the same result is obtained. Although the volatility of aid total of all three components is lower than the component-wise volatilities, it is still much higher than the volatility of GDP for both African and non-African subsamples. Average volatility of GDP is 11.1% for African and 8.4% for non-African subsample, whereas average volatility of total aid is 65% and 54% for African and non-African subsamples, respectively.

According to Table 5, the volatility of donors' aid outflows given to the recipients in the sample is 89% on average, which is greater than the volatility of total aid inflows (total of all three components of aid) received by the recipient countries in the sample, which is 65% for African subsample and 54% for the other recipients.

When the correlation between aid total of all three components and African countries' GDP is considered, total aid is found to be procyclical for 12 countries out of 33 (36%), countercyclical for 3 countries (9%) and acyclical for the remaining 18 countries (55%). For half of the countries with procyclicality, aid flows lag the business cycle. No leads are observed for the African sample. In the sample consisting of countries outside Africa, aid is procyclical for 10 out of 23 countries (43%), countercyclical for 3 countries (13%), and acyclical for the remaining 10 countries (43%). For 3 of the countries with procyclicality, aid flows lead the cycle. For 5 countries, aid flows lag the cycle while for 2 of them the highest correlation between aid flows and GDP is contemporaneous (see Table 6).

Table 7 shows that for 28 out of 56 recipient countries in the sample, a significant relationship between emergency aid flows and GDP of the recipient countries is found. For 45% of African recipients (15 out of 33), the cyclical component of emergency aid receipts is positively correlated with the cyclical component of GDP. For 9 of these countries aid flows lag the cycle and for 2 of them aid flows lead the cycle. For the remaining 4 countries, the highest correlation is contemporaneous. Emergency aid is countercyclical for 3% of non-African recipients (1 country) and acyclical for the rest (52%). For 7 out of 23 (30%) non-African recipients, aid is procyclical and leads are observed for 3 of them. Aid is countercyclical for 5 countries (22%) and acyclical for the remaining 11 countries (48%).

When the correlation between program aid inflows and African countries' GDP is considered, program aid is found to be procyclical for 7 countries (21%), countercyclical for 3 countries (9%) and acyclical for the remaining 23 countries (70%). In the sample consisting of countries outside Africa, aid is procyclical for 4 out of 23 countries (17%), countercyclical for 2 countries (9%), and acyclical for the remaining 17 countries (74%).

For 32 out of 56 countries, a significant correlation between project aid receipts and GDP is found. For 39% of African recipients, project aid is procyclical (13 countries). Project aid is countercyclical for 3 of African recipients (9%) and acyclical for 14 of them (42%). On the other hand, for 61% of non-African recipients (14 out of 23 countries) project aid is procyclical. For 2 of these countries outside Africa (9%) project aid is countercyclical and for 7 of them (40%) project aid is acyclical.

According to Table 8 that follows, for 8 out of the 18 donors (44%), the cyclical component of donor GDP is negatively and significantly correlated with the cyclical component of total aid (total of program, project and emergency aid) given to the recipients in the sample, whereas only one donors' aid is found significantly

procyclical (6%). For the remaining 9 donors (50%), a significant relationship between their business cycles and aid given to the recipient countries could not be found.

5. CONCLUSION

In this paper, the cyclical characteristics of various components of foreign aid flows, namely emergency, program and project aid, were examined. Although it is well established that high volatility of aid can be very welfare-reducing, not much attention has been paid to the cyclical behavior of foreign aid. Also, the different business cycle characteristics of different aid components have not been analyzed in the foreign aid literature.

Results showed that all three components of foreign aid inflows to the recipients in the sample demonstrate higher volatility than the recipients' GDP for both African and non-African countries. Although the volatility of aid total of all three components is lower than the component-wise volatilities, it is still much higher than the volatility of GDP for both African and non-African subsamples. According to the empirical evidence presented in this paper, decomposing foreign aid makes sense. Total aid flows demonstrate lower volatility than emergency and program aid flows, and slightly greater volatility than project aid. Therefore, just looking at the variability of aggregate aid may be misleading when determining the empirical characteristics of foreign aid.

The high volatility of project aid inflows, given the high volatility of GDP of the recipients, is disturbing due to the welfare-reducing effects of highly volatile aid. However, the pattern of project aid disbursements can be improved by a higher degree of compliance to the projects' conditions by the recipients. Then the aid disbursements may show a smoother pattern. There are also cases where the recipients have less control such as external shocks to the country. These shocks may temporarily prevent recipients from taking necessary steps to comply with the projects' conditions. Therefore, they lose aid disbursements which are tied to the achievement of specific improvements. However, this problem can be solved by improved project design which allows recipients more flexibility.

Total aid was found to be acyclical for the African countries in the sample. The same finding applies to emergency aid, project aid, and program aid. For the non-African countries, project aid inflows were found to be procyclical. This evidence together with the high volatility indicates that project aid enhances the economic instability in the recipient countries instead of eliminating it. For non-African recipients, emergency aid and program aid were acyclical while total aid inflows were found to be procyclical/acyclical. The final result that emerged from the analysis is that donors give foreign aid in an acyclical fashion to the recipients in the sample. That means that donors' act of disbursing aid and their business cycles do not coincide.

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APPENDIX

Table 1: Ratio of Foreign Aid Received to Recipient GDP (%)

Recipients (African)		Recipients (Non-African)	
Benin	2.59	Bangladesh	0.70
Botswana	0.40	Bolivia	1.91
Burkina Faso	2.89	Costa Rica	0.16
Burundi	2.27	Dominican Rep.	0.20
Cameroon	1.04	Ecuador	0.39
Cape Verde	3.36	El Salvador	0.78
Chad	1.93	Guatemala	0.47
Congo, DR	0.71	Guyana	2.47
Congo, Rep.	0.67	Haiti	1.08
Cote d'Ivoire	1.01	Honduras	1.33
Egypt	0.79	India	0.28
Gabon	0.44	Indonesia	0.80
Gambia	1.79	Jordan	3.27
Ghana	2.79	Malaysia	0.17
Guinea-Bissau	5.38	Mexico	0.03
Kenya	1.69	Pakistan	0.62
Lesotho	1.82	Panama	0.10
Madagascar	1.22	Paraguay	0.50
Malawi	5.22	Peru	0.43
Mali	3.56	Philippines	0.94
Mauritania	3.10	Sri Lanka	1.74
Mauritius	0.32	Thailand	0.46
Morocco	0.69	Uruguay	0.08
Nigeria	0.12		
Rwanda	3.67		
Senegal	2.36		
Seychelles	0.35		
Sudan	0.55		
Swaziland	0.56		
Tanzania	3.54		
Togo	1.60		
Tunisia	0.88		
Zambia	3.95		
Average	**1.92**	**Average**	**0.82**

Table 2: Ratio of Foreign aid Given to Donor GDP (%)

Donor	Given to African countries	Given to non-African countries	Given to all countries
Australia	0	0.011	0.011
Austria	0.007	0.026	0.032
Belgium	0.02	0.009	0.029
Canada	0.015	0.019	0.034
Denmark	0.023	0.015	0.037
Finland	0.035	0.018	0.053
France	0.038	0.014	0.053
Germany	0.02	0.029	0.048
Ireland	0.011	0.001	0.013
Italy	0.008	0.004	0.012
Japan	0.012	0.084	0.095
Netherlands	0.024	0.02	0.043
New Zealand	0.001	0.002	0.003
Norway	0.025	0.012	0.037
Sweden	0.054	0.036	0.09
Switzerland	0.008	0.006	0.014
United Kingdom	0.011	0.011	0.022
United States	0.005	0.005	0.01
Average	**0.0176**	**0.0179**	**0.0355**

Table 3: Volatility of GDP (%) (donors and recipients)

Donors		Recipients (African)		Recipients (Non-African)	
Australia	4.54	Benin	10.7	Bangladesh	5.9
Austria	1.28	Botswana	3.6	Bolivia	3.1
Belgium	1.18	Burkina Faso	12.0	Costa Rica	4.4
Canada	2.07	Burundi	9.8	Dominican Rep.	10.7
Denmark	1.33	Cameroon	11.3	Ecuador	12.3
Finland	4.11	Cape Verde	2.8	El Salvador	4.5
France	1.45	Chad	18.8	Guatemala	4.3
Germany	1.17	Congo, DR	42.4	Guyana	5.9
Ireland	3.7	Congo, Rep.	18.8	Haiti	18.2
Italy	1.06	Cote d'Ivoire	8.0	Honduras	6.1
Japan	1.1	Egypt	6.5	India	5.6
Netherlands	1.91	Gabon	8.4	Indonesia	16.2
New Zealand	1.74	Gambia	2.5	Jordan	6.8
Norway	1.56	Ghana	13.4	Malaysia	8.8
Sweden	2.44	Guinea Bissau	7.0	Mexico	13.3
Switzerland	1.65	Kenya	9.3	Pakistan	5.2
UK	1.37	Lesotho	5.0	Panama	7.2
US	1.42	Madagascar	11.5	Paraguay	13.3
		Malawi	20.8	Peru	7.1
		Mali	10.8	Philippines	6.6
		Mauritania	7.8	Srilanka	3.8
		Mauritius	2.6	Thailand	10.9
		Morocco	3.7	Uruguay	13.6
		Nigeria	15.7		
		Rwanda	24		
		Senegal	12.8		
		Seychelles	7.2		
		Sudan	16.3		
		Swaziland	3.5		
		Tanzania	10.2		
		Togo	14		
		Tunisia	1.9		
		Zambia	11.8		
Average volatility	**1.95**	**Average volatility**	**11.1**	**Average volatility**	**8.4**

Table 4: Volatility of Aid Inflows to Recipients (%)

Recipients (African)					Recipients (Non-African)				
	Emergency aid	**Program aid**	**Project aid**	**Total aid**		**Emergency aid**	**Program aid**	**Project aid**	**Total aid**
Benin	195.6	99.6	32.3	43	Bangladesh	185.1	120.3	29.5	34
Botswana	234.8	0.0	53.4	53	Bolivia	102.4	131.8	32.7	31
Burkina Faso	217.1	159.9	161.0	165	Costa Rica	176	96.3	56.7	56
Burundi	137.0	215.7	120.0	107	Dominican Rep.	242.1	43.8	56.1	56
Cameroon	265.8	169.8	38.9	52	Ecuador	184.8	102.2	48.9	49
Cape Verde	73.2	54.7	56.8	35	El Salvador	155.3	44.7	59.9	31
Chad	217.5	79.4	53.1	134	Guatemala	131.1	63.6	28.6	30
Congo, DR	169.0	175.1	106.2	90	Guyana	243.5	101.7	76.8	44
Congo, Rep.	62.8	173.6	95.9	117	Haiti	193.8	62.8	62.8	89
Cote d'Ivoire	233.4	113.9	58.3	60	Honduras	219.4	83.4	31.8	32
Egypt	304.4	180.3	43.4	48	India	118.5	219	29.9	28
Gabon	214.2	241.7	80.1	113	Indonesia	95.6	175.9	28.9	36
Gambia	141.3	84.0	55.8	60	Jordan	57.4	105.9	36.3	60
Ghana	264.8	59.5	25.7	21	Malaysia	104.5	0	97.9	98
Guinea Bissau	96.0	175.6	31.5	30	Mexico	157.9	192.5	97.3	97
Kenya	124.4	154.4	16.7	22	Pakistan	59.3	110	35.8	42
Lesotho	93.3	59.4	46.3	50	Panama	171.4	71.6	160.2	187
Madagascar	185.1	106.4	47.3	55	Paraguay	197.8	0	61.4	61
Malawi	142.8	195.9	38.9	47	Peru	228.2	109.1	37.2	55
Mali	185.9	85.3	57.6	64	Philippines	313.8	52.9	38.3	37
Mauritania	216.9	132.8	27.6	36	Srilanka	203.3	138.8	24.7	19
Mauritius	6.2	3.2	118.7	119	Thailand	184.7	252.9	28.1	29
Morocco	219.5	109.1	22.1	23	Uruguay	332.3	0	49.6	50
Nigeria	305.7	268.9	82.5	63					
Rwanda	99.8	71.5	54.1	65					
Senegal	238.3	160.3	31.5	38					
Seychelles	0.0	168.8	123.5	115					
Sudan	79.6	184.1	93.9	74					
Swaziland	65.0	15.1	31.5	33					
Tanzania	171.8	74.9	29.4	35					
Togo	159.4	117.1	111.0	111					
Tunisia	174.5	134.7	30.1	30					
Zambia	268.8	119.6	30.5	31					
Average volatility	**169**	**126**	**61**	**65**	**Average volatility**	**176**	**99**	**53**	**54**

Table 5: Volatility of Aid Outflows by Donors (%)

Donor	Volatility
Australia	89
Austria	57
Belgium	90
Canada	55
Denmark	266
Finland	98
France	29
Germany	21
Ireland	94
Italy	50
Japan	53
Netherlands	162
New zealand	168
Norway	150
Sweden	29
Switzerland	67
UK	47
US	87
Average	**89**

Table 6: Correlations between Total Aid (x) and Recipient GDP

Recipients (African)							Recipients (Non-African)						
Recipient	x(t-1)		x		x(t+1)		Recipient	x(t-1)		x		x(t+1)	
Benin	0.036		-0.026		-0.5	*	Bangladesh	**0.551**	**	-0.329	*	-0.596	**
Botswana	0.164		**0.401**	*	0.414		Bolivia	-0.378	*	-0.264		-0.283	
Burkina Faso	-0.295		-0.113		0.158		Costa Rica	0.237		-0.185		-0.543	**
Burundi	-0.285		0.129		**0.62**	**	Dominican Rep.	-0.923	***	-0.037		**0.473**	**
Cameroon	0.262		0.103		-0.143		Ecuador	0.244		**0.366**	*	0.128	
Cape Verde	-0.223		0.004		**0.433**	*	El Salvador	-0.119		-0.211		-0.066	
Chad	-0.442	*	-0.268		0.022		Guatemala	0.073		0.109		-0.058	
Congo, DR	0.708	***	**0.78**	***	0.467		Guyana	0.165		-0.305		0.213	
Congo, Rep,	0.11		**0.406**	*	0.056		Haiti	-0.053		**-0.513**	**	-0.293	
Cote d'Ivoire	0.011		-0.045		0.224		Honduras	0.284		0.522	**	**0.738**	***
Egypt	-0.631	**	**-0.815**	***	-0.532		India	0.101		0.103		0.101	
Gabon	0.347		-0.15		-0.715	***	Indonesia	-0.062		-0.155		0.122	
Gambia	0.395		0.465	**	**0.563**	**	Jordan	0.459	**	**-0.549**	**	0.41	
Ghana	0.005		-0.012		-0.195		Malaysia	0.413	*	**0.632**	***	0.627	**
Guinea-Bissau	-0.263		0.055		-0.006		Mexico	-0.721	***	-0.338		0.194	
Kenya	-0.388		**-0.62**	***	-0.642	***	Pakistan	-0.203		0.393		**0.47**	*
Lesotho	0.248		-0.033		-0.27		Panama	-0.512	**	-0.106		**0.368**	*
Madagascar	-0.05		**0.409**	*	-0.133		Paraguay	**0.401**	*	0.16		0.088	
Malawi	-0.174		-0.322		**0.388**	*	Peru	-0.415	*	**-0.563**	**	-0.266	
Mali	-0.228		-0.293		-0.298		Philippines	**0.494**	**	0.059		0.127	
Mauritania	0.405		**-0.666**	**	-0.573	**	Sri Lanka	-0.313		0.222		-0.162	
Mauritius	-0.129		-0.318		-0.038		Thailand	0.189		0.291		**0.337**	*
Morocco	0.347		**0.366**	*	-0.485	**	Uruguay	-0.008		-0.2		-0.635	***
Nigeria	-0.375		0.043		**0.406**	*							
Rwanda	-0.156		0.167		0.293								
Senegal	-0.228		-0.125		0.001								
Seychelles	-0.084		-0.194		-0.243								
Sudan	0.362		0.359		0.224								
Swaziland	-0.058		-0.066		**0.422**	*							
Tanzania	-0.397	*	0.109		0.238								
Togo	-0.099		-0.167		-0.284								
Tunisia	0.578	**	**0.69**	***	0.197								
Zambia	-0.115		-0.003		0.179								

***,**, and * denote significance at 1%, 5%, and 10% respectively.

Table 7: Correlations between Individual Aid Components and Recipient GDP

Panel A: Correlations between Emergency Aid (x) and Recipient GDP

Recipients (African)							Recipients (Non-African)						
Recipient	x(t-1)		x		x(t+1)		Recipient	x(t-1)		x		x(t+1)	
Benin	-0.067		-0.069		-0.04		Bangladesh	0.236		**0.471**	*	-0.047	
Botswana	-0.13		0.109		0.063		Bolivia	0.167		0.144		-0.175	
Burkina Faso	-0.26		0.067		**0.541**	**	Costa Rica	0.269		0.196		0.077	
Burundi	-0.145		0.196		**0.385**	*	Dominican Rep.	-0.199		0.141		-0.348	*
Cameroon	0.081		**-0.352**	*	0.112		Ecuador	-0.559		**-0.55**	**	-0.068	
Cape Verde	-0.276		-0.132		-0.15		El Salvador	-0.472		-0.093		-0.285	
Chad	-0.38		-0.52		**0.423**	**	Guatemala	-0.115		-0.034		-0.109	
Congo, DR	0.243		0.329		0.304		Guyana			-0.088		-0.208	
Congo, Rep,	0.037		-0.099		**0.573**	**	Haiti	0.158		-0.027		0.278	
Cote d'Ivoire	**0.381**	*	0.085		-0.35	*	Honduras	0.464		**0.453**	*	0.033	
Egypt	0.274		0.028		-0.095		India	-0.461		0.043		0.258	
Gabon	0.164		-0.095		-0.185		Indonesia	-0.252		**-0.448**	**	-0.1	
Gambia	**0.627**	**	0.193		-0.103		Jordan	-0.076		0.209		0.034	
Ghana	0.159		**0.455**	**	0.061		Malaysia	**0.428**	*	0.2		-0.108	
Guinea-Bissau	0.308		0.102		-0.558	**	Mexico	0.228		**0.377**	*	-0.12	
Kenya	-0.483	*	-0.027		0.128		Pakistan	**0.393**	*	0.169		-0.177	
Lesotho	-0.367	*	-0.06		-0.333		Panama	0.031		**-0.495**	**	0.1	
Madagascar	-0.315		0.074		0.152		Paraguay	-0.716	***	**-0.557**	**	-0.129	
Malawi	-0.344	*	0.058		-0.172		Peru	-0.516	**	**-0.771**	***	-0.37	*
Mali	0.2		**0.699**	***	0.157		Philippines	**0.597**	**	0.595	***	0.442	*
Mauritania	-0.045		-0.098		**0.811**	***	Sri Lanka	0.075		**0.544**	**	0.436	*
Mauritius							Thailand	0.166		-0.159		-0.479	**
Morocco	-0.359	*	-0.19		**0.468**	**	Uruguay	0.031		-0.084		0.173	
Nigeria	-0.125		-0.159		-0.145								
Rwanda	-0.338	*	-0.235		**0.507**	**							
Senegal	0.167		0.085		**0.478**	**							
Seychelles													
Sudan	0.202		**0.597**	*	0.352								
Swaziland	-0.032		-0.032		-0.298								
Tanzania	0.012		-0.235		-0.028								
Togo	0.177		**0.448**	**	0.005								
Tunisia	-0.002		-0.214		**0.501**	**							
Zambia	-0.023		-0.282		0.116								

***,**, and * denote significance at 1%, 5%, and 10% respectively.

Panel B: Correlations between Program Aid (x) and Recipient GDP

Recipients (African)							Recipients (Non-African)						
Recipient	x(t-1)		x		x(t+1)		Recipient	x(t-1)		x		x(t+1)	
Benin	0.092		0.172		-0.175		Bangladesh	0.31		-0.191		-0.344	*
Botswana							Bolivia	0.163		-0.129		-0.502	**
Burkina Faso	0.385	*	**-0.47**	**	-0.208		Costa Rica	0.061		-0.218		-0.529	**
Burundi	0.155		0.45	*	**0.862**	***	Dominican Rep.	0.161		0.03		-0.178	
Cameroon	0.077		-0.158		-0.036		Ecuador	-0.367	*	-0.162		-0.014	
Cape Verde	-0.295		-0.222		0.232		El Salvador	-0.24		-0.274		-0.245	**
Chad	-0.047		-0.143		-0.08		Guatemala	-0.043		-0.304		-0.182	
Congo, DR	0.421	*	**0.757**	***	0.705	***	Guyana	0.196		-0.094		0.116	
Congo, Rep,	0.203		-0.026		-0.123		Haiti	-0.145		0.077		0.329	
Cote d'Ivoire	-0.134		-0.252		0.115		Honduras	0.021		-0.243		-0.104	
Egypt	-0.223		**-0.341**	*	-0.028		India	-0.231		**-0.522**	**	-0.106	
Gabon	**0.374**	*	0.192		-0.483	**	Indonesia	0.037		**-0.564**	**	-0.379	*
Gambia	**0.455**	*	0.027		-0.619	***	Jordan	**0.486**	*	-0.409		0.227	
Ghana	-0.107		0.144		-0.285		Malaysia						
Guinea-Bissau	0.076		-0.087		-0.09		Mexico	0.061		0.328		0.172	
Kenya	0.133		0.154		-0.258		Pakistan	-0.124		0.193		**0.397**	*
Lesotho	-0.218		-0.288		0.151		Panama	0.12		-0.08		-0.285	
Madagascar	-0.043		-0.005		0.074		Paraguay						
Malawi	0.327		-0.318		0.142		Peru	-0.149		-0.302		-0.179	
Mali	0.069		**-0.559**	**	-0.216		Philippines	**0.432**	*	-0.182		-0.423	*
Mauritania	0.219		-0.317		-0.383		Sri Lanka	0.154		-0.193		-0.304	
Mauritius	-0.089		-0.221		-0.102		Thailand	-0.123		0.069		**0.364**	*
Morocco	**0.505**	**	0.256		0.084		Uruguay						
Nigeria	-0.374	*	-0.032		**0.608**	**							
Rwanda	0.182		-0.196		-0.389	*							
Senegal	0.08		-0.206		0.228								
Seychelles	**0.439**	*	-0.333	*	-0.211								
Sudan	-0.061		0.16		-0.086								
Swaziland	0.301		-0.32		-0.101								
Tanzania	-0.323		-0.097		0.261								
Togo	0.244		0.269		0.175								
Tunisia	0.077		-0.041		-0.212								
Zambia	0.034		-0.332		-0.276								

***,**, and * denote significance at 1%, 5%, and 10% respectively.

Panel C: Correlations between Project aid (x) and Recipient GDP

Recipients (African)							Recipients (Non-African)						
Recipient	x(t-1)		x		x(t+1)		Recipient	x(t-1)		x		x(t+1)	
Recipient	0.26		**-0.362**	*	-0.794	***	Bangladesh	**0.587**	**	-0.313		-0.624	*
Benin	0.18		0.429	*	**0.437**	*	Bolivia	-0.416	*	-0.23		-0.023	
Botswana	-0.318		-0.026		0.164		Costa Rica	0.174		-0.102		-0.423	*
Burkina Faso	-0.294		0.058		**0.511**	**	Dominican Rep.	-0.92	***	-0.034		**0.473**	**
Burundi	**0.439**	*	0.436	*	-0.096		Ecuador	0.212		0.319		0.127	
Cameroon	-0.325		-0.044		0.168		El Salvador	**0.508**	**	0.235		0.16	
Cape Verde	0.062		-0.219		-0.209		Guatemala	0.275		0.269		0.154	
Chad	0.702	***	**0.722**	***	0.456	*	Guyana	0.183		-0.13		**0.488**	*
Congo, DR	0.075		**0.502**	**	0.311		Haiti	**0.463**	*	-0.042		-0.648	***
Congo, Rep,	0.028		0.195		0.327		Honduras	0.133		0.598	**	**0.81**	***
Cote d'Ivoire	-0.455	*	**-0.712**	***	-0.713	***	India	0.235		0.189		0.13	
Egypt	-0.154		-0.31		-0.131		Indonesia	0.316		0.395	*	**0.471**	**
Gabon	0.401	*	0.478	**	**0.622**	***	Jordan	-0.147		0.267		**0.407**	*
Gambia	0.123		0.049		0.159		Malaysia	0.415	*	**0.635**	***	0.624	***
Ghana	0.103		-0.273		0.202		Mexico	-0.721	***	**-0.337**	*	0.194	
Guinea-Bissau	-0.287		**-0.523**	**	-0.623	***	Pakistan	-0.167		**0.519**	**	0.359	
Kenya	0.21		-0.024		-0.301		Panama	-0.61	***	0.361	*	**0.615**	***
Lesotho	-0.098		**0.376**	*	-0.264		Paraguay	**0.4**	*	0.16		0.088	
Madagascar	-0.026		-0.024		0.154		Peru	-0.585	**	**-0.514**	**	0.117	
Malawi	-0.094		-0.038		-0.415	*	Philippines	**0.456**	*	0.078		0.182	
Mali	**0.637**	**	0.346		-0.253		Sri Lanka	-0.223		-0.2		-0.244	
Mauritania	-0.129		-0.318		-0.036		Thailand	0.248		0.361	*	**0.432**	*
Mauritius	0.304		**0.391**	*	-0.536	**	Uruguay	-0.01		-0.2		-0.632	***
Morocco	-0.548	**	-0.248		0.282								
Nigeria	-0.162		**0.391**	*	0.283								
Rwanda	-0.2		0.317		-0.14								
Senegal	0.023		0.222		-0.116								
Seychelles	**0.666**	*	-0.132		-0.294								
Sudan	-0.109		-0.136		**0.397**	*							
Swaziland	-0.405	*	0.216		0.221								
Tanzania	-0.175		-0.171		-0.339								
Togo	**0.739**	***	0.37	*	-0.014								
Tunisia	0,044		0,311		0,323								

***,**, and * denote significance at 1%, 5%, and 10% respectively.

Table 8: Contemporaneous Correlation between Total Aid (x) and Donor GDP

Donor	x	
Australia	-0.786	***
Austria	-0.308	
Belgium	0.332	
Canada	-0.805	***
Denmark	0.207	
Finland	0.222	
France	-0.152	
Germany	-0.341	*
Ireland	-0.373	*
Italy	-0.477	**
Japan	0.231	
Netherlands	0.524	**
New Zealand	0.029	
Norway	-0.443	**
Sweden	-0.363	*
Switzerland	-0.223	
United Kingdom	0.186	
United States	-0.514	**

***,**, and * denote significance at 1%, 5%, and 10% respectively.