Compete or Coordinate? Aid Fragmentation and Lead Donorship – Supplemental Material

December 17, 2013

1 Bias in $\hat{\rho}$

There is no closed form solution for the maximum likelihood estimator of the connectivity parameter ρ (denoted as $\hat{\rho}$). To show how omitting a) miss-specification of connectivity weights b and b) omitting a variable from the covariates $\boldsymbol{X}\beta$ introduces bias in $\hat{\rho}$, we perform a series of Monte-Carlo analyses. We write the general spatial auto-regressive (SAR) data generating process as

$$y_{r,i} = \rho \sum_{j \neq i} b_{r,i,j} y_{r,j} + \beta_0 + \beta_1 I_{Lead\ Donor} + \beta_2 x_{r,i} + \beta_3 z_{r,i} + \varepsilon_{r,i}, \tag{1}$$

where $y_{r,i}$ is aid per capita going from donor country i to recipient country r, $I_{LeadDonor}$ is an indicator variable that takes on value 1 if donor country i is a lead donor, and 0 otherwise, $x_{r,i}$ and $z_{r,i}$ are other independent variables, $b_{r,i,j}$ are weights capturing the connectivity between donors i and j for country r, ρ is the connectivity parameter, and ε is an iid normal error term with constant variance.

We begin with the lead donorship case. Problems could arise in the empirical analysis because we work with a sub-sample of recipient countries that have a lead donor. By design, one of the donors i has markedly larger aid provisions $y_{r,i}$ than the other donors j. At the same time, our theory suggests that donors j should condition their aid allocations specifically on i's actions. Accordingly, we choose a large $b_{r,i,j}$ for the connection between a donor country j and the lead donor i, i.e. the connectivity weights are endogenous. Problems occur when $\beta_1 > 0$, i.e. the lead donor provides more aid than others for non-strategic reasons, but we omit $\beta_1 I_{Lead\ Donor}$ from the analysis. In this case, absolute point estimates of ρ will be inflated. This is a form of omitted variable bias because the connectivity structure $\rho \sum_{j \neq i} y_i$ and $I_{Lead\ Donor}$ are correlated.

To investigate the severity and direction of the resulting bias, we generate data from (1), setting $\rho = -0.5$, $\beta_0 = 0.5$, $\beta_1 = 1$, $\beta_2 = 2$, $\beta_3 = 0$ and $Var(\varepsilon) = 1$. We assume that

there are $k = 10$ donor countries and $d = 100$ recipient countries, for a total number of observations of $n = 1,000$. Note that ρ is negative because our theory leads us to expect substitution effects in the lead donor case. For each recipient country, we randomly draw a lead donor from the set of donors $K = \{1, \ldots, 10\}$ and specify lead donor connectivity weights as described in the main text. We perform $m = 1,000$ Monte-Carlo repetitions of this procedure. We fit two SAR models to each data set. The first is the correct model according to (1). The second model omits the lead donor dummy $\beta_1 I_{Lead\ Donor}$ (note that $\beta_3 = 0$),

$$y_{r,i} = \rho \sum_{j \neq i} b_{r,i,j} y_{r,j} + \beta_0 + \beta_2 x_{r,i} + \varepsilon_{r,i}. \tag{2}$$

Table 1 summarizes the empirical distribution of recovered point estimates $\hat{\rho}$ for both the correctly and incorrectly specified models, and provides the bias (mean deviation from ρ).

Table 1: Lead donor case, lead donor weights, effect of omitted variable

$\rho = -0.5$	2.5th percentile	median	97.5th percentile	bias
β_1 omitted , $\hat{\rho}$	-0.615	-0.549	-0.486	-0.050
β_1 included, $\hat{\rho}$	-0.560	-0.497	-0.438	0.000986

There are two results. First, omitting the lead donor intercept $I_{Lead\ Donor}$ biases $\hat{\rho}$ downward. For the purposes of our analysis this is not benign, since the direction of this bias inflates the estimated effect size of strategic interactions, falsely providing support for our hypothesis. Second, in contrast to this, the correctly specified SAR model does a very good job at recovering ρ with only minimal bias. Thus, once we account for the non-strategic part of the lead donor's aid allocations, we are able to correctly identify the strategic component, despite endogenous connectivity weights. Based on this finding, we include lead donor fixed effects in the empirical analysis.

Next we turn to the case without lead donorship. We investigate two possible threats to inference, un-modeled heterogeneity of aid provisions between recipient countries, and miss-specification of connectivity weights $b_{r,i,j}$. We begin with heterogeneity. In our empirical analysis we use cross-sectional data for 128 countries. For cases without lead donor, we recover positive values of ρ, indicating complementarities in aid provision. The problem arises because the aid allocations for all donors vary jointly across recipient countries. If this heterogeneity is not correctly modeled in the non-strategic term $\boldsymbol{x\beta}$, we suspect that estimates for ρ are biased upward, giving undue credence to the presence of complementarities.

To test this notion, we generate Monte Carlo data according to model (1), setting $\beta_0 = 0.5$, $\beta_1 = 0$ (since there is no lead donor), $\beta_2 = 1$, and $Var(\varepsilon) = 1$. Since our estimate of ρ in the empirical analysis is positive, we want to know whether this estimate is exaggerated if the true ρ is positive. In an initial run we therefore set $\rho = 0.4$. We are also concerned that the bias could be so severe that we recover a positive value of ρ although the true parameter is negative. In a second run we therefore set $\rho = -0.4$. To investigate whether the sign of the omitted variable matters, we also vary between $\beta_3 = -2$ and $\beta_3 = 3$.

Importantly, to simulate heterogeneity in aid allocations by recipient country, we let $z_{i,r}$ vary only by recipient country, not by donor. Connectivity weights correspond to the even weights used in the empirical analysis, $b_{r,i,j} = 1/(k-1)$, i.e. they connect donor countries equally irrespective of recipient country or donor country identity. The other parameters are as before, $k = 10$, $d = 100$, and $m = 1,000$.

We fit both a correctly and an incorrectly specified SAR model to the Monte-Carlo data. The incorrectly specified model omits $\beta_3 z_{r,i}$ (note that $\beta_1 = 0$),

$$y_{r,i} = \rho \sum_{j \neq i} b_{r,i,j} y_{r,j} + \beta_0 + \beta_2 x_{r,i} + \varepsilon_{r,i}. \tag{3}$$

Table 2 shows results. We find that $\hat{\rho}$ is biased downward in all omitted variable situations,

irrespective whether ρ is positive or negative and independent of the sign of the omitted term $\beta_3 z_{r,i}$. Our concerns therefore are unfounded. This form of bias does not incorrectly flip the sign of the estimate of ρ, nor are our positive estimates of ρ inflated. On the contrary, the fact that this form of bias attenuates estimates of ρ increases the risk of a type II error, as confidence bands around the biased point estimate become more likely to include the zero. If anything, the presence of heterogeneity in our empirical analysis leads us to underestimate the size of positive spill-ins.

Table 2: No lead donor, even connectivity weights, effect of omitted variable

		2.5th percentile	median	97.5th percentile	bias
$\rho = 0.4$	$\beta_3 = -2$				
	β_3 omitted, $\hat{\rho}$	0.310	0.394	0.470	-0.00684
	β_3 included, $\hat{\rho}$	0.352	0.398	0.447	0.00248
	$\beta_3 = 3$				
	β_3 omitted , $\hat{\rho}$	0.308	0.395	0.463	-0.00665
	β_3 included, $\hat{\rho}$	0.364	0.399	0.430	-0.00106
$\rho = -0.4$	$\beta_3 = -2$				
	β_3 omitted, $\hat{\rho}$	-0.591	-0.415	-0.248	-0.0124
	β_3 included, $\hat{\rho}$	-0.502	-0.404	-0.304	0.00136
	$\beta_3 = 3$				
	β_3 omitted , $\hat{\rho}$	-0.589	-0.408	-0.255	-0.0112
	β_3 included, $\hat{\rho}$	-0.473	-0.401	-0.334	0.00388

The last threat to inference also applies to cases without lead donorship. In our empirical analysis, we give each pair of donors the same connectivity weights, $b_{r,i,j} = 1/(k-1)$. The idea is that even weights do not incorporate any special strategic relationship between donors, as our theory does not predict strategic asymmetries. Though even weights in a sense reflect our lack of knowledge beyond what our theory predicts, the process that generates the real world data could look quite differently, leaving our SAR models miss-specified. We would like to know to what extent this renders our inferences about ρ incorrect. Since we find positive values for ρ in our analysis, the worst case scenario would be that ρ is negative in

reality, but we recover an incorrect positive effect.

To investigate this situation, we make slight modifications to the data generating process from the previous Monte Carlo setup. Instead of even connectivity weights, we randomly assign $b_{r,i,j}$ according to a uniform distribution on the [0,1] interval and then row-standardize the resulting connectivity matrix. We hold these weights fixed for each MC iteration. Substantively, we can think of the resulting connectivity weights as reflecting geographic distance between donor countries (scaled to lie between 0 and 1), or the difference in distance between individual donors and the recipient country. Geographic weights are commonly used in the specification of SAR models. To reflect the worst case scenario, we set $\rho = -0.4$ and in a second round of simulations $\rho = -0.8$. All other parameters stay the same, i.e. $\beta_0 = 0.5$, $\beta_1 = 0$ (no lead donor), $\beta_2 = 1$, $\beta_3 = 3$, $Var(\varepsilon) = 1$, $k = 10$, $d = 100$, and $m = 1,000$. Again, we fit a correctly specified and a miss-specified SAR model to the MC data. The miss-specification consists of incorrect even weights, $b_{r,i,j} = 1/(k-1)$, such as we used in our empirical analysis.

Table 3: No lead donor, geographic connectivity weights, effect of miss-specified weights

	2.5th percentile	median	97.5th percentile	mean bias
$\rho = -0.4$				
$b_{r,i,j}$ incorrect, $\hat{\rho}$	-0.569	-0.417	-0.267	-0.0169
$b_{r,i,j}$ correct, $\hat{\rho}$	-0.540	-0.407	-0.290	-0.0108
$\rho = -0.8$				
$b_{r,i,j}$ incorrect, $\hat{\rho}$	-1.01	-0.812	-0.638	-0.0110
$b_{r,i,j}$ correct, $\hat{\rho}$	-0.935	-0.806	-0.667	-0.00440

Table 3 shows results. Using miss-specified weights introduces negative bias in the analysis, essentially exaggerating the recovered estimated effect. The size of this bias does not depend on the magnitude of the negative spill ins in the data generating process. For $\rho = 0.4$ and $\rho = 0.8$ the bias is almost the same. We conclude that it is not possible that incorrect

even connectivity weights can lead to a positive estimated sign of ρ when the true sign is negative.

2 Regression Results

Table 4: SAR – aid per capita, no lead donor, even weights

	All Channels		Government Aid		NGO Aid	
ρ	**0.132**	(0.057)	0.0374	(0.0627)	0.0632	(0.0614)
s^2	**23.4**	(0.335)	**20.9**	(0.298)	**0.716**	(0.0102)
Constant	**-9.95**	(3.32)	**-12**	(2.96)	**0.424**	(0.103)
Total donor aid	**0.00989**	(0.0012)	**0.00677**	(0.00107)	**0.00021**	(3.67e-05)
Donor concentration	**13.9**	(6.42)	8.12	(5.68)	-0.214	(0.195)
Oil exports	9.5	(6.76)	0.507	(6.02)	-0.253	(0.207)
Total imports	**-3.44**	(1.53)	-1.78	(1.36)	-0.0159	(0.0468)
Central America	-0.516	(2.26)	-0.285	(2.01)	**-0.194**	(0.0695)
South America	0.0744	(2.22)	0.737	(1.98)	**-0.205**	(0.0686)
Africa	1.11	(1.9)	*2.92*	(1.69)	-0.0635	(0.058)
Middle East	0.83	(2.31)	1.01	(2.06)	**-0.184**	(0.0709)
Asia	1.3	(2.17)	2.08	(1.93)	**-0.246**	(0.0673)
Oceania	**16**	(3.2)	**17.1**	(2.9)	**0.378**	(0.0981)
Population	-0.0827	(0.329)	0.0277	(0.293)	0.00155	(0.0101)
GDP per capita, ppp	0.0042	(0.012)	0.017	(0.0108)	-0.000211	(0.000369)
Former colony	**20.7**	(2.86)	**17.3**	(2.55)	-0.0734	(0.0876)
Joint UN voting	**6.82**	(3.38)	**9.52**	(3.02)	**-0.355**	(0.104)
n						

Table 5: SAR – aid per capita, lead donor, lead donor connectivity weights

	All Channels		Government Aid		NGO Aid	
ρ	**-0.0478**	(0.0171)	**-0.0405**	(0.0155)	-0.0107	(0.0264)
s^2	**48.7**	(1.04)	**0.0483**	(0.00103)	**0.6**	(0.0128)
Constant	**-56.2**	(12)	**-0.059**	(0.0119)	-0.154	(0.147)
Lead Donor Dummy	**85.4**	(7.94)	**0.0461**	(0.00784)	**0.351**	(0.0975)
Total donor aid	**0.0184**	(0.00399)	**1.9e-05**	(3.95e-06)	**0.000157**	(4.94e-05)
Donor concentration	14.7	(10.8)	0.013	(0.0106)	-0.167	(0.133)
Oil exports	-8.33	(23.7)	-0.00355	(0.0235)	-0.0644	(0.292)
Total imports	**-22.4**	(5.41)	**-0.0174**	(0.00536)	*-0.114*	(0.0667)
Central America	2.56	(9.67)	0.00451	(0.00958)	0.0843	(0.119)
South America	7.51	(9.25)	0.00849	(0.00916)	0.0549	(0.114)
Africa	5.46	(8.11)	0.00748	(0.00803)	0.138	(0.102)
Middle East	5.96	(9.41)	0.00853	(0.00932)	0.0648	(0.116)
Asia	5.68	(8.38)	0.0083	(0.0083)	0.0461	(0.103)
Oceania	**37.3**	(9.15)	**0.0331**	(0.00895)	**0.357**	(0.112)
Population	*1.63*	(0.944)	0.00144	(0.000935)	0.00697	(0.0116)
GDP per capita, ppp	0.0365	(0.0327)	3.28e-05	(3.26e-05)	-0.000292	(0.000404)
Former colony	**59.2**	(8.07)	**0.0572**	(0.00799)	**0.236**	(0.0994)
Joint UN voting	**57.3**	(11.3)	**0.0583**	(0.0112)	*0.24*	(0.14)
n						

Table 6: SAR – aid per capita, lead donor, even connectivity weights

	All Channels		Government Aid		NGO Aid	
ρ	-0.0944	(0.105)	-0.162	(0.111)	-0.185	(0.115)
s^2	**48.9**	(1.04)	**0.0484**	(0.00103)	**0.599**	(0.0128)
Constant	**-54.2**	(12)	**-0.0576**	(0.0119)	-0.163	(0.147)
Lead Donor Dummy	**87.5**	(7.93)	**0.0469**	(0.00784)	**0.351**	(0.0971)
Total donor aid	**0.0185**	(0.004)	**1.92e-05**	(3.96e-06)	**0.000159**	(4.91e-05)
Donor concentration	7.78	(10.5)	0.00893	(0.0104)	-0.177	(0.128)
Oil exports	-7.93	(23.8)	-0.00347	(0.0235)	-0.0614	(0.291)
Total imports	**-22.5**	(5.43)	**-0.0175**	(0.00537)	*-0.113*	(0.0665)
Central America	4.37	(9.68)	0.00578	(0.00958)	0.0918	(0.119)
South America	8.23	(9.28)	0.00899	(0.00918)	0.059	(0.114)
Africa	6.27	(8.13)	0.00785	(0.00804)	0.153	(0.101)
Middle East	7.05	(9.44)	0.0091	(0.00933)	0.0706	(0.116)
Asia	6.59	(8.4)	0.0086	(0.00831)	0.0495	(0.103)
Oceania	**31.7**	(9.01)	**0.0302**	(0.00888)	**0.408**	(0.115)
Population	*1.62*	(0.947)	0.00141	(0.000937)	0.00691	(0.0116)
GDP per capita, ppp	0.0296	(0.0329)	2.62e-05	(3.25e-05)	-0.000325	(0.000401)
Former colony	**59.3**	(8.09)	**0.0572**	(0.00801)	**0.231**	(0.0992)
Joint UN voting	**57.9**	(11.3)	**0.0592**	(0.0112)	*0.259*	(0.14)
n						

Table 7: SAR – 1970s–1990s, aid per capita, no lead donor

	1970–79		1980–89		1990–99	
ρ	**0.16**	(0.0611)	**0.181**	(0.0559)	**0.12**	(0.0554)
s^2	**18.9**	(0.301)	**11.8**	(0.177)	**32**	(0.438)
Constant	-4.48	(4.73)	-1.41	(2.82)	-0.965	(3.88)
Total donor aid	**0.00831**	(0.00218)	**0.00882**	(0.00106)	**0.00958**	(0.00199)
Donor concentration	**14.2**	(5.73)	4.46	(3.5)	**14.9**	(7.47)
Oil exports	9.87	(23.6)	-2.85	(8.27)	-10.6	(20.2)
Total imports	-15.1	(9.26)	**-13.8**	(5.21)	-3.21	(3.53)
Central America	0.69	(4.19)	1.72	(2.61)	-2.08	(3.09)
South America	1.53	(4.26)	0.676	(2.63)	-0.828	(3.45)
Africa	2.02	(4.11)	1.77	(2.57)	-0.878	(2.88)
Middle East	0.976	(4.27)	0.23	(2.61)	-4.86	(3.3)
Asia	0.417	(4.19)	-0.141	(2.61)	-3.05	(3.09)
Oceania	**9.87**	(4.55)	**9.72**	(2.82)	**14.2**	(3.99)
Population	0.244	(0.69)	0.019	(0.218)	-0.0893	(0.485)
GDP per capita, ppp	-0.00332	(0.00441)	-0.00429	(0.00349)	0.00655	(0.0103)
Former colony	**35.6**	(2.43)	**20.1**	(1.42)	**33.7**	(3.58)
Joint UN voting	-2.64	(2.2)	-1.86	(1.57)	-4.58	(3.35)
n						

Table 8: SAR – 1970s–1990s, aid per capita, lead donor, lead donor connectivity weights

	1970–79		1980–89		1990–99	
ρ	**-0.0766**	(0.0132)	*-0.0264*	(0.0136)	**-0.0386**	(0.0123)
s^2	**29.6**	(0.468)	**20**	(0.353)	**117**	(1.94)
Constant	**-17.5**	(5.77)	*-6.48*	(3.48)	-25.8	(18)
Lead Donor Dummy	**68.2**	(4.02)	**61.9**	(2.76)	**113**	(15.3)
Total donor aid	-0.00434	(0.00334)	0.00243	(0.0021)	-0.000689	(0.00904)
Donor concentration	**45.7**	(6)	**15.9**	(4.54)	**63.3**	(22.3)
Oil exports	-88.8	(66)	-21.4	(16.8)	-21.5	(76.4)
Total imports	-16	(16.6)	**-22.7**	(7.63)	**-53.4**	(21.6)
Central America	*-8.02*	(4.83)	0.552	(2.66)	-0.389	(11.5)
South America	3.11	(4.99)	3.04	(3.29)	5.81	(13.9)
Africa	-3.42	(4.65)	1.2	(2.69)	-1.06	(11.6)
Middle East	-2.4	(4.94)	1.69	(2.87)	-2.58	(12.4)
Asia	-4.94	(4.94)	-0.995	(2.83)	0.313	(11.8)
Oceania	5.63	(5.29)	**11.3**	(3.18)	**64.6**	(15.7)
Population	-7.33	(5.48)	-0.0577	(0.451)	1.44	(2.17)
GDP per capita, ppp	*-0.0165*	(0.00904)	-0.00803	(0.00636)	0.0209	(0.0353)
Former colony	**18.2**	(4.21)	**11.8**	(2.93)	**98.4**	(16.4)
Joint UN voting	-2.82	(3.21)	-2.8	(2.66)	-20.4	(15.1)
n						

Table 9: SAR – total aid, no lead donor

	All Channels		Government Aid		NGO Aid	
ρ	**0.456**	(0.0364)	**0.422**	(0.0385)	**0.29**	(0.0475)
s^2	**141**	(2.03)	**18.5**	(0.266)	**5.42**	(0.0776)
Constant	-20.9	(20)	2.7	(2.64)	**3.18**	(0.77)
Total donor aid	**0.0707**	(0.00724)	**0.0118**	(0.00095)	**0.00202**	(0.000277)
Donor concentration	-14.5	(38.3)	-7.6	(5.05)	-1.99	(1.48)
Oil exports	**193**	(40.8)	**-15**	(5.35)	*-2.69*	(1.56)
Total imports	**25.7**	(9.24)	1.69	(1.21)	-0.0692	(0.354)
Central America	5.48	(13.6)	-2.07	(1.79)	*-0.875*	(0.522)
South America	2.57	(13.4)	-2.47	(1.76)	**-1.03**	(0.514)
Africa	2.24	(11.4)	0.839	(1.51)	-0.119	(0.441)
Middle East	**33.5**	(14.2)	1.1	(1.83)	-0.28	(0.536)
Asia	10.1	(13.1)	**-3.57**	(1.72)	**-1.53**	(0.503)
Oceania	3.06	(18.4)	-1.87	(2.41)	-1.06	(0.705)
Population	2.33	(2.01)	0.0623	(0.261)	0.0581	(0.0762)
GDP per capita, ppp	*-0.135*	(0.073)	-0.00753	(0.00954)	-0.00299	(0.0028)
Former colony	**45.4**	(17.3)	**8.87**	(2.27)	-0.849	(0.662)
Joint UN voting	16.9	(20.5)	-2.55	(2.68)	**-3.43**	(0.784)
n	2442		2442		2442	

Table 10: SAR – total aid, lead donor, lead donor connectivity weights

	All Channels		Government Aid		NGO Aid	
ρ	0.0037	(0.0164)	**-0.0881**	(0.0192)	0.0245	(0.0217)
s^2	**65.4**	(1.39)	**4.53**	(0.0965)	**0.926**	(0.0197)
Constant	23	(16.1)	**-5.08**	(1.16)	**0.582**	(0.227)
Lead Donor Dummy	**180**	(10.7)	**8.85**	(0.74)	**0.385**	(0.15)
Total donor aid	0.00802	(0.00536)	**0.000994**	(0.000371)	**0.000212**	(7.59e-05)
Donor concentration	-17.6	(13.9)	**5.64**	(1.15)	-0.271	(0.201)
Oil exports	-11	(31.9)	1.09	(2.21)	-0.0722	(0.451)
Total imports	**169**	(7.37)	**-1.83**	(0.503)	-0.117	(0.103)
Central America	-2.24	(12.9)	0.0454	(0.896)	0.043	(0.184)
South America	-3.11	(12.4)	0.114	(0.86)	-0.0722	(0.176)
Africa	-4.83	(10.9)	*1.39*	(0.758)	0.232	(0.156)
Middle East	13.8	(12.8)	1.27	(0.875)	0.0311	(0.179)
Asia	5.74	(11.3)	0.225	(0.778)	-0.0791	(0.159)
Oceania	-7.85	(11.8)	**3.07**	(0.851)	0.0336	(0.168)
Population	**-3.66**	(1.64)	*0.163*	(0.0878)	0.00504	(0.0179)
GDP per capita, ppp	**-0.159**	(0.0467)	**-0.00985**	(0.00311)	**-0.0016**	(0.000625)
Former colony	7.61	(10.8)	**4.22**	(0.751)	-0.178	(0.153)
Joint UN voting	-4.13	(15.2)	**3.3**	(1.06)	**-0.62**	(0.215)
n						

Table 11: SAR – total aid, lead donor, even connectivity weights

	All Channels		Government Aid		NGO Aid	
ρ	**0.196**	(0.0798)	**-0.252**	(0.119)	*0.152*	(0.0842)
s^2	**65.2**	(1.39)	**4.56**	(0.0973)	**0.925**	(0.0197)
Constant	19.5	(16)	**-4**	(1.14)	**0.562**	(0.227)
Lead Donor Dummy	**181**	(10.6)	**9.17**	(0.74)	**0.381**	(0.15)
Total donor aid	0.00782	(0.00534)	**0.000922**	(0.000373)	**0.000215**	(7.57e-05)
Donor concentration	-15.8	(13.9)	**3.55**	(1.04)	-0.257	(0.2)
Oil exports	-8.53	(31.7)	0.885	(2.22)	-0.0883	(0.45)
Total imports	**170**	(7.27)	**-1.85**	(0.506)	-0.117	(0.103)
Central America	-1.8	(12.9)	0.245	(0.901)	0.0303	(0.184)
South America	-2.91	(12.4)	0.226	(0.864)	-0.0735	(0.176)
Africa	-4.17	(10.8)	1.22	(0.765)	0.204	(0.157)
Middle East	10.3	(12.7)	1.23	(0.884)	0.0162	(0.179)
Asia	3.4	(11.2)	0.264	(0.783)	-0.0783	(0.159)
Oceania	-6.78	(11.7)	**2.43**	(0.85)	0.0214	(0.167)
Population	**-5.24**	(1.46)	*0.152*	(0.0883)	0.005	(0.0179)
GDP per capita, ppp	**-0.134**	(0.045)	**-0.00826**	(0.00314)	**-0.00142**	(0.000638)
Former colony	7.71	(10.8)	**4.34**	(0.755)	-0.181	(0.153)
Joint UN voting	-5.98	(15.1)	**2.97**	(1.06)	**-0.618**	(0.214)
n						

Table 12: SAR – aid per capita, all channels, lead donor using alternative definitions

	HHI only, cutoffs						All criteria, different time periods			
	50th centile		60th centile		70th centile		4 out of 7 years		3 out of 5 years	
ρ	**-0.0505**	(0.0171)	**-0.0424**	(0.0204)	**-0.147**	(0.0293)	**-0.0458**	(0.0169)	**-0.043**	(0.0141)
s^2	**46.7**	(0.949)	**52.4**	(1.22)	**59.1**	(1.6)	**48.4**	(1.02)	**43.5**	(0.768)
Constant	**-41.7**	(11.3)	**-64.5**	(20.1)	**-60.2**	(27.2)	**-54.4**	(11.8)	**-41.3**	(8.54)
Lead Donor	**68.9**	(8.23)	**78**	(10.2)	**81.9**	(13.1)	**86.6**	(7.83)	**66.5**	(5.78)
Total aid	**0.0129**	(0.00365)	**0.0174**	(0.00497)	**0.031**	(0.00672)	**0.018**	(0.00394)	**0.0152**	(0.00294)
Concentration	14.6	(10.1)	21.5	(13.6)	**-67**	(23.3)	16.5	(10.6)	12.6	(8.65)
Oil exports	-17	(22.2)	-15.3	(26.7)	-54.8	(53.7)	4.18	(20.9)	0.626	(19.6)
Total imports	**4.8**	(1.29)	**4.32**	(1.53)	**4.72**	(1.97)	**-22.6**	(5.36)	**-16.9**	(4.32)
Central America	1.66	(8.49)	6.49	(14.1)	24.8	(17.2)	2.88	(9.6)	2.81	(6.42)
South America	5.04	(8.82)	12	(13.4)	**37.6**	(18)	7.44	(9.19)	4.96	(7.24)
Africa	3.38	(7.69)	9.6	(12.5)	*29.4*	(15.1)	4.58	(8.01)	2.85	(5.97)
Middle East	3.6	(8.64)	8.33	(14.3)	21.8	(17)	8.23	(9.05)	4.13	(6.53)
Asia	2.71	(8)	6.95	(13.2)	*31.5*	(18.3)	5.12	(8.31)	2.76	(6.16)
Oceania	**34.9**	(8.67)	**37.3**	(12.9)	**113**	(18.3)	**36.3**	(9.06)	**34.6**	(7.06)
Population	0.342	(0.66)	0.217	(0.967)	-18.5	(18.1)	*1.65*	(0.936)	*1.09*	(0.646)
GDP p.c.	-0.00813	(0.0297)	0.00415	(0.038)	0.0685	(0.0504)	0.0213	(0.031)	0.00346	(0.0207)
Former colony	**53.1**	(7.38)	**67.3**	(9.44)	**77.6**	(12)	**57.7**	(7.9)	**49.3**	(5.96)
Joint UN voting	**43.6**	(10.2)	**59.7**	(16.7)	**105**	(23.2)	**55**	(11.1)	**45.2**	(8.2)
n										

Table 13: SAR – aid per capita, lead donor, geographic proximity weights

	All Channels		Government Aid		NGO Aid	
ρ	-0.0944	(0.101)	-0.17	(0.105)	-0.134	(0.117)
s^2	**48.9**	(1.04)	**48.3**	(1.03)	**0.599**	(0.0128)
Constant	**-49.9**	(12)	**-57.6**	(11.9)	-0.158	(0.147)
Lead Donor Dummy	**79.9**	(7.95)	**46.8**	(7.84)	**0.352**	(0.0972)
Total donor aid	**0.0124**	(0.0041)	**0.0192**	(0.00396)	**0.000158**	(4.91e-05)
Donor concentration	6.26	(10.5)	9.31	(10.4)	-0.171	(0.129)
Oil exports	-15.5	(23.7)	-3.49	(23.5)	-0.0627	(0.292)
Total imports	**5.43**	(1.45)	**-17.5**	(5.37)	*-0.114*	(0.0666)
Central America	0.109	(9.77)	5.63	(9.57)	0.088	(0.119)
South America	7.68	(9.29)	8.93	(9.17)	0.0567	(0.114)
Africa	5.79	(8.14)	7.8	(8.04)	0.147	(0.101)
Middle East	5.96	(9.45)	9.02	(9.32)	0.0677	(0.116)
Asia	5.66	(8.41)	8.56	(8.3)	0.0476	(0.103)
Oceania	**31.6**	(8.99)	**30.4**	(8.87)	**0.383**	(0.113)
Population	0.0604	(0.864)	1.42	(0.936)	0.00693	(0.0116)
GDP per capita, ppp	-0.00156	(0.0339)	0.0271	(0.0325)	-0.000312	(0.000402)
Former colony	**55.6**	(8.08)	**57.2**	(8)	**0.233**	(0.0993)
Joint UN voting	**57.3**	(11.3)	**59**	(11.2)	*0.249*	(0.139)
n						

Table 14: SAR – aid per capita, no lead donor, geographic proximity weights

	All Channels		Government Aid		NGO Aid	
ρ	**0.131**	(0.0585)	0.0319	(0.0639)	*0.109*	(0.061)
s^2	**23.4**	(0.335)	**20.9**	(0.298)	**0.716**	(0.0102)
Constant	**-9.43**	(3.32)	**-12**	(2.97)	**0.415**	(0.103)
Total donor aid	**0.00957**	(0.00119)	**0.00677**	(0.00107)	**0.00021**	(3.67e-05)
Donor concentration	**14.1**	(6.43)	8.18	(5.68)	-0.208	(0.194)
Oil exports	1.44	(5.73)	0.508	(6.02)	-0.252	(0.207)
Total imports	0.0022	(NaN)	-1.78	(1.36)	-0.0162	(0.0468)
Central America	-0.715	(2.26)	-0.299	(2.01)	**-0.188**	(0.0694)
South America	0.0226	(2.22)	0.732	(1.98)	**-0.198**	(0.0686)
Africa	0.986	(1.9)	*2.93*	(1.69)	-0.0648	(0.058)
Middle East	0.776	(2.31)	1	(2.06)	**-0.179**	(0.0709)
Asia	1.24	(2.17)	2.08	(1.93)	**-0.238**	(0.0672)
Oceania	**16.2**	(3.17)	**17.3**	(2.87)	**0.373**	(0.0954)
Population	-0.321	(0.313)	0.0272	(0.293)	0.00159	(0.0101)
GDP per capita, ppp	0.00368	(0.012)	0.0172	(0.0108)	-0.000188	(0.000368)
Former colony	**20.2**	(2.86)	**17.3**	(2.55)	-0.0715	(0.0875)
Joint UN voting	*6.27*	(3.38)	**9.52**	(3.02)	**-0.358**	(0.103)
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