

Abstract

The Commitment to Development Index of the Center for Global Development rates 22 rich countries on the “development-friendliness” of their policies. It is revised and updated annually. The component on foreign assistance combines quantitative and qualitative measures of official aid, and of fiscal policies that support private charitable giving. The quantitative measure uses a net transfers concept, as distinct from the net flows concept in the net Official Development Assistance measure of the Development Assistance Committee. The qualitative factors are: a penalty for tying aid; a discounting system that favors aid to poorer, better-governed recipients; and a penalty for “project proliferation.” The charitable giving measure is based on an estimate of the share of observed private giving to developing countries that is attributable to a) lower overall taxes or b) specific tax incentives for giving. Despite the adjustments, overall results are dominated by differences in quantity of official aid given. This is because while there is a seven-fold range in net concessional transfers/GDP among the scored countries, variation in overall aid quality across donors appears far lower, and private giving is generally small. Denmark, the Netherlands, Norway, and Sweden score highest while the largest donors in absolute terms, the United States and Japan, rank at or near the bottom. Standings by the current methodology have been relatively stable since 1995.

The Center for Global Development is an independent think tank that works to reduce global poverty and inequality through rigorous research and active engagement with the policy community.

Use and dissemination of this Working Paper is encouraged, however reproduced copies may not be used for commercial purposes. Further usage is permitted under the terms of the Creative Commons License. The views expressed in this paper are those of the author and should not be attributed to the directors or funders of the Center for Global Development.

An Index of Donor Performance

David Roodman¹

Center for Global Development

October 2011

Rich nations are often compared on how much they share their wealth with poorer countries. The Nordics and the Netherlands, it is noted, are the most generous with foreign assistance, while the United States gives among the least aid per unit of gross domestic product. Two major international consensus documents issued in 2002, the reports of the International Conference on Financing for Development, in Monterrey, Mexico, and the World Summit on Sustainable Development, in Johannesburg, call on donors to move toward giving at least 0.7 percent of their national income in aid, as few now do. (UN 2002a, p. 9; UN 2002b, p. 52)

The measure of aid implicitly or explicitly referenced in all these comparisons and benchmarks is “net overseas development assistance” (Net ODA), which is a measure of aid quantity defined by the donor-funded Development Assistance Committee (DAC) in Paris. DAC counts total grants and concessional (low-interest) development loans given to developing countries, and subtracts principle repayments received on such loans (thus the “net”).²

Yet it is widely recognized that some dollars and euros of foreign aid do more good than others. While some aid has funded vaccinations whose effectiveness can be measured in pennies per life saved, other aid has handsomely paid donor-country consultants to write policy reports that collect dust on shelves, or merely helped recipients make interest payments on old aid loans. As a result, a simple quantity metric is hardly the last word on donor performance.

This paper describes an index of donor performance that takes the standard quantity measure as a starting point. It is motivated by the desire to incorporate determinants of aid impact other than quantity into the Commitment to Development Index (CDI) (Roodman 2011). The aid index was introduced in 2003 and has been updated annually. At its heart, it is an attempt to quantify aspects of aid quality. But it also introduces a novel variant on the definition of aid *quantity*, and factors in tax policies that support private giving.

¹ The author thanks Mark McGillivray, Simon Scott, and Paul Isenman for helpful comments on earlier drafts, Jean-Louis Grolleau for assistance with the data, and Alicia Bannon and Scott Standley for their contributions to the charitable giving section of this paper.

² DAC considers a loan concessional if it has a grant element of at least 25 percent of the loan value, using a 10 percent discount rate.

In the last four decades, researchers have taken three main approaches to cross-country quantitative assessment of aid quality. Since at least the early 1970s, econometric studies have been done of the determinants of donors' aid allocations, factors such as recipient's poverty rate and level of oil exports (citations are below). Though often not evaluative in character, the approach offers a way to measure one aspect of aid quality, selectivity, by looking at how responsive aid allocation is to recipient need and development potential. How best to integrate such results with aid quantity into a single performance index is less obvious, however. Attempts to create a single index began with Mark McGillivray (1989, 1994), who essentially computed the weighted sum of each donor's aid disbursements to all recipients, basing weights on recipient GDP/capita as an indicator of need.

The third approach is the most straightforward and flexible in its overall structure, if most atheoretical. Various indicators of aid quality are assembled, transformed onto a standardized scale, then averaged. Usually, aid quantity is not considered. Easterly (2002b) appears to have begun this school, measuring several aspects of aid quality as well as aid quantity; and Easterly and Pfütze (2008) go on to incorporate additional aspects of aid quality and drop aid quantity. And a new, even more ambitious wave of such studies has arrived: Knack, Rogers, and Eubank (2010) and Birdsall and Kharas (2010). The principal contrast is in mathematical structure. Easterly's style is to use mathematical constructs that are relatively intuitive. Easterly (2002b), for instance, ranks donors on each indicator, whether of quantity or quality, then average ranks.

Driven in part by the need to weigh both quality and quantity, the index described here uses more conceptually sound—though still of course debatable—structures to construct and integrate various measures. Quality and quantity, for instance, are combined multiplicatively in the index since they do so in reality. That way, a donor that gives a total of one penny of high-quality aid, by ranking low on quantity and high on quality, would not end up ranked as average. Likewise, the penalty for tying aid is applied as a discount to aid quantity at level influenced by past studies of the cost of tying, rather than being introduced as a stand-alone indicator that is averaged with other indicators. The approach does have a disadvantage, though, which is that the computations tend to be more complex, even if they are more conceptually defensible. In fact, Easterly (2002b) constitutes CGD's initial attempt at a design for the CDI aid component, and is an important source of inspiration for the current design.

The donor performance measure described here factors quality of recipient governance as well as poverty into the selectivity scoring system, penalizes tying of aid, handles reverse flows (debt service) in a consistent way, penalizes project proliferation (overloading recipient governments with the administrative burden of many small aid projects), and rewards tax policies that encourage private charitable giving to developing countries.

Because this aid measure is designed to draw entirely from available statistics, primarily the DAC databases, many important aspects of aid quality are not reflected in the index—factors such as the realism of project designs and the effectiveness of structural adjustment conditionality. Moreover, most variation in aid quality may occur *within* donor’s aid portfolios rather than across donors. As a result, while there is a sevenfold range in net aid transfers/GDP among the 22 rich countries scored here, the calculations in this paper reveal nothing like that sort of variation in aid quality across donors. Moreover, including private giving does not change this picture because it appears to be much smaller than official giving in most countries. Thus the sheer quantity of official aid is still the dominant determinant of donors’ scores on this index.

Still, the measure does highlight some interesting differences among donors, and does somewhat rearrange the usual standings. Japan is especially hurt by the netting out of its large amounts of interest received (ODA is not net of interest received). Donors such as Australia and Italy are pulled low by the apparent tendency to spread their aid budgets thinly, over many projects.

This paper details the calculations and illustrates them with primarily 2008 data, which are the latest available and the basis for the current edition. The first six sections describe the computations involved in rating official aid programs: their final output is “quality-adjusted aid quantity” in dollars, or simply “quality-adjusted aid.” They treat multilateral and bilateral donors in parallel, so that the World Bank’s main concessional aid program, for instance, can be compared for selectivity to Denmark’s aid program. The penultimate section describes how the quality-adjusted aid of multilaterals is allocated back to the bilaterals that fund them, in order to give national governments scores on official aid that reflect both their bilateral aid programs and their contributions to multilaterals. The last section describes how the aid index factors in tax policies that favor private charitable giving.

1. The first step: gross aid transfers

The starting point for the calculation of quality-adjusted official aid is gross disbursements of ODA and Official Aid (OA), disaggregated by donor *and* recipient. DAC reports both commitments and disbursements of ODA, but its press releases normally focus on disbursements. Similarly, I use disbursements. Dudley and Montmarquette (1976) argue that commitments better indicate donor policies, on the idea that recipient absorptive capacity limits largely explain any shortfalls in disbursements. But commitment-disbursement divergences could reflect bottlenecks or unrealism on either side of the donor-recipient relationship. Large and persistent gaps between commitments and disbursements may reflect a tendency of certain donors to promise more than they can realistically deliver, or a failure to learn from history that certain recipients cannot absorb aid as fast as donors hope. On balance, it seems best to stick with disbursements and avoid the risk of rewarding donors for overpromising aid or systematically underestimating the capacity to absorb it.

The definition of gross disbursements used here differs in one respect from DAC's. In recent years, donors have formally cancelled billions of dollars in non-ODA loans to countries such as Nigeria, Iraq, Pakistan, Cameroon, and the Democratic Republic of Congo (DRC). These OOF or "Other Official Finance" loans are ones with too small a concessional element to qualify as ODA, or that are meant for military, export financing, or other non-development purposes. The DRC, for example, was the world's top ODA recipient in 2003, at just over \$5 billion. It turns out that under a Paris Club agreement, donors cancelled \$4.5 billion in outstanding OOF loans to the DRC that year. Actual transfers of money were an order of magnitude lower.

When OOF loans are cancelled, they are, in effect, retroactively recognized by the DAC accounting system as ODA grants. This is a reasonable choice *if* the original purpose of the loan was for development and it was merely disqualified as ODA because it was not concessional enough. The DAC system books the transfer at the time it is officially recognized. It would be more accurate to recognize the gradual transfer that occurs year by year as the loans become uncollectible over time. The U.S. government does something like this, regularly assessing the likely collectibility of its outstanding sovereign loans and taking on budget any drop in their apparent value.³ DAC does not do this, perhaps in part because of the complexity, in part because past years' data would be constantly revised, and in part because accounting rules and appropriations processes within some of the donor agencies, which govern DAC, create strong disincentives for recognizing such losses.

Unfortunately, some of the resulting ODA numbers have seemed quite unrealistic in the last few years. The true, current financial value of debt cancellation for countries such as the DRC in 2003 is far less than the face value. Even Pakistan, which received \$1 billion in OOF debt relief in 2003, was a Highly Indebted Poor Country going by its debt/exports ratio GDP/capita (Roodman 2001). Much of its cancelled debt may therefore have been uncollectible anyway, suggesting that the true value of the cancellation per se was far lower.

The definition of gross disbursements used here therefore excludes forgiveness of non-ODA loans. The reasoning is that the net transfers that do occur are not primarily a credit to current policy. If a Carter Administration export credit to Zaire went bad in the early 1980s, and was finally written off in 2003, the transfer that occurred does not for the most part reflect 2003 development policy.

Purging OOF loan forgiveness from ODA turns out to be complicated. The starting point is the formula for DAC's standard gross ODA⁴:

$$\text{Gross ODA} = \text{grants} + \text{ODA loans extended}$$

The term "grants" on the right contains a subtlety relating to debt relief. When DAC accounts for cancellation of ODA loans (not the OOF ones just discussed), it does so with two opposite transactions. The first is a "debt forgiveness grant," which is included under "grants." The second is an "offsetting entry for debt relief," which

³ The process occurs within the U.S. government's Interagency Country Risk Assessment System.

⁴ "Grants" here includes capital subscriptions to multilateral organizations.

represents the immediate return of that grant in the form of amortization and is considered an ODA loan repayment. This mechanism prevents double-counting of forgiven ODA loans, which were already fully counted as aid at disbursement. Since the offsetting entry is considered a reflow, it does not enter gross ODA, but will surface in Net ODA in the next section. So canceling any loan, ODA or OOF, increases gross ODA. In fact, when donors and recipients *reschedule* debt, as under Paris Club agreements, the capitalization of interest arrears is treated as a new aid flow, and is included in “ODA loans extended”, under the subheading, “rescheduled debt.”

Since the purpose here is to count only transactions that reflect current, actual transfers, we exclude all debt forgiveness grants and capitalized interest, none of which involves actual movement of money. The result is called “gross aid transfers” or simply “gross aid” to distinguish it from gross ODA. Thus:

$$\text{Gross aid} = (\text{grants} - \text{debt forgiveness grants}) + (\text{ODA loans extended} - \text{rescheduled debt})$$

This removes all debt forgiveness grants, for both ODA and non-ODA loans, from the definition of gross aid. Now, the DAC definition of Net ODA, discussed in the next section, does itself remove grants for ODA loan forgiveness, by counting those offsetting entries for debt relief in ODA reflows. So in order to highlight the real departure of gross aid transfers from DAC accounting, I compare gross aid to DAC’s Gross ODA net of offsetting entries for ODA loan forgiveness. Table 1 shows the 10 recipients most affected by changing the definition this way for 2005, a year in which much debt was cancelled. In all, cancellation of non-ODA loans accounted for an extraordinary \$23.9 billion of reported gross ODA. It may be a long time before that figure is surpassed since it is clearly driven by unusual developments in Iraq and Nigeria.

Table 1. Gross ODA net of offsetting entries for ODA loan forgiveness vs. gross aid transfers, selected recipients, 2005 (million \$)

Recipient	Gross ODA net of offsetting entries for ODA loan forgiveness	Gross aid	Difference
Iraq	21,654	7,726	13,927
Nigeria	6,490	854	5,635
Congo, Rep.	1,565	167	1,397
Congo, Dem. Rep.	1,864	1,355	509
Indonesia	2,835	2,332	503
Zambia	1,233	892	340
Madagascar	975	681	293
Serbia & Montenegro	1,142	937	205
Cameroon	603	404	199
Egypt	1,491	1,309	182
All Part I countries	119,142	95,204	23,938

Table 2 shows the implications from the donor perspective for the latest year. Among bilaterals, the United States gave the most gross aid to non-DAC governments and Japan came in second. Among multilaterals, the European Commission disbursed the most, with the World Bank’s International Development Association (IDA) not far behind. Most of the calculations in the aid index are done for each donor-recipient pair. The

donor-level totals in Table 2, are *not* used in the calculations, but are summaries for illustration. The final row of the table is an exception: it shows the figures for one donor-recipient pair, Japan and Sierra Leone. I will continue the Japan-Sierra Leone example in order to illustrate the actual calculations at the level of the donor-recipient pair.

Table 2. Gross ODA net of offsetting entries for ODA loan forgiveness vs. gross aid transfers aid by donor, 2009

Donor	Gross ODA net of offsetting		% reduction from gross ODA	
	entries for ODA loan	Gross aid transfers	to gross aid transfers	
Australia	2,312	2,309		0
Austria	517	458		11
Belgium	1,629	1,525		6
Bill & Melinda Gates	1,827	1,827		0
Canada	3,182	3,134		2
Czech Republic	101	98		3
Denmark	1,941	1,937		0
Finland	791	791		0
France	9,588	6,690		30
Germany	8,306	8,216		1
Greece	297	297		0
Hungary	30	29		1
Iceland	25	25		0
Ireland	693	693		0
Israel	108	108		0
Italy	1,049	876		16
Japan	12,919	12,877		0
Luxembourg	266	266		0
Netherlands	4,914	4,875		1
New Zealand	226	226		0
Norway	3,168	3,168		0
Poland	96	96		0
Portugal	310	310		0
Slovak Republic	20	20		0
Slovenia	25	25		0
South Korea	615	615		0
Spain	4,820	4,750		1
Sweden	3,009	2,989		1
Switzerland	1,761	1,598		9
Taiwan	402	402		0
Thailand	35	35		0
Turkey	665	665		0
United Arab Emirat	1,038	1,038		0
United Kingdom	7,865	7,853		0
United States	25,913	25,775		1
AfDB	167	0		100
AfDF	2,669	2,669		0
AsDF	2,789	2,788		0
CarDB	85	85		0
EC	13,021	13,019		0
GAVI	498	498		0
GEF	711	711		0
GFATM	2,337	2,337		0
IAEA	65	65		0
IDA	11,224	11,218		0
IDB Sp.Fund	611	605		1
IFAD	399	399		0
Montreal Protocol	29	29		0
Nordic Dev.Fund	71	76		-7
SAF+ESAF(IMF)	2,498	2,487		0
UNAIDS	243	243		0
UNDP	631	631		0
UNECE	13	13		0
UNFPA	346	346		0
UNHCR	301	301		0
UNICEF	1,086	1,086		0
UNRWA	772	772		0
UNTA	645	645		0
WFP	290	290		0
WHO	437	437		0
Japan-Sierra Leone	37	37		0

2. *Subtracting debt service*

The next step is to net debt service received out of gross aid transfers, in the belief that net transfers are a better measure than gross of the cost to the donor's treasury and benefit to the recipient. This departs somewhat from the approach of the DAC, whose Net ODA statistic is net of payments of principal, not interest. The rationale for the DAC approach is an analogy with the capital flow concept of net foreign direct investment. Only return of capital is netted out of net FDI, not repatriation of earnings. Similarly, only amortization is netted out of Net ODA, not interest, which can be seen as the donors' "earnings" on aid investment. So the formula for Net ODA is simply:

$$\text{Net ODA} = \text{Gross ODA} - (\text{ODA loans received} + \text{Offsetting entries for ODA loan forgiveness})$$

(As mentioned in the previous section, Net ODA does subtract out the offsetting entries for forgiveness of ODA loans since those loans were counted in full as aid at disbursement.)

But for the purposes of evaluating aid policy, the FDI metaphor seems inapt. When the government of Ghana sends a check to the government of Japan for \$1 million, it hardly matters to citizens in either country whether the check has "interest" or "principal" in the memo field, that is, whether the transaction enters the capital or current account. It seems unlikely that interest and principal payments have different effects on Japan's treasury or Ghana's development.

Moreover, studies have found evidence of defensive lending on the part of bilateral and multilateral lenders, whereby new loans go to servicing old ones (Ratha 2001; Birdsall, Claessens, and Diwan 2002). To the extent that donors are lending to cover interest payments they receive on concessional loans, Net ODA makes the circulation of money on paper look like an aid increase. Much the same can be said for treating capitalization of interest arrears as new aid. For these reasons, the CDI aid index treats debt service uniformly. "Net aid transfers" is defined as "gross aid transfers" less debt service actually received on ODA loans. (See Table 3.)

However, computing actual transfers from DAC data is surprisingly difficult. In DAC accounting, "interested received" includes interest on ODA loans that has been forgiven, not actually paid. Forgiving interest generates two opposite transactions: a debt forgiveness grant and a (forgiven) interest received transaction, which is included in total interest received. Since the definition of gross aid used here excludes the debt forgiveness grant, it must also exclude the return transaction for consistency. Thus:

$$\begin{aligned} \text{Net aid transfers} &= \text{gross aid transfers} - \text{ODA loans received} \\ &\quad - (\text{interest received} - \text{interest forgiven}) \end{aligned}$$

Note that "ODA loans received," unlike "interest received," only counts payments that result in actual transfers. Amortization payments made as the result of debt cancellation agreements are recorded separately, as offsetting entries for debt relief, described earlier. Surprisingly, it is impossible in general using DAC data to

determine exactly how much interest a given aid recipient actually paid a given donor in a given year. DAC Table 2a, the table with disbursements data by donor and recipient only, reports total interest received, amalgamating interest actually paid and interest forgiven. DAC Table 1, however, which contains donor-level aggregates, does make the distinction, and provides a good basis for estimating the shares at the donor-recipient level, via prorating. The portion of “interest received” for each donor-recipient pair that is actually forgiven is assumed to be the same for each of a donor’s recipients. Table 3 shows the donor-level amounts that are the basis for the prorating. For most donors, the potential error at the donor-recipient level is small because they a) receive no little or no interest or b) almost all of the interest they report receiving is actually received rather than forgiven.

The final column of Table 3 shows net aid transfers by donor. For multilaterals lenders, only concessional (low-interest) lending programs such as the World Bank’s International Development Association are counted since only they generate ODA. Again, the calculations displayed do not in fact enter the aid index directly and are only illustrative summaries, except for the Japan-Sierra Leone example at the bottom. Among bilaterals, this adjustment to gross aid particularly affects Japan, which received \$9.3 billion in debt service on concessional loans, equal to a striking 72% of its gross aid transfers and sufficient to put Japan’s bilateral aid program well behind those of France, Germany, the Netherlands, Spain, the United Kingdom, and the United States in size. Among bilaterals, France and Germany were also major recipients of debt service for their size. Multilateral institutions of course are too.

Table 3. Subtracting Debt Service, 2009

Donor	A. Gross aid		C. DAC interest	D. Estimated interest	Net Aid Transfers	
	transfers	B. Amortization	received	actually paid	(A – B – D)	
Australia	2,309	0	0	0	0	2,309
Austria	458	10	0	0	0	448
Belgium	1,525	44	2	2	2	1,478
Bill & Melinda Gates Fc	1,827	0	0	0	0	1,827
Canada	3,134	41	2	2	2	3,091
Czech Republic	98	0	0	0	0	98
Denmark	1,937	36	1	1	1	1,900
Finland	791	0	0	0	0	791
France	6,690	2,569	1,110	1,086	1,086	3,036
Germany	8,216	1,209	308	269	269	6,738
Greece	297	0	0	0	0	297
Hungary	29	0	0	0	0	29
Iceland	25	0	0	0	0	25
Ireland	693	0	0	0	0	693
Israel	108	0	0	0	0	108
Italy	876	175	0	0	0	702
Japan	12,877	6,918	2,368	2,365	2,365	3,594
Luxembourg	266	0	0	0	0	266
Netherlands	4,875	116	27	27	27	4,733
New Zealand	226	0	0	0	0	226
Norway	3,168	0	0	0	0	3,168
Poland	96	4	0	0	0	92
Portugal	310	34	11	11	11	265
Slovak Republic	20	0	0	0	0	20
Slovenia	25	0	0	0	0	25
South Korea	615	35	25	25	25	556
Spain	4,750	347	6	0	0	4,403
Sweden	2,989	0	0	0	0	2,989
Switzerland	1,598	10	0	0	0	1,588
Taiwan	402	0	0	0	0	402
Thailand	35	0	0	0	0	35
Turkey	665	0	0	0	0	665
United Arab Emirates	1,038	205	0	0	0	834
United Kingdom	7,853	208	0	0	0	7,646
United States	25,775	740	289	263	263	24,773
AfDB	0	0	0	0	0	0
AfDF	2,669	87	92	92	92	2,491
AsDF	2,788	845	261	261	261	1,682
CarDB	85	17	10	10	10	58
EC	13,019	0	0	0	0	13,019
GAVI	498	0	0	0	0	498
GEF	711	0	0	0	0	711
GFATM	2,337	0	0	0	0	2,337
IAEA	65	0	0	0	0	65
IDA	11,218	2,263	807	807	807	8,148
IDB Sp.Fund	605	232	88	88	88	285
IFAD	399	169	49	49	49	181
Montreal Protocol	29	0	0	0	0	29
Nordic Dev.Fund	76	8	0	0	0	69
SAF+ESAF(IMF)	2,487	672	35	35	35	1,779
UNAIDS	243	0	0	0	0	243
UNDP	631	0	0	0	0	631
UNECE	13	0	0	0	0	13
UNFPA	346	0	0	0	0	346
UNHCR	301	0	0	0	0	301
UNICEF	1,086	0	0	0	0	1,086
UNRWA	772	0	0	0	0	772
UNTA	645	0	0	0	0	645
WFP	290	0	0	0	0	290
WHO	437	0	0	0	0	437

[†]From previous table.

3. Discounting tied aid

Most bilateral donors tie some of their aid, requiring recipients to spend it on goods and services from the donor's home country, which reduces recipient governments' freedom to shop for the best deals. Catrinus Jepma's literature review (1991, p. 58) finds that tying raises the cost of aid projects a typical 15–30%. This suggests that tying reduces the *value* of aid by 13–23 percent. (Consider that a 15-percent cost increase lowers the purchasing power of aid by $1 - 1/1.15 = 13$ percent. Similarly, a 30-percent cost increase cuts the value of aid 23 percent.)

The DAC tying statistics split aid commitments—tying data are unavailable for disbursements—into three categories: untied, tied, and partially untied. “Partially untied aid” comes with restrictions, but ones that are looser than those of “tied aid.” To be precise, partially untied aid is subject to the restriction that it must be spent on goods and services from the donor nation *or* developing countries, or else to the restriction that it be spent on goods and services from developing countries only. In principle, the approach taken to penalizing tying is simple. Tied aid is discounted by 20% (a round number in the 13–23% range) and partially untied aid by 10%. No attempt is made to account for unreported, informal, de facto tying that may occur.

Implementation is more complex. The tying figures come primarily from the detailed commitment-level data in DAC's Creditor Reporting System (CRS) database, and are aggregated to the level of the donor-recipient pair. Since the data are for commitments, not disbursements, it is assumed that the same shares of disbursements and commitments are tied, untied, or partially untied. The discount applies to gross aid; returns flows are not discounted since they are assumed to have an opportunity cost equivalent to untied aid. The selectivity discount described in the next section exempts emergency aid, so the tying discount step also splits gross aid into emergency and non-emergency aid and discounts them separately for tying.⁵ Table 4 shows the results of this step, “net tying-discounted aid” by emergency status.⁶

⁵ For commitments that missing tying status information, the index calculation algorithm uses two backstops to estimate the tied fraction. If the donor is multilateral, it assumes the aid is untied. Otherwise, it takes the average tied share of all of a donor's commitments, excluding debt forgiveness, from DAC Table 7b, for the most recently available year.

⁶ For simplicity, aid to recipients missing tying information, such as to “Far East Asia unallocated,” is assumed untied. Therefore the donor-level totals involve no extrapolations and are simple sums of the feasible estimates at the donor-recipient level.

Table 4. Penalizing tied aid, 2009

Donor	Non-emergency					Emergency				
	A. Gross transfers	B. Tied	C. Partially untied	D. Tying penalty (20%×B+ 10%×C)	Tying-discounted gross transfers (A – D)	E. Gross transfers	F. Tied	G. Partially untied	H. Tying penalty (20%×F+ 10%×G)	Tying-discounted gross transfers (E – H)
Australia	2,001	47	0	9	1,991	308	8	0	2	306
Austria	422	200	0	40	382	36	23	0	5	32
Belgium	1,407	59	0	12	1,395	118	0	0	0	118
Bill & Melinda Gate	1,827	0	0	0	1,827	0	0	0	0	0
Canada	2,811	158	4	32	2,779	322	1	0	0	322
Czech Republic	94	0	0	0	94	4	0	0	0	4
Denmark	1,807	131	0	26	1,780	130	1	0	0	130
Finland	688	62	0	12	675	104	1	0	0	103
France	6,651	839	0	168	6,483	39	0	0	0	39
Germany	7,847	1,988	0	398	7,449	369	12	0	2	367
Greece	282	115	1	23	259	15	8	0	2	14
Hungary	29	0	0	0	29	0	0	0	0	0
Iceland	25	0	0	0	25	0	0	0	0	0
Ireland	596	0	0	0	596	98	0	0	0	98
Israel	108	0	0	0	108	0	0	0	0	0
Italy	763	310	5	62	700	114	40	0	8	106
Japan	12,564	799	0	160	12,404	313	2	0	0	312
Luxembourg	228	0	0	0	228	38	0	0	0	38
Netherlands	4,571	581	0	116	4,454	305	14	0	3	302
New Zealand	226	30	5	6	220	0	0	0	0	0
Norway	2,897	1	0	0	2,897	271	0	0	0	271
Poland	96	0	0	0	96	0	0	0	0	0
Portugal	309	105	0	21	288	1	0	0	0	1
Slovak Republic	20	0	0	0	20	0	0	0	0	0
Slovenia	25	0	0	0	25	0	0	0	0	0
South Korea	599	302	0	60	538	17	12	0	2	14
Spain	4,306	878	274	203	4,103	444	58	5	12	432
Sweden	2,627	13	0	3	2,624	362	0	0	0	362
Switzerland	1,439	6	0	1	1,438	159	18	0	4	155
Taiwan	402	0	0	0	402	0	0	0	0	0
Thailand	35	0	0	0	35	0	0	0	0	0
Turkey	616	0	0	0	616	50	0	0	0	50
United Arab Emirat	903	0	0	0	903	135	0	0	0	135
United Kingdom	7,124	0	0	0	7,124	729	0	0	0	729
United States	21,399	4,412	0	882	20,517	4,376	1,132	0	226	4,150
AfDF	2,669	0	0	0	2,669	0	0	0	0	0
AsDF	2,788	0	0	0	2,788	0	0	0	0	0
CarDB	85	0	0	0	85	0	0	0	0	0
EC	11,499	0	0	0	11,499	1,521	0	0	0	1,521
GAVI	498	0	0	0	498	0	0	0	0	0
GEF	711	0	0	0	711	0	0	0	0	0
GFATM	2,337	0	0	0	2,337	0	0	0	0	0
IAEA	65	0	0	0	65	0	0	0	0	0
IDA	11,218	0	0	0	11,218	0	0	0	0	0
IDB Sp.Fund	604	0	0	0	604	1	0	0	0	1
IFAD	399	0	0	0	399	0	0	0	0	0
Montreal Protocol	29	0	0	0	29	0	0	0	0	0
Nordic Dev.Fund	76	0	0	0	76	0	0	0	0	0
SAF+ESAF(IMF)	2,487	0	0	0	2,487	0	0	0	0	0
UNAIDS	243	0	0	0	243	0	0	0	0	0
UNDP	575	0	0	0	575	55	0	0	0	55
UNECE	13	0	0	0	13	0	0	0	0	0
UNFPA	346	0	0	0	346	0	0	0	0	0
UNICEF	1,053.3	0.0	0.0	0.0	1,053.3	33.0	0.0	0.0	0.0	33.0
UNRWA	772	0	0	0	772	0	0	0	0	0
UNTA	645	0	0	0	645	0	0	0	0	0
WFP	171	0	0	0	171	119	0	0	0	119
WHO	419	0	0	0	419	18	0	0	0	18
Japan-Sierra Leone	37	1	0	0	37	0	0	0	0	0

4. *Adjusting for selectivity*

It has long been argued that which country aid goes to is an important determinant of its effectiveness (Burnside and Dollar 2000; Easterly 2002a, p. 35). Some countries need aid more than others. Some countries can use it better than others. There is little empirically grounded consensus, however, on what precisely donors should select for.⁷

For anyone measuring selectivity, two main challenges arise: choosing a mathematical *structure* to distill numbers on recipient attributes and donor aid allocations into a metric; and choosing the *attributes* that donors are expected to select for, such as low income, good policies, or good governance. This section discusses the choices made here at the level of principle, then descends to the details of implementation.

Principles

The oldest approach to measuring selectivity—even if not thought of as such—is the use of cross-country regressions to explain donors' aid allocations as a function of recipient characteristics. Historically, these characteristics have included indicators of geopolitical importance (e.g, oil exports or military expenditure), commercial links (trade with donors), and development need and potential (income, governance) (Kaplan 1975; Dudley and Montmarquette 1976; McKinley and Little 1979; Mosley 1981, 1985; Maizels and Nissanke 1984; Frey and Schneider 1986; Gang and Lehman 1990; Schraeder, Hook, and Taylor 1998; Trumbull and Wall 1994; Alesina and Dollar 1998; Burnside and Dollar 2000; Collier and Dollar 2002; Birdsall, Claessens, and Diwan 2002). In general, bilateral donors appear to be less sensitive to recipient need and potential than to strategic and commercial interests. More limited evidence suggests that multilaterals act oppositely. Almost all the studies that check find a bias in favor of small countries, in the sense that the elasticity of aid receipts with respect to population or GDP is less than 1.

The cross-country regression approach to measuring selectivity is conceptually consistent, but if used to evaluate donors, it invites methodological challenges that it seems better to avoid. This is because it embodies an attempt to model donor decision-making and predict the effects on allocations of marginal changes in recipient characteristics, all else equal. (That is the meaning of regression coefficient estimates.) With modeling comes the risk of misspecification. If a donor's aid allocations fail to relate to the chosen variables via the chosen functional form, the results may not be meaningful. For example, if a donor specializes in a region, such as France does in francophone Africa, its aid allocations will be highly nonlinear with respect to most indicators of recipient appropriateness, and a linear regression may produce strange results. Similarly if a donor specializes in the poorest nations. Results may also be sensitive to the choice of regressors. The United States gives large amounts of aid to countries such as Russia and Pakistan that appear too poorly governed to make good use of aid for development but have obvious geopolitical value. As a result, regressions that control for geopolitical

⁷ And as Radelet (2004) points out, aid allocation rules should probably vary by aid type.

value may yield a different coefficient on governance for the United States than regressions that do not. This then raises the question of whether evaluations of selectivity should abstract from donors' responsiveness to non-development concerns. Controlling for non-development concerns gives a better picture of the effects of a hypothetical marginal change in an indicator of recipient development potential. Not controlling for it gives a better picture of the general importance of development potential in allocation. It is a question, in other words, of what is meant by "selectivity."

The work of David Dollar and Victoria Levin (2006) stands in the regression tradition and faces these questions. The authors estimate the elasticity of a donor's aid disbursements with respect to recipient's income and governance. They posit a log-linear (elasticity-type) relationship between aid disbursements and recipient population, GDP/capita, and "institutions/policies" as indicated by the World Bank's Country Policy and Institutional Assessment (CPIA). They do not control for commercial or geopolitical interests but in controlling for population they abstract from small-country bias, even though Collier and Dollar (2002) find that global aid could reduce poverty twice as fast if most of it were reallocated to India.

The second major approach to evaluating selectivity was initiated by McGillivray (1989, 1992). It is more radically empirical, eschewing any attempt to model allocation procedures or estimate marginal effects, and lends itself more naturally to creating an index that combines aid quantity and selectivity. His index is essentially the weighted sum of a donor's aid disbursements to all recipients, where the weights are mathematically related to a recipient characteristic such as GDP/capita. If the weights lie between 0 and 1, they can be thought of as discounts that penalize or reward selection for desired characteristics. The ratio of the weighted sum to the unweighted sum measures overall selectivity.⁸

Rao (1994, 1997) points out that donors can maximize their scores on McGillivray's index by concentrating all their aid in the single poorest country. He argues that the source of this perverse result is the failure of McGillivray's index to consider recipients' *post-aid* GDP/capita. On the assumption that aid leads directly to GDP gains, if all aid went to the poorest country, that country's GDP/capita would rise rapidly and make it a less deserving recipient. He revises McGillivray's index to factor in both pre- and post-aid GDP. This introduces a notion of diminishing returns to aid: not diminishing returns to the effectiveness of aid in raising GDP/capita, but diminishing returns to the value of doing so.

The third approach to assessing selectivity is the newest and most sophisticated. Drawing on the cross-country literature on determinants of aid allocation, McGillivray, Leavy, and White (2002), formally model aid allocation. They endow donors with utility functions that depend on their allocation of aid among recipients that are characterized by various commercial and geopolitical interest factors as well as levels of development need

⁸ McGillivray's original (1989) index sums aid/recipient population rather than total aid to each recipient. White (1992) questions the implicit notion of donors allocating aid/recipient population: shifting \$1 million in aid from small, poor Mali to large, poor India would reduce a donor's score in McGillivray's system because the aid would be lower *per capita* in India. In reply, McGillivray (1992) proposes using absolute aid rather than aid/capita, within the same basic framework.

and potential. The authors incorporate diminishing returns to aid, compute optimal allocations, and penalize donors to the extent they deviate from their optima. The approach has several disadvantages from the point of view of the CDI. It is conceptually complex. It is vulnerable to challenges analogous to those that apply to the first approach, regarding proper specification. It rewards donors for pursuing geopolitical and commercial interests (though this could be easily changed, to focus purely on recipient need, as appropriate for the CDI). And it penalizes donors for aid allocations that are rather different from the ideal ones even if they do not generate much lower utility. For example, if a donor at the optimal allocation shifts aid between two identical recipients, the marginal utility loss is zero, but the marginal decline in the donor's score would be non-zero.

The approach taken here is closest to McGillivray's original. For the purposes of the CDI, it has the advantages of conceptual simplicity. It combines quantity and quality (selectivity) in a natural way that minimizes questions about proper modeling specification. Since it does not model with smooth functional forms, it does not inherently penalize sharp specialization in a certain region or income bracket. It can be combined with other discount factors, such as for tying and project proliferation. It lends itself to a distinction between subflows of aid (emergency and non-emergency). And it can handle negative net aid flows, which do occur and which some of the common functional forms cannot. (Reverse flows, like zero flows, would bedevil the elasticity approach of Dollar and Levin, for example.)

Here is a simple example of how the chosen system works. The selectivity formula introduced here, it will emerge, assigns Uganda a weight of 0.75 for non-emergency aid and Uzbekistan a 0.25 for the 2006 data year. A donor whose aid program consisted of giving \$1 million to each of these countries would have selectivity-weighted aid of \$1 million ($0.75 \times \$1 \text{ million} = \0.75 million for Uganda plus $0.25 \times \$1 \text{ million} = \0.25 million for Uzbekistan). The donor's overall "selectivity" is then the ratio of its selectivity-weighted aid to its unweighted aid—in this case, $\$1 \text{ million} / \$2 \text{ million} = 0.5$. This is also the average selectivity weight of the donor's recipients, where the average is weighted by how much aid the donor gives each recipient.

One potentially counterintuitive result of this approach is that a donor that is constitutionally confined to a clientele with low selectivity weights comes off poorly even if it is in some sense selective within that pool. The best example is the European Bank for Reconstruction and Development (EBRD), which lends to nations of the former Eastern bloc, which are relatively rich. Once again we are faced with the question of what we mean by "selectivity." But for the present purpose of comparing *bilateral* donors to each other, the potentially counterintuitive outcome makes sense. As will be described below, the "quality-adjusted aid quantities" of multilaterals are ultimately allocated back as credits to the bilaterals. If Germany is to be more rewarded for giving aid to Mali than Slovenia, it should be more rewarded for doing the same indirectly—giving more to the African Development Fund than the EBRD.

Having settled the question of mathematical form for measuring selectivity, there remains the question of what donors are supposed to select for. The aid index uses two indicators. The first is GDP/capita, converted

to dollars on the basis of exchange rates.⁹ The second indicator is the composite governance variable of Daniel Kaufman and Aart Kraay (Kaufmann, Kraay, and Mastruzzi 2008), which is the most comprehensive governance indicator available. The KK composite is an average of indicators on up to six dimensions, available data permitting: democracy, political instability, rule of law, bureaucratic regulation, government effectiveness, and corruption. The six variables are themselves synthesized from several hundred primary variables from more than a score of datasets. These two indicators of recipient need and appropriateness, GDP/capita and the KK composite, have several strengths for measuring selectivity. They have wide coverage. They are updated annually and made freely available. And they reflect consensus views that a) the richer a country is, the less it needs aid; and b) that institutional quality is a key determinant of development and, most likely, aid effectiveness.

Before descending to the particulars of the selectivity discounting, it is worth reiterating that two concepts are defined here relating to selectivity. The first, selectivity-weighted aid, is a measure of aid allocations that blends quantity and quality, and is of primary interest for grading performance. It possesses the desirable properties of linearity: If a country doubles its aid to every recipient, its selectivity-adjusted aid score will double. If it runs two parallel aid programs, the selectivity-adjusted aid total of the combination is the sum of those for the individual programs.

The second concept is the weighted-average selectivity score of a donor’s recipients—the donor’s “selectivity.” This measure, it should be noted, behaves strangely when applied to donors with net transfers much smaller than gross transfers. Consider this example. Donor X is a development bank. It disburses nothing to Recipient Y, which has selectivity weight 0.6, but *receives* \$1 million from Y in debt service, which is treated as negative aid. It disburses the \$1 million to Recipient Z, which has weight 0.8. Donor X’s selectivity-weighted aid is thus:

$$0.6 \times (-\$1 \text{ million}) + 0.8 \times (\$1 \text{ million}) = \$0.2 \text{ million.}$$

Its score is small but positive because it has transferred funds from a less appropriate to a more appropriate aid “recipient”—perhaps an odd result, but meaningful. Now, what is the “selectivity” of Donor X?

$$\text{selectivity-weighted net transfers} / \text{total net transfers} = \$0.2 \text{ million} / 0 = \infty.$$

The donor has done some good for the developing world on net, according to the measure, with zero net disbursement of funds. It is infinitely efficient.

This extreme example illustrates a counterintuitive result for donors whose net transfers are much smaller than gross transfers (because of debt service). In these cases, the donor’s reported “selectivity” can lie outside the range of most of its recipients’ selectivity weights. For example, the IDB’s Fund for Special Operations disbursed \$593 million in 2003. It received \$434 million in debt service, for net aid of only \$159 million. Yet it generally transferred funds from countries deemed less appropriate for aid to those deemed more appropriate

⁹ PPP-based GDP might seem more meaningful, but it is highly correlated with exchange-rate GDP in logs, so that it gives nearly the same results as used here, and is available for slightly fewer countries.

and so achieves a selectivity score of 0.88 in 2003, which is higher than the selectivity weight of any of its recipients. Mathematically, the 0.88 is a weighted average of selectivity factors between 0 and 1, where some of those weights (net transfers) are negative.

One can avoid such results by measuring selectivity of gross disbursements only, which I call “gross selectivity.” In the abstract example above, Donor X has gross selectivity of \$0.2 million/\$1 million = 0.2. This result seems more meaningful than infinity, but comes at the expense of ignoring the debt service received from Recipient Y.

The sometimes-strange behavior of the version that includes reflows, “net selectivity,” does not mean it is inherently flawed. Rather, it points up yet another subtlety in the question of what is meant by selectivity. The picture conjured by the word “selectivity” is of a donor that only sends funds outward. In fact, donors not only distribute their own money but redistribute that of recipients. What does selectivity mean in such a context? Is a donor that bestows all its net transfers on Mali almost perfectly selective? Or is it falling far short of the ideal by failing to transfer billions of dollars from Kuwait to Mali?

The aid index set forth here does incorporate reflows into its measure of selectivity. To avoid infinities, it makes a compromise between principle and simplicity. It segregates (tying-discounted) disbursements from reflows. It then applies the gross selectivity factor to disbursements, yielding selectivity-weighted disbursements, and applies the same factor to reflows, implicitly assuming that the distribution of a donor’s disbursements and reflows across recipients are same. It would be more accurate to separately compute the “selectivity” of the donor’s reflows, but would also be more complicated, and tends to generate extreme results in some cases.

Implementation

The flow to which selectivity weights are applied is the output of the previous steps in the construction of the aid performance measure, namely “gross tying-discounted aid” and debt service. These quantities are multiplied by two discount factors. The first is linearly related to a country’s KK governance score. The linear relationship is such that in the benchmark year of 2001, the data year for the first edition of the CDI, the governance weight ranges exactly between 0 (for the worst-governed country, Afghanistan) and 1 (for Singapore). The second factor is a linear function of a country’s log GDP/capita. In 2001, Singapore (GDP/capita of \$21,869 in year-2000 dollars) gets a 0 and the DRC (GDP/capita of \$81), defines the upper end for the GDP/capita weights. This upper end is not 1.0, as one might expect, but 2.21, a number chosen so that the highest *combined* selectivity weight (the product of the governance and income factors) is 1.0 in the benchmark year of 2001 (for Ghana). Table 5 summarizes the weight computations for the latest year.¹⁰ Since the scalings just described are based on

¹⁰ The KK governance variables are available on a biannual basis for 1996–2004 and annual since. For years missing KK data, the aid index uses the previous year’s values.

2001 data and remain fixed thereafter for the sake of valid comparisons over time, it is possible for selectivity weights in later years to stray outside the 0–1 range.

There are two exceptions to this weighting. First, emergency aid is exempted from the selectivity discounting since it is often effective even in the poorest-governed countries. Second is an exemption from the governance discount—the first discount factor—for aid that is meant to *improve* governance, broadly defined. This sort of aid receives a uniform governance-based discount of 50%—compared to, say, the 75% discount it would otherwise get in Haiti. It seems perverse to penalize donors for trying to improve governance where it is low. On the other hand, poor governance may indeed undermine the effectiveness of aid meant to improve it. The choice of a uniform 50% discount seems like a minimally arbitrary, middle-of-the-road response to the problem. Governance aid is defined as that assigned a code in the 15000’s in DAC’s Creditor Reporting System database. The headings for these 16 codes are: Government and civil society, general; Economic & development policy/planning; Public sector financial management; Legal and judicial development; Government administration; Strengthening civil society; Elections; Human rights; Free flow of information; Womens equality organisations and institutions; Security system management and reform; Civilian peace-building; Conflict prevention and resolution; Post-conflict peace-building (UN); Demobilisation; Land mine clearance; and Child soldiers (prevention and demobilisation).^{11,12}

This system implies several valuations, which are meant to be minimally arbitrary but should be made explicit. For one, non-emergency program aid to the highest-weighted recipient in 2001, Ghana, is precisely as meritorious as emergency aid to any country any year, since the latter is not discounted. All other aid is valued less. And because of the multiplicative weighting structure, non-emergency aid to the richest country is valueless no matter how well-governed the country: by virtue of being the richest its income weight is zero. Similarly, non-emergency, non-governance aid to the worst-governed country is also treated as valueless regardless of how poor the country is. In general, governance quality and income level are each seen as conditioning the other’s relevance for aid effectiveness.

Table 6 summarizes the calculations by donor, which, recall, actually take place at the donor-recipient level.

¹¹ The full CRS purpose classification is at <http://www.oecd.org/dataoecd/40/23/34384375.doc>.

¹² I think Ian Anderson and Terry O’Brien for comments that led to this change.

Table 5. Computation of selectivity weights, 2009

Country name	A. Exchange rate GDP/capita, 2009 (\$)	B. Log ex- change rate GDP/capita	C. GDP selec- tivity multiplier	D. Kaufmann- Kraay composite governance score, 2009	E. Governance selectivity mul- tiplier	F. Combined selectivity mul- tiplier ¹
Formula:		Log A	(linear map of B onto stand- ard scale)		(linear map of B onto standard scale)	C × E
Ghana	343	5.84	1.56	0.13	0.62	0.97
Malawi	168	5.12	1.76	-0.33	0.49	0.87
Burkina Faso	264	5.58	1.63	-0.31	0.50	0.81
Mozambique	371	5.92	1.54	-0.21	0.53	0.81
Lesotho	471	6.15	1.47	-0.12	0.55	0.81
Benin	363	5.89	1.54	-0.24	0.52	0.80
Kiribati	762	6.64	1.33	0.05	0.60	0.80
Cape Verde	1,763	7.47	1.09	0.48	0.72	0.79
Zambia	401	5.99	1.51	-0.31	0.50	0.75
Tanzania	439	6.08	1.49	-0.29	0.50	0.75
Mali	304	5.72	1.59	-0.40	0.47	0.75
Vanuatu	1,561	7.35	1.13	0.28	0.66	0.75
Rwanda	334	5.81	1.56	-0.42	0.47	0.73
Bhutan	1,287	7.16	1.18	0.06	0.60	0.71
Senegal	534	6.28	1.43	-0.33	0.49	0.71
St. Vincent and the Grenadines	4,314	8.37	0.84	0.90	0.84	0.71
Madagascar	255	5.54	1.64	-0.56	0.43	0.70
India	766	6.64	1.33	-0.21	0.53	0.70
Gambia	382	5.95	1.53	-0.46	0.46	0.70
St. Lucia	4,744	8.46	0.81	0.93	0.85	0.69
Chile	6,083	8.71	0.74	1.15	0.91	0.68
Botswana	4,082	8.31	0.86	0.67	0.78	0.66
Dominica	4,373	8.38	0.84	0.73	0.79	0.66
Niger	173	5.15	1.75	-0.73	0.38	0.66
Micronesia, Fed. Sts.	1,999	7.60	1.06	0.14	0.63	0.66
Georgia	1,199	7.09	1.20	-0.12	0.55	0.66
Estonia	6,113	8.72	0.74	1.07	0.89	0.66
Mongolia	716	6.57	1.35	-0.34	0.49	0.66
Namibia	2,673	7.89	0.98	0.31	0.67	0.66
Bulgaria	2,542	7.84	0.99	0.27	0.66	0.66
Moldova	554	6.32	1.42	-0.45	0.46	0.65
Mauritius	4,917	8.50	0.80	0.78	0.81	0.65
Romania	2,607	7.87	0.98	0.22	0.65	0.64
Uganda	366	5.90	1.54	-0.61	0.41	0.64
Lithuania	5,154	8.55	0.79	0.70	0.78	0.62
Latvia	4,973	8.51	0.80	0.66	0.77	0.62
Armenia	1,299	7.17	1.18	-0.22	0.52	0.62
Costa Rica	5,043	8.53	0.80	0.64	0.77	0.61
Hungary	5,833	8.67	0.76	0.79	0.81	0.61
Sierra Leone	265	5.58	1.63	-0.76	0.37	0.60
Vietnam	674	6.51	1.37	-0.52	0.44	0.60
Macedonia, FYR	2,158	7.68	1.04	-0.03	0.58	0.60
Liberia	148	5.00	1.79	-0.89	0.33	0.60
Albania	1,863	7.53	1.08	-0.12	0.55	0.59
Jordan	2,497	7.82	1.00	0.03	0.60	0.59
Czech Republic	7,225	8.89	0.69	0.94	0.85	0.59
Poland	6,331	8.75	0.73	0.78	0.81	0.59
South Africa	3,689	8.21	0.89	0.28	0.66	0.59
Marshall Islands	2,111	7.66	1.04	-0.09	0.56	0.58
Grenada	4,445	8.40	0.83	0.39	0.70	0.58
Guyana	1,148	7.05	1.22	-0.39	0.47	0.58
Indonesia	1,124	7.02	1.22	-0.41	0.47	0.57
Djibouti	903	6.81	1.28	-0.51	0.44	0.57
St. Kitts and Nevis	8,022	8.99	0.67	0.91	0.84	0.56

Solomon Islands	1,088	6.99	1.23	-0.46	0.46	0.56
Timor-Leste	325	5.78	1.57	-0.82	0.35	0.56
El Salvador	2,566	7.85	0.99	-0.08	0.56	0.56
Tunisia	2,805	7.94	0.96	-0.05	0.57	0.55
Morocco	1,781	7.48	1.09	-0.29	0.50	0.55
Sri Lanka	1,233	7.12	1.20	-0.45	0.46	0.55
Guinea-Bissau	143	4.96	1.81	-1.00	0.30	0.55
Togo	247	5.51	1.65	-0.90	0.33	0.55
Kenya	452	6.11	1.48	-0.77	0.37	0.54
Ukraine	987	6.89	1.26	-0.55	0.43	0.54
Tonga	2,017	7.61	1.06	-0.26	0.51	0.54
Malta	10,693	9.28	0.58	1.19	0.92	0.54
Philippines	1,215	7.10	1.20	-0.48	0.45	0.54
Slovak Republic	8,042	8.99	0.66	0.79	0.81	0.54
Uruguay	8,618	9.06	0.65	0.83	0.82	0.53
Ethiopia	201	5.30	1.71	-0.98	0.31	0.53
Papua New Guinea	695	6.54	1.36	-0.70	0.39	0.52
Malaysia	4,992	8.52	0.80	0.24	0.65	0.52
Brazil	4,399	8.39	0.84	0.13	0.62	0.52
Cambodia	493	6.20	1.46	-0.81	0.36	0.52
Croatia	6,415	8.77	0.73	0.43	0.71	0.52
Thailand	2,567	7.85	0.99	-0.23	0.52	0.52
Nicaragua	870	6.77	1.29	-0.67	0.40	0.51
Kyrgyz Republic	385	5.95	1.53	-0.89	0.33	0.51
Bosnia and Herzegovina	2,162	7.68	1.04	-0.34	0.49	0.51
Nepal	261	5.56	1.64	-0.97	0.31	0.51
Jamaica	3,691	8.21	0.89	-0.05	0.57	0.51
Belize	3,567	8.18	0.89	-0.08	0.56	0.50
Burundi	112	4.72	1.87	-1.12	0.27	0.50
Egypt, Arab Rep.	1,836	7.52	1.08	-0.44	0.46	0.50
Mauritania	462	6.14	1.47	-0.87	0.34	0.50
Honduras	1,380	7.23	1.16	-0.57	0.42	0.49
Swaziland	1,553	7.35	1.13	-0.55	0.43	0.49
Bangladesh	482	6.18	1.46	-0.90	0.33	0.49
Panama	5,732	8.65	0.76	0.17	0.64	0.48
Cameroon	694	6.54	1.36	-0.82	0.35	0.48
Kazakhstan	2,376	7.77	1.01	-0.40	0.47	0.48
Antigua and Barbuda	10,542	9.26	0.59	0.79	0.81	0.48
Peru	2,913	7.98	0.95	-0.31	0.50	0.47
Turkey	4,778	8.47	0.81	-0.02	0.58	0.47
Slovenia	12,577	9.44	0.54	1.01	0.87	0.47
Maldives	3,287	8.10	0.92	-0.31	0.50	0.46
China	2,206	7.70	1.03	-0.51	0.44	0.46
Guatemala	1,858	7.53	1.08	-0.59	0.42	0.45
Bolivia	1,192	7.08	1.21	-0.76	0.37	0.45
Laos	496	6.21	1.45	-0.98	0.31	0.45
Haiti	390	5.97	1.52	-1.03	0.29	0.45
Dominican Republic	3,697	8.22	0.88	-0.29	0.50	0.45
Colombia	3,102	8.04	0.93	-0.39	0.48	0.44
Paraguay	1,432	7.27	1.15	-0.74	0.38	0.43
Tajikistan	249	5.52	1.65	-1.14	0.26	0.43
Comoros	367	5.91	1.54	-1.09	0.28	0.43
Cyprus	15,209	9.63	0.48	1.03	0.88	0.43
Seychelles	7,389	8.91	0.69	0.11	0.62	0.42
Mexico	6,099	8.72	0.74	-0.15	0.54	0.40
Fiji	2,194	7.69	1.03	-0.72	0.38	0.39
Syrian Arab Republic	1,350	7.21	1.17	-0.90	0.33	0.39
Azerbaijan	2,303	7.74	1.02	-0.74	0.38	0.38
South Korea	15,444	9.64	0.48	0.73	0.79	0.38
Trinidad and Tobago	10,541	9.26	0.59	0.20	0.64	0.38
Central African Republic	233	5.45	1.67	-1.28	0.22	0.37
Russian Federation	2,805	7.94	0.96	-0.72	0.38	0.37
Nigeria	506	6.23	1.45	-1.17	0.25	0.37

Angola	1,313	7.18	1.18	-0.97	0.31	0.37
Eritrea	133	4.89	1.83	-1.37	0.20	0.36
Algeria	2,190	7.69	1.03	-0.83	0.35	0.36
Ecuador	1,771	7.48	1.09	-0.90	0.33	0.36
Gabon	4,054	8.31	0.86	-0.61	0.41	0.36
Cote d'Ivoire	536	6.28	1.43	-1.23	0.24	0.34
Congo, Rep.	1,267	7.14	1.19	-1.06	0.29	0.34
Pakistan	657	6.49	1.37	-1.20	0.25	0.34
Belarus	2,556	7.85	0.99	-0.87	0.34	0.34
Yemen	565	6.34	1.42	-1.25	0.23	0.33
Saudi Arabia	9,863	9.20	0.61	-0.29	0.50	0.31
Singapore	28,765	10.27	0.30	1.44	0.99	0.30
Uzbekistan	893	6.79	1.29	-1.26	0.23	0.29
Argentina	9,880	9.20	0.61	-0.37	0.48	0.29
Chad	265	5.58	1.63	-1.44	0.18	0.29
Lebanon	6,342	8.75	0.73	-0.67	0.40	0.29
Guinea	400	5.99	1.51	-1.44	0.18	0.27
Hong Kong, China	33,442	10.42	0.26	1.40	0.98	0.26
Iran, Islamic Rep.	2,168	7.68	1.04	-1.20	0.25	0.25
Libya	7,692	8.95	0.68	-0.87	0.34	0.23
Turkmenistan	1,827	7.51	1.08	-1.35	0.20	0.22
Congo, Dem. Rep.	97	4.57	1.92	-1.67	0.11	0.22
Iraq	743	6.61	1.34	-1.50	0.16	0.22
Macao, China	33,542	10.42	0.26	0.79	0.81	0.21
Sudan	536	6.29	1.43	-1.56	0.14	0.20
Qatar	38,466	10.56	0.22	0.76	0.80	0.18
Venezuela, RB	5,638	8.64	0.77	-1.27	0.23	0.17
Zimbabwe	288	5.66	1.61	-1.73	0.10	0.16
Equatorial Guinea	8,011	8.99	0.67	-1.28	0.22	0.15
Bermuda	66,268	11.10	0.07	1.06	0.89	0.06

¹To allow comparisons over time, the linear maps are designed so that selectivity weights fit exactly in the 0–1 range in a fixed reference year, 2001. In other years, weights can cross these bounds.

Table 6. Discounting for selectivity, 2009

Donor	Tying-discounted gross transfers			D. Gross selectivity	Tying- and selectivity-	Selectivity-
	A. Non-emergency ¹	B. Emergency ¹	C. Reflows ¹		discounted gross transfers	discounted reflows
					(A × D + B)	(C × D)
Australia	1,991	306	0	0.59	1,474	0
Austria	382	32	10	0.54	239	4
Belgium	1,395	118	46	0.55	881	18
Bill & Melinda Gates Fo	1,827	0	0	0.57	1,032	0
Canada	2,779	322	43	0.62	2,037	19
Czech Republic	94	4	0	0.58	58	0
Denmark	1,780	130	37	0.65	1,293	18
Finland	675	103	0	0.62	524	0
France	6,483	39	3,654	0.55	3,585	1,389
Germany	7,449	367	1,478	0.56	4,518	569
Greece	259	14	0	0.54	152	0
Hungary	29	0	0	0.57	17	0
Iceland	25	0	0	0.64	16	0
Ireland	596	98	0	0.66	494	0
Israel	108	0	0	0.51	55	0
Italy	700	106	175	0.53	479	67
Japan	12,404	312	9,283	0.56	7,292	3,461
Luxembourg	228	38	0	0.63	182	0
Netherlands	4,454	302	143	0.63	3,106	65
New Zealand	220	0	0	0.59	130	0
Norway	2,897	271	0	0.61	2,038	0
Poland	96	0	4	0.47	45	1
Portugal	288	1	45	0.68	198	21
Slovak Republic	20	0	0	0.52	10	0
Slovenia	25	0	0	0.49	12	0
South Korea	538	14	59	0.53	297	21
Spain	4,103	432	347	0.52	2,583	127
Sweden	2,624	362	0	0.64	2,042	0
Switzerland	1,438	155	10	0.60	1,023	4
Taiwan	402	0	0			
Thailand	35	0	0	0.49	17	0
Turkey	616	50	0	0.40	299	0
United Arab Emirates	903	135	205	0.37	467	56
United Kingdom	7,124	729	208	0.60	4,979	91
United States	20,517	4,150	1,002	0.54	15,198	397
AfDB	0	0	0			
AfDF	2,669	0	178	0.62	1,658	82
AsDF	2,788	0	1,106	0.50	1,382	394
CarDB	85	0	27	0.55	47	10
EC	11,499	1,521	0	0.56	8,007	0
GAVI	498	0	0	0.50	247	0
GEF	711	0	0	0.52	372	0
GFATM	2,337	0	0	0.57	1,329	0
IAEA	65	0	0	0.50	32	0
IDA	11,218	0	3,070	0.57	6,382	1,271
IDB Sp.Fund	604	1	320	0.50	305	117
IFAD	399	0	218	0.55	221	87
Montreal Protocol	29	0	0	0.50	15	0
Nordic Dev.Fund	76	0	8	0.65	50	4
SAF+ESAF(IMF)	2,487	0	708	0.57	1,408	290
UNAIDS	243	0	0	0.52	126	0
UNDP	575	55	0	0.66	435	0
UNECE	13	0	0			
UNFPA	346	0	0	0.51	177	0
UNHCR	0	301	0			
UNICEF	1,053	33	0	0.53	591	0
UNRWA	772	0	0	0.44	337	0
UNTA	645	0	0	0.51	328	0
WFP	171	119	0	0.55	214	0
WHO	419	18	0			
Japan-Sierra Leone	37	0	0	0.61	23	0

¹From previous tables.

5. Penalizing project proliferation

Project proliferation, donor fragmentation, and lack of coordination have long been cited as major problems for aid effectiveness. Donors often act at cross-purposes—one donor’s trains won’t run on another’s tracks, literally or metaphorically. Or donors overload recipient ministries with mission visitations and project reporting requirements (Acharya, de Lima, and Moore 2006; Roodman 2006a, 2006b). Roodman (2006a) shows theoretically how the tendency to proliferate can create bottlenecks in aid delivery on the recipient side, limiting absorptive capacity for aid. A related model in Roodman (2006b) suggests that to maximize aid effectiveness, donors need to fund fewer, larger projects in *smaller* countries, all else equal, since they have less administrative capacity.

Though such transaction costs of aid are widely thought to be substantial, they have mostly defied direct measurement. For example, Brown et al. (2000) set out to measure aid transaction costs in Vietnam but ended up obtaining only anecdotal information. A pair of recent papers has made fresh contributions to analyzing the extent of proliferation and indirectly measuring its costs. Arnab Acharya, Ana Fuzzo de Lima, and Mick Moore (2006) develop indexes of donors’ tendency to *proliferate* (disperse) aid among recipients, and of the tendency of recipients’ aid to be *fragmented* among many donors. Stephen Knack and Aminur Rahman (2007) measured fragmentation similarly, and find it to be predictive of lower recipient bureaucratic quality. They hypothesize that donors out-compete recipient governments for the scarce resource of skilled nationals.

The inputs to the indexes of proliferation and fragmentation in these papers are data on aid disbursements by donor and recipient, from DAC Table 2a. Given that dataset, the indexes are logical first steps toward measuring proliferation. But this style of analysis also has disadvantages since it looks at allocation of aid across countries rather than allocation across projects within countries. A donor that gives aid to only one country but does so through tiny projects would score perfectly on the Acharya, de Lima, and Moore proliferation index since it would not be proliferating at all across recipients, while a donor that provided large, equal-sized blocks of pure budgetary support to several dozen nations would be a major “proliferator.”

The idea of the adjustment in the CDI for project proliferation is to weight each dollar of aid based on the size of the “aid activity” of which it is part. The weights depend on the sizes of other projects in the country and the country’s governance.

Calculating these size weights in a conceptually sound way turns out to be more complicated than calculating selectivity weights. One reason is that the sizes of aid activities range over many orders of magnitude, from \$10,000 or smaller to \$100 million or bigger. A linear map from this range to a limited span needed for weights, such as [0, 1], would have to consign all projects smaller than \$10 million to near-0 weights. A map from *log* project size would work little better, for while it would compress the high end, bringing \$10 million and \$100 million aid activities closer together, it would explode the low end, generating large weight differences between \$1,000 and \$10,000 projects. A second complication is that if there is such a thing as too small a

project, there is also such a thing as too big. As Radelet (2004) and Roodman (2006b) argue, large blocks of program support are less appropriate for countries where governance is poor. In such countries, the oft-criticized transaction costs associated with aid activities—meetings with donors, quarterly reports, etc.—also have the benefit of improving measurability of results and holding recipients accountable for outcomes. This makes size fundamentally different from governance and poverty. For the latter, monotonic weighting functions are reasonable: to a first approximation, the poorer or better governed the country, the more appropriate it arguably is aid. In contrast, there is in, in some theoretical sense, an *optimal* project size. It should depend on several factors, including how big the receiving country is, how much aid it is receiving, and the quality of its governance.

For these reasons, the size weighting function in the CDI tends toward zero at both the low and high ends, with a peak in between. More precisely, it is lognormal. This is the most natural functional form for this situation because it has strictly positive support (and project size is never negative), takes strictly positive values (so that size weights are never negative), and is inherently compatible with the tendency of aid activity sizes to range over many orders of magnitude, being a normal function of log project size.

As it happens, aid activities themselves tend to be lognormally distributed by size. Thus the mathematical framework is one where a weighted sum of an approximately lognormal distribution of aid activities is taken using weights from a separate lognormal function. Figure 1, on page 27, illustrates on a logarithmic scale. The heavy line shows the distribution of aid activities by size in a hypothetical country. The most common size is at the peak of this curve. Because of the lognormal scale, however, the *average size*, which is lifted by a few very large projects, is far to the right of the peak. The dashed line shows one possible weighting curve for rewarding or penalizing projects of various sizes. The weighting curve drawn here peaks at an “optimal” size somewhat above the average project size, implying the belief that the average aid dollar is going into aid activities that are too small. The weighting curve is also relatively wide, which can be taken to indicate uncertainty about what the true optimal size is, and how much deviation from this optimum matters.

Applying such a weighting function to the distribution of projects that donors fund forces choices about the height, location, and width of this size weighting curve for each recipient. In a near-vacuum of empirical evidence about the costs of proliferation, three principles hinted at above shape the choices. First, the *actual* distribution of aid activities by size is taken as a starting point. Even though this is probably far from optimal in most countries, the choice serves to minimize arbitrariness and puts some faith in donors’ judgments about where large or small projects are most appropriate. Second is a bias toward larger projects. There is more consensus that the proliferation of small projects in countries such as Tanzania and Mozambique is inefficient than that \$100,000,000 million loans from Japan and the Asian Development Bank to China are too big, even though one might legitimately question the appropriateness of such *carte blanche* disbursements to a relatively unaccountable, corrupt government. Thus the parameters chosen here lead to formulas that tend to penalize projects

on the small side of the observed distributions more than those on the large side. Third is a bias toward agnosticism given the poor understanding of these issues, toward preventing the differences among bilaterals' overall proliferation scores from being too great, manifest as a relatively wide weighting curve.

The choices can be stated precisely, as follows. The data source is the CRS database, for which the unit of observation is the "aid activity," which the CRS reporting guidelines describe as follows:

An aid activity can take many forms. It could be a project or a programme, a cash transfer or delivery of goods, a training course or a research project, a debt relief operation or a contribution to an NGO. (DAC 2002)

All aid activities in the CRS database are included, except for those coded as being donor administrative costs or debt forgiveness.

Since there are three degrees of freedom in the lognormal family of curves, which can be thought of as height, width, and mode (highest-weighted project size), three constraints must be imposed. The first constraint is that the weighting function must reach a peak value of 1.0, so that only projects of "optimal" size go undiscounted. That fixes the height. To describe how the optimal size is defined, let μ_1 and σ_1 be the mean and standard deviation of a recipient's log aid activity size. These are the standard parameters of the lognormal distribution. Let KK be the country's Kaufmann-Kraay governance score (on which 0 is average). Then the mode of the weighting function is decreed to occur at size $2^{KK} e^{\mu_1 + \sigma_1^2}$. For comparison, if the aid activities are perfectly lognormally distributed, *their* modal size is $e^{\mu_1 - \sigma_1^2}$, their median at e^{μ_1} , and their average size at $e^{\mu_1 + \sigma_1^2/2}$ (Aitchison and Brown 1963, p. 8). Thus for a country of average governance ($KK = 0$), the "optimal aid activity size" is $e^{\mu_1 + \sigma_1^2}$, which is a step above the average—just as far above the average as the average is above the median, in order-of-magnitude terms. Meanwhile, as a hypothetical country's KK score climbs from 0 to about standard deviation above the mean, to 1.0, the "optimal" project size exactly doubles.¹³ Finally, the width of the weighting curve, as measured by its standard deviation in log space, is set to twice that of the distribution of projects, that is, to $2\sigma_1$. A relatively broad weighting curve is meant to reflect uncertainty about the true optimal size. All of these choices are meant to be minimally arbitrary.

To simplify the calculations somewhat, the weighting is not done project by project. Rather, the mean and standard deviation of log aid activity size of donor's projects in each recipient country are computed. The donor's projects are then treated as if they are perfectly lognormally distributed, corresponding to the heavy line in Figure 1, thus fully characterized by these two numbers. *Size-weighted aid* is then calculated using a general formula for the integral of the product of two lognormal curves. (See Appendix for details.)

As elsewhere, there are practical complications. Bilateral donors that do not report full CRS commitments data, including Belgium, Spain, and Ireland, are assigned, recipient by recipient, the average weight for

¹³ Scores on each of the 6 Kaufmann-Kraay components are standardized to have mean 0 and standard deviation 1. The composite has mean zero and standard deviation 0.93 (in 2002).

donors that do. Multilaterals that do not provide CRS data are assigned an average size weight of 1.0 for all recipients. Figure 2 shows that most of the multilaterals that do report get size weights near 1. Given this pattern, a figure near 1 is clearly appropriate for the only major multilateral not reporting, the IMF, which disburses in large blocks. Both emergency and non-emergency aid are subject to the discount. For consistency, debt service is discounted too, but by the average size weight for the full distribution of a recipient's projects from all donors. This implicitly assumes that the opportunity cost of debt service is a set of aid activities of a size that is not necessarily typical for the donor in that country, but is typical of all donors. Note that this choice can heavily penalize a donor that disburses aid to a country through small projects and then receives comparable amounts of money in debt service. If the debt service is discounted much less than the disbursements for size, a donor's size-adjusted aid can turn negative.

The approach does penalize very large projects in theory, especially in poorly governed countries, but because the parameter choices create a bias toward large projects and a degree of agnosticism, few large projects are actually discounted much. As a result, there is a strong positive correlation between a donor's average project size across all recipients and its average size weight in the CDI. (See Figure 2.) In sum, the approach has a thought-through and somewhat sophisticated theoretical foundation, but in practice, because of the conservative parameter choices, the upshot is essentially a straightforward discount based on each donor's average log project size.

As before, the actual calculations take place at the donor-recipient level. At that level, two size weights figure: one for the donor's own portfolio of projects in the recipient country, the other for all donors' projects in each recipient country, which is used for discounting debt service.

Since this is the last adjustment for quality, the final column of Table 7 is labeled "net quality-adjusted aid." This is a dollar value that embodies both quantity and quality factors. Since this actually calculated at the donor-recipient level, the next step to describe is aggregating up to the donor level.

Figure 1. Illustration of aid activity size weighting

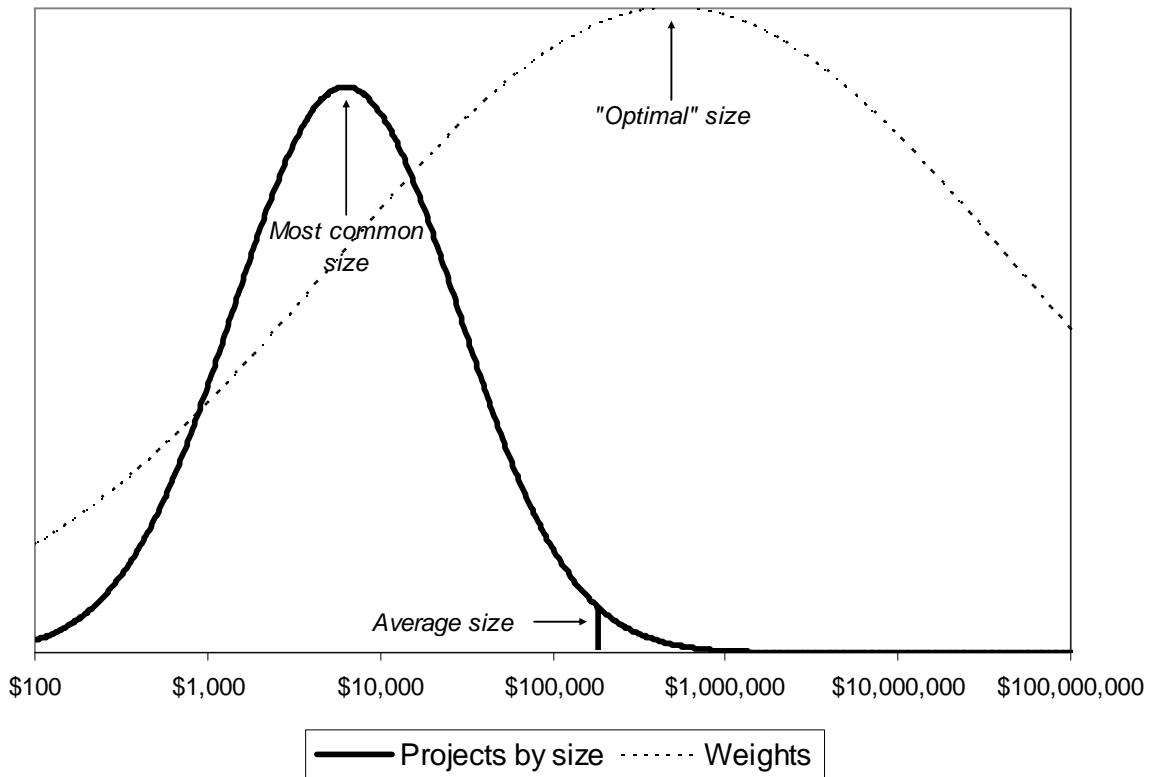


Figure 2. Average size weight in CDI versus average log aid activity commitment, 2003

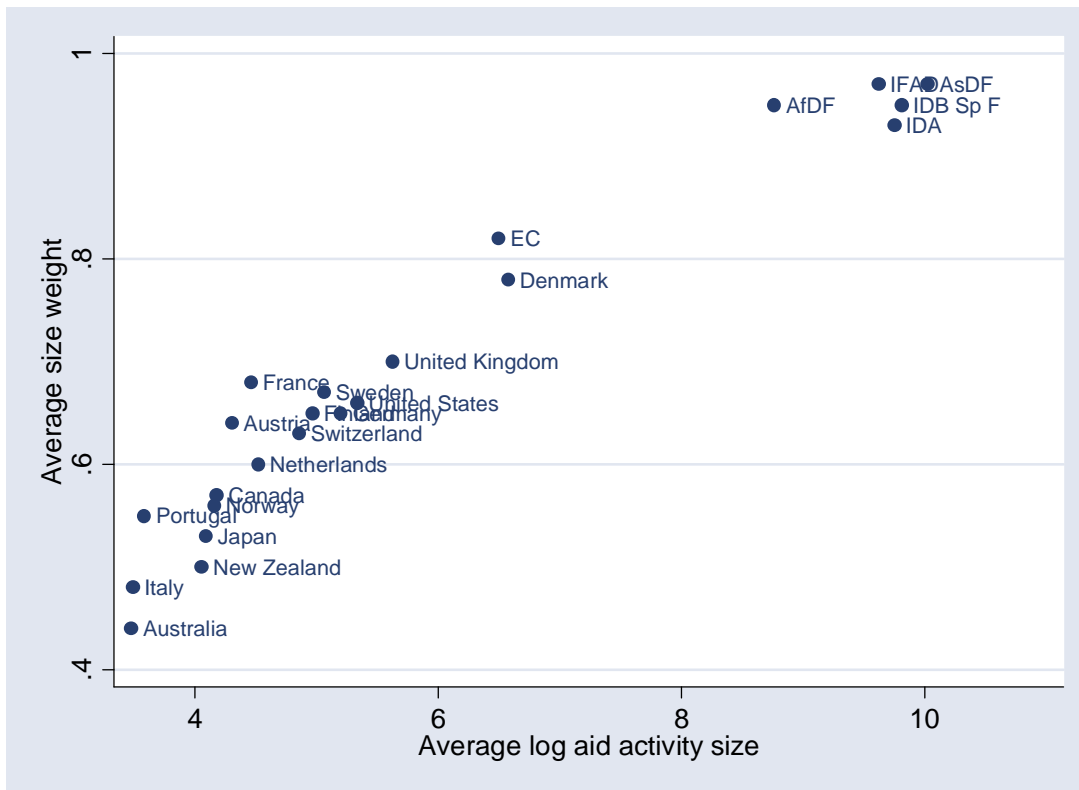


Table 7. Discounting for proliferation, 2009

Donor	A. Tying- and selectivity- discounted gross aid ¹	B. Selectivity- discounted reflows ¹	C. Size weight	D. Recipient average size weight	E. Gross quality- adjusted aid (A × C)	F. Quality- adjusted repayments (B × D)	Net quality- adjusted aid (E – F)
Australia	1,474	0	0.64	0.67	940	0	940
Austria	239	6	0.58	0.72	138	4	134
Belgium	881	25	0.67	0.72	590	18	572
Bill & Melinda Gates	1,032	0	0.75	0.75	771	0	771
Canada	2,037	26	0.53	0.73	1,075	19	1,056
Czech Republic	58	0	0.74	0.74	43	0	43
Denmark	1,293	24	0.70	0.73	907	18	890
Finland	524	0	0.67	0.72	351	0	351
France	3,585	1,999	0.62	0.69	2,235	1,389	846
Germany	4,518	824	0.55	0.69	2,487	569	1,919
Greece	152	0	0.74	0.74	112	0	112
Hungary	17	0	0.69	0.69	12	0	12
Iceland	16	0	0.75	0.75	12	0	12
Ireland	494	0	0.74	0.74	366	0	366
Israel	55	0	0.73	0.73	40	0	40
Italy	479	93	0.56	0.71	268	67	202
Japan	7,292	5,223	0.52	0.66	3,812	3,461	351
Luxembourg	182	0	0.60	0.71	109	0	109
Netherlands	3,106	90	0.77	0.72	2,392	65	2,327
New Zealand	130	0	0.61	0.67	80	0	80
Norway	2,038	0	0.62	0.73	1,259	0	1,259
Poland	45	2	0.69	0.69	31	1	30
Portugal	198	31	0.56	0.68	112	21	91
Slovak Republic	10	0	0.73	0.73	8	0	8
Slovenia	12	0	0.76	0.76	9	0	9
South Korea	297	31	0.40	0.68	118	21	97
Spain	2,583	182	0.55	0.70	1,423	127	1,296
Sweden	2,042	0	0.62	0.73	1,275	0	1,275
Switzerland	1,023	6	0.64	0.72	660	4	656
Taiwan							
Thailand	17	0	0.65	0.65	11	0	11
Turkey	299	0	0.76	0.76	226	0	226
United Arab Emirat	467	75	0.66	0.74	310	56	254
United Kingdom	4,979	124	0.69	0.73	3,434	91	3,343
United States	15,198	540	0.70	0.74	10,643	397	10,246
AfDB							
AfDF	1,658	111	0.83	0.74	1,371	82	1,289
AsDF	1,382	548	0.97	0.72	1,341	394	948
CarDB	47	15	0.69	0.69	32	10	22
EC	8,007	0	0.87	0.73	6,927	0	6,927
GAVI	247	0	0.75	0.75	186	0	186
GEF	372	0	0.96	0.69	356	0	356
GFATM	1,329	0	0.88	0.73	1,170	0	1,170
IAEA	32	0	0.71	0.71	23	0	23
IDA	6,382	1,747	0.92	0.73	5,877	1,271	4,606
IDB Sp.Fund	305	161	0.84	0.73	258	117	140
IFAD	221	121	0.88	0.72	195	87	107
Montreal Protocol	15	0	0.62	0.62	9	0	9
Nordic Dev.Fund	50	5	0.97	0.72	48	4	45
SAF+ESAF(IMF)	1,408	401	0.66	0.72	936	290	646
UNAIDS	126	0	0.61	0.73	76	0	76
UNDP	435	0	0.58	0.73	252	0	252
UNECE							
UNFPA	177	0	0.58	0.72	103	0	103
UNHCR			0.74	0.74			
UNICEF	591	0	0.69	0.73	411	0	411
UNRWA	337	0	0.69	0.69	233	0	233
UNTA	328	0	0.71	0.71	231	0	231
WFP	214	0		0.74		0	
WHO							
Japan-Sierra Leone	23	0	0.55	0.74	12	0	12

¹ From previous tables.

6. *Aggregation to the donor level*

In principle, this aggregation is matter of simple sums over recipients. But as always data problems intrude and complicate. Not all aid in the DAC database is fully disaggregated by recipient country, partly because administrative costs at headquarters are hard to allocate, partly because aid can support projects or programs intended to benefit an entire region or continent. The United States, for example, gave \$2.435 billion in gross transfers in 2003 to “Least developed countries unspecified,” \$130 million to “Americas Unspecified,” and a separate \$37 million to “North and Central America Unallocated.” In addition, it is impossible to assign selectivity weights to some recipients for lack of data for GDP/capita or the KK composite. These aid flows cannot be discounted for selectivity without further assumptions. Similarly, some recipients, including recipient groups like those just mentioned, have no commitments listed in the CRS database for some donors, so that no size weight can be directly computed.

Leaving out aid that cannot be directly discounted for selectivity or size would understate donors’ contributions. So such aid is incorporated as follows. For each sub-continental region, as defined in the DAC database, such aid is discounted by the donor’s average selectivity and size weights for aid that *can* be directly discounted. Once this discounting is done, all selectivity-discounted aid to each region is summed. This procedure repeats at the level of the continent, then the Part, then the aid recipient universe.¹⁴ This is how donor-level figures in previous tables are calculated.

7. *Allocating multilateral quality-adjusted aid to bilaterals*

Since the motivation for this exercise is to compare national governments, it is important to give bilaterals credit for their contributions to multilateral institutions. This final step in computing the index of official aid performance does this. But it operates in a way that is the mirror image of the standard DAC approach for imputing aid through multilaterals. In the DAC approach, each bilateral’s contribution to each multilateral is imputed forward to recipient countries based on the multilateral’s allocation across recipients in the same year. So if Japan gives \$50 million to the Asian Development Fund in some year, and 10% of the AsDF’s Net ODA goes to Indonesia that year, then $10\% \times \$50 \text{ million} = \5 million is imputed as Japan-Indonesia aid. In the CDI, the process runs the other way, because it is necessary to transmit back the information about the multilaterals’ aid quality that is contained in their quality-adjusted aid totals. So in the aid index, bilaterals receive credit for the aid programs of multilaterals in proportion to the bilaterals’ contributions to those multilaterals during the same year.

¹⁴ The DAC database divides Part II countries not into continents but into two major groups—former eastern bloc nations, and relatively rich non-DAC members. For the present calculations, these two groups are treated as “continents.”

The calculations properly handle the fact that multilaterals occasionally give aid to other multilaterals, so that the flow of money from a bilateral donor to its ultimate multilateral recipient can take more than one step. For example, since the United Kingdom accounted for 8.23% of net contributions to the UNDP during 2005 (6.56% of that disbursed directly and 1.67% through the EC), it receives credit for 8.23% of the UNDP's quality-adjusted aid of \$153 million, or \$12.6 million.¹⁵

Table 8 shows the results of all this aggregation and imputation. The penultimate column is the final measure of official aid performance: quality-adjusted aid as a share of donor Gross National Income. GNI figures are converted to dollars using market exchange rates, and are from the DAC.

Despite the quality adjustments, what most distinguishes donors from each other in this index is still the sheer quantity of aid they disburse, especially when measured as true net transfers. Denmark, the Netherlands, Norway, and Sweden are large donors by DAC's Net ODA measure, and they score highest on this one too, with at least 0.39% of GNI. Two large donors by DAC's standard Net ODA measure, the United States and Japan, score among the lowest on this index of relative effort, at 0.09% and 0.05% respectively. One reason for Japan's low score is that its true net transfers are much lower than its Net ODA. The newest entrant to DAC—South Korea—is a step behind Japan at 0.03%.

The final column of Table 8 offers a measure of aid quality: the ratio of quality-adjusted aid to net aid transfers. U.S. aid quality is low despite large projects because it channels the lion's share of its aid through its bilateral program, which features high tying and low selectivity for poverty and good governance. One subtle but important reason that Japan's aid quality measures low is the way its aid quantities move around. The *opportunity cost* of the substantial debt service it receives is assumed to be equivalent to the value of high-quality aid since if the recipient were not paying the debt service, it would be free to use the aid without donor constraints such as tying and small project size. Penalties for tying and project proliferation are computed as a fraction of gross aid and so loom large relative to Japan's much-smaller net aid. The leader on quality is Ireland.

Although the final scores are expressed as percentages of GNI, they should not be compared to other variables so expressed, such as Net ODA/GNI, only to each other. The selectivity adjustment, for example, could have super-weighted aid to the most appropriate recipients rather than discounting it to less appropriate ones. This equally meaningful choice would make little difference for the relative results, but would raise scores across the board.

I back-calculate this index of official aid performance to explore time-series as well as cross-sectional variation in scores. What sets the starting point of the time frame is the availability of the Kaufmann-Kraay governance variable—for even years in 1996–2004. For odd years, I use the previous year's score, except that

¹⁵ A few small multilaterals, such as the Central American Bank for Economic Integration receive contributions in but do not themselves report to DAC on their own aid allocations (examples include). This made it impossible to compute their quality-adjusted aid and allocate it back to bilaterals. To prevent contributions to these unscored multilaterals from being dropped, a simple extrapolation was performed based on each bilateral's ratio of quality-adjusted allocated back from scored multilaterals to contributions the donor made to those multilaterals.

1995 calculations also use the 1996 KK scores. This allows calculation of the index for 1995–2009. Total quality-adjusted aid/GNI of bilaterals hardly changed over this period. The simple average was 0.200% in 1995 and 0.199% in 2008; and the correlation of 1995 and 2009 scores is 0.88.¹⁶ (See Figure 3.) Aid quality (quality-adjusted aid/net aid transfers) is more volatile, but also shows little long term trend.

Table 8. Allocating multilateral quality-adjusted aid to bilaterals, 2009

Donor	Net aid				Quality-adjusted aid				GNI	Adjusted aid/GNI	Adjusted/ Net aid (Aid Quality)
	Gross aid (million \$)	Bilateral	Multilateral	Total	Bilateral	Multilateral	Total	(million \$)			
Australia	2,759	2,309	450	2,759	940	301	1,241	940,529	0.1319	45	
Austria	1,087	448	628	1,077	134	369	503	378,024	0.1331	47	
Belgium	2,536	1,478	1,011	2,490	572	556	1,128	474,490	0.2377	45	
Canada	3,993	3,091	859	3,950	1,056	667	1,723	1,319,735	0.1305	44	
Denmark	2,833	1,900	896	2,797	890	451	1,341	319,162	0.4202	48	
Finland	1,285	791	493	1,285	351	264	615	237,920	0.2583	48	
France	12,192	3,036	5,502	8,537	846	3,150	3,996	2,677,754	0.1492	47	
Germany	13,138	6,738	4,922	11,660	1,919	2,721	4,640	3,403,356	0.1363	40	
Greece	600	297	303	600	112	154	266	321,596	0.0826	44	
Ireland	1,002	693	308	1,002	366	166	532	184,655	0.2881	53	
Italy	3,256	702	2,380	3,081	202	1,237	1,439	2,081,292	0.0691	47	
Japan	16,355	3,594	3,478	7,072	351	2,307	2,658	5,223,130	0.0509	38	
Netherlands	6,486	4,733	1,611	6,344	2,327	770	3,097	783,178	0.3954	49	
New Zealand	309	226	83	309	80	41	121	111,365	0.1086	39	
Norway	4,084	3,168	915	4,084	1,259	433	1,692	385,554	0.4387	41	
Portugal	542	265	232	497	91	125	216	218,909	0.0988	44	
South Korea	851	556	236	791	97	170	267	837,241	0.0319	34	
Spain	6,834	4,403	2,084	6,487	1,296	1,103	2,400	1,433,891	0.1673	37	
Sweden	4,520	2,989	1,531	4,520	1,275	871	2,146	405,581	0.5292	47	
Switzerland	2,159	1,588	561	2,149	656	337	992	514,342	0.1929	46	
United Kingdom	11,647	7,646	3,793	11,439	3,343	2,122	5,465	2,222,955	0.2458	48	
United States	29,444	24,773	3,669	28,442	10,246	2,358	12,604	14,011,000	0.0900	44	

¹⁶ These figures exclude Greece, which did not report to DAC for 1995, and may have given essentially no aid.

Figure 3. Quality-adjusted aid/GNI by bilateral donor, 1995–2009

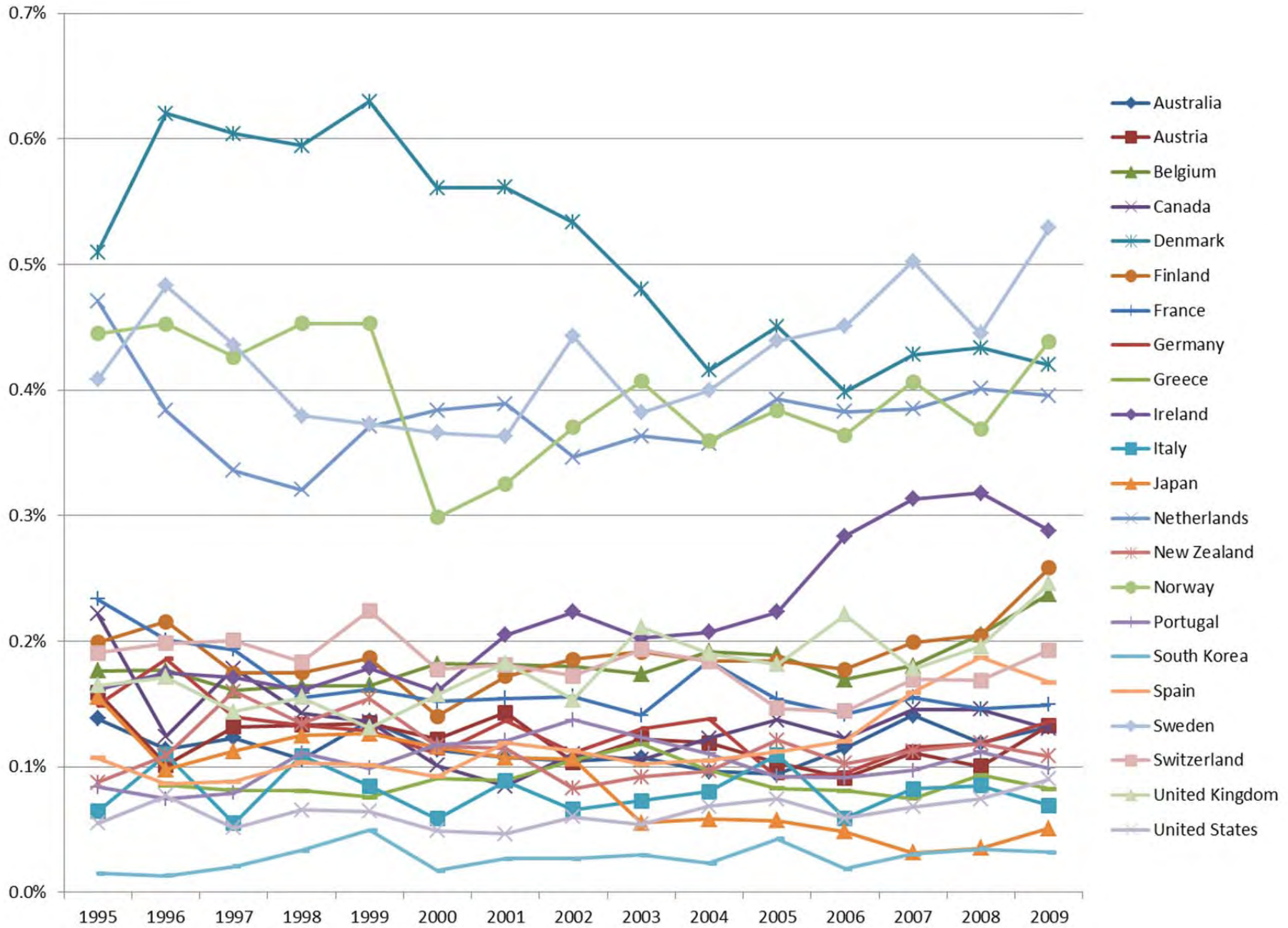
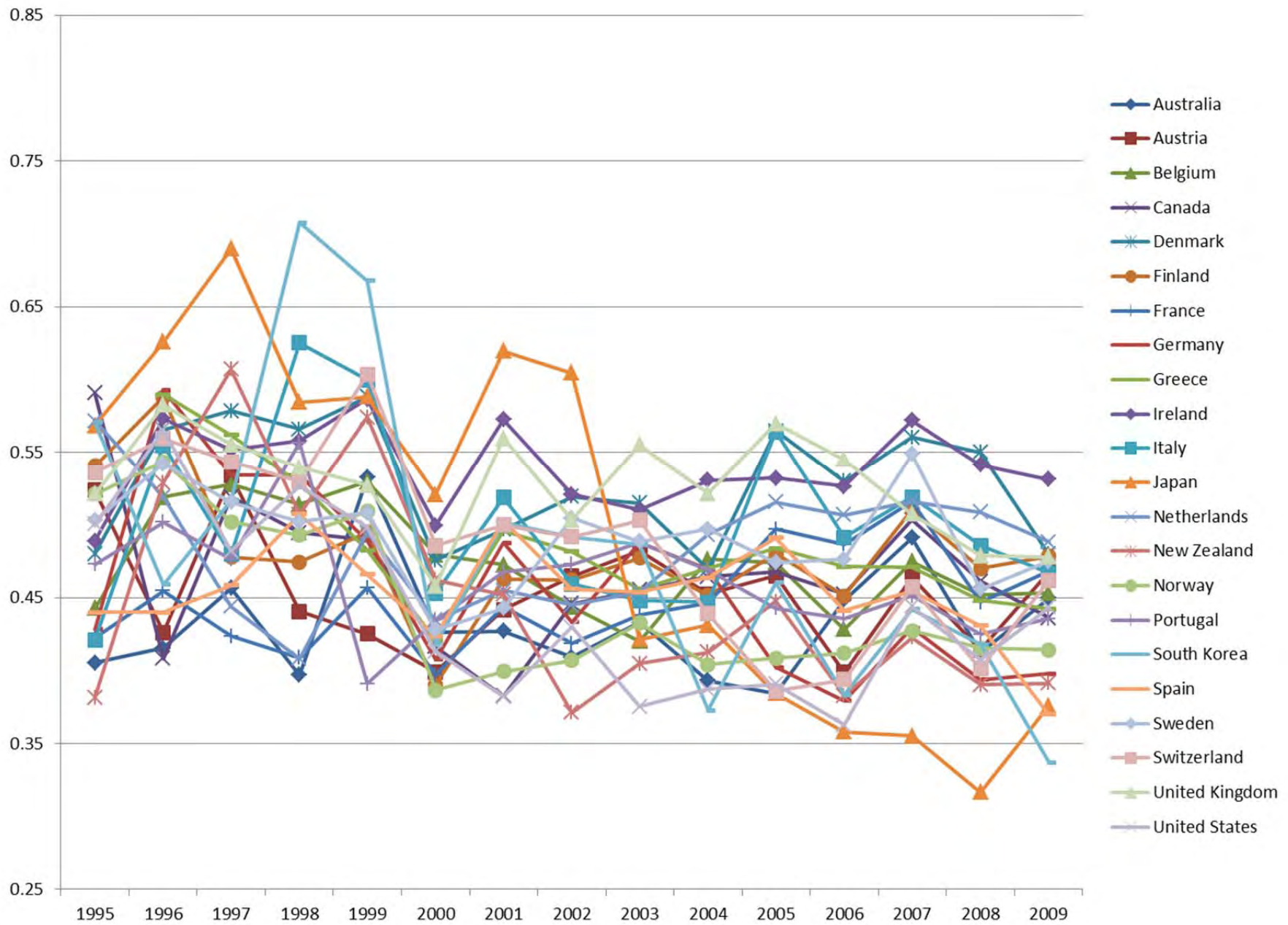


Figure 4. Quality-adjusted aid/net aid by bilateral donor, 1995–2009



8. *Rewarding tax policies that support private giving*

The focus so far has been on foreign aid in the sense of public expenditure. However, private citizens also give aid to developing countries, usually via non-governmental organizations. Private giving is of course not public policy per se, but it is influenced by public policy—fiscal policy in particular. The aid index therefore incorporates estimates of the charitable giving caused by public policy. The approach taken here is to estimate the proportional increase in giving caused by each country's tax policies, compare that to actual giving, then work backwards to estimate how much giving would have occurred in the absence of the policies and how much is a credit to their presence. Two aspects of fiscal policy are considered. First are targeted income tax incentives that lower the “price” of giving. Second is the total tax revenue/GDP ratio: lower taxes leave citizens and corporations with more after-tax income to give to charity.

The approach here will seem simplistic to some and too sophisticated to others. To make the calculations practical, we make several simplifying assumptions. Each country's tax policies are complex and idiosyncratic. No two households are in exactly the same financial position, and so the tax codes present different incentives to different households. And of course different people respond to the same incentives differently. On the other hand, the sophistication of the calculations, such as it is, should not be read to imply that we see our estimates as beyond improvement.

According to a survey reported in Roodman and Standley (2006), all but three index countries—Austria, Finland, and Sweden—offer income tax incentives for charitable giving. Australia, Belgium, Denmark, Germany, Greece, Ireland, Japan, Netherlands, Norway, Switzerland, the United Kingdom, and the United States allow partial or full deduction of charitable donations from taxable income. Canada, France, Italy, New Zealand, Portugal, and Spain offer partial credits—through the tax code, they reimburse a percentage of donations. These incentives lower the price of giving in the sense that a dollar of forgone after-tax income buys more than a dollar of charity. Charitable donations can fund the operations of non-profit groups working in developing countries, such as Oxfam and CARE, or they can go to foundations that fund such projects.

We translate the presence of a tax incentive into an estimate of the increase in charitable giving in three steps. First, we express the tax measure as a price effect. For credits, this step is straightforward. Canada's 45% tax credit, for example, reduces the price of giving by 45%. For deductions, we used a crude but available proxy for the marginal income tax rate faced by the households with above-average incomes that appear to generate most charity. This proxy is the marginal income tax rate for people at 167% of the income level of the average production worker, from the OECD Tax Database. For example, the rate was 31.7% for the United States in 2008, so deductibility of charitable giving in the United States is treated as reducing the price by 31.7% in that year. The second step is to factor in whether the deduction or credit is capped. In countries where high-income,

high-giving people account for most charity in the aggregate, caps can severely limit the incentive effect in practice. Precisely how much, however, is hard to know, especially because there is little information about the distribution of giving by income group outside the United States. Given the uncertainty, we factor caps in coarsely, by taking the simple average of the below- and above-threshold price incentives. For most countries with caps, the above-threshold price incentive is 0—there is no tax incentive to exceed the cap—so the price effect is halved. The exception is Greece, which offers full deductibility up to €2,950 a year, then imposes a 10% tax above that limit. Since the Greece’s representative marginal income tax was 29.4%, the above-threshold price incentive is the difference between this and the special tax rate, i.e., 19.4%. So the simple average of the below- and above-threshold rates for Greece is 24.4%. (See Table 9.)

Finally, having estimated the price effect, we couple it with an estimate of the price elasticity of giving. Research puts it at around 0.5 in the United States (Andreoni 2001). Thus, if a representative individual in the United States faced a price effect of 31.7% in 2008, full deductibility of charitable contributions multiplied giving by a factor of

$$(1 - 0.317)^{-0.5} = 1.210, \text{ for a 21.0\% increase.}$$

The procedure is similar for the effect of lower total taxes. When the overall tax ratio is lower, individuals have more money to give to charity. Thus, while high *marginal* tax rates *increase* the incentive to give when we look at the price effects of tax deductions, higher *average* taxes *decrease* the incentive to give when we look at income effects. Among the 22 scored countries, the tax revenue/GDP ratio in 2001, the last year with data available for the first edition of the CDI, ranged from 27.4% in Japan to 51.9% in Sweden (OECD 2004). To reward countries for lower tax ratios, we need a baseline against which to define lowness. We choose Sweden’s 2001 tax ratio, the highest. We combine this with an estimate of the income elasticity of giving of 1.1 (Andreoni 2001). The United States in 2008, to continue the example, is treated as having reduced its total tax burden in 2008, the last year with data available for the current aid index, from Sweden’s 2001 ratio of 51.9% to the actual 26.9%. (Sweden’s 2001 ratio is used every year for a consistent benchmark.) This hypothetically raised the privately claimed share of GDP from $100\% - 51.9\% = 48.1\%$ to $100\% - 26.9\% = 73.1\%$, an increase of $73.1\% / 48.1\% - 100\% = 58.6\%$.¹⁷ As a result, the lower U.S. tax burden is estimated to have multiplied charity by

$$\left(\frac{1 - 0.269}{1 - 0.519}\right)^{1.1} = 1.586, \text{ for a 58.6\% increase.}$$

¹⁷ Some share of the revenue funds transfer payments, which increase recipients’ disposable income and should therefore increase charitable giving. However, the transfer payments going to the high-income people that appear to account for most charity are probably relatively small. p

The two multipliers are then combined, and divided into observed giving in order to estimate giving in the absence of these favorable policies. Observed giving is “grants by NGOs” from DAC Table 1; it counts contributions by foundations and individuals, which do ordinarily go through NGOs, but excludes official aid that is channeled through NGOs. Just as with official aid, grants by NGOs to Part 2 countries are also counted. The result is a set of estimates for the dollar increase in private giving to developing countries caused by fiscal policy. In the 2008 U.S. case, the multipliers combine to $1.210 \times 1.586 = 1.919$. Observed giving of \$17.122 billion in 2008 happens to be 1.919 times \$8.922 billion, so U.S. policy is credited for the difference, \$8.200 billion. (The 2009 figure, used in the 2011 CDI, is \$8.156 billion.)

To incorporate the results on charitable giving attributed to policy into the main quality-adjusted aid measure, it is necessary to adjust the charitable giving results for quality in parallel fashion. As noted above, quality-adjusted aid cannot be directly compared or added to simple aid totals. Moreover, private giving too can go to countries that are more or less appropriate for aid, and can contribute to the problems of project proliferation. As a rough adjustment in the absence of information on the quality of private aid, the CDI discounts policy-induced private giving by the simple average of the quality discounts for the bilaterals’ own aid programs, relative to net aid transfers, which is 64% for 2009.

Table 10 incorporates private giving into the previous results on official aid. The last column of this table reports the final results of this evaluation of aid policy, counting both quality-adjusted official aid and charitable giving attributable to fiscal policy. The latter turns out to have small effects on the scores. In the case of the United States, a country often pointed to as a stingy public donor and a generous source of private charity, the result is \$2.945 billion in quality-adjusted charitable giving attributed to fiscal policy in 2009. Added to the country’s \$12.604 billion in official quality-adjusted aid, this raises the final U.S. score on the aid index from 0.09% to 0.11% of GNI, putting the country ahead of Greece, Italy, Japan, and South Korea.

Table 9. Computation of price incentive of tax policy, 2009

Country	A. Tax deduction?	B. Marginal income tax rate (%) ¹	C. Tax credit	D. Deduction or credit capped?	E. Tax incentive ³	F. Increase in giving with incentive (%)	G. Tax revenue/GDP	H. Giving increase because of smaller government	I. Combined increase (%)	J. Grants by NGOs (million \$) ²	K. Giving in absence of favorable tax policies	Giving attributed to tax policies
Formula:						$(1-E)^{\text{price elasticity}}-1^4$		$\frac{((1-G)/(1-51.9\%))^{\text{income elasticity}}-1^5}{(1+H)-1}$	$\frac{(1+F) \times J}{(1+H)-1}$	$J/(1+I)$	J-K	J-K
Australia	Yes	41.5%	0.0%	No	41.5%	30.7%	27.1%	58.1%	106.7%	670	324	346
Austria	No	37.0%	40.0%	No	40.0%	29.1%	42.8%	21.1%	56.3%	140	89	50
Belgium	Yes	45.3%	0.0%	No	45.3%	35.2%	43.2%	20.0%	62.3%	377	233	145
Canada	No	33.0%	45.0%	No	45.0%	34.8%	31.1%	48.5%	100.3%	1,338	668	670
Denmark	Yes	54.8%	0.0%	Yes	27.4%	17.4%	48.2%	8.6%	27.4%	116	91	25
Finland	No	40.5%	0.0%	No	0.0%	0.0%	43.1%	20.3%	20.3%	17	14	3
France	No	30.1%	66.0%	No	66.0%	71.5%	41.9%	23.1%	111.1%	280	133	147
Germany	Yes	44.3%	0.0%	No	44.3%	34.0%	37.0%	34.6%	80.3%	1,369	759	610
Greece	Yes	29.4%	0.0%	No	24.4%	15.0%	29.4%	52.4%	75.3%	2	1	1
Ireland	Yes	42.7%	0.0%	No	42.7%	32.1%	27.8%	56.3%	106.5%	182	88	94
Italy	No	38.7%	19.0%	No	19.0%	11.1%	43.5%	19.3%	32.6%	162	123	40
Japan	Yes	25.6%	0.0%	No	25.6%	15.9%	28.1%	55.5%	80.3%	533	296	238
Netherlands	Yes	50.0%	0.0%	No	50.0%	41.4%	39.1%	29.7%	83.4%	542	295	246
New Zealand	No	38.0%	33.3%	No	33.3%	22.5%	31.0%	48.7%	82.1%	46	25	21
Norway	Yes	40.0%	0.0%	Yes	20.0%	11.8%	41.0%	25.1%	39.8%	452	323	129
Portugal	No	34.0%	25.0%	No	25.0%	15.5%	35.2%	38.7%	60.1%	4	3	2
South Korea	Yes	16.2%	0.0%	No	16.2%	9.2%	25.6%	61.6%	76.6%	156	88	68
Spain	No	37.0%	25.0%	No	25.0%	15.5%	30.7%	49.4%	72.5%	133	77	56
Sweden	No	56.5%	0.0%	No	0.0%	0.0%	46.4%	12.7%	12.7%	74	66	8
Switzerland	Yes	26.8%	0.0%	No	26.8%	16.9%	30.3%	50.5%	75.8%	357	203	154
United Kingdom	Yes	40.0%	0.0%	No	40.0%	29.1%	34.3%	40.8%	81.8%	329	181	148
United States	Yes	31.7%	0.0%	No	31.7%	21.0%	24.0%	65.5%	100.3%	16,288	8,132	8,156

¹Marginal income tax rate for single individual at 167% of income level of the average production worker. ²Uniquely, Greece gives full deductibility up to a certain amount (2,950 euros) and imposes a low tax (10%) on contributions above the threshold. In general, for deductions or credits that are capped, the average of below- and above-cap incentives is used. ³Data for latest available year. ⁴Price elasticity of giving taken to be -0.5. ⁵Income elasticity of giving taken to be 1.1. 51.9% is the highest revenue/GDP observed, in Sweden, in the reference year of 2001.

Table 10. Incorporating private giving attributable to public policy, 2009

Donor	A. Quality-adjusted official aid ¹	B. Charitable giving credited to policy ¹	C. Quality-adjusted charitable giving credited to policy (B × (1-64%))	Adjusted (aid+charitable giving)/GNI ((A + C)/GNI, %)
Australia	1,241	346	125	0.15
Austria	503	50	18	0.14
Belgium	1,128	145	52	0.25
Canada	1,723	670	242	0.15
Denmark	1,341	25	9	0.42
Finland	615	3	1	0.26
France	3,996	147	53	0.15
Germany	4,640	610	220	0.14
Greece	266	1	0	0.08
Ireland	532	94	34	0.31
Italy	1,439	40	14	0.07
Japan	2,658	238	86	0.05
Netherlands	3,097	246	89	0.41
New Zealand	121	21	8	0.12
Norway	1,692	129	46	0.45
Portugal	216	2	1	0.10
South Korea	267	68	24	0.03
Spain	2,400	56	20	0.17
Sweden	2,146	8	3	0.53
Switzerland	992	154	56	0.20
United Kingdom	5,465	148	53	0.25
United States	12,604	8,156	2,945	0.11

¹From previous tables.

Appendix. Size weighting formula

This appendix derives the formula used to compute size-weighted aid for each donor-recipient pair. It first derives a general formula for the integral of the product of two lognormal curves. In the application in this paper, one curve represents the distribution of aid activities by size and the other the weights applied to them based on size. This appendix then shows how the parameters of the size weighting curve are mathematically determined.

Suppose we have two lognormal curves of the form:

$$h_1(x) = \frac{N_1}{\sqrt{2\pi\sigma_1 x}} e^{-\frac{1}{2}\left(\frac{\ln x - \mu_1}{\sigma_1}\right)^2}$$

$$h_2(x) = \frac{N_2}{\sqrt{2\pi\sigma_2 x}} e^{-\frac{1}{2}\left(\frac{\ln x - \mu_2}{\sigma_2}\right)^2}$$

If $u = \ln x$, then $x = e^u$, $du = dx/x$, and the total integral of the product of the two curves is

$$\begin{aligned} & \int_0^{\infty} \frac{N_1}{\sqrt{2\pi\sigma_1 x}} e^{-\frac{1}{2}\left(\frac{\ln x - \mu_1}{\sigma_1}\right)^2} \frac{N_2}{\sqrt{2\pi\sigma_2 x}} e^{-\frac{1}{2}\left(\frac{\ln x - \mu_2}{\sigma_2}\right)^2} dx \\ &= \frac{N_1 N_2}{2\pi\sigma_1\sigma_2} \int_{-\infty}^{\infty} \frac{1}{e^u} e^{-\frac{1}{2}\left(\frac{u - \mu_1}{\sigma_1}\right)^2 - \frac{1}{2}\left(\frac{u - \mu_2}{\sigma_2}\right)^2} du \\ &= \frac{N_1 N_2}{2\pi\sigma_1\sigma_2} \int_{-\infty}^{\infty} \frac{1}{e^u} e^{-\frac{1}{2}\left(u^2\left(\frac{1}{\sigma_1^2} + \frac{1}{\sigma_2^2}\right) - 2u\left(\frac{\mu_1}{\sigma_1^2} + \frac{\mu_2}{\sigma_2^2}\right) + \frac{\mu_1^2}{\sigma_1^2} + \frac{\mu_2^2}{\sigma_2^2}\right)} du \\ &= \frac{N_1 N_2}{2\pi\sigma_1\sigma_2} \int_{-\infty}^{\infty} e^{-\frac{1}{2}\left(u^2\left(\frac{1}{\sigma_1^2} + \frac{1}{\sigma_2^2}\right) - 2u\left(\frac{\mu_1}{\sigma_1^2} + \frac{\mu_2}{\sigma_2^2}\right) + \frac{\mu_1^2}{\sigma_1^2} + \frac{\mu_2^2}{\sigma_2^2}\right)} du. \end{aligned}$$

This arranges the exponent as a quadratic expression in u . Completing the square in that expression gives

$$\begin{aligned} & \frac{N_1 N_2}{2\pi\sigma_1\sigma_2} \int_{-\infty}^{\infty} e^{-\frac{1}{2}\left(u\left(\sqrt{\frac{1}{\sigma_1^2} + \frac{1}{\sigma_2^2}} \frac{\mu_1 + \mu_2 - 1}{\frac{\mu_1}{\sigma_1^2} + \frac{\mu_2}{\sigma_2^2}} - \frac{\left(\frac{\mu_1}{\sigma_1^2} + \frac{\mu_2}{\sigma_2^2}\right) - \frac{\mu_1^2}{\sigma_1^2} + \frac{\mu_2^2}{\sigma_2^2}}{\frac{1}{\sigma_1^2} + \frac{1}{\sigma_2^2}}\right)^2} du \\ &= \frac{N_1 N_2}{2\pi\sigma_1\sigma_2} e^{-\frac{1}{2}\left(\frac{\left(\frac{\mu_1}{\sigma_1^2} + \frac{\mu_2}{\sigma_2^2}\right) - \frac{\mu_1^2}{\sigma_1^2} + \frac{\mu_2^2}{\sigma_2^2}}{\frac{1}{\sigma_1^2} + \frac{1}{\sigma_2^2}}\right)^2} \int_{-\infty}^{\infty} e^{-\frac{1}{2}\left(u\left(\sqrt{\frac{1}{\sigma_1^2} + \frac{1}{\sigma_2^2}} \frac{\mu_1 + \mu_2 - 1}{\frac{\mu_1}{\sigma_1^2} + \frac{\mu_2}{\sigma_2^2}}\right)\right)^2} du. \end{aligned}$$

The integral has been transformed into that of a normal curve, and evaluates to

$$\frac{\sqrt{2\pi}}{\sqrt{\frac{1}{\sigma_1^2} + \frac{1}{\sigma_2^2}}}.$$

The whole expression is therefore

$$\begin{aligned} & \frac{N_1 N_2}{2\pi\sigma_1\sigma_2} \frac{\sqrt{2\pi}}{\sqrt{\frac{1}{\sigma_1^2} + \frac{1}{\sigma_2^2}}} e^{-\frac{1}{2} \left(\frac{\left(\frac{\mu_1 + \mu_2 - 1}{\sigma_1^2 + \sigma_2^2}\right)^2}{\frac{1}{\sigma_1^2} + \frac{1}{\sigma_2^2}} + \frac{\mu_1^2 + \mu_2^2}{\sigma_1^2 + \sigma_2^2} \right)} \\ &= \frac{N_1 N_2}{\sqrt{2\pi} \sqrt{\sigma_1^2 + \sigma_2^2}} e^{-\frac{1}{2} \left(\frac{\mu_1^2 + \mu_2^2}{\sigma_1^2 + \sigma_2^2} - \frac{\left(\frac{\mu_1 + \mu_2 - 1}{\sigma_1^2 + \sigma_2^2}\right)^2}{\frac{1}{\sigma_1^2} + \frac{1}{\sigma_2^2}} \right)}. \end{aligned}$$

Letting $\eta_1 = \mu_1/\sigma_1$, $\eta_2 = \mu_2/\sigma_2$, and $\hat{\sigma} = \sqrt{\sigma_1^2 + \sigma_2^2}$, this can be rewritten as

$$\int_0^{\infty} h_1(x) h_2(x) dx = \frac{N_1 N_2}{\sqrt{2\pi} \hat{\sigma}} e^{-\frac{1}{2} \left(\eta_1^2 + \eta_2^2 - \frac{\sigma_1^2 \sigma_2^2}{\hat{\sigma}^2} \left(\frac{\eta_1 + \eta_2 - 1}{\sigma_1 \sigma_2} \right)^2 \right)}. \quad (1)$$

In the present case, h_1 is the distribution of aid activities by size, so N_1 , the number of aid activities, is known, and μ_1 and σ_1 can be estimated from the data. To fix the three parameters of h_2 , the size weighting function, we impose three constraints. First, we require that the peak value of the weighting function is 1. In general, the mode of h_2 is $e^{\mu_2 - \sigma_2^2}$ (Aitchison and Brown 1963), at which it takes the value

$$h_2\left(e^{\mu_2 - \sigma_2^2}\right) = \frac{N_2}{\sqrt{2\pi}\sigma_2 e^{\mu_2 - \sigma_2^2}} e^{-\frac{1}{2\sigma_2^2}(\mu_2 - \sigma_2^2 - \mu_2)^2} = \frac{N_2}{\sqrt{2\pi}\sigma_2 e^{\mu_2 - \frac{\sigma_2^2}{2}}}.$$

This is 1 when

$$N_2 = \sqrt{2\pi}\sigma_2 e^{\mu_2 - \frac{\sigma_2^2}{2}}.$$

As discussed in the main text, we next require that h_2 peaks at $2^{KK} e^{\mu_1 + \sigma_1^2}$, where KK is the recipient's Kaufmann-Kraay governance score.¹⁸ And we require that h_2 is twice as wide as h_1 , that is, $\sigma_2 = 2\sigma_1$. Since the peak of h_2 occurs at $e^{\mu_2 - \sigma_2^2}$, we have $2^{KK} e^{\mu_1 + \sigma_1^2} = e^{\mu_2 - \sigma_2^2}$. Ergo

$$\mu_2 = \ln\left(2^{KK} e^{\mu_1 + \sigma_1^2}\right) + \sigma_2^2 = \mu_1 + \sigma_1^2 + KK \ln 2 + 4\sigma_1^2 = \mu_1 + 5\sigma_1^2 + KK \ln 2.$$

¹⁸ Previous editions of this paper erroneously stated that h_2 peaks at $2^{KK} e^{\mu_1 + \sigma_1^2}/2$. I thank Ken Togo and Yoshio Wada (2007) for pointing out this error.

Having expressed N_2 , μ_2 , and σ_2 as functions of N_1 , μ_1 , σ_1 , and KK , we can then apply (1) to estimate total size-weighted aid for a given project distribution.

References

- Acharya, Arnab, Ana Fuzzo de Lima, and Mick Moore (2006), "Proliferation and Fragmentation: Transactions Costs and the Value of Aid," *Journal of Development Studies*, 42(1), pp. 1–21, January.
- Aitchison, J., and J.A.C. Brown (1963), *The Lognormal Distribution*, Cambridge University Press, Cambridge.
- Alesina, Alberto, and David Dollar (1998), *Who Gives Foreign Aid to Whom and Why?*, Working Paper 6612, National Bureau for Economic Research, Cambridge, MA, June.
- Andreoni, J. (2001), "Economics of Philanthropy," *International Encyclopedia of the Social & Behavioral Sciences*, Elsevier Science Ltd, Oxford, U.K.
- Birdsall, Nancy, Stijn Claessens, and Ishac Diwan (2002), "Policy Selectivity Foregone: Debt and Donor Behavior in Africa," Working Paper 17, Center for Global Development, Washington, DC, October.
- Birdsall, Nancy, and Homi Kharas (2010), "Quality of Official Development Assistance Assessment," Center for Global Development and Brookings Institution, Washington, DC, September.
- Birdsall, Nancy, and David Roodman (2003), "The Commitment to Development Index: A Scorecard of Rich-Country Policies," Center for Global Development, Washington, DC, April.
- Brown, Adrienne, Felix Naschold, Tim Conway and Adrian Fozzard (2000), "Aid Transaction Costs in Viet Nam," Report for UNDP, December.
- Burnside, Craig and Dollar, David (2000), "Aid, Policies, and Growth." *American Economic Review*, September, 90(4), pp. 847–68.
- Center for Global Development and *Foreign Policy* (CGD and FP) (2006), "Ranking the Rich," *Foreign Policy*, September/October.
- Collier, Paul and Dollar, David (2002). "Aid Allocation and Poverty Reduction." *European Economic Review*, September, 45(1), pp. 1–26.
- Dollar, David, and Victoria Levin (2004), "The Increasing Selectivity of Foreign Aid, 1984–2003," *World Development*, December, 34(12), pp. 2034–46.
- Dudley, Leonard, and Claude Montmarquette (1976), "A Model of the Supply of Bilateral Foreign Aid," *American Economic Review*, March, 66(1), pp. 132–42.
- Easterly, William (2002a), "The Cartel of Good Intentions: Bureaucracy versus Markets in Foreign Aid," Working Paper 4, Center for Global Development, Washington, DC, March.
- Easterly, William (2002b), "Evaluating Aid Performance of Donors," Center for Global Development, Washington, DC, October.
- Easterly, William, Ross Levine, and David Roodman (2004), "Aid, Policies, and Growth: Comment." *American Economic Review*, June, 94(3).

- Easterly, William, and Tobias Pfutze (2008), "Where Does the Money Go? Best and Worst Practices in Foreign Aid," *Journal of Economic Perspectives*, Spring.
- Frey, Bruno S., and Friedrich Schneider (1986), "Competing Models of International Lending Activity," *Journal of Development Economics* 20.
- Gang, Ira N., and James A. Lehman (1990), "New Directions or Not: USAID in Latin America," *World Development* 18(5).
- Jepma, Catrinus J. (1991), *The Tying of Aid*, OECD Development Centre, Paris.
- Kaplan, Stephen S. (1975) "The Distribution of Aid to Latin America: A Cross-national Aggregate Data and Time Series Analysis," *Journal of Developing Areas*, October, 10.
- Kaufmann, Daniel, Aart Kraay, and Massimo Mastruzzi (2008), *Governance Matters VII: Governance Indicators for 1996–200*, World Bank, Washington, DC, June.
- Knack, Stephen, and Aminur Rahman (2007), "Donor Fragmentation and Bureaucratic Quality in Aid Recipients," *Journal of Development Economics*, May, 83(1), pp. 176–97.
- Knack, Stephen, F. Halsey Rogers, and Nicholas Eubank (2010), "Aid Quality and Donor Rankings," Policy Research Working Paper 5290, World Bank, Washington, DC.
- Maizels, Alfred, and Machiko K. Nissanke (1984), "Motivations for Aid to Developing Countries," *World Development* 12 (9).
- McGillivray, Mark (1989), "The Allocation of Aid among Developing Countries: A Multi-Donor Analysis Using a Per Capita Aid Index," *World Development* 17(4), pp. 561–68.
- (1992), "A Reply," *World Development* 20(11), pp. 1699–1702.
- (2003), "Commitment to Development Index: A Critical Appraisal," prepared for the Australian Agency for International Development, Canberra, November, http://www.aid.gov.au/publications/pdf/cdi_appraisal.pdf.
- McGillivray, Mark, Jennifer Leavy, and Howard White (2002), "Aid Principles and Policy: An Operational Basis for the Assessment of Donor Performance", in B. Mak Arvin, ed., *New Perspectives on Foreign Aid and Economic Development*, Praeger, Westport.
- McKinley, R.D., and R. Little (1979), "The US Aid Relationship: A Test of the Recipient Need and the Donor Interest Models," *Political Studies* XXVII (2).
- Mosley, Paul (1981), "Models of the Aid Allocation Process: A Comment on McKinley and Little," *Political Studies* XXIX (2).
- (1985), "The Political Economy of Foreign Aid: A Model of the Market for a Public Good," *Economic Development and Cultural Change*, January, 33 (2).

Organisation for Economic Co-operation and Development (OECD) (2002), *Reporting Directives for the Creditor Reporting System*, Paris.

----- (2003), *Revenue Statistics: 1965–2003*, Paris.

Radelet, Steven (2004), “Aid Effectiveness and the Millennium Development Goals,” Working Paper 39, Center for Global Development, Washington, DC, April.

Ratha, Dilip (2001), “Demand for World Bank Lending,” Working Paper 2652, World Bank, Washington, DC.

Rao, J. Mohan (1994), “Judging Givers: Equity and Scale in Index Allocation,” *World Development* 22(10), pp. 1579–84.

----- (1997), “Ranking Foreign Donors: An Index Combining the Scale and Equity of Aid Giving,” *World Development* 25(10), pp. 947–61.

Roodman, David (2001), *Still Waiting for the Jubilee: Pragmatic Solutions for the Third World Debt Crisis*, Worldwatch Paper 155, Worldwatch Institute, Washington, DC, April.

----- (2003), “An Index of Donor Aid Performance,” Center for Global Development, Washington, DC, April.

----- (2006a), “Aid Project Proliferation and Absorptive Capacity,” Working Paper 75, Center for Global Development, January.

----- (2006b), “Competitive Proliferation of Aid Projects: A Model,” Working Paper 89, Center for Global Development, June.

----- (2011), “The Commitment to Development Index: 2011 Edition,” Center for Global Development, Washington, DC, October.

Roodman, David, and Scott Standley (2006), “Tax Incentives for Private Giving,” Center for Global Development, Working Paper 62, Washington, DC, February.

Schraeder, Peter J., Steven W. Hook, and Bruce Taylor (1998), “Clarifying the Foreign Aid Puzzle: A Comparison of American, Japanese, French, and Swedish Aid Flows,” *World Politics* 50, January.

Togo, Ken, and Yoshio Wada (2007), “Index of Donor Performance (2006 Edition): Selectivity and Project Proliferation Reconsidered,” prepared for the RIETI International Workshop on “Economics of Foreign Aid,” Tokyo, July 2.

Trumbull, William N., and Howard J. Wall (1994), “Estimating Aid-Allocation Criteria with Panel Data,” *Economic Journal*, July, 104 (245).

United Nations (UN) (2002a), *Report of the International Conference on Financing for Development*, New York.

----- (2002b), *Report of the World Summit on Sustainable Development*, New York.

White, Howard (1992), "The Allocation of Aid Among Developing Countries: A Comment on McGillivray's Performance Index," *World Development* 20(11), pp. 1697–98.