The Commitment to Development Index: 2006 Edition

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Introduction

Three years ago, the Center for Global Development and *Foreign Policy* magazine introduced the Commitment to Development Index (Birdsall and Roodman 2003; CGD and *FP* 2003).[1] The immediate purpose was and is to rate rich countries based on how much their government policies facilitate development in poorer countries. But "ranking the rich" is a means to other ends: to draw media attention to the many ways that rich-country governments affect development, to provoke debate on which policies matter and how to measure them, to highlight gaps in current knowledge, to stimulate data collection and other research, to educate the public and policymakers, and, ultimately, to prod policy reform.

For this, the fourth edition, the index has once more been revised and updated. However, the design changes this year are minimal, for the first time. Clearly the CDI has entered a new phase. The years of rapid development are over, and now the value of design stability is coming to the fore. The design will probably continue to evolve in response to new data sources and thinking, but slowly. As a result, the 2006 CDI embodies intellectual contributions from collaborators over the last few years, including Theodore Moran of the Georgetown University School of Foreign Service (on investment); Kimberly Hamilton and Jeanne Batalova of the Migration Policy Institute (migration); B. Lindsay Lowell and Valerie Edwards Carro of Georgetown University (also migration); Michael O'Hanlon and Adriana Lins de Albuquerque of the Brookings Institution (security); Amy Cassara and Daniel Prager of the World Resources Institute (environment); and Keith Maskus of the University of Colorado at Boulder (technology). As always, the final design departs in places from the recommendations of background paper authors. Ultimate responsibility for it rests solely with CGD.

One thing that has not changed is the conceptual framework of the CDI. It still ranks 21 countries: all the members of the Development Assistance Committee (DAC) save Luxembourg. The policy domains are aid, trade, investment, migration, environment, security, and technology. A country's overall score is the average of its seven component scores. The CDI aims to assess policies *today*. In practice, because of lags in official data, most information used is for 2004. And it rates countries in ways that allow normative comparisons, which usually means adjusting for size. Denmark cannot be expected to give as much foreign aid as Japan, which has an economy 25 times as big, but Japan could be asked to give as much as Denmark as a share of its gross domestic product, and that is how the index gauges aid quantity. Switzerland cannot be expect to import as much from developing countries as the Unite States, but it could have trade barriers as low, which is what the trade component looks for.

This paper describes the CDI methodology for 2006. Section 1 confronts some overarching design issues having to do with scaling and weighting of scores. Section 2 reviews the index component by component. It builds on background research done for each of the seven policy areas (Roodman 2005, 2006c; Cline 2004; Moran 2006b; Grieco and Hamilton 2004; Lowell and Carro 2006; O'Hanlon and de Albuquerque 2003; Maskus 2005; Cassara and Prager 2005), while making explicit where the final CDI departs from their recommendations. Section 3 presents the overall re-

[1] The Commitment to Development Index is a collective effort. I am grateful to the collaborators for technical work on components; to Kim Hamilton, John McHale, Demetri Papademetriou, and Lant Pritchett for comments the draft migration component design this year; to CGD President Nancy Birdsall for guidance, to the Rockefeller Foundation for its support; and to the governments that have joined the CDI Consortium, namely those of Australia, Canada, Denmark, Finland, France, the Netherlands, Norway, Sweden, Switzerland, the United Kingdom, and the United States.

sults, back-calculates the 2006 methodology to 2003–05, and analyzes the sensitivity to changes in component weights. Most of the calculations described are embedded in a single spreadsheet, available at www.cgdev.org/cdi.

1. Scaling and weighting

The CDI combines readings on dozens of indicators. Since the indicators are not perfectly correlated, countries' standings on the final results are affected by the relative importance the formulas give to the various indicators. In mathematical terms, the results are affected by choices of both functional form and parameters. Both the CDI designers and commentators have naturally asked whether the CDI makes the best choices.

In some parts of the CDI, the way in which indicators are combined is grounded in a clear conceptual framework and calibrated to available evidence. For example, the aid component combines donors' aid-giving totals with information on the extent to which they tie their aid (requiring recipients to spend it on donor-country goods and services) by referring to a finding that tying raises project costs 15–30%. Tied aid is discounted 20% (I detail the rationale below), and the result is a figure, tying-discounted aid, that still has real-world meaning. Other examples are the theory-grounded method used to express agricultural subsidies in tariff-equivalent terms, which allows them to be combined with actual tariffs; and the reasonable but coarse assumption that the marginal cost of deploying personnel in international security operations is $10,000/month/person, which allows personnel and financial contributions to such operations to be combined in dollar terms. All these techniques use theory and evidence to reduce arbitrariness in the CDI design.

But where theory and evidence are thinner, we have not found such solid ways to reduce arbitrariness. When we needed to combine indicators in a sort of conceptual vacuum, we restricted ourselves to taking linear combinations, as a first step toward managing the complexity. This happened in all components but the aid component, and in each of these cases the CDI designers chose to weight some indicators more than others. The weights are of course open to challenge, but are backed by years of experience in the relevant fields.

At the top level of the CDI hierarchy, however, where the seven CDI components merge into a single index, the components are equally weighted. Because of the prominence of this choice and its potential importance for the final results (section 3 quantifies its importance), this decision has provoked many challenges. I will focus on it for the rest of the section.

Intuitively, taking linear combinations happens in two steps: mapping each variable to be combined onto a standard scale, which may involve scaling and translation (shifting up or down); then taking a weighted average. Both steps—standardizing and weighting—raise tough conceptual questions. Consider the challenges of standardizing first. To prepare the scores on the seven CDI components combination into an overall score, the standardizing system should arguably have the following properties:

1. Standardized scores should fall within some intuitive scale, say 0–10.

2. For components that measure "goods" (aid, investment, migration, security, and technology), zero should map to zero. That is, if a country gives no aid (more precisely, if its aid program is deemed valueless after adjusting for quality), its final aid score should be

0—not –2 or +2. For components that measure "bads" (environment and trade, which mainly assess environmental harm and trade barriers) a perfect absence of the thing assessed should translate into an intuitive maximum score, such as 10.

All this is nearly equivalent to requiring that the coefficient of variation (standard deviation divided by the mean) be preserved. For the "good" components, it also means that the transformation should be a simple rescaling, with no translation.

3. The standardized averages on each component, at least in some base year, should be the same—say, 5. Then one can immediately tell by looking at a country's aid, environment, or other score whether it is above or below the base-year average. And one can tell whether a country's score in one component is better than its score in another by the standards of its peers. The first edition's scoring system did not have this property. The average trade score (6.4) was twice the average aid score (3.2). As a result, when Switzerland scored 4.0 on trade and 3.3 on aid, it appeared to a lay reader to be better on trade than aid when in fact it was below average on trade and above average on aid.

4. The variance of standardized scores should be the same for each component—as they would be if they were *z* scores (number of standard deviations from the mean). In other words, countries should be "graded on a curve" for each component. If they are not—if, instead, standardized scores on one component are relatively clustered—this effectively under-weights that component because differences between countries on the component will have relatively little effect on the overall results.

Since we have restricted ourselves to linear transformations, two free parameters—slope and intercept—determine how the results from each component are standardized. With seven components, that yields 14 degrees of freedom. The above constraints together would consume far more than 14 degrees of freedom. The first imposes what we can call 14 inequalities[2], and the other three impose 6 equalities each, for a total of 18. Thus only by luck could all four conditions be satisfied. If one drops the requirement that standard deviations are equal, there is more hope (12 equalities and 14 inequalities imposed on 14 parameters), but it still would take luck.

Luck has not been with the CDI designers. As a result, we have faced trade-offs, trade-offs that are tricky because they involve mathematical principles, our (limited) understanding of rich world-poor world linkages, and the imperatives of effective mass communication. For example, in the index's first year, standardized investment scores averaged 3.0. Forcing those scores to average 5 instead might have required adding 2 to every country's standardized investment score, which would have raised Portugal to 11 and given a "no investment support" country 2 points out of 10. Or it could have required multiplying all the scores by 5/3, which would have raised Portugal to 15. Thus, enforcing condition 3 would have led to violations of condition 1 and perhaps 2.

The current system, adopted in 2004, gives up on condition 1 in favor of condition 3. Scores on each component now average 5 in the base year by fiat; as a result, so do the overall CDI scores. But the boundaries of 0 and 10 are no longer inviolable. Countries whose aid programs, say, are deemed more than twice as good as average score above 10. And countries with trade barriers or

[2] Technically the first condition imposes $21\times7\times2=294$ inequalities: each country's score on each component should be ≥0 and ≤10. The "14 inequalities" apply to the maximum and minimum scores on each component.

rates of environmental harm more than twice the average score below 0. In fact, in 2006, just one of the 147 component scores is negative; and one more exceeds 10. These few transgression of the intuitive range seem worth the greater ease of comparison within and across components. For example, Switzerland now scores higher on aid than trade—4.8 versus 3.1—which makes more sense for a country that is near the average of its peers on aid and well below it on trade. The parameters of the standardization transformations are calibrated to the benchmark year of 2003, the CDI's first year, and then held constant over time to allow inter-temporal comparisons of scores. Thus in subsequent years, average scores are not precisely 5. This allows proper comparison over time.

An astute reader will have noticed in the discussion of condition 4, which demands equal standard deviations, that *weighting* crept into the discussion of *scaling*. Using a linear transformation to double the range or standard deviation of a component has exactly the same effect on overall standings as doubling its weight.

Nevertheless, for the lay reader, weighting is a distinct concept, and raises distinct concerns. Indeed, one criticisms of the CDI is that it is "equal weighted," even though some policy domains, it is argued, may very well matter more than others (Picciotto 2003; Chowdhury and Squire 2003). The accusation of equal weighting is true in that a country's overall CDI score is the simple average of its component scores.

Before examining the criticism, it is worth noting that "equal weighting" is a not a well-defined concept. Consider that allowing trade scores to range more widely in 2004 happened to increase the effective weight on trade. Yet the CDI was still "equal weighted." Under which system is trade really "equal weighted"? Both, and neither. There are several reasonable ways to scale scores—characterized in part by which of the above conditions are enforced—thus several possible rankings resulting from "equal weighting." So in choosing "equal weighting" for the CDI, we are not claiming to truly give aid, trade, etc., equal weight. That would be meaningless. Rather, both this year and last year, we have opted for what seems least arbitrary in the face of uncertainty.

Still, I agree with the attacks on "equal weighting" in the sense that the CDI certainly does not have the following property: *any two CDI-measured policy changes in a given country that have an equal effect on development have an equal effect on the CDI.* We have not striven for that ideal, out of several considerations. First, achieving it does not seem essential for the CDI as a communications strategy and a goad to research, and it must be remembered that such are the ultimate goals of the project, not scientific measurement. The CDI broadcasts the basic message that many policy areas matter and that all countries have major room for improvement as is. The success of the project so far in spotlighting issues is reassuring.

Second, a survey of expert opinion suggests that "equal weighting" is not unreasonable. Shyamal Chowdhury and Lyn Squire (2003) surveyed members of the Global Development Network, who are researchers in both rich and poor countries working on development issues. Of the 200 solicited respondents in the stratified random sample, 105 completed the questionnaire. They were asked to assign their own weights to each of the major issue areas then in the CDI.[3] For four of the six components covered by their survey, the mean weight was statistically different from the

[3] The survey was based on the first draft of the first edition of the CDI, in which anti-corruption was a separate, seventh component rather than being folded in to investment as it eventually was. On the other hand, after the survey, the CDI gained a seventh component, on technology.

"equal weight" of one-sixth.[4] Trade and investment were high (with weights of 0.20 and 0.19 respectively) and aid and migration were low (0.14 and 0.13). However the significance of these weight differences for the index results—as distinct from their statistical significance—is small. There was no consensus for anything as extreme as, say, aid and trade alone getting two-thirds of the total weight. As a result, Chowdury and Squire find that reweighting the 2003 CDI using their survey results produces overall scores that are correlated 0.98 with the original, and rank-correlated 0.99. On balance, the study corroborates my own experience. Of the seven current CDI policy areas, all but one has been nominated to me for extra weight by someone with a decade or more of experience in development.[5]

There are other reasons to be cautious about departing from "equal weighting." One phrase in the ideal property enunciated above, "equal effect on development," is, like "equal weighting," not well defined. Different policies have different effects on people in different times and places. Moral and philosophical conundrums arise about how one should compare effects on people with different levels of poverty and opportunities; about which discount rate to use; and about whether development is a something that happens to people or countries.[6] Huge uncertainties also loom about the actual long-term effects of trade barriers, greenhouse gas policies, government R&D spending, humanitarian interventions, migration, etc.

Finally, it cannot be assumed that the proper mathematical form for combining the components into an overall score is linear. Especially for large donor nations, the policy areas may interact significantly. For example, Thomas Hertel, head of the Global Trade Analysis Project, has called for simultaneous computable general equilibrium modeling of trade and migration.[7] To the extent policy areas interact, there can be no right weights in a linear framework.

It may still be possible in light of current knowledge, or especially with more research, to stick with the linear approach and yet find unequal weights that would command a broader consensus than equal weighting does. One starting point might be estimates of global dollar flows of aid, trade, investment, remittances, and so on. Greenhouse gases could be converted to the same dollar units via a fixed rate per ton, based on estimates of the harm climate change could do to developing country economies. Picciotto (2003) suggests an approach along these lines.[8]

But from the point of view of the CDI, flows are merely intermediaries between rich-country policies on the one hand and poor-country development on the other, and it is the linkages between these variables that should determine ideal weights. In some areas, these relationships are reasonably well understood. For example, several studies have estimated the economic effects of rich-country trade policies on poor-country development. (e.g., World Bank 2001; Cline 2004) Cline estimates that complete rich-country liberalization would, after a 15-year adjustment, increase income

[4] This contradicts my characterization of their work last year, which reflects improvements in their own analysis in successive drafts of this paper.
[5] The exception is environment—and that is probably only because hardly any environmental experts have commented. Surely it can be argued that tinkering with the planet's biogeochemical cycles is an issue of the first rank.
[6] This last distinction is important for migration. If someone moves permanently from a poor to a rich country, quadruples her income, and sends back no remittances, is that development?
[7] Private communication between Thomas Hertel and Michael Clemens, CGD, October 2002.
[8] But for trade, Picciotto suggests using estimates of the benefits, in producer surpluses, of complete rich-country liberalization rather than current earnings on exports from developing to developed countries. This is not parallel to current total aid, remittance, or investment flows.

in developing countries by $100 billion per year, which is approximately twice current aid flows. Similar work is now being done on migration liberalization. CGE modeling by Walmsley and Winters (2003) suggests that an if rich countries increased their temporary migrant worker stocks by an amount equal to just 3% of their labor forces, global income would increase $150 billion, with most of that accruing to the temporary workers themselves. Complete liberalization could generate vastly larger gains for temporary workers.[9]

The trouble with unequal weighting is that one cannot do it halfway. As soon as one, say, doubles trade's weight relative to aid, one needs equally sound rationales for the choice of weights for every other component. The links between policy and development in other policy domains are more uncertain or controversial. There is little evidence on how investment-relevant policies in rich countries affect developing countries. And it is far from clear how to weigh in security interventions and rich-country public R&D investment.

For the time being then, we have stood by the humble choice of "equal weights." We hope that the CDI will increasingly spur research to speed the day when unequal weighting will be more defensible. Meantime, "equal weighting" serves.

2. The Seven Components

Aid

The aid component of Roodman (2006c) is a slightly revised from last year's. It starts with a measure of aid quantity, then discounts it to reflect several quality concerns, namely, tying, selectivity, and project proliferation. And it factors in private charitable giving to developing countries to the extent this can be credited to government fiscal policy. The component is built largely on data from the Development Assistance Committee (DAC).

The calculations run as follows:

- The starting point is gross disbursements of grants and concessional (low-interest) loans for each donor (bilateral or multilateral) and recipient. The data are the latest available, for 2004.[10] Included here is what DAC terms Official Development Assistance (ODA) and Official Assistance (OA).[11] Unlike in standard DAC accounting, cancellation of old, non-concessional loans ("Other Official Finance" or "OOF" loans) is not considered current aid. OOF loans tend to be less motivated by development concerns than ODA (they include export credits and subsidized loans for arms sales). And to the extent that cancellation is associated with transfers of funds, the transfers have typically occurred long ago, and are not

[9] This does not automatically imply, however, that the migration component is currently underweighted relative to, say, trade. On the current scale, conceivably, a country that completely liberalized temporary migration might earn a score of 50 or 100—a score so high that it might actually exaggerate the benefits of migration. In other words, it is possible with the current scaling that a 1-point increase in trade score still corresponds to more benefit than a 1-point increase on migration.

[10] Preliminary 2005 data available at this writing are too incomplete for use in the CDI.

[11] OA is like ODA except that it goes to "Part II" countries, which include most European states that emerged out of the Soviet bloc and richer non-DAC members such as Israel and Singapore. DAC excludes OA from its most frequently cited statistic (net ODA), but I include it the quality-adjusted aid measure because many Part II countries are in need and receiving aid. Some, such as Ukraine, are poorer than many Part I countries. Aid to relatively rich countries, such as Israel, is heavily discounted in a subsequent step.

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, is the cancellation a transfer of funds in 2003? In fact, Zaire (now the Democratic Republic of Congo) did receive more than $5 billion in gross ODA in 2003 according to DAC accounting, but some $4.5 billion of this resulted from a Paris Club agreement to write off old debts that were uncollectible and worthless. Policy action was taken in 2003, but it was essentially a matter of changes in accounting. The first two data columns of Table 2 show that this change particularly affects France and the United Kingdom for 2004.

- Tied aid is discounted 20%. Studies suggest that tying raises aid project costs 15–30% (Jepma 1991), which translates into a reduction in aid *value* of 13–23%.[12] 20% is a round figure toward the top of this range. "Partially untied"[13] aid is discounted 10%. The tying figures come from project-level data in DAC's Creditor Reporting System database. Since tying data are for aid commitments rather than disbursements, rates of tying are assumed to be the same for commitments and disbursements. Technical assistance is only treated as tied if reported as such.[14]

- Principal and interest payments are netted out, to more closely reflect net transfers to recipients. DAC's standard "net ODA" statistic is net of principal payments only. The DAC approach reflects the influence of the traditional capital flow concept. Only return of capital is netted out of net foreign direct investment (FDI), not repatriation of earnings. Similarly, only amortization is netted out of standard net ODA, not interest, which can be seen as the donors' "earnings" on aid investment. I find the capital flow concept inapt. In the case of FDI, return of capital can be expected to reduce the host country's capital stock much more than repatriation of profits. But when the government of Ghana writes a check to the government of Japan for $1 million, it should hardly matter for either whether it says "interest" or "principal" in the check's memo field. It seems unlikely that interest and principal payments have different effects on Ghana's development investments. For this reason, the CDI treats debt service uniformly.

- For each donor-recipient pair, the tying-discounted net transfer is multiplied by a "selectivity weight" that is meant to reflect the country's appropriateness for aid, the idea being that the poorer and better-governed it is, the more appropriate for aid. The selectivity weight is the product of two factors. The first is linearly related to the country's Kaufmann-Kraay composite governance score, which captures information on six aspects of governance: voice and accountability, political stability, government efficiency, regulatory quality, rule of law, and control of corruption. The Kaufmann-Kraay composite score, like the CDI, is a simple average of scores for each of these components (Kaufmann, Kraay, and Mastruzzi 2005). The Democratic Republic of Congo, the country with the lowest governance score in 2000, which is used as a reference year for the CDI scaling, defines the bottom of that range, getting a 0 in 2000. Chile anchors the top for 2000, with a weight of 1.0. (Because both coun-

[12] A 15-percent cost increase lowers the purchasing power of aid by 1–1/1.15 = 13%. Similarly, a 30% cost increase cuts aid value 23%.

[13] Aid that must be spent on goods and services from the donor nation *or* developing countries; or aid that must be spent on goods and services from developing countries only.

[14] Technical assistance may deserve a discount far higher than 20% since foreign experts are often an order of magnitude more expensive than local ones. Most studies of the costs of tying have looked at tied goods rather than services.

tries' governance scores have improved since 2000, neither gets exactly a 0 or 1 for later years.)

The second selectivity multiplier reflects the country's poverty. It is linearly related to the country's log GDP/capita, with the United Arab Emirates (GDP/capita of $28,750 on an exchange rate basis in 2001), getting a 0 for 2001, the reference year, and DRC, the poorest country with data (GDP/capita of just $91 in 2001), getting a 1.84. The latter number was chosen so that the maximum combined selectivity factor (poverty factor × governance factor) for any country in the reference year of 2001 is 1.0. (Since Kaufmann and Kraay have only computed their variables for even-numbered years since 1996, scores for odd-numbered years are assumed to be the same as for the year before. This is why 2000 is used as a reference year for governance and 2001 for GDP/capita.) Table 1 shows the resulting weights.

New this year is an exemption from the governance discount—the first discount factor—for aid that is meant to *improve* governance, broadly defined. Since it seemed perverse to penalize donors for trying to improve governance where it is low, this sort of aid now receives a uniform governance discount of 50%—compared to the 75% discount it would otherwise get in, say, the DRC or Afghanistan or Liberia. This exception supplements the long-standing exemption for emergency aid from both poverty and selectivity discounting. Governance aid is defined as that assigned a code in the 15000's in DAC's Creditor Reporting System database. The headings for these 15 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; 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).[15,16]

- For each donor-recipient pair, selectivity-weighted aid is multiplied by a final factor that reflects concerns about the problem of project proliferation. Project proliferation is thought to overburden recipient governments with administrative and reporting responsibilities, and lure the most talented workers out of government and into the employ of the donors, thus undermining the effectiveness of aid projects, and government administration in general. (Cassen 1994; Brown et al., 2001; Knack and Rahman 2004; Roodman 2006a, 2006b).

  The idea of the adjustment is to weight the aid going to each aid activity based on the size of dollar commitment of which it is part. Roodman (2006c) provides the details. The approach is theoretically capable of penalizing large projects, especially in poorly governed countries, but because certain parameter choices for the CDI bias the results in favor of large projects, few large projects are actually discounted much. As a result, there is a strong correlation between a donor's average log project size across all recipients and its average discount for project proliferation in the CDI. (See Figure 1.) For example, the World Bank's concessional lending arm, the International Development Association (IDA), disburses in large chunks compared to other donors in countries where it operates, so its size weight is 0.94, meaning only a 6% discount, for minimal project proliferation. Table 2 shows the overall size weight for each donor.

[15] The full CRS purpose classification is at http://www.oecd.org/dataoecd/40/23/34384375.doc.
[16] I think Terry O'Brien for comments that led to this change.

- For each bilateral and multilateral donor, the resulting tying-, selectivity-, and size-weighted aid figures are summed across recipients to obtain a single figure for each donor, whether bilateral or multilateral. (See Table 2.)

- The result is a "quality-adjusted aid quantity" for each bilateral or multilateral donor. The quality-adjusted aid totals of multilaterals are then allocated back to bilaterals in proportion to the bilaterals' net contributions to the multilaterals during the year in question. For example, since Germany accounted for 19.90% of net contributions to the IDA during 2004, it receives credit for 19.90% of the IDA's quality-adjusted aid of $3.338 billion, or $664 million.

- The final performance measure for government aid is bilaterals' total quality-adjusted aid as a share of GDP. (See Table 4.)

The aid component also rewards policies that encourage private charitable giving to development organizations. Private giving is encouraged by specific tax incentives that lower the "price" of giving. And it is encouraged by a low tax/GDP ratio, which leaves citizens and corporations with more after-tax income to spend on charitable giving. The approach taken in the CDI is to estimate the proportional increase in giving caused by each country's fiscal policies, compare that to actual giving, then work backwards to estimate how much actual giving is a credit to policy. (See Table 3.) Specifically:

- An estimate is made of the increase in charitable giving to developing countries brought about by tax incentives for charity. The CDI distinguishes between deductions and credits, and takes account of limits on the amount of giving that can earn the tax incentive. Twelve CDI countries offer income tax deductions for charitable giving, including overseas giving. Of the remaining nine, six—Canada, France, Italy, New Zealand, Portugal, and Spain—offer tax credits instead, while three—Austria, Finland, and Sweden—offer no incentive. Drawing on results of a survey of all CDI countries (Roodman and Standley 2006), we estimate the "price" of giving in each country. For example, in France, which offers a 60% tax credit, the price of giving for the giver is 40 cents on the euro. For deductions, the price is based on a representative marginal tax rate, namely the marginal income tax rate faced by single individuals at 167% of the income level of the average production worker. For countries that cap deductions or credits, we use the simple average of the below- and above-cap prices. Based on a survey of the academic literature, we set the price elasticity of charitable giving at –0.5. In the United States, where the representative marginal tax rate is 31.4% for 2003, the latest year with data, this implies that income tax incentives increase charitable giving by 20.8%.[17]

- An estimate is also made of how much having lower taxes increases giving. The benchmark against which "lowness" is measured is Sweden's tax revenue/GDP ratio of 53.8% in 2000 (the reference year), the highest among the 21 countries. The United States, to continue the example, is treated as having reduced its total tax burden from this 53.8% to the actual 25.6% in 2004. This raises the privately claimed share of GDP from 46.2% to 74.4%, an in-

[17] The calculation is $(1 - 0.314)^{-0.5} - 1 = 0.208$.

crease of 61.0% over the base.[18] Again drawing on the literature, we take the income elasticity of giving to be 1.1: charitable giving increases somewhat more than proportionally with private income. As a result, the lower U.S. tax burden is estimated to raise charity 68.9%.[19]

- The price and income effects are then combined. For the United States in 2004, the 20.8% and 68.9% increases compound to a 104.0% increase.[20]

- DAC data on actual private giving to developing countries is then used to estimate what giving would have been in the absence of these policies, thus what credit should be given to the policies. This statistic counts all giving by individuals and foundations to non-DAC countries, including "Part II" countries (former Soviet nations, Israel, and some other relatively rich non-DAC nations)[21], but leaves out government aid that is channeled through NGOs. In the U.S. case, charitable giving is reported at $10.369 billion for 2004. The CDI estimates this would have been $5.084 billion before the policy-induced 104.0% increase, and attributes the $5.285 billion difference to public policy.

- The policy-induced increases in charitable giving are then discounted for quality so that they can be compared and added to the quality-adjusted official aid quantities. Private giving too can go to countries that are more or less appropriate for aid, and can contribute to the problems of project proliferation, for example by siphoning off talented administrators from government service. As a rough adjustment, the CDI discounts policy-induced private giving by the simple average of the quality discounts for bilaterals' own aid programs, which is 64%. To complete the U.S. example, we credit the country for $5.285 billion × (1–64%) = $1.909 billion in quality adjusted aid. Added to its $7.418 billion in official quality-adjusted aid, this raises its CDI aid score to 2.2, from what would be 1.8 were charitable contributions not considered.

The treatment of charitable giving involves a number of coarse assumptions. It models taxpayers with a single representative agent, simplifies complex tax provisions, uses rough but ready approximations for the appropriate tax rates, assumes certain fixed elasticities, and assumes that the elasticities are the same for charitable giving to developing countries as they are for charitable giving in general. Its methodological sophistication, such as it is, should not be confused with precision. Nevertheless, it suffices to suggest that conventional aid programs are still the dominant government-induced aid channel developing countries. On the other hand, the $7.688 billion in policy-induced charitable giving across all donors nearly matches aid transfers from France, Germany, or the United Kingdom. Were this giving a country in some sense, it would be one of the world's largest donors.

Overall, despite the quality adjustments and the incorporation of private giving, what most distinguishes donors from each other in the CDI is still the quantity of official aid they disburse. Denmark, the Netherlands, Norway, Sweden are large donors by DAC's quantity measure (net

[18] 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.
[19] The calculation is $((1 - 0.256)/(1 - 0.538))^{1.1} - 1 = 0.689$.
[20] $(1+0.208)(1+0.689)-1=1.040$.
[21] This is an improvement since last year, when only giving to Part I countries was counted.

ODA), and they score highest on the CDI aid measure too. The nearly sevenfold gap between the most generous donors (Denmark and Norway, with net aid transfers at 0.89% of GDP in 2004) and the least generous (Japan, at 0.14%) dominates differences in quality, which does not vary nearly as much according the CDI metric, nor, most likely, in actuality. The official aid results also dominate private giving. That said, the adjustments in the CDI do have some interesting effects. Italy's small projects and heavy tying of aid, combined with the relatively high amounts of giving credited to U.S. tax policy, pull the country below the United States. The combination of the exclusion of OOF loan forgiveness, high debt service received, including more than $2 billion in interest that DAC does not net out, and relatively low project size pull Japan into last place. Ireland appears to have the highest-quality aid program (final column of Table 4).

Table 1. Computation of selectivity weights

Country name	A. Exchange rate GDP/capita, 2003 ($)	B. Log exchange rate GDP/capita	C. GDP selectivity multiplier	D. Kaufmann-Kraay composite governance score, 2004	E. Governance selectivity multiplier	F. Combined selectivity multiplier[1]
Formula:		Log A	(linear map of B onto standard scale)		(linear map of B onto standard scale)	C × E
Bhutan	308	5.73	1.45	0.08	0.67	0.98
Madagascar	249	5.52	1.52	–0.12	0.61	0.93
Ghana	401	5.99	1.36	–0.08	0.63	0.86
Kiribati	614	6.42	1.23	0.13	0.69	0.85
Mongolia	556	6.32	1.26	0.06	0.67	0.84
Gambia, The	268	5.59	1.49	–0.30	0.56	0.84
Malawi	146	4.98	1.69	–0.55	0.49	0.82
Mali	437	6.08	1.34	–0.17	0.60	0.80
Sao Tome and Principe	343	5.84	1.41	–0.32	0.56	0.79
Mozambique	290	5.67	1.47	–0.39	0.53	0.78
Mauritania	454	6.12	1.33	–0.21	0.59	0.78
Lesotho	677	6.52	1.20	–0.02	0.64	0.77
Tanzania	302	5.71	1.46	–0.45	0.52	0.75
Burkina Faso	368	5.91	1.39	–0.41	0.53	0.74
Senegal	671	6.51	1.20	–0.18	0.60	0.72
Benin	549	6.31	1.26	–0.29	0.56	0.71
Uganda	259	5.56	1.50	–0.63	0.46	0.70
India	650	6.48	1.21	–0.26	0.57	0.69
Niger	261	5.56	1.50	–0.66	0.45	0.68
Rwanda	225	5.41	1.55	–0.71	0.44	0.68
Zambia	489	6.19	1.30	–0.52	0.50	0.65
Guyana	1,030	6.94	1.06	–0.18	0.60	0.64
Nicaragua	812	6.70	1.14	–0.32	0.56	0.63
Sri Lanka	1,010	6.92	1.07	–0.24	0.58	0.62
Guinea-Bissau	202	5.31	1.58	–0.87	0.39	0.62
Ethiopia	113	4.73	1.77	–1.01	0.35	0.62
Sierra Leone	188	5.24	1.61	–0.90	0.38	0.61
Micronesia, Fed. Sts.	2,090	7.64	0.84	0.27	0.73	0.61
Cape Verde	2,283	7.73	0.81	0.35	0.76	0.61
Cambodia	343	5.84	1.41	–0.76	0.42	0.60
Vietnam	547	6.30	1.27	–0.60	0.47	0.60
Vanuatu	1,560	7.35	0.93	–0.06	0.63	0.59
St. Vincent & the Grenadines	3,439	8.14	0.68	0.68	0.85	0.58
Moldova	582	6.37	1.25	–0.64	0.46	0.57
Namibia	2,711	7.91	0.75	0.35	0.76	0.57
Eritrea	203	5.31	1.58	–0.98	0.36	0.57
Philippines	1,002	6.91	1.07	–0.41	0.53	0.57
Kenya	473	6.16	1.31	–0.74	0.43	0.56
Jordan	1,996	7.60	0.85	0.03	0.66	0.56
Nepal	248	5.51	1.52	–0.94	0.37	0.56
Marshall Islands	1,871	7.53	0.87	–0.03	0.64	0.56

Country name	A. Exchange rate GDP/capita, 2003 ($)	B. Log exchange rate GDP/capita	C. GDP selectivity multiplier	D. Kaufmann-Kraay composite governance score, 2004	E. Governance selectivity multiplier	F. Combined selectivity multiplier[1]
Bolivia	1,005	6.91	1.07	–0.43	0.52	0.56
Morocco	1,555	7.35	0.93	–0.19	0.59	0.55
Egypt, Arab Rep.	987	6.89	1.08	–0.46	0.51	0.55
Kyrgyz Republic	435	6.08	1.34	–0.80	0.41	0.55
Dominica	3,883	8.26	0.64	0.68	0.85	0.55
Armenia	1,187	7.08	1.02	–0.43	0.52	0.53
Honduras	1,052	6.96	1.06	–0.51	0.50	0.53
Maldives	2,219	7.70	0.82	–0.04	0.64	0.52
Uruguay	3,854	8.26	0.64	0.54	0.81	0.52
Suriname	2,540	7.84	0.78	0.05	0.67	0.52
Chile	5,947	8.69	0.50	1.25	1.02	0.52
Papua New Guinea	721	6.58	1.18	–0.72	0.44	0.51
Costa Rica	4,651	8.44	0.58	0.77	0.88	0.51
Thailand	2,558	7.85	0.77	0.03	0.66	0.51
St. Lucia	4,439	8.40	0.60	0.68	0.85	0.51
Comoros	563	6.33	1.26	–0.83	0.40	0.51
China	1,270	7.15	1.00	–0.49	0.50	0.50
El Salvador	2,398	7.78	0.79	–0.06	0.63	0.50
Bulgaria	3,206	8.07	0.70	0.21	0.71	0.50
Togo	392	5.97	1.37	–0.96	0.36	0.50
Guinea	380	5.94	1.38	–0.97	0.36	0.50
Bangladesh	402	6.00	1.36	–0.96	0.36	0.50
Tonga	1,932	7.57	0.86	–0.26	0.57	0.49
Dominican Republic	2,097	7.65	0.84	–0.25	0.58	0.48
Botswana	5,283	8.57	0.54	0.80	0.89	0.48
Belize	3,972	8.29	0.63	0.37	0.76	0.48
Tunisia	2,827	7.95	0.74	–0.01	0.65	0.48
Mauritius	4,965	8.51	0.56	0.66	0.85	0.48
Jamaica	2,961	7.99	0.73	–0.05	0.64	0.46
Grenada	4,879	8.49	0.57	0.54	0.81	0.46
Tajikistan	297	5.69	1.46	–1.13	0.31	0.46
Indonesia	1,082	6.99	1.05	–0.73	0.43	0.45
Solomon Islands	462	6.14	1.32	–1.03	0.34	0.45
Brazil	3,286	8.10	0.69	0.01	0.65	0.45
Romania	3,274	8.09	0.69	–0.01	0.65	0.45
Ukraine	1,376	7.23	0.97	–0.63	0.46	0.45
South Africa	4,792	8.47	0.57	0.43	0.78	0.45
Latvia	5,897	8.68	0.51	0.71	0.86	0.44
Cameroon	884	6.78	1.11	–0.87	0.39	0.44
Fiji	2,986	8.00	0.72	–0.17	0.60	0.43
Lithuania	6,181	8.73	0.49	0.77	0.88	0.43
Georgia	1,084	6.99	1.05	–0.80	0.41	0.43
Burundi	87	4.47	1.85	–1.40	0.23	0.43
Paraguay	1,152	7.05	1.03	–0.78	0.42	0.43
Peru	2,483	7.82	0.78	–0.35	0.55	0.43
Malaysia	5,016	8.52	0.56	0.38	0.76	0.43
Pakistan	604	6.40	1.23	–1.03	0.34	0.42
Albania	2,141	7.67	0.83	–0.48	0.51	0.42
Chad	457	6.13	1.32	–1.12	0.32	0.42
Bosnia and Herzegovina	1,869	7.53	0.87	–0.58	0.48	0.42
Lao PDR	397	5.98	1.37	–1.16	0.30	0.42
Djibouti	1,420	7.26	0.96	–0.73	0.43	0.42
Panama	4,467	8.40	0.59	0.16	0.70	0.42
Macedonia, FYR	2,573	7.85	0.77	–0.39	0.53	0.41
Yemen, Rep.	639	6.46	1.22	–1.05	0.34	0.41
Poland	6,273	8.74	0.49	0.54	0.81	0.39
Estonia	8,050	8.99	0.41	1.06	0.97	0.39
Colombia	2,302	7.74	0.81	–0.55	0.49	0.39
Azerbaijan	1,083	6.99	1.05	–0.96	0.36	0.38
Syrian Arab Republic	1,282	7.16	0.99	–0.91	0.38	0.38
Swaziland	2,117	7.66	0.83	–0.68	0.45	0.37

Country name	A. Exchange rate GDP/capita, 2003 ($)	B. Log exchange rate GDP/capita	C. GDP selectivity multiplier	D. Kaufmann-Kraay composite governance score, 2004	E. Governance selectivity multiplier	F. Combined selectivity multiplier[1]
Slovak Republic	7,578	8.93	0.43	0.74	0.87	0.37
Ecuador	2,293	7.74	0.81	–0.65	0.46	0.37
Guatemala	2,344	7.76	0.80	–0.65	0.46	0.37
Nigeria	573	6.35	1.25	–1.21	0.29	0.36
Turkey	4,384	8.39	0.60	–0.17	0.60	0.36
Argentina	3,883	8.26	0.64	–0.34	0.55	0.35
Central African Republic	319	5.76	1.44	–1.39	0.24	0.34
Barbados	10,079	9.22	0.33	1.13	0.99	0.33
Congo, Rep.	1,251	7.13	1.00	–1.12	0.32	0.32
Mexico	6,441	8.77	0.48	0.04	0.66	0.32
Oman	8,370	9.03	0.39	0.49	0.80	0.31
Hungary	9,938	9.20	0.34	0.90	0.92	0.31
Algeria	2,633	7.88	0.76	–0.82	0.41	0.31
Kazakhstan	2,688	7.90	0.76	–0.82	0.41	0.31
Croatia	7,605	8.94	0.42	0.24	0.72	0.31
Iran, Islamic Rep.	2,415	7.79	0.79	–0.94	0.37	0.29
Russian Federation	4,042	8.30	0.63	–0.63	0.46	0.29
Uzbekistan	454	6.12	1.33	–1.46	0.21	0.28
Czech Republic	10,443	9.25	0.32	0.74	0.87	0.28
Gabon	5,304	8.58	0.54	–0.47	0.51	0.28
Angola	1,745	7.46	0.90	–1.16	0.30	0.27
Liberia	160	5.07	1.66	–1.63	0.16	0.27
St. Kitts and Nevis	10,222	9.23	0.33	0.58	0.82	0.27
Cote d'Ivoire	903	6.81	1.11	–1.38	0.24	0.26
Zimbabwe	389	5.96	1.37	–1.54	0.19	0.26
Belarus	2,211	7.70	0.82	–1.12	0.32	0.26
Afghanistan	202	5.31	1.58	–1.64	0.16	0.26
Sudan	501	6.22	1.29	–1.52	0.20	0.25
Congo, Dem. Rep.	112	4.71	1.77	–1.70	0.14	0.25
Antigua and Barbuda	11,754	9.37	0.29	0.77	0.88	0.25
Lebanon	5,771	8.66	0.51	–0.55	0.49	0.25
Malta	13,582	9.52	0.24	1.25	1.02	0.25
Haiti	446	6.10	1.33	–1.59	0.18	0.23
Seychelles	8,709	9.07	0.38	–0.15	0.61	0.23
Venezuela, RB	4,357	8.38	0.60	–0.97	0.36	0.22
Trinidad and Tobago	11,529	9.35	0.29	0.30	0.74	0.22
Libya	5,167	8.55	0.55	–0.94	0.37	0.20
Turkmenistan	1,269	7.15	1.00	–1.53	0.19	0.19
Korea, Rep.	14,042	9.55	0.23	0.61	0.83	0.19
Saudi Arabia	9,730	9.18	0.35	–0.38	0.54	0.19
Slovenia	16,008	9.68	0.19	0.99	0.95	0.18
Equatorial Guinea	6,236	8.74	0.49	–1.15	0.31	0.15
Bahrain	16,227	9.69	0.18	0.38	0.76	0.14
Cyprus	19,847	9.90	0.12	0.87	0.91	0.11
Israel	19,035	9.85	0.13	0.45	0.79	0.10
Iraq	1,025	6.93	1.07	–1.88	0.09	0.10
Hong Kong, China	23,778	10.08	0.06	1.31	1.04	0.06
Singapore	24,576	10.11	0.05	1.62	1.13	0.06
Kuwait	24,673	10.11	0.05	0.30	0.74	0.04

[1]To 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 exceed these bounds.

Figure 1. Average size weight in CDI versus average log aid activity commitment, 2003

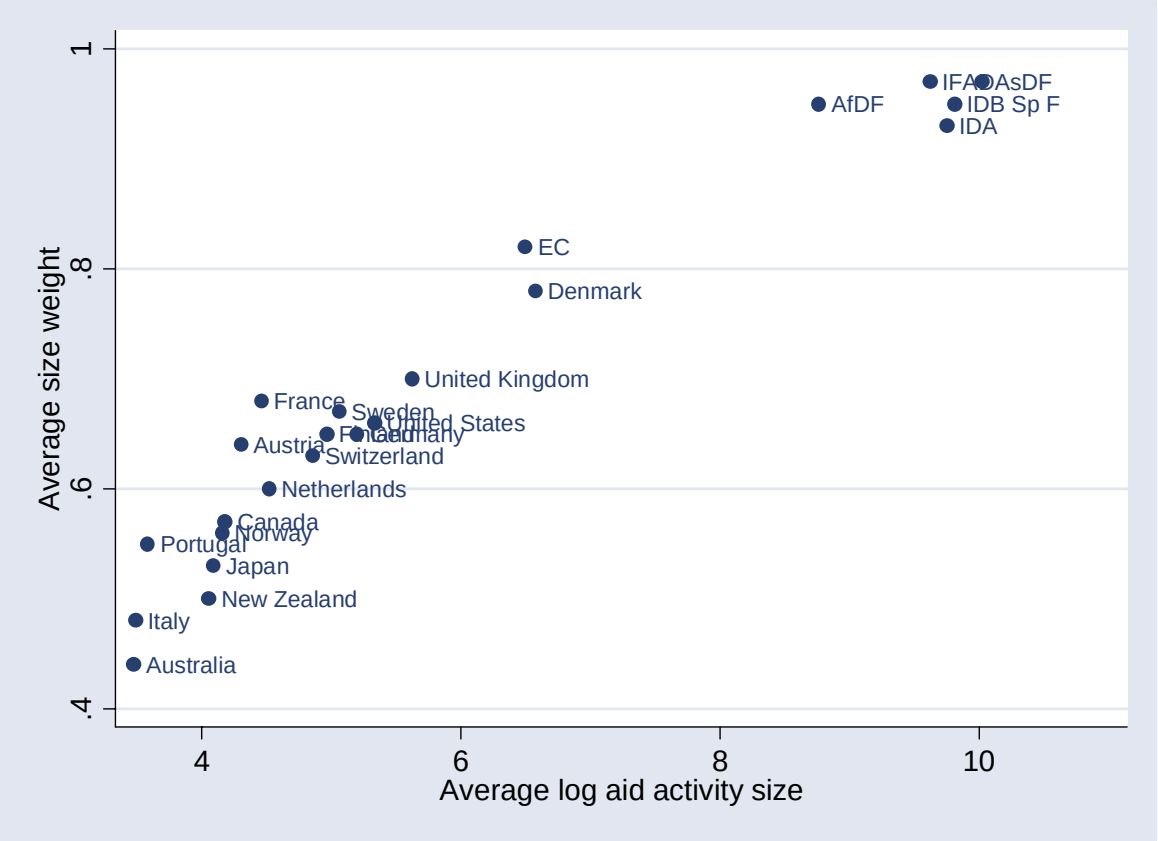


Table 2. Quality-adjusted aid quantity by donor, bilateral or multilateral

Donor	Gross aid (according to DAC)	Gross aid excluding forgiveness of non-concessional loans	Amortization	Interest	Net aid	Tying cost	Selectivity weight	Size weight	Quality-adjusted aid
Arab Agencies	636	636	254	0	382	0	0.63	0.79	178
Arab Countries	4,336	4,336	586	0	3,750	0	0.43	0.75	1,245
Australia	1,195	1,185	0	0	1,185	32	0.50	0.48	332
Austria	514	345	4	1	340	30	0.45	0.53	96
Belgium	972	766	74	4	688	4	0.35	0.76	322
Canada	2,115	1,993	31	2	1,959	130	0.54	0.67	784
Czech Republic	74	63	0	0	63	0	0.43	0.73	24
Denmark	1,331	1,312	86	18	1,207	34	0.63	0.71	543
Finland	407	407	0	0	407	7	0.54	0.66	159
France	8,073	6,098	943	341	4,815	105	0.43	0.64	1,474
Germany	5,531	4,964	1,233	358	3,373	123	0.52	0.64	1,078
Greece	354	354	0	0	354	43	0.41	0.79	110
Hungary	30	30	0	0	30	0	0.42	0.74	9
Iceland	16	16	0	0	16	0	0.73	0.78	9
Ireland	413	413	0	0	413	0	0.64	0.78	221
Italy	1,005	888	288	0	600	0	0.51	0.50	137
Japan	11,114	10,847	5,136	2,327	3,385	126	0.51	0.58	791
Korea	353	353	20	23	310	62	0.48	0.72	91
Lithuania	2	2	0	0	2	0	0.34	0.72	0
Luxembourg	174	174	0	0	174	0	0.58	0.75	80
Netherlands	3,266	3,050	544	42	2,465	110	0.61	0.67	982
New Zealand	160	160	0	0	160	10	0.52	0.56	51
Norway	1,587	1,587	6	0	1,582	0	0.53	0.59	584
Other Donors	104	104	0	0	104	0	0.44	0.73	33
Poland	40	40	0	0	40	0	0.43	0.74	13
Portugal	878	175	5	1	170	2	0.57	0.48	50
Slovak Republic	14	14	0	0	14	0	0.44	0.76	5
Spain	1,595	1,456	180	0	1,276	44	0.49	0.73	471
Sweden	2,199	2,172	0	0	2,172	32	0.55	0.76	1,034
Switzerland	1,286	1,277	10	0	1,267	8	0.55	0.50	423
Turkey	392	392	0	0	392	0	0.37	0.76	131
United Kingdom	5,684	4,929	275	0	4,653	0	0.58	0.77	2,280
United States	18,812	18,639	1,027	433	17,178	2,074	0.48	0.65	5,692
AfDF	1,057	1,057	137	95	824	0	0.69	0.96	591
AsDF	1,084	1,084	390	196	498	0	0.56	0.96	332
CarDB	60	60	21	9	30	0	0.55	0.62	10
EBRD	86	86	0	0	86	0	0.43	0.72	27
EC	12,577	12,577	276	85	12,216	0	0.47	0.72	4,607
GEF	150	150	0	0	150	0	0.49	0.68	50
IDA	8,842	8,801	1,546	938	6,317	0	0.60	0.94	3,338
IDB Sp F	560	560	299	137	124	0	0.67	0.95	98
IFAD	283	283	117	40	126	0	0.64	0.96	90
Montreal Protocol	60	60	0	0	60	0	0.51	0.60	18
Nordic Dev.Fund	74	74	4	5	65	0	0.68	0.78	34
Other UN	274	274	0	0	274	0	0.43	0.69	81
SAF+ESAF(IMF)	1,204	1,204	1,383	0	–179	0		0.82	–80
UNDP	389	389	0	0	389	0	0.52	0.77	157
UNFPA	314	314	0	0	314	0	0.53	0.76	127
UNHCR	367	367	0	0	367	0		0.79	
UNICEF	655	655	0	0	655	0	0.52	0.77	253
UNRWA	449	449	0	0	449	0		0.67	
UNTA	444	444	0	0	444	0	0.49	0.75	165
WFP	270	270	0	0	270	0	0.53	0.79	113

Table 3. Calculation of policy-induced charitable giving

Country	A. Tax deduction?	B. Marginal income tax rate, 2004[1, 2]	C. Tax credit (%)	D. Deduction or credit capped?	E. Tax incentive (%)[3]	F. Increase in giving with incentive (%)	G. Tax revenue/ GDP, 2002 (%)	H. Giving increase because of smaller gov't (%)	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)^price elasticity–1[4]		((1–G)/(1–53.8%))^ income elasticity–1[5]	(1+F)× (1+H)–1		J/(1+I)	J–K
Australia	Yes	48.5%	0.0%	No	48.5%	39.3%	31.6%	54.0%	114.6%	489	228	261
Austria	No	31.7%	0.0%	No	0.0%	0.0%	43.1%	25.8%	25.8%	101	80	21
Belgium	Yes	45.1%	0.0%	No	45.1%	35.0%	45.4%	20.2%	62.2%	181	111	69
Canada	No	35.4%	29.0%	No	29.0%	18.7%	33.8%	48.5%	76.3%	639	362	276
Denmark	Yes	54.9%	0.0%	Yes	27.5%	17.4%	48.3%	13.2%	32.9%	64	48	16
Finland	No	43.7%	0.0%	No	0.0%	0.0%	44.8%	21.6%	21.6%	14	11	2
France	No	24.9%	60.0%	No	60.0%	58.1%	43.4%	25.0%	97.7%	280	142	138
Germany	Yes	47.5%	0.0%	No	47.5%	38.0%	35.5%	44.3%	99.2%	1,148	576	572
Greece	Yes	25.2%	0.0%	No	20.2%	11.9%	35.7%	43.9%	61.0%	19	12	7
Ireland	Yes	42.0%	0.0%	No	42.0%	31.3%	29.7%	58.7%	108.4%	234	112	122
Italy	No	36.4%	19.0%	No	19.0%	11.1%	43.1%	25.8%	39.7%	49	35	14
Japan	Yes	20.4%	0.0%	No	20.4%	12.1%	25.3%	69.6%	90.1%	425	223	201
Netherlands	Yes	52.0%	0.0%	No	52.0%	44.3%	38.8%	36.2%	96.7%	412	209	202
N. Zealand	No	39.0%	33.3%	Yes	16.7%	9.5%	34.9%	45.8%	59.7%	29	18	11
Norway	Yes	41.5%	0.0%	Yes	20.7%	12.3%	43.4%	25.0%	40.4%	452	322	130
Portugal	No	24.0%	25.0%	No	25.0%	15.5%	37.1%	40.4%	62.1%	3	2	1
Spain	No	26.2%	25.0%	No	25.0%	15.5%	34.9%	45.8%	68.4%	133	79	54
Sweden	No	51.5%	0.0%	No	0.0%	0.0%	50.6%	7.6%	7.6%	31	28	2
Switzerland	Yes	25.1%	0.0%	No	25.1%	15.6%	29.5%	59.2%	83.9%	329	179	150
U.K.	Yes	22.0%	0.0%	No	22.0%	13.2%	35.6%	44.1%	63.2%	394	242	153
U.S.	Yes	31.4%	0.0%	No	31.4%	20.8%	25.6%	68.9%	104.0%	10,369	5,084	5,285

[1]Marginal income tax rate for single individual at 167% of income level of the average production worker. [2]Data for latest available year. [3] Uniquely, 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. [4]Price elasticity of giving taken to be –0.5. [5]Income elasticity of giving taken to be 1.1. 53.8% is the highest revenue/GDP observed, in Sweden, in the reference year of 2000.

Table 4. Quality-adjusted aid quantity with multilateral aid allocated back to bilaterals

Country	Bilateral quality-adjusted aid[1]	Quality-adjusted aid allocated from multilaterals	Total quality-adjusted official aid	Policy-induced charitable giving	Quality-adjusted charitable giving	Adjusted (aid+charitable giving)/GDP	Memo: Official aid quality (Adjusted aid/net transfers)
Australia	332	116	448	261	94	0.09%	31%
Austria	96	176	272	21	7	0.10%	36%
Belgium	322	310	633	69	25	0.18%	44%
Canada	784	275	1,060	276	100	0.12%	41%
Denmark	543	311	854	16	6	0.36%	40%
Finland	159	100	259	2	1	0.14%	35%
France	1,474	1,530	3,004	138	50	0.15%	35%
Germany	1,078	1,950	3,028	572	207	0.12%	38%
Greece	110	85	196	7	3	0.10%	33%
Ireland	221	65	287	122	44	0.21%	47%
Italy	137	822	959	14	5	0.06%	32%
Japan	791	1,031	1,822	201	73	0.04%	28%
Netherlands	982	683	1,665	202	73	0.30%	40%
New Zealand	51	18	69	11	4	0.08%	32%
Norway	584	211	795	130	47	0.33%	35%
Portugal	50	86	136	1	0	0.08%	35%
Spain	471	430	901	54	20	0.09%	39%
Sweden	1,034	196	1,231	2	1	0.35%	44%
Switzerland	423	177	600	150	54	0.17%	37%
United Kingdom	2,280	1,247	3,527	153	55	0.16%	44%
United States	5,692	1,726	7,418	5,285	1,909	0.08%	36%

[1]From Table 2.

Trade

The focus of the trade component is a measure of barriers in rich-counties to goods exports from poorer ones. The index has two major parts. The first, getting 75% weight, is an aggregate measure of protection (AMP), which estimates the combined effect of tariffs, non-tariff measures, and domestic production subsidies on an *ad valorem* tariff-equivalent basis. Out of concern that unmeasured (tacit) barriers may be an important factor in reducing access of developing countries to rich country markets, especially in Japan, the remaining 25% weight goes to an indicator of "revealed openness," which is essentially imports from developing countries as a share of importer's GDP. William Cline (2002; 2004, ch. 3) develops the original trade index.

Starting in 2005, Roodman (2005) preserves the structure while substantially improving the underlying calculations of border measures (tariffs and quotas) by switching to a different dataset and refining some of the calculations. It takes advantage of the Market Access Map (MAcMap) data set of the Centre d'Etudes Prospectives et d'Informations Internationales (CEPII) (Bouët et al. 2004). The latest MAcMap data available for the 2006 CDI are for 2001. The data set has several strengths, including fairly good coverage of "preferences" for least-developed countries (special low tariffs for their exports), such as under the EU's Everything But Arms program and the U.S. Africa Growth and Opportunity Act. This is made possible by the high detail in the 35 million–row dataset: one protection estimate for each importer, exporter, and six-digit line in the Harmonized System (HS6) classification of traded goods.

MAcMap embodies a particular approach to the problem of the perennial problem of the endogeneity of import-based weights, whereby the highest tariffs can get the least weight because the country imposing the tariffs imports hardly any of the goods in question. The CEPII authors cluster importing countries into reference groups. The weight for a given trade barrier is imports not just of the country imposing the barrier but of all countries in its group. However, it appears that MAcMap weights do not solve the endogeneity problem, at least for purposes of aggregating across major product groups as in the CDI (Roodman 2005). For example, using MAcMap weights, border measures in Japan were equivalent to a 4.1% across the board *ad valorem* tariff for middle-income nations and 2.0% for least-developed countries (Bouët et al. 2004; these figures exclude quotas on textiles and apparel, as well as agricultural subsidies). Numbers for other rich countries are similarly low, and seem to imply that rich-country trade barriers hardly affect developing countries. But this contradicts most of the rest of the literature (Cline 2004; World Bank 2005, ch. 4).

For this reason, the CDI uses detailed MAcMap protection data while eschewing MAcMap weights where possible.[22] Instead, it weights trade barriers as much as possible by the value of exporter's production (in dollar terms), which is less endogenous than exports to protection faced. Production is not a perfect indicator of propensity to export—thus of the welfare cost of barriers against such exports—but in areas such as agriculture where the barriers are quite high, it seems more meaningful. Thailand's share of world rice production seems a better predictor of what its share of world rice exports to Japan would be in a free-trade world than actual exports to Japan, which are greatly suppressed by tariffs.

The data on production by country and product come from the GTAP 6.0 database.[23] GTAP 6.0 divides the world into 87 countries or regions and organizes products and services into 57 groups (oil, wood products, etc.). The production data used for weights are at this resolution. So to incorporate them, the CDI first aggregates from HS 6 lines to GTAP product categories using MAcMap-weighted averages, and across countries within GTAP country/regions based on their exchange rate GDPs. Table 5 displays some of the intermediate results of particular interest, on rich-country agricultural protection.

Before aggregating all the way to the level of the rich country, two other kinds of information are integrated in the protection data. The first is on textile and apparel quotas that were imposed by Canada, the European Union, and the United States until the beginning of this year. The 2005 and 2006 CDIs do not count them, but back-calculated versions to 2003 and 2004, discussed in section 3, do. In these cases, estimates of the export tax equivalents of the quotas are taken from Francois and Spinanger (2004)—separately for textiles and apparel—and chained with the corresponding tariff levels derived from MAcMap.[24]

The second source of additional data is on agricultural subsidies, which are not included in MAcMap but do obstruct developing-country exports. It is often said that OECD governments spend $300 billion a year subsidizing agricultural production. Although aid to rich-country farmers is copious, the $300 billion "fact" is wrong, so phrased. Rather, OECD farmers and food buyers receive support by virtue of government policy that is *equivalent* to $300 billion in subsidies, as

[22] William Cline guided this approach.
[23] I thank Betina Dimaranan for her assistance with the data.
[24] The CDI uses the estimates from the version of Francois and Spinanger's model that is free of some restrictions otherwise imposed for consistency with GTAP 6.0.

measured by the OECD's Total Support Estimate (TSE). Much of this benefit is actually delivered to farmers in the form of tariffs, which the OECD converts to subsidy equivalents. Much of the rest includes "general services" such as agricultural education and R&D, transfers to consumers rather than producers, and transfers to producers in ways that create little incentive for additional production, thus little trade distortion.

Since the CDI aims to measure trade distortions, and handles tariffs separately, it uses a narrower definition of subsidy, while still drawing on the OECD (2005a) subsidy data. Table 6 shows the full OECD agricultural subsidy typology, and how the TSE and the CDI subsidy totals are arrived at. The OECD lists three major kinds of support: support to producers, general services such as agricultural extension and inspection services, and support to consumers. The first major subcategory of producer support is Market Price Support (MPS, row B of the table), which is the additional income accruing to producers because their farmgate prices are higher than world prices. Governments maintain these price differentials with two kinds of border measures: barriers to imports (tariffs) and subsidies for exports. Import barriers account for the lion's share of MPS in OECD countries and, because they generate transfers from domestic consumers to domestic producers, they also show up as negative entries under consumer support (row T). Spending on export subsidies can be inferred by taking the algebraic sum of MPS and transfers from consumers to producers, which carry a negative sign (see rows Y and AC). The other subcategories of OECD producer support are in fact subsidies in the sense of government expenditure.

The OECD's TSE counts all producer support, including MPS, as well as general services and taxpayers subsidies to consumers—$303 billion/year average in 2002–04 for the 21 CDI countries (row AB). In contrast, the subsidy measure in the CDI consists only of certain subcategories of producer support, those that are true government expenditures that distort production (rows AC and AD). From the MPS it takes only export subsidies. It excludes payments based on overall farming income since these should not distort production decisions. It also discounts payments based on historical entitlements by half. In theory, these subsidies too are decoupled from present production and shouldn't distort it, but they are often administered in ways that stimulate production. For example, the U.S. formally decoupled many support payments in 1996—but then disbursed an extra $8.6 billion/year in "emergency assistance" during 1998–2001, and in 2002 allowed farmers to update the base figures for their "decoupled" subsidies. And some EU payments are decoupled only at the national or regional level. Allocation within regions is still based on actual production (de Gorter, Ingco, and Ignacio 2003).

Throughout, averages for 2002–04 are used because subsidy levels are sensitive to volatile world prices. For the 21 scored countries, total trade-distorting subsidies are estimated at $83.0 billion/year for 2002–04.

Although agricultural subsidies among EU members are largely unified under the Common Agricultural Policy, many members do offer additional subsidies to their farmers outside the CAP. In past years, the CDI counted these, using data gleaned from the annual OECD reviews of agricultural policy. However, the 2006 CDI does not. The data have become harder to find in the reports and incorporating them complicated the computations without changing the results much.

The agricultural subsidy totals having been arrived at, they are then converted to *ad valorem* tariff equivalents. The methodology is summarized in Cline (2004, ch. 3). These tariff equivalents

are then chained with the actual tariff levels derived from MAcMap to reach overall levels of protection for agriculture. These in turn are averaged with protection in other sectors, weighting by the value of production in non-CDI countries, to produce estimates of overall levels of protection. (See Table 7.)

These estimates may still miss important but less formal barriers to trade. So the CDI trade component gives 25% weight to a direct measure of imports from non-DAC countries as a share of importer's GDP, called "revealed openness," based on data from the United Nations Commodity Trade Statistics Database database. Imports from the least developed countries (LDCs) are double-weighted to reflect the extra potential for trade to reduce poverty in countries where it is highest. Imports of manufactures too are double-weighted because they seem more likely than, say, oil imports, to be subject to the tacit barriers this component tries to detect (Cline 2004). As a result, manufactures imports from LDCs are quadruple-weighted. All EU members are assigned the same revealed openness score.[25] Notably, revealed openness corresponds well with measured protection. The three countries with the highest measured protection levels, Japan, Norway, and Switzerland, have the lowest revealed openness. (See Table 8.)

These two top-level indicators—measured protection and revealed openness—have opposite senses: lower measured protection and higher openness should be rewarded. Because they are in effect separate estimates of the same underlying variable, the true level of protection, they are combined in a way that is unique within the CDI. The revealed openness scores are linearly transformed to have the same mean, standard deviation, and sign sense as the measured protection results (higher being worse). Once the two indicators are on the same scales, they are combined in a 75/25 ratio. (See Table 9.)

Agricultural tariffs are the dominant source of inter-country variation, giving Japan and Norway very low scores, and Switzerland a low one as well. The sources of the very high numbers for Norway, Switzerland, and Japan are agricultural tariff-rate quotas (TRQs), which were enacted under the Uruguay Round agreement of the World Trade Organization to replace actual quotas. They are pairs of tariffs, a low one that applies to imports of some product up to some level and a high one that applies to imports above the level. That said, in the remaining countries, which represent the lion's share of the rich-country agricultural market, the protective effect of agricultural subsidies is of the same order of magnitude as the tariffs, and exceeds it in Australia and the United States.

[25] We experimented with computing revealed openness separately for each EU member, but found that it gave the Netherlands and Belgium outsized scores, probably because they have small economies and are ports of entry for the continent. The two probably ship a good share of their reported imports from developing countries on to other nations.

Table 5. Estimated uniform *ad valorem* tariff-equivalents of tariff regimes against agricultural commodities, 2001 (percent)

	Animal products other	Beverages and tobacco products	Bovine cattle, sheep and goats, horses	Bovine meat products	Cereal grains other	Crops other	Dairy products	Food products other	Meat products other	Oil seeds	Paddy rice	Plant-based fibers	Processed rice	Vegetable oils and fats	Wheat	**Overall weighted average**
Australia	0.0	15.8	0.0	0.0	0.0	0.0	0.9	1.8	0.7	0.8	0.0	0.0	0.0	1.0	0.0	2.7
Austria	4.8	10.5	15.4	75.9	16.8	2.1	38.1	9.2	15.2	0.0	76.6	0.0	137.2	4.9	0.7	22.8
Belgium	4.8	10.5	15.4	75.9	16.8	2.1	38.1	9.2	15.2	0.0	76.6	0.0	137.2	4.9	0.7	22.8
Canada	6.5	6.9	0.0	8.4	0.3	0.5	97.7	4.4	39.5	0.0	0.0	0.0	0.0	2.2	2.6	9.7
Denmark	4.8	10.5	15.4	75.9	16.8	2.1	38.1	9.2	15.2	0.0	76.6	0.0	137.2	4.9	0.7	22.8
Finland	4.8	10.5	15.4	75.9	16.8	2.1	38.1	9.2	15.2	0.0	76.6	0.0	137.2	4.9	0.7	22.8
France	4.8	10.5	15.4	75.9	16.8	2.1	38.1	9.2	15.2	0.0	76.6	0.0	137.2	4.9	0.7	22.8
Germany	4.8	10.5	15.4	75.9	16.8	2.1	38.1	9.2	15.2	0.0	76.6	0.0	137.2	4.9	0.7	22.8
Greece	4.8	10.5	15.4	75.9	16.8	2.1	38.1	9.2	15.2	0.0	76.6	0.0	137.2	4.9	0.7	22.8
Ireland	4.8	10.5	15.4	75.9	16.8	2.1	38.1	9.2	15.2	0.0	76.6	0.0	137.2	4.9	0.7	22.8
Italy	4.8	10.5	15.4	75.9	16.8	2.1	38.1	9.2	15.2	0.0	76.6	0.0	137.2	4.9	0.7	22.8
Japan	11.0	16.4	53.6	38.2	53.2	1.3	82.4	12.1	36.5	1.6	844.4	0.0	919.5	4.8	214.4	117.2
Netherlands	4.8	10.5	15.4	75.9	16.8	2.1	38.1	9.2	15.2	0.0	76.6	0.0	137.2	4.9	0.7	22.8
New Zealand	0.4	16.3	0.0	0.0	0.0	0.4	1.3	1.6	2.7	0.0	0.0	0.0	0.0	0.4	0.0	2.9
Norway	88.1	22.3	106.2	222.7	114.8	9.5	134.0	29.0	224.3	48.6	31.8	0.0	27.1	49.1	208.4	73.9
Portugal	4.8	10.5	15.4	75.9	16.8	2.1	38.1	9.2	15.2	0.0	76.6	0.0	137.2	4.9	0.7	22.8
Spain	4.8	10.5	15.4	75.9	16.8	2.1	38.1	9.2	15.2	0.0	76.6	0.0	137.2	4.9	0.7	22.8
Sweden	4.8	10.5	15.4	75.9	16.8	2.1	38.1	9.2	15.2	0.0	76.6	0.0	137.2	4.9	0.7	22.8
Switzerland	7.7	16.2	4.1	168.2	77.7	8.2	106.8	14.0	111.3	21.2	5.8	0.0	7.1	26.6	131.6	36.5
U.K.	4.8	10.5	15.4	74.2	23.4	2.1	37.2	9.2	15.4	0.0	76.6	0.0	137.2	4.9	0.7	23.0
United States	0.4	2.7	0.1	2.6	0.9	2.7	16.7	3.1	3.3	8.7	5.2	1.0	5.2	3.0	3.2	3.4
Production in non-CDI countries ($)	205	241	79	78	67	116	70	399	114	50	81	29	99	64	72	

Table 6. Calculations of production-distorting agricultural subsidies for CDI and of Total Support Estimate of OECD, 2002–04

	Australia	Canada	EU-15	Japan	N. Zea-land	Norway	Switzer-land	United States	Total ($)
National currency figures									
A. Producer Support Estimate (PSE)	1,689	7,816	103,050	5,456	318	21,064	7,339	40,409	
B. Market Price Support (MPS)	13	3,737	56,230	4,915	262	9,912	4,085	14,272	
C. Payments based on output	0	345	3,630	173	0	1,961	348	4,093	
D. Payments based on area planted/animal numbers	37	825	28,715	0	0	3,721	936	2,494	
E. "Counter cyclical payments"		0	0	0	0	0	0	2,703	
F. Payments based on historical entitlements	183	1,026	1,188	24	0	1,128	1,307	5,961	
G. Payments based on input use	1,284	402	8,457	179	55	3,367	332	7,118	
H. Payments based on input constraints	0	5	4,961	164	0	437	141	1,959	
I. Payments based on overall farming income	171	1,362	10	0	2	537	0	2,079	
J. Miscellaneous payments	0	114	–142	0	0	0	191	0	
K. General Services Support Estimate (GSSE)	891	2,291	9,117	1,386	207	1,638	518	30,635	
L. Research and development	607	460	1,569	87	99	675	91	2,691	
M. Agricultural schools	0	252	924	21	13	0	20	0	
N. Inspection services	86	617	422	9	66	308	12	779	
O. Infrastructure	173	439	2,105	1,102	29	336	196	4,973	
P. Marketing and promotion	8	523	3,048	27	0	98	63	19,769	
Q. Public stockholding	0	0	907	33	0	9	45	248	
R. Miscellaneous	16	0	141	107	1	213	191	2,174	
S. Consumer Support Estimate (CSE)	–490	–3,514	–51,480	–6,848	–254	–10,296	–4,877	9,725	
T. Transfers to producers from consumers	–494	–3,338	–55,366	–4,914	–254	–10,515	–4,103	–14,272	
U. Other transfers from consumers	0	–217	–1,011	–1,899	0	–446	–1,048	–1,931	
V. Transfers to consumers from taxpayers	4	28	3,708	6	0	130	162	25,928	
W. Excess feed cost	0	12	1,190	6	0	535	113	0	
X. *OECD Total Support Estimate (A+K+V)*	2,365	10,135	115,875	6,848	525	22,832	8,019	96,972	
Y. Export subsidies (B+T)	–481	399	864	1	8	–603	–18	0	
Z. Other direct trade–distorting subsidies (C+D+E+F/2+G+H)	1,413	2,090	46,357	528	55	10,050	2,411	21,348	
AA. Exchange rate/$	1.58	1.29	0.90	0.12	1.71	7.26	1.37	1.00	
Dollar figures									
AB. OECD Total Support Estimate (X/AA)	1,497	7,887	128,496	58,896	307	3,146	5,838	96,972	303,038
AC. Export subsidies (Y/AA)	–304	310	958	9	5	–83	–13	0	881
AD. Other trade–distorting subsidies (Z/AA)	894	1,626	51,406	4,541	32	1,385	1,755	21,348	82,987
Total trade–distorting subsidies (AC+AD)	**590**	**1,937**	**52,364**	**4,550**	**37**	**1,302**	**1,742**	**21,348**	**83,868**

Table 7. Computation of measured protection, *ad valorem* tariff equivalents (%)

	Agricultural commodities			Other goods:	
	Tariffs	Subsi-dies	Total	Tariffs	Weighted average
Australia	2.6	11.8	14.7	4.6	6.6
Austria	22.5	14.4	40.1	3.4	10.6
Belgium	22.5	15.2	41.1	3.4	10.8
Canada	9.5	14.1	24.9	2.3	6.7
Denmark	22.5	15.0	40.9	3.4	10.8
Finland	22.5	12.2	37.4	3.4	10.1
France	22.5	13.8	39.5	3.4	10.5
Germany	22.5	14.4	40.2	3.4	10.6
Greece	22.5	14.5	40.2	3.4	10.6
Ireland	22.5	17.2	43.6	3.4	11.3
Italy	22.5	11.6	36.7	3.4	10.0
Japan	115.8	3.7	123.7	4.4	27.8
Netherlands	22.5	10.0	34.8	3.4	9.6
New Zealand	3.0	2.3	5.3	2.3	2.9
Norway	73.0	15.2	99.3	2.3	21.4
Portugal	22.5	12.0	37.2	3.4	10.1
Spain	22.5	13.6	39.1	3.4	10.4
Sweden	22.5	12.3	37.6	3.4	10.1
Switzerland	35.9	13.1	53.7	4.3	14.0
U.K.	22.7	14.5	40.6	3.4	10.7
United States	3.2	12.9	16.5	2.5	5.2
Weight: value of production in non-CDI countries (billion $)			1,765	7,225	

Table 8. Revealed openness

	Imports (billion $)						
	A	B	C	D			
	Least developed countries only		All low and middle income		Weighted total		Weighted imports/
	Manu-factures	Total imports	Manu-factures	Total imports	(A+B+C+D)	GDP	GDP (%)
Australia	0.06	0.15	23.73	28.63	52.57	631	8.3
Canada	0.58	0.90	40.90	50.75	93.13	980	9.5
EU	11.02	17.30	516.11	726.85	1,271.28	12,059	10.5
Japan	0.48	2.42	136.34	207.73	346.96	4,620	7.5
New Zealand	0.01	0.12	3.85	4.55	8.52	100	8.5
Norway	0.11	0.12	7.32	8.58	16.12	250	6.4
Switzerland	0.10	0.13	8.15	10.37	18.75	359	5.2
United States	5.58	13.30	497.31	670.53	1,186.71	11,700	10.1

Table 9. Computation of overall trade score

	Measured protection (75% of score)	Revealed openness (25% of score)		Compos-ite	**Standardized score**
		Raw value	Transformed to protection scale		
	---------- (%)----------				
Australia	6.6	8.3	15.5	8.8	**6.4**
Austria	10.6	10.5	8.1	10.0	**5.9**
Belgium	10.8	10.5	8.1	10.1	**5.9**
Canada	6.7	9.5	11.6	7.9	**6.8**
Denmark	10.8	10.5	8.1	10.1	**5.9**
Finland	10.1	10.5	8.1	9.6	**6.1**
France	10.5	10.5	8.1	9.9	**6.0**
Germany	10.6	10.5	8.1	10.0	**5.9**
Greece	10.6	10.5	8.1	10.0	**5.9**
Ireland	11.3	10.5	8.1	10.5	**5.7**
Italy	10.0	10.5	8.1	9.5	**6.1**
Japan	27.8	7.5	18.2	25.4	**-0.4**
Netherlands	9.6	10.5	8.1	9.2	**6.2**
New Zealand	2.9	8.5	14.8	5.9	**7.6**
Norway	21.4	6.4	21.8	21.5	**1.2**
Portugal	10.1	10.5	8.1	9.6	**6.1**
Spain	10.4	10.5	8.1	9.9	**6.0**
Sweden	10.1	10.5	8.1	9.6	**6.1**
Switzerland	14.0	5.2	25.9	17.0	**3.1**
United Kingdom	10.7	10.5	8.1	10.1	**5.9**
United States	5.2	10.1	9.5	6.3	**7.4**
Average	11.0	9.7	11.0	12.3	
Standard deviation	5.1	1.5	5.1		

Investment

Investment flows from abroad have long played a major role in economic development—from the 19th century in the United States to the 21st century in China. Source-country policies can affect capital flows, and given the magnitude of the capital flows—net foreign direct investment from DAC to non-DAC countries was $104 billion in 2002 (DAC 2004)—relatively small policy changes on the source side could make a significant difference for countries on the receiving side.

But incorporating investment into the CDI is difficult for two reasons. First, not all investment is good for development, or at least is not as good as it should be. Prime examples include oil industry ventures in Nigeria and Angola, and foreign-financed factories with inhumane working conditions.

Second, the role of rich-country policies in stimulating and guiding investment is subtle and difficult to quantify. Theodore Moran has designed the investment component of the CDI since 2004. Moran's approach , adopted without modification, is based on a survey of government policies using a checklist approach. Countries can gain or lose points based on the answers to 22 distinct questions. A perfect score would be 100. For example, countries get 15 points for having pro-

grams to insure nationals against political risks for investment in developing countries. But they lose 4 if they do not screen for and monitor environmental, labor, and human rights problems.

The 22 questions fit into five categories. Two in category 3, on preventing bribery, are new in 2006. The full list is:

1) Official provision of political risk insurance, which protects investors against such risks as the host country government nationalizing their factories (25 points)

    a) Is the country a member of the Multilateral Investment Guarantee Agency (5 points) and the International Finance Corporation (3), both part of the World Bank Group, and regional development banks (2)? All provide political risk insurance.
    b) Does the country have a national political risk insurance agency (15)?
    c) Does the national agency fail to screen for environmental, labor standards, and human rights issues (–4)?
    d) Does the agency have a history of covering inefficient projects that make financial sense thanks only to subsidies and import protection, for example, to subsidized sugar projects (–2)?
    e) Does the agency avoid projects in "sensitive" sectors that could threaten certain source-country commercial interests (–2)?
    f) Does the agency impose inappropriate national economic interest tests for eligibility, such as that the project would not cost a single job at home (–2)?
    g) Does the agency offer coverage to firms majority-owned by nationals, as opposed to any firm with a significant presence in the home economy (–2)?

2) Procedures to prevent double taxation of profits earned abroad—taxation, that is, in both source and receiving countries (20 points)

    a) Does the county have tax sparing agreements with developing countries, whereby the government allows investors to pay taxes only under the (potentially favorable) tax code of the receiving country (20)? Or does the country at least offer a tax credit for foreign taxes paid so that there is no double taxation (18)?
    b) Does the developed country deny investors the benefits from favorable tax treatment in developing countries (–6)?
    c) Does it treat foreign taxes paid as a deductible expense rather than providing a full credit (–10)?

3) Actions to prevent bribery and other corrupt practices abroad (30 points)

    a) How has the country progressed in implementing the OECD Convention against Bribery of Foreign Public Officials in International Business Transactions? Has it begun Phase II monitoring to evaluate whether it is effectively implementing the Convention in its own laws (6)? Did it complete Phase II by the end of 2004 (4)?
    b) Do the country's laws make it easy for domestic corporations to circumvent the intent of the OECD convention, for example by entering Enron-like partnerships with relatives of foreign officials, as documented in Moran (2006a) (–2 points)? This question is new in 2006 and all countries receive the penalty.

c) Has it participated in "publish what you pay" initiatives to promote transparency in payments, taxes, receipts, and expenditures that its multinationals pay to foreign governments (up to 16 points). Examples: the Extractive Industries Transparency Initiative (EITI), the G–8 Anti-Corruption and Transparency Action Plan, the Kimberly Process to control trade in "blood diamonds," and the World Bank trust fund to combat bribery.
d) Has the country shown real leadership on such issues (bonus up to 6 points)? For example, Norway has been a leader of the EITI effort, has made its national oil company, Statoil, a model, has helped convince several least-developed countries to join, and is one of four contributors to the World Bank–administered Multi-Donor Trust Fund for the EITI. This item too is new for 2006.
e) Score on Transparency International's Bribe Payers' Index, which measures the perceived propensity of nationals to bribe abroad: 5 minus the country's score quintile, with countries excluded from the survey receiving 2 (4 points maximum).
f) Other policies that greatly encourage or discourage bribery abroad (±3).

4) Other measures to support foreign direct investors in developing countries (5 points)

a) Does the country assist its firms in identifying investment opportunities (2)?
b) Does it give official assistance to developing-country investment promotion agencies (3)?
c) Does it advocate against receiving countries applying labor, environmental, or human rights standards to FDI (–5)?

5) Policies that affect portfolio flows (20 points)

a) Does the country support developing countries designing securities institutions and regulations (4)?
b) Does it provide support for support for portfolio flows, for example by lending start-up capital to mutual funds investing in developing countries (4)?
c) Does the country eschew restrictions on portfolio investments in developing countries by home country pension funds, beyond the "prudent man" fiduciary rule on diversification (12)?

The first four categories, worth a total of 80 points, pertain to foreign direct investment. The last, with 20 points, obviously relates to portfolio flows. (See Table 10 for the results.)

Ireland stands out at the bottom end of the ranking with 28 points. Perhaps because until recently it had viewed itself as lagging economically within Europe, its policies are strongly oriented toward keeping capital at home.

Table 10. Summary of Investment Component

	Factor	Australia	Austria	Belgium	Canada	Denmark	Finland	France	Germany	Greece	Ireland	Italy	Japan	Nether-lands	New Zealand	Norway	Portugal	Spain	Sweden	Switzer-land	U.K.	U.S.
Political risk insurance	Multilateral Insurance?	10	10	10	10	10	10	10	10	10	10	10	10	10	5	10	10	10	10	10	10	10
	Official national agency?	15	15	15	15	15	15	15	15	15	0	15	15	15	0	15	15	15	15	15	15	15
	Agency monitor environment/ labor/ human rights?	0	0	–2	0	–2	–2	–2	0	0	0	0	0	0	0	0	–2	0	–2	0	0	0
	Investors in all sectors eligible?	0	–2	0	0	0	0	0	0	–2	0	0	0	0	0	0	–2	0	0	0	0	–2
	No inappropriate national economic interest tests?	0	–2	0	0	0	0	0	0	–2	0	0	0	0	0	0	0	0	0	0	0	–2
	Restrict extending coverage to inefficient import-substituting projects?	–2	–2	–2	–2	–2	–2	–2	–2	–2	0	–2	–2	–2	0	–2	–2	–2	0	0	0	–2
	International companies with a significant presence in this country eligible?	0	0	0	0	0	0	0	0	–2	0	0	0	0	0	0	–2	0	0	–2	–2	–2
Double taxation	Avoids double taxation?	20	18	18	20	18	18	20	20	18	0	18	18	18	5	18	18	20	18	16	18	18
	Doesn't let investors enjoy developing country tax incentives?	–2	–6	0	0	–6	–4	0	0	–6	0	–4	0	–2	0	0	0	0	–6	–6	0	0
	Treats foreign taxes as deductible rather than credit?	0	–10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Corrupt practices	OECD convention—participation level?	6	10	10	10	6	10	10	10	10	6	10	10	6	6	10	6	10	6	10	10	10
	Laws make avoidance easy?	–2	–2	–2	–2	–2	–2	–2	–2	–2	–2	–2	–2	–2	–2	–2	–2	–2	–2	–2	–2	–2
	EITI or other initiatives?	10	0	8	12	4	14	16	10	0	0	0	10	16	8	16	4	8	0	12	16	16
	Bribe Payers Index Quintile	4	4	3	4	2	2	2	3	2	2	1	2	3	2	2	2	2	4	4	2	2
	Strong leadership on EITI?	0	0	0	2	0	0	2	0	0	0	0	0	2	0	6	0	0	3	0	6	4
	Punish bribe payers or negligent about this?	–2	0	0	–2	0	0	–2	–4	0	0	0	–6	0	0	0	0	–6	0	0	0	–4
Other FDI	Official assistance in resolving investment disputes?	2	2	0	2	2	2	0	2	2	0	2	2	2	0	2	2	2	2	2	2	0
	Help set up investment promotion agencies?	3	3	0	3	3	3	0	3	0	0	3	3	3	2	0	3	3	3	3	3	3
	"Negative advocacy"?	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Portfolio	Support for design of securities institutions and regulations?	4	0	0	4	0	4	0	0	0	0	0	0	4	0	4	4	4	4	4	4	4
	No restrictions on pension fund investment?	0	0	4	0	0	2	0	0	4	0	0	4	4	4	0	4	0	4	4	4	4
	Support for portfolio flows?	12	0	12	12	12	0	0	12	0	12	12	0	12	12	12	12	12	12	12	12	6
Total		**78**	**38**	**74**	**88**	**60**	**70**	**67**	**77**	**45**	**28**	**63**	**64**	**89**	**42**	**91**	**70**	**76**	**71**	**82**	**98**	**78**

Migration

Migration is one of the thornier topics in the index. Though it is widely agreed that the effects of migration and migration policy on development are great, they have not been as extensively studied as those of aid and trade polices. There is no widely accepted analytical framework from the perspective of development, and little empirical evidence. In addition, there are data problems, including lack of comprehensive information on remittances and illegal immigration, and a paucity of internationally comparable information on rich countries' migration policies.

The CDI migration component is built on the conviction that migration advances development in source countries because it "provides immigrants with access to labor markets and higher wages which, in turn, increase the potential for individual immigrants to remit money or goods to the sending country…and enables migrants to establish migrant networks, which encourage continuous and expanding economic relations between sending and receiving countries." (Hamilton and Grieco, 2002)

In addition, freer flows of people, like freer flows of goods, should contribute to global convergence in factor markets. The easier it is for a Vietnamese woman to get a job in Japan, the more Nike will have to pay her to keep her sewing clothes in its Vietnam factories. And emigration of workers that are unskilled (by rich-world standards) should increase the wages of those who do not leave by reducing labor supply. It should be said that while freer migration may directly benefit rich countries too, it can lower pay for nationals facing more intense competition for their jobs. This is not a major consideration for the CDI, however, not because it doesn't worry us, but because the purpose of the CDI is to focus on effects on developing countries.

What happens when professionals leave developing countries—the so-called "brain drain"—is more heavily debated. Some worry that, say, the U.K. health care industry is emptying Ghanaian clinics of nurses. Even here, however, the harm is not obvious. Factors besides the emigration opportunities draw health professionals away from serving the poor, including low pay and terrible working conditions in public clinics. Meanwhile, sometimes professionals gain skills abroad and then return home: Returned Indian expatriates are playing a big role in the software and services boom in Bangalore. Even when professionals remain abroad, they often retain links with industry and research at home. And they send home money.

The 2006 migration component is descended from a design by Grieco and Hamilton (2004). They proposed taking a weighted average of six indicators:

1) gross non-DAC immigrant inflow/receiving-country population;

2) gross non-DAC immigrant inflow/total immigrant inflow;

3) net migrant inflow over five years/receiving-country population—this includes inflows from DAC countries too for lack of resolution in the data;

4) the difference between the unemployment rates for natives and immigrants, which is supposed to reflect barriers to immigrants entering the work force;

5) the share of foreign students that are from non-DAC countries; and

6) an index from the United Nations High Commissioner for Refugees (UNHCR) measuring countries' contributions to aiding refugees and asylum seekers.

The CDI adopts these recommendations with some substantial changes. It drops the second indicator because of conceptual overlap with the first. In place of indicator 3, it uses a series from a data set by Docquier and Marfouk (2005), commissioned by the World Bank. They use 1990 and 2000 census data to estimate immigrant stocks by country of origin and skill level, providing one of the first glimpses of differences in the movement of skilled and unskilled workers. The series used in the CDI is the change in the stock of immigrants from developing countries who are unskilled, meaning having no tertiary education. As far as this indicator goes then, unskilled immigration is rewarded while skilled immigration is treated neutrally, as a reflection of theoretical and empirical uncertainty about the effect of skilled migration on the sending country. This measure can be expected to count illegal immigrants, but may undercount them. As a net stock change measure it differs from a flow measure in being net of immigrant deaths during the period.

The CDI also includes indicator 1, which Jeanne Batalova of the Migration Policy Institute maintains by contacting national statistical agencies. In contrast with the Docquier and Marfouk series, this is a flow rather than a stock measure; it is gross, not net of outflows; it includes skilled migrants; it probably counts few illegal immigrants, since it is based on migration rather than census data; and is for the most recent available year rather than the 1990s as a whole. Taken together, the two indicators can be seen as two imperfect snapshots of migration patterns, each with advantages and disadvantages, and both strongly determined by the limits of available data. The net stock change measure, for example, allows the distinction between skilled and unskilled, but is old, thus a poorer indicator of current policy. Note that overall, skilled immigration is still rewarded, but less than unskilled migration, since it is counted in one of the two indicators. The two each get 32.5% of the weight in the migration component, for a total of 65%.

The CDI leaves out Grieco and Hamilton's indicator 4, the unemployment rate difference. Higher unemployment among immigrants might actually reflect the *greater* attractiveness of a country's labor market to foreign workers. "Unemployment," after all, is the state of not having a job, yet being in the job market. If there are many immigrants "in the market for a job," this could reflect policy barriers to employment, which the CDI ought to penalize, or policies that facilitate entrance to the market, which the CDI ought to reward. Because of this ambiguity in sign, it seemed appropriate to leave this indicator aside until there is more evidence to validate it one way or the other.

The CDI adopts Grieco and Hamilton's indicator 5, the share of the foreign student population that is non-DAC, without change. This deserves comment since it could be misleading. A country could host almost no non-DAC students, yet have a high non-DAC *ratio* if it hosts even fewer DAC students. Japan is a case in point. Its 2001 non-DAC student body was 60,687, which was 95% of its total foreign student body, the highest in the sample. But that was only 0.05% of Japan's population, which is barely above the 0.03% of Italy and Portugal, which are lowest on this measure, and far behind Australia's 0.47%. The essential question is, which indicator is more likely to capture differences in *policy*—non-DAC students/total foreign students or non-DAC students/total population? For students much more than unskilled workers, language is likely to be a major non-policy barrier, and probably does much to explain Japan's low foreign student numbers across the board. It seems more meaningful, then, to abstract from the predominantly non-policy factors that

reduce the foreign student body altogether, by taking foreign student population as the denominator. The data are from the OECD (2005b).

The CDI also uses a simplified version of the UNHCR index. The CGD version is computed as total of three quantities, all taken over receiving-country GDP: the number of refugees hosted domestically; the number of other people "of concern" to UNHCR, such as those internally displaced; and the number of asylum applications taken.[26]

In 2006, B. Lindsay Lowell and Valerie Edwards Carro of the Institute for the Study of International Migration at Georgetown University took on the difficult task of developing additional indicators for the component (Lowell and Carro 2006). They proposed the following for consideration:

1) Financial contributions to the International Organization for Migration and UNHCR.

2) Membership in various U.N. and International Labour Organization (ILO) conventions. Namely: the ILO Migration for Employment Convention (number C97, 1949), Equality of Treatment (Social Security) Convention (C118, 1962), Migrations in Abusive Conditions (C143, 1975), Maintenance of Social Security Rights (C157, 1982); and the U.N. Convention Relating to the Status of Refugees (1951), Protocol Relating to the Status of Refugees (1967), ICPMW (1990), Convention against Transnational Organized Crime (2000), Trafficking Protocol (2000), and Smuggling Protocol (2000).

3) An indicator of whether foreigners pay higher tuition at a country's universities, this being penalized.

4) The number of resident foreign-born people with tertiary education, low being rewarded.

5) An indicator of the government's intentions, reported by knowledgeable officials to a particular U.N. agency, about whether it plans to increase, hold steady, or decrease skilled immigration flows, prospective decreases being rewarded.

6) A pair of similar indicators of prospective changes in openness to unskilled immigrants and inducements for them to return, both being rewarded.

7) An indicator of how much a donor's aid goes to the countries its immigrants come from.

In the end, only indicator 3 made it into the CDI. Nevertheless, Lowell and Carro's work is valuable in demonstrating that we have for now hit diminishing returns to design effort on the migration component, which highlights the need for researchers and governments to improve collective understanding of the issues and improve the data.

The concern with indicator 1 is that it is already counted as aid, thus factored into the aid component; and it is not clear that the ILO and UNHCR represent a particularly high-value use of aid or are nearly as important to most migrants as the donors' own immigration policies. As for in-

[26] The UNHCR ranks all countries—not just rich countries—on the three indicators, averages the ranks, then reorders the countries and assigns final ranks.

dicator 2, Lowell and Carro doubted the practical importance of these treaties and gave them little weight. Indicator 4 penalizes brain drain but the CDI historically has not done so. Forthcoming work by CGD fellow Michael Clemens is likely to strongly question the seeming worst-case example of brain drain, the departure of health professionals from Africa. As suggested above, emigration appears to be a minor factor in the lack of access among poor Africans to good health care. Indicators 5 and 6 are based on *predictions* of future policy *changes* rather than *evidence* of past policy *states* and therefore are not consistent with the CDI construct. Finally, indicator 7 overlaps with the CDI aid component. In addition, it is premised on the debatable argument that countries where people are hostile to the influx of migrants ought to be proactive about improving conditions back home for would-be migrants, so they feel less compelled to leave. But to avoid complicated normative debates—do Guatemalan villagers deserve aid more than those in Benin because it is relatively practical for them to come to the United States?—the CDI strives for utilitarianism, simply asking where aid will do the most good. Thus the pertinent question is whether there is an *interaction* that makes aid more valuable in countries that are major sources of a donor's immigrants. There appears to be no evidence of this.

Indicator 3, however, offers a nice complement to Grieco and Hamilton's statistic on foreign-born students since it is a more direct measure of policy. The OECD (2005b) reports on whether foreign students in general, or, for some European countries, non-European students, pay higher or the same tuition as nationals at public universities—or get in free, along with nationals. The three possibilities are translated into a 3-point scale.

Accepting the considered judgment of Grieco and Hamilton (2004), openness to foreign students, now comprising two indicators, gets 15% weight; and the modified UNHCR index gets 20%. The 15% for foreign students is now split between the outcome indicator, the share of foreign students who are from developing countries, and the policy indicator, on tuition levels. The remaining weight goes to the indicators of migration flows. Before combining the various measures, each is rescaled so that the back-calculated scores for 2003, the CDI's first year, average 5.0. Table 11 shows the calculations. Austria and Switzerland emerge on top. The major reason appears to be their acceptance of immigrants form the nearby the former Yugoslavia, which many people fled in the 1990s.

Table 11. Summary of migration component

	Non-DAC immigrant gross inflow, most recent available year		Net stock change, unskilled non-DAC immigrants, 1990–2000		Non-DAC students		Tuition for foreigners		Refugee population[1] + asylum applications, 2004		
	% of population	Standardized score	% of population	Standardized score	% of foreign students, 2003[2]	Standardized score	Points	Standardized score	Per billion $ PPP GDP	Standardized score	**Overall**
Australia	0.41	3.9	2.9	11.6	83	6.7	1	2.8	118.2	2.5	**6.4**
Austria	1.05	10.2	4.1	16.1	52	4.2	1	2.8	311.0	6.7	**10.5**
Belgium	0.34	3.3	0.2	0.8	49	3.9	1	2.8	176.9	3.8	**2.6**
Canada	0.66	6.3	0.9	3.6	63	5.1	1	2.8	193.9	4.2	**4.7**
Denmark	0.29	2.8	1.0	4.1	73	5.9	3	8.5	402.2	8.6	**5.0**
Finland	0.18	1.7	0.6	2.3	72	5.8	3	8.5	95.0	2.0	**2.7**
France	0.22	2.1	0.3	1.1	82	6.6	2	5.7	146.6	3.1	**2.6**
Germany	0.64	6.2	1.0	4.1	76	6.1	3	8.5	433.7	9.3	**6.2**
Greece	0.08	0.8	0.1	0.2	99	7.9	2	5.7	72.3	1.6	**1.7**
Ireland	0.89	8.6	0.6	2.4	37	3.0	1	2.8	142.8	3.1	**4.6**
Italy	0.50	4.9	0.6	2.4	65	5.2	2	5.7	14.9	0.3	**3.2**
Japan	0.25	2.4	–0.1	–0.3	96	7.7	2	5.7	0.8	0.0	**1.7**
Netherlands	0.31	3.0	1.5	5.8	48	3.8	1	2.8	325.1	7.0	**4.8**
New Zealand	0.72	7.0	2.7	10.7	88	7.1	1	2.8	69.6	1.5	**6.9**
Norway	0.40	3.9	0.9	3.7	51	4.1	3	8.5	297.3	6.4	**4.6**
Portugal	0.12	1.2	0.1	0.3	79	6.3	2	5.7	2.4	0.1	**1.4**
Spain	0.90	8.7	1.3	5.0	47	3.8	2	5.7	10.3	0.2	**5.2**
Sweden	0.38	3.7	0.8	3.0	36	2.9	3	8.5	456.3	9.8	**4.8**
Switzerland	0.45	4.4	4.7	18.5	37	2.9	1	2.8	372.9	8.0	**9.5**
United Kingdom	0.22	2.1	0.4	1.7	53	4.3	1	2.8	198.9	4.3	**2.6**
United States	0.30	2.9	2.0	8.0	79	6.3	1	2.8	62.5	1.3	**4.6**
Average[3]	0.52		1.27		62		1.8		233.0		
Weight		32.5%		32.5%		7.5%		7.5%		20%	

[1]"People of concern" to the U.N. High Commissioner for Refugees. [2]Canada data for 2000. [3]Average is based on the scores from the current methodology back-calculated to the 2003 CDI edition, i.e., based on data that would have been current in 2003.

Environment

The environmental realm offers a wealth of potential indicators, but ones that are expressed in various units. Considerations run from treaty ratifications to dollar amounts of subsidies to rates of pollution. The approach taken in the component, as with migration, is to choose a set of indicators, translate each onto a standard scale, then combine them in a weighted average. Roodman (2003) set forth the original design. In 2005, Amy Cassara and Daniel Prager (2005) of the World Resources Institute proposed a revamping, dropping a few old indicators and adding a collection of new ones that deepened the component. The CDI version differs from their initial proposal in number of ways. Some of the changes the authors suggested in response to reviewers' comments; others CGD made.

In particular, the indicator on net coffee imports per capita, which was included last year at the recommendation of Cassara and Prager, was dropped this year. The rationale was that modern coffee is industrialized, typical occurring in ways that contribute deforestation and soil erosion. High coffee imports in rich countries were thus taken as a sign of their governments' failure to act responsibly. But coffee cultivation does good too. Around 100 million people depend on coffee for their livelihoods, which is why the trade component rewards coffee imports. Because of this ambiguity, it seemed best to drop the indicator. This necessitated adjusting weights on some indicators to keep the sum at 100%.

The CDI version contains indicators in three major areas: global climate, fisheries, and biodiversity and global ecosystems. Each indicator is assigned either 5%, 10%, or 15% weight in the whole. Most of the indicators are translated into standardized scores in the usual CDI way, such that 5 is average in the reference year of 2003 (meaning in the back-calculated 2003 edition of the current methodology, for which pre-2003 data would be used) while 0 indicates the complete absence of a good (such as gasoline taxes) or 10 indicates complete absence of a bad (such as greenhouse gas emissions). Exceptions are noted below. Table 12 shows results on all the indicators and Table 13 shows the standardized scores. The indicators are:

1) Global climate (50% of total)

   a) Greenhouse gas emissions per capita (10%). The risks of climate change bear particularly on developing countries in part because they have less capacity to adapt. Climate change could affect agriculture and aid in the spread of diseases such as malaria and cholera (Gross 2002). The numerator includes many different gases converted to carbon dioxide–equivalent amounts. Population rather than GDP is the denominator in order to avoid sending the odd message that the richer a country is, the more acceptable it is for it to harm shared resources. Emissions, of course, are not a policy but an outcome. But policies ranging from land use planning to utility regulation do affect emissions, and are themselves hard to quantify.
   b) Average annual change in greenhouse gas emissions per unit GDP, last 10 years (10%). Most rich countries' economies are growing faster than their emissions, so that their greenhouse gas intensity (emissions/GDP) is falling. Their economic growth tends to take place in low-polluting industries such as information technology. But *differences* in the rate of decline may be a relatively good proxy for policy. Two countries where the decline has been fastest—indeed, where emissions have declined in absolute terms—are Denmark and the United Kingdom. The Danish government recently achieved a goal it set in the early 1990s to generate one-tenth of the country's electricity from wind. The United Kingdom's drop is thanks in no small part to rising gas taxes and subsidies for renewable energy sources. The rates in the CDI are "least squares" decline rates for the last 10 years of available data—1994–2004 for the 2006 CDI. If decline rates were constant in percentage terms over time, then graphs of the log of emissions/GDP over time would be perfectly linear. In reality, the graphs are not perfectly linear, so log emissions/GDP is regressed on time to find the best fit, and the corresponding average decline rate. This least squares approach, in contrast to the more obvious approach of looking at the difference between 1994 and 2004 levels, reduces sensitivity to aberrations, such as a cold winter, in the end-point years. The GDP figures are converted to dollars on a purchasing power parity (PPP) basis.
   c) Gasoline taxes in PPP dollars per liter (10%). Gasoline taxes are indicative of motor fuel taxes in general (the other major fuel being diesel), which are collectively the major form of

energy taxation in most rich countries. And there is a clear negative correlation across CDI countries between motor fuel taxes and motor fuel use (Roodman 1998).

d) Consumption of ozone-depleting substances per capita (10%). Pursuant to the Montreal Protocol on Substances that Deplete the Ozone Layer, rich countries have radically reduced their consumption and production of ozone-depleting substances since a hole was discovered in the ozone layer over the Arctic in the 1980s. And more reductions can be expected as countries comply with increasingly tight limits on the chemicals. The indicator used here is consumption of ozone-depleting substances on an ozone-depleting-potential (ODP) basis, for 2003, the latest year with complete data. ODP-tons are a unit analogous to CO_2-equivalent tons of greenhouse gas emissions, allowing comparison of several different chemicals. The total includes chlorfluorocarbons (CFCs), hydrochlorfluorocarbons (HCFCs), halons, other fully halogenated CFCs, methyl chloroform, and methyl bromide. As with greenhouse gases, consumption of ozone-depleting substances is divided by population. Since the European Union reports as a single country under the Montreal Protocol, all 14 EU members scored for this index receive the same mark on this indicator.
e) Ratification of the Kyoto Protocol (10%). Finalized in 1997, this is the most important international effort to date to prevent climate change. It set important precedents by establishing emissions targets for industrial countries, and opening the way for international trading in emissions rights. Russia ratified the treaty in November 2004; as a result, it went into effect 90 days later, with Australia and the United States remaining outside the treaty. This is a rare indicator with both a clear minimum (no ratification) and clear maximum (ratification). So in a departure from the usual scaling rules, a country gets a simple 10 points for ratification, so that the averages score is 9 rather than 5.

2) Fisheries (10% of total)

a) Fishing subsidies per capita (5%). Marine fisheries are most heavily exploited by rich countries, sometimes at the immediate expense of fishers from poorer countries. Half of all major marine fisheries are now fully exploited, and another quarter are overexploited, or have experienced a crash (FAO 2000). Most rich countries subsidize their fishing fleets. Landlocked Austria and Switzerland naturally do not. Dollar values for the subsidies are from OECD (2005). In a change from last year, they only include direct payments and cost-reducing transfers but exclude general services, such as funding for the coast guard, fisheries management, membership in international organizations, and infrastructure construction, since the latter do not obviously increase fishing effort in waters near developing countries.[27]
b) Ratification of the United Nations Agreement for the Implementation of the Provisions of the United Nations Convention on the Law of the Sea relating to the Conservation and Management of Straddling Fish Stocks and Highly Migratory Fish Stocks (5%). The U.N. fisheries agreement is a treaty that helps nations coordinate management of fish stocks that migrate or are in international waters, including whales. It went into effect in 2001 and most rich countries have signed on to it—and most therefore get 10 points on this indicator.

3) Biodiversity and global ecosystems (40% of total)

[27] I thank Otto Gregussen for pointing us to this improvement.

a) Imports per capita of selected threatened species under the Convention on International Trade in Endangered Species of Wild Flora and Fauna (10%). Counted are imports of seven indicator species: live parrots, live coral, live lizards, crocodile skins, cat skins, lizard skins, and snake skins. Importing endangered or controlled species heightens their risk of extinction and, due to unregulated harvesting, can further damage the ecosystems from which they are collected (Cassara and Prager 2005).
b) Ratification of the Convention on Biodiversity (5%). The Convention on Biological Diversity was one contribution to international law from the 1992 "Earth Summit" in Rio de Janeiro. The convention takes a first step toward international cooperation to protect the diversity of life. "The CBD establishes three main goals: the conservation of biodiversity, sustainable use of the components of biodiversity, and sharing the benefits arising from the commercial and other utilization of genetic resources in a fair and equitable way. Nations that ratify the treaty agree to create national action plans that incorporate the preservation of biodiversity into numerous sectors such as forestry, agriculture, fisheries, and energy." (Cassara and Prager 2005) Like the other treaty indicators, this one gives a simple 10 points for ratification.
c) Value of tropical timber imports per capita (15%). Perhaps no other commodity import from developing countries is associated with as much environmental destruction as tropical wood. Some 70,000–170,000 square kilometers of tropical forests disappear annually in Latin America, Africa, and Asia. Although there are short-term economic benefits for some in the exporting countries, the lion's share of the income goes to a small group of timber company owners and the government rent-seekers that control timber licenses, while harming those who harvest wood more sustainably or harvest non-timber forest products such as wicker. Timber imports are not obviously a proxy for policy, but Cassara and Prager argue that rich-country governments have a responsibility to the global environmental impact of their societies, so that high imports indicate a failure to act. Because tropical timber ships in many forms—various species, plywood, pulp—it is difficult to measure total imports in physical units. So the dollar value of imports is used.[28] Some small European countries have extremely high tropical timber imports per capita, probably because they are ports of entry for the entire continent. So all 16 scored European nations are assigned the same, averaged score. Imports data are from the United Nations Commodity Trade Statistics Database.
d) Presence of explicit policy to regulate imports of illegally cut timber (5%). This is a more direct and qualitative policy indicator relating to tropical timber. More that half the timber felled in Southeast Asia and South America is harvested in ways that violate the countries' own laws. Some rich countries have adopted policies to limit imports of such wood; they get a full 10 points on the indicator. Countries get a 5 if such a policy is being developed. If it is not in process, they still get 2.5 points if they have signed agreements with some timber exporting nations to limit such exports.

The United Kingdom tops the environment standings with rapidly declining greenhouse gas emissions intensity, high gasoline taxes, active participation in global environmental governance, and a policy to regulate illegal timber imports. The United States is last because of high greenhouse gas emissions, low gas taxes, and refusal to sign environmental treaties.

[28] Tropical timber is defined as all goods in Harmonized System 2-digit codes 44 and 45 coming from non-CDI countries.

Table 12. Indicators used in environment component

	Global climate					Fisheries		Biodiversity and global ecosystems			
	Greenhouse gas emissions/capita, 2004 (tons CO_2 equivalent)	Annual change in greenhouse gas emissions/ PPP GDP, 1994–2004 (%)	Gasoline taxes, 2004 (PPP / liter)	Consumption of ozone–depleting substances/ capita, 2003 (ODP metric tons)	Kyoto Protocol ratification, end-2005	Fishing subsidies/ capita, 2003 ($)	UN Fisheries Agreement ratification, end-2005	Imports of selected species/ capita, 2002	Convention on Biodiversity ratification, end-2004	Tropical timber imports/ capita, 2003 ($)	Policy to regulate illegal timber, end-2005
Australia	28.5	–1.3	0.34	12.9		3.2		0.0	✓	13.4	No
Austria	11.3	–1.0	0.64	39.6	✓	0.0	✓	1.7	✓	13.2	In Process
Belgium	15.7	–2.3	0.85	39.6	✓	0.1	✓	1.6	✓	13.2	In Process
Canada	23.4	–1.9	0.24	25.9	✓	8.1	✓	2.1	✓	5.9	No
Denmark	12.8	–4.0	0.68	39.6	✓	8.5	✓	1.8	✓	13.2	Yes
Finland	16.5	–2.3	0.85	39.6	✓	0.6	✓	0.2	✓	13.2	In Process
France	9.5	–2.4	0.85	39.6	✓	0.6	✓	6.7	✓	13.2	In Process
Germany	12.4	–2.4	0.87	39.6	✓	0.1	✓	5.3	✓	13.2	Yes
Greece	12.8	–2.0	0.60	39.6	✓	6.8	✓	2.8	✓	13.2	In Process
Ireland	17.4	–7.0	0.60	39.6	✓	1.5	✓	0.0	✓	13.2	In Process
Italy	9.9	–0.5	0.89	39.6	✓	1.7	✓	11.5	✓	13.2	In Process
Japan	10.9	–0.7	0.45	28.5	✓	0.3		3.2	✓	26.7	In Process
Netherlands	13.8	–3.5	0.94	39.6	✓	0.0	✓	1.7	✓	13.2	Yes
N. Zealand	19.0	–0.9	0.37	11.0	✓	0.0	✓	0.2	✓	7.3	No[1]
Norway	12.7	–1.4	0.70	22.2	✓	3.7	✓	0.4	✓	13.2	In Process
Portugal	7.8	–0.4	1.04	39.6	✓	0.1	✓	2.4	✓	13.2	In Process
Spain	10.6	–0.4	0.67	39.6	✓	7.5	✓	10.6	✓	13.2	In Process
Sweden	8.0	–3.6	0.73	39.6	✓	0.6	✓	1.5	✓	13.2	In Process
Switzerland	7.0	–1.5	0.47	4.5	✓	0.0		8.7	✓	13.2	In Process
U.K.	10.9	–3.8	0.96	39.6	✓	0.0	✓	1.1	✓	13.2	Yes
U.S.	24.5	–2.2	0.10	36.8		0.6	✓	5.2		12.4	No

[1] Does have agreements with individual developing countries.

Table 13. Summary of environment component

	Global climate					Fisheries		Biodiversity and global ecosystems				
	Greenhouse gas emissions/ capita	Annual % change in greenhouse gas emissions/ GDP	Gasoline taxes	Consumption of ozone–depleting substances	Kyoto Protocol ratification	Fishing subsidies	UN Fisheries Agreement ratification	Imports of selected species	Convention on Biodiversity ratification	Tropical timber imports/ capita	Presence of policy to regulate illegal timber	**Overall**
Australia	–0.2	3.3	2.9	8.7	0.0	–0.3	10.0	10.0	10.0	3.0	0.0	**3.9**
Austria	5.9	2.5	5.4	6.1	10.0	10.0	10.0	7.9	10.0	3.1	5.0	**6.2**
Belgium	4.4	5.8	7.2	6.1	10.0	9.7	10.0	7.9	10.0	3.1	5.0	**6.6**
Canada	1.6	4.7	2.0	7.5	10.0	–16.1	10.0	7.2	10.0	6.9	0.0	**4.5**
Denmark	5.4	10.0	5.7	6.1	10.0	–17.4	10.0	7.6	10.0	3.1	10.0	**6.1**
Finland	4.1	5.8	7.1	6.1	10.0	8.2	10.0	9.7	10.0	3.1	5.0	**6.7**
France	6.6	6.0	7.2	6.1	10.0	8.0	10.0	1.3	10.0	3.1	5.0	**6.1**
Germany	5.6	5.9	7.3	6.1	10.0	9.8	10.0	3.2	10.0	3.1	10.0	**6.7**
Greece	5.4	5.0	5.1	6.1	10.0	–11.8	10.0	6.4	10.0	3.1	5.0	**5.2**
Ireland	3.7	17.6	5.1	6.1	10.0	5.2	10.0	10.0	10.0	3.1	5.0	**7.5**
Italy	6.4	1.1	7.5	6.1	10.0	4.4	10.0	–4.9	10.0	3.1	5.0	**4.8**
Japan	6.1	1.8	3.8	7.2	10.0	8.9	0.0	5.9	10.0	–4.0	5.0	**4.3**
Netherlands	5.1	8.8	7.9	6.1	10.0	10.0	10.0	7.8	10.0	3.1	10.0	**7.5**
N. Zealand	3.2	2.3	3.1	8.9	10.0	10.0	10.0	9.7	10.0	6.2	2.5	**6.4**
Norway	5.4	3.4	5.9	7.8	10.0	–2.0	10.0	9.4	10.0	3.1	5.0	**6.1**
Portugal	7.2	0.9	8.7	6.1	10.0	9.7	10.0	6.9	10.0	3.1	5.0	**6.4**
Spain	6.2	1.0	5.7	6.1	10.0	–14.1	10.0	–3.7	10.0	3.1	5.0	**3.8**
Sweden	7.1	9.0	6.1	6.1	10.0	8.2	10.0	8.1	10.0	3.1	5.0	**7.0**
Switzerland	7.5	3.7	4.0	9.6	10.0	10.0	0.0	–1.2	10.0	3.1	5.0	**5.3**
U.K.	6.1	9.6	8.0	6.1	10.0	10.0	10.0	8.6	10.0	3.1	10.0	**7.8**
U.S.	1.2	5.6	0.9	6.4	0.0	8.0	10.0	3.2	0.0	3.5	0.0	**3.2**
Weight	10%	10%	10%	10%	10%	5%	5%	10%	5%	15%	10%	

Security

Internal stability and freedom from fear of external attack are prerequisites for development. Sometimes a nation's security is enhanced by the actions of other nations. But as recent events have made obvious, one person's liberation is another's destructive intervention, so choosing what to reward or penalize in the CDI is inherently controversial.

The 2004 security component, done under the guidance of Michael O'Hanlon and Adriana Lins de Albuquerque of the Brookings Institution (2004), counted contributions to peacekeeping operations and forcible humanitarian interventions. The 2005 version—carried over unchanged to 2006—added two new sections to the component, on protection of sea lanes for global trade and on arms exports.

Peacekeeping and humanitarian interventions carry 50% weight in the component. Examples of operations counted include the Australian-led intervention in East Timor in 1999 to halt Indonesian repression after the territory had voted for independence, and the NATO-led war against the Serbian army in Kosovo. The component uses data from 1993 to 2004, the latest year with data. The rationale for this long period is that total government contributions to such operations is a particularly volatile variable—Kosovo's and East Timor's do not come along that often. A decade of history gives more insight than two years into a government's *current* capacity and willingness to intervene.

Because of the inherent controversy in choosing which rich-country interventions to reward, it seems essential for validity, in considering the universe of interventions over the last decade or so, to apply either a weighting system in counting interventions—analogous to the aid component's weighting based on recipient poverty and governance—or a filter, which is actually an extreme form of weighting. The CDI follows O'Hanlon and de Albuquerque's advice for a filter: it only counts operations that have been endorsed by an international body such as the U.N. Security Council, NATO, or the African Union.[29]

To be precise, five costs of peacekeeping and humanitarian interventions are counted, all taken as a share of rich-country GDP:

1) Dollar contributions to the U.N. peacekeeping budget. These are averaged over 1998–2004. Data were not available for 1993–97.

2) The cost of *maintaining capacity* for contributing personnel to U.N.-run peacekeeping operations. To estimate this, a country's *peak* personnel contribution to such operations during 1993–2004 as a share of its standing military forces is computed. This percentage is then applied to its military budget for the year.

3) The cost of *deploying* personnel in U.N.-run peacekeeping operations. This is estimated at $9,000/person/month. (The full cost is estimated at $10,000, but the U.N. reimburses contributing countries at the rate of about $1,000/person/month.) This too is averaged over 1993–2004.

[29] The component excludes a pair of operations that technically make it through the filter: the U.S. and French peacekeeping interventions in Rwanda immediately after the genocide and revolution in 1994. These interventions were approved by the U.N. Security Council, but the overall behavior of rich countries with respect to Rwanda during the genocide was totally contrary to the spirit of this component.

4) The cost of maintaining capacity for contributing personnel to peacekeeping and forcible humanitarian operations that are *not* U.N.-run but receive international approval. This is calculated in the same way as item 2. (Table 14 lists operations counted.)

5) The cost of *deploying* personnel in such non-U.N. operations—calculated the same way as item 3, except using $10,000/person/month.

Two aspects of the methodology need to be explained. First, in a departure from O'Hanlon and de Albuquerque, all the tabulations incorporate a discount rate of 7%/annum, equivalent to 50%/decade, on the grounds that a recent contribution is more indicative of present policy stance than an old one. Thus the averages described above are weighted averages, with each year getting 7% less weight than the next. And the peaks are discounted too. Absent the discounting, we would face each year a choice between dropping the oldest year's data as we shift the time frame forward, which could introduce unrealistic discontinuities, and expanding the time frame across which equal weighting occurs, a choice that, if perpetuated for many years, would create absurdities as ancient events received as much weight as current ones. The discounting allows us to formally expand the time frame while smoothly phasing out old data.

Second, neither the U.S.-led invasion of Iraq nor the "postwar" military presence approved by the U.N. Security Council on October 16, 2003 are counted. The invasion is left out because it lacked an international imprimatur. The later, U.N.-approved operations technically pass through the filter. However, including them would completely change the security component results and would go against the spirit of the filter, rewarding the United States, and, to a lesser extent, Britain, for spending hugely to continue a "job" that never won approval from the international community. Nevertheless, the exception here is large and problematic enough that the CDI spreadsheet has been constructed to allow users to investigate the effects of counting Iraq operations after October 16, 2003.[30,31]

The security component also attempts to capture the contribution that global sea powers make by securing important international trading routes against piracy or threat from hostile governments. The approach, developed by O'Hanlon, is rough but ready. His short note describing it reads in substantial part:

> Based on the premise that key ocean trading routes require some level of protection or presence, even today, to ensure their availability for global trade—a necessary feature of any development strategy—we estimate here the corresponding financial contributions (in dollar equivalent value) of the 21 CGD countries for this purpose. Deployments to the Mediterranean, Persian Gulf, Western Pacific including Northeast Asia and the Indonesian Straits, and Indian Ocean are all viewed as serving this purpose. (Deployments in the Caribbean are not, given the relatively benign character of those waters; the Mediterranean is a judgment call, but included here nonetheless.) The presence of ships in these waters can reduce and deter piracy, reduce the chances that countries in Southeast Asia will use force to compete for disputed resources in the South China Sea, and possibly lower the risks of terrorism against a merchant ship in key shipping lanes.

[30] O'Hanlon has argued for excluding all military and security operations in Iraq on the grounds that they are motivated primarily by national security rather than development interests.
[31] See cells K103 and K104 of the "Security 2006" sheet of the detailed index workbook, available under "Data & Graphs" at www.cgdev.org/cdi.

> The methodology is simple. The fraction of a country's Navy ships typically deployed for such purposes is calculated (using data from IISS's *Military Balance*), and multiplied by the country's Navy budget (or an estimate of it, where need be—assuming somewhat crudely that whatever the Navy's fraction of a country's total military manpower might be, that is also the fraction of its defense budget allocated to naval forces). This may understate a fair estimate of actual contributions, since ships cannot be continuously deployed (so it typically takes 3x or 4x ships in the fleet to keep x deployed). But it may also overstate, in some ways, given that those deployed ships clearly have other tasks besides defending sea lanes. Also, this approach implicitly assumes that aircraft and other naval assets are deployed roughly in comparable proportions to how ships are deployed.

The details of the calculations are in Table 16. The underlying data come from the Institute for International Strategic Studies (2006).

Finally, there is a penalty for certain arms exports, which was developed in consultation with O'Hanlon.[32] The question of how and whether to penalize arms exports to developing countries has been with the CDI project since the start, and the absence of any penalty in the first two editions was noted by commentators such as Picciotto (2003) and the U.K. House of Commons International Development Committee (2004). Certainly, putting weapons in the hands of despots can increase repression at home and the temptation for military adventures abroad. And when the weapons are sold instead of given, they siphon away money that could be better spent on teachers or transit systems. But arms exports are not always bad. Countries need guns as well as butter. Arming a police force can strengthen the rule of law. But it is not obvious how to develop a defensible system for deciding which exports to penalize and which not.

Since 2005, the CDI has contained what can be seen as an attempt at consensus on how to judge rich countries' overall policies on arms exports. It starts with a database maintained by the Stockholm International Peace Research Institute on transfers of major conventional weapons systems, broken down by importer-exporter pair.[33] The SIPRI database does not distinguish between market-price sales, subsidized sales, and outright grants. In fact, because the value of transfers is often difficult to determine from press reports and other sources, SIPRI uses standard conversion factors—say, $100 million each for a certain class of fighter jet—to express transfers in dollar terms, yielding what it calls "trend indicator values."

The arms export penalty works from these data, weighting arms exports depending on which countries they go to. To be precise, three weights are applied multiplicatively. The first depends on how democratic the recipient is, according to the subcomponent of the Kaufmann-Kraay index on "voice and accountability." Sales to countries above average on this index (above 0) are zeroed out. Sales to those below average are multiplied by the recipient's (negative) voice and accountability score. Thus the CDI is neutral on arms exports to governments that are reasonably accountable to the governed and penalizes those to undemocratic governments. Second is a weight based on how heavily recipients spend on the military in general. Exports to those that spend below average for developing countries (2.4% of GDP for those countries with data in the World Bank's *World Development Indicators* for 2004) also get 0 weight. This is meant to acknowledge that military spending—and arms exports—can be appropriate up to some point in every country. Exports to the rest are weighted by the extent to which their spending exceeds the average. Last is a weight based on

[32] Ethan Kapstein's advice was also critical.
[33] I thank Michiko Yamashita for alerting us to this data set.

the recipient's GDP/capita—the same as is used to weight aid in the selectivity calculation of the aid component. This is meant to capture the opportunity cost of giving arms to the poorest countries. Whether sold or granted, the resources used to arm the poorest countries have high opportunity cost if they come at the expense of meeting basic needs. Thus exports to the poorest countries, provided they are relatively unaccountable and heavy military spenders, are penalized more heavily. For lack of data, exports of machine guns and other small arms are not included in the SIPRI database, thus neither in the CDI.

The upshot of the first two factors is that exports to only 12 countries that received arms transfers from CDI countries according to SIPRI data are actually penalized. Table 17 shows the weight derivation for these countries and their total imports according to SIPRI. It is evident that exports to a handful of nations in the Middle East and South Asia drive the results. Because arms exports, like armed interventions, are volatile in quantity from year to year, here too multi-year discounted averages are taken. We use a discount rate of 13% per annum, so that sales five years ago matter half as much as today's. This rate is higher than that for armed interventions because arms exports policy is more changeable. Table 18 runs the arms exports numbers.

The three major sections of the security component are combined as follows. Since the final results for humanitarian interventions and sea lanes protection are both government spending as fractions of GDP, they are simply added together. The results are put on the standard mean-5 scale, as are those for arms exports, and the two are averaged in a 75/25 ratio.

Table 19 computes the overall security results for 2006. Despite the obvious willingness of the United States to spend heavily on overseas engagements, it scores about average on peacekeeping and humanitarian interventions since activities in Iraq are not counted, while those with U.N. or NATO backing in the former Yugloslavia (with relatively heavy European involvement) are. Switzerland and Japan score lowest in this department. Japan has a strong constitutional and cultural commitment to peaceful conflict resolution. And Switzerland has an ancient tradition of neutrality. It did not join the United Nations until 2002. On arms exports, France, the United Kingdom, and the United States are more than twice as bad as average, and so get negative scores. Meanwhile, seven countries, including Japan, had no reported exports to penalized countries during 1995–2004, and so get perfect 10's on this subcomponent. Overall, Australia and Norway tie for first in 2006.

Table 14. Non–U.N.-run military operations counted in CDI security component

Where	When	Major participants
Afghanistan (postwar)	2001–present	Canada, France, Germany, Italy, Spain, U.K.
Albania (aid for Kosovo refugees)	1999	Italy
Bosnia[1]	1996–present	Austria, Belgium, Canada, Denmark, Finland, France, Germany, Greece, Italy, Netherlands, Norway, Portugal, Spain, Sweden, U.K., U.S.
Bougainville, Papua New Guinea	1998–2003	Australia, New Zealand
Côte d'Ivoire	2002–03	France
East Timor	1999–2000	Australia
Egypt and Israel	1982–present	U.S.
Haiti	1994–95	U.S.
Kosovo (air war)	1999	Belgium, France, Germany, Italy, Netherlands, U.K., U.S.
Kosovo (postwar)[2]	1999–present	Germany, Italy, Netherlands, Norway, Portugal, Spain, Sweden, U.K., U.S.
Iraq (Northern no-fly zone)	1997–2003	U.K., U.S.
Sierra Leone	2000	U.K.
Solomon Islands	2003–04	Australia, New Zealand
Somalia	1992–93	U.S.

[1]Includes implementation force (IFOR), stabilization force (SFOR), and operation Deliberate Forge.
[2]Includes operation Joint Guardian and Kosovo Force (KFOR).

Table 15. Summary of measurement of contributions to peacekeeping and forcible humanitarian interventions, as percentages of GDP

	U.N.-run peacekeeping operations and humanitarian interventions			Non–U.N.-run PKO and humanitarian interventions		
	Contributions to U.N. peacekeeping budget	Cost of maintaining personnel capacity	Cost of using personnel	Cost of maintaining personnel capacity	Cost of using personnel	Total
Australia	0.017	0.048	0.007	0.011	0.153	0.235
Austria	0.034	0.012	0.008	0.017	0.014	0.085
Belgium	0.015	0.012	0.008	0.033	0.035	0.104
Canada	0.015	0.028	0.006	0.023	0.053	0.124
Denmark	0.021	0.044	0.007	0.048	0.066	0.186
Finland	0.056	0.030	0.007	0.043	0.043	0.179
France	0.012	0.025	0.010	0.038	0.062	0.146
Germany	0.002	0.002	0.008	0.026	0.039	0.077
Greece	0.002	0.001	0.006	0.077	0.043	0.130
Ireland	0.079	0.040	0.004	0.008	0.010	0.141
Italy	0.001	0.002	0.008	0.037	0.063	0.111
Japan	0.000	0.002	0.008	0.000	0.000	0.011
Netherlands	0.013	0.028	0.007	0.046	0.073	0.167
New Zealand	0.048	0.084	0.007	0.015	0.053	0.207
Norway	0.039	0.072	0.006	0.051	0.079	0.247
Portugal	0.049	0.031	0.007	0.038	0.029	0.154
Spain	0.001	0.001	0.007	0.027	0.021	0.058
Sweden	0.017	0.026	0.008	0.025	0.046	0.122
Switzerland	0.001	0.003	0.001	0.003	0.013	0.021
U.K.	0.010	0.032	0.008	0.042	0.146	0.238
United States	0.001	0.004	0.005	0.016	0.101	0.127

Table 16. Details of calculation of contribution to protecting sea lanes

	Major ships in fleet							Deployed near sea lanes							
	Submarines	Principal surface combatants	Mine warfare	Amphibious	Combat logistics	Sealift	A. Total	Description	B. Count	C. Naval personnel (1000)	D. Total military personnel (1000)	E. Defense spending (million $)	F. Total contribution (million $, B/A × C/D × E)	G. GDP (billion $, market prices)	**Total contribution/ GDP (F/G)**
France	15	34	22	3			74	French West Indies: 1 frigate, 1 medium landing ship; Indian Ocean: 2 frigates, 1 medium landing ship New Caledonia: 1 frigate Polynesia: 1 frigate, 1 medium landing ship	8	44.00	255	51,600	1,018	2,000	**0.051**
Netherlands	10	34	21	5			70	Netherlands Antilles: 1 frigate	1	12.13	53	9,600	71	575	**0.012**
United Kingdom	4	14	12	1			31	Indian Ocean: 1 destroyer/frigate West Indies: 1 destroyer/frigate	2	40.63	206	49,600	265	2,130	**0.012**
United States	80	118	26	38	5	24	291	Mediterranean: 3 submarines Japan: 1 aircraft carrier, 10 surface combatants, 4 amphibious ships, 1 minesweeper 7th fleet (counted half): 1 aircraft carrier, 7 surface combatants, 2 landing platforms, 2 minesweepers 5th fleet: 1 aircraft carrier, 6 surface combatants, 3 amphibious ships, 4 minesweepers	48	376.75	1,474	455,900	19,221	11,700	**0.164**

Table 17. Arms transfer penalty weight for those recipients for which it is not zero

Country	A. Voice and accountability, 2004	B. Defense expenditure/ GDP, 2004	C. Average defense expenditure/ GDP, 2004	D. GDP/ capita, 2004	E. Log GDP/ capita	F. GDP weight	Penalty weight (A × (B–C) × F)	Total arms transfers, 1999–2004
		(%)	(%)	($)				(million $)
Jordan	–0.68	7.63	2.39	1,996	7.60	0.85	–3.04	838
Saudi Arabia	–1.63	7.71	2.39	9,730	9.18	0.35	–3.00	2,965
Oman	–0.90	10.43	2.39	8,370	9.03	0.39	–2.85	234
Pakistan	–1.31	4.14	2.39	604	6.40	1.23	–2.83	1,339
Morocco	–0.55	4.54	2.39	1,555	7.35	0.93	–1.10	184
Colombia	–0.47	4.34	2.39	2,302	7.74	0.81	–0.74	460
Algeria	–0.91	3.31	2.39	2,633	7.88	0.76	–0.64	381
Lebanon	–0.81	3.75	2.39	5,771	8.66	0.51	–0.57	8
Egypt	–1.04	2.76	2.39	987	6.89	1.08	–0.42	3,416
Turkey	–0.15	3.90	2.39	4,384	8.39	0.60	–0.14	3,518
Sri Lanka	–0.16	2.81	2.39	1,010	6.92	1.07	–0.07	72
Singapore	–0.13	4.72	2.39	24,576	10.11	0.05	–0.02	1,630

Note: Arms transfers are “trend indicator values,” based on value estimates for various weapons systems.

Table 18. Summary of penalty for arms exports to undemocratic nations that spend heavily on the military (% of exporter’s GDP)

	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	Weighted average
Australia	0.0000	0.0000	0.0000	–0.0003	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Austria	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	–0.0020	0.0000	0.0000	–0.0003
Belgium	0.0000	0.0000	0.0000	0.0000	0.0000	–0.0008	–0.0137	–0.1077	0.0000	0.0000	–0.0190
Canada	–0.0507	–0.0410	–0.0333	–0.0606	–0.0402	–0.0099	–0.0189	–0.0162	–0.0122	–0.0173	–0.0304
Denmark	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Finland	–0.0930	0.0000	0.0000	0.0000	0.0000	0.0000	–0.0001	0.0000	–0.0005	–0.0015	–0.0060
France	–0.0158	–0.0374	–0.0175	–0.0422	–0.0648	–0.0288	–0.0292	–0.1286	–0.1157	–0.0862	–0.0823
Germany	–0.0097	–0.0097	–0.0024	–0.0250	–0.0124	–0.0133	–0.0021	–0.0007	–0.0040	0.0000	–0.0077
Greece	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	–0.0001	0.0000	0.0000	0.0000	0.0000
Ireland	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Italy	–0.0159	–0.0150	–0.0458	–0.0006	0.0000	–0.0009	–0.0045	–0.0352	–0.0056	–0.0130	–0.0157
Japan	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Netherlands	–0.0014	–0.0336	–0.0323	–0.0246	–0.0052	–0.0041	0.0000	0.0000	–0.0020	–0.0004	–0.0086
New Zealand	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Norway	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	–0.0145	–0.0091	0.0000	0.0000	–0.0034
Portugal	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Spain	–0.0028	–0.0039	–0.0039	–0.0097	0.0000	0.0000	0.0000	–0.0034	–0.0096	–0.0041	–0.0048
Sweden	–0.0063	–0.0070	–0.0058	–0.0038	–0.0035	–0.0057	–0.0058	–0.0041	–0.0034	–0.0046	–0.0057
Switzerland	–0.0514	–0.1173	–0.0316	0.0000	0.0000	–0.0263	0.0000	0.0000	0.0000	0.0000	–0.0168
U.K.	–0.0493	–0.0903	–0.3618	–0.3602	–0.0015	–0.0290	–0.0092	–0.0236	–0.0154	–0.0080	–0.0836
United States	–0.0521	–0.0690	–0.0884	–0.1605	–0.0800	–0.0061	–0.0057	–0.0091	–0.0060	–0.0092	–0.0437
Discount weight	0.29	0.33	0.38	0.44	0.50	0.57	0.66	0.76	0.87	1.00	

Table 19. Summary of security component

	Spending				Arms exports		
	Peacekeeping & humanitarian interventions (% of GDP)	Sea lanes protection (% of GDP)	Total (% of GDP)	Score	Weighted exports (% of GDP)	Score	**Overall**
Australia	0.235	0.000	0.235	7.5	0.000	10.0	**8.1**
Austria	0.085	0.000	0.085	2.7	0.000	9.9	**4.5**
Belgium	0.104	0.000	0.104	3.3	–0.019	3.8	**3.4**
Canada	0.124	0.000	0.124	3.9	–0.030	0.1	**3.0**
Denmark	0.186	0.000	0.186	5.9	0.000	10.0	**6.9**
Finland	0.179	0.000	0.179	5.7	–0.006	8.0	**6.3**
France	0.146	0.051	0.197	6.3	–0.082	–16.8	**0.5**
Germany	0.077	0.000	0.077	2.4	–0.008	7.5	**3.7**
Greece	0.130	0.000	0.130	4.1	0.000	10.0	**5.6**
Ireland	0.141	0.000	0.141	4.5	0.000	10.0	**5.9**
Italy	0.111	0.000	0.111	3.5	–0.016	4.9	**3.9**
Japan	0.011	0.000	0.011	0.3	0.000	10.0	**2.8**
Netherlands	0.167	0.012	0.179	5.7	–0.009	7.2	**6.1**
New Zealand	0.207	0.000	0.207	6.6	0.000	10.0	**7.4**
Norway	0.247	0.000	0.247	7.8	–0.003	8.9	**8.1**
Portugal	0.154	0.000	0.154	4.9	0.000	10.0	**6.2**
Spain	0.058	0.000	0.058	1.8	–0.005	8.5	**3.5**
Sweden	0.122	0.000	0.122	3.9	–0.006	8.1	**4.9**
Switzerland	0.021	0.000	0.021	0.7	–0.017	4.5	**1.6**
United Kingdom	0.238	0.012	0.251	8.0	–0.084	–17.3	**1.6**
United States	0.127	0.164	0.291	9.2	–0.044	–4.3	**5.9**
Average[1]			0.158		–0.015		
Weight				75%		25%	

[1]Average is based on the scores from the current methodology back-calculated to the 2003 CDI edition, i.e., based on data that would have been current in 2003.

Technology

Technology is an essential factor in development. Innovations in medicine, communications, agriculture, and energy meet societal needs, improve quality of life, increase productivity, and facilitate industrialization in poorer countries. Taking the long view, a fundamental reason that China's economy has grown at rates of 7% or more for many years is because the country is taking up innovations developed elsewhere over the last century. Vaccines and antibiotics led to major gains in life expectancy in Latin America and East Asia in the 20th century, achieving in a few decades improvements that took Europe almost 150 years. Cell phones have brought electronic communications to the masses even in Africa. The Internet helps developing countries access and disseminate information, form civil society movements, and do commerce with rich-world economies.

Thus people in developing countries benefit from technological advances as both producers and consumers. Recognizing the link between technology and development, the 2004 edition of the

index introduced a technology component (Bannon and Roodman 2004). For 2005, Keith Maskus of the University of Colorado refined and elaborated the design. It is unchanged this year.

Technology policy can be divided into two areas, pertaining to generation and diffusion of innovations. In Maskus (2005), as in Bannon and Roodman (2004), the starting point for the assessment of government policy regarding generation is OECD data on direct government R&D, whether performed by public agencies or by private parties on contract. Maskus refines the calculation by discounting by 25% certain kinds of first-world R&D as having somewhat less value for developing countries—namely in agriculture, energy, and industrial development. As in Bannon and Roodman, military R&D is discounted by half because while some of it does have useful civilian spin-offs (including the Internet), much does more to improve the destructive capacity of rich countries than the productive capacity of poor ones. (See Table 20.)

To this is added an estimate of the subsidy value of tax incentives for private R&D. The OECD publishes a "B index" that measures the rate of tax subsidization for business expenditure on R&D. We use the simple average of the rates for small and large companies. On this B index, a 1 indicates full subsidization, 0 indicates no subsidization or taxation, and negative values indicate taxation. The benchmark is full expensing. That is, a 0 means that the tax code treats R&D as an ordinary expense, allowing it to be fully deducted from taxable corporate income in the year the expenditure is made. If a governments does not allow immediate full deduction, this is considered taxation. Tax treatment more favorable than simple expensing is a subsidy. This tax or subsidy rate is multiplied by a country's total business enterprise expenditure on R&D (BERD) to generate an estimate of government tax expenditures on R&D. This estimate is discounted in order to produce a figure that is more comparable to the discounted government R&D spending figure described above. There R&D spending in various categories faces a discount between 0% and 50%; but we know little about which sectors benefit most from tax subsidies, so we use the central figure of 25% for a uniform discount on these subsidies. The subsidy figures being made comparable, they are added together and taken over GDP for an overall measure of government support for R&D with relevance to developing countries. (See Table 21.)

Measuring variation in policies relating to *diffusion* is challenging, in part because intellectual property right (IPR) protection is primarily governed in index countries by the World Trade Organization Trade-Related Aspects of Intellectual Property Rights (TRIPS) agreement, making countries' policies more similar than different. The subcomponent on technology dissemination imposes penalties for seven kinds of IPR policies that restrict the flow of innovations to developing countries. All of these go beyond TRIPS and therefore exhibit variation between countries. It should be noted that stronger IPR protection also increases incentives for creating innovations that help developing countries in the first place. But Maskus (2005) concludes that the instances he penalizes harm developing countries more by restricting the flow of those innovations once created. The penalties fall into three groups:

1) Patent coverage (20% weight)

    a) Patentability of plant and animal species. Some rich countries grant patents for plant and animal varieties developed through, for example, genetic engineering. Patent monopolies can deprive poor countries with low purchasing power of access to such innovations, including ones that could be valuable for food production.

b) Similarly, some countries allow patenting of software innovations (which are distinct from copyrights on specific programs).

2) Lack of certain limitations on patent rights ("rights loss provisions") (30%)

a) Lack of provision for revocation due to discontinuing working. Some countries revoke a patent if the holder does not "work" it—implement or license it—within a certain period. Countries that have few or no such provisions lose a point.

b) Lack of compulsory licensing. Some countries can force patent holders to allow use of their patents if it serves a pressing social need, such as a vaccine might in the face of an epidemic. Those that largely do not are penalized.

3) Other IPR extensions (50%)

a) "TRIPS+" measures. Some rich countries use their leverage to insert IPR provisions in bilateral (two-country) trade agreements that go beyond TRIPS. For example, the United States persuaded Morocco to accept a provision in their trade treaty that test data submitted to the Moroccan government for approval of new drugs be kept secret for 5 years, and agricultural chemicals for 10 years. In many other bilateral agreements, such as that with Vietnam, these periods are five years, consistent with the comparable U.S. standard. A longer period means delayed access to information useful to companies that would develop competing drugs—possibly deferring the day when life-saving drugs become affordable for people in poor countries. While TRIPS contains a provision under which countries are supposed to protect such data, it specifies no such period. The U.S. has also pushed its treaty partners to limit compulsory licensing domestically and give patents for genetic sequences. For all this, the United States is dinged a full point. The European Union tends to push for "geographical indications," which are private rights to use product names derived from places, such as "Bordeaux." This earns EU nations a half-point penalty. Finally, European Free Trade Area members (among the index countries, Norway and Switzerland) tend, like the U.S., to push for limits on compulsory licensing and strong test data protections, for which they are also penalized 0.5.

b) Anti-circumvention rules. Some countries have enacted strong criminal penalties for development or use of technologies that can copy copyrighted digital materials by circumventing encryption devices. This is penalized as unnecessarily restrictive.

c) European nations have granted restrictive patent-like rights to compilers of databases even when those include publicly funded data that is itself in the public domain. This too is penalized, for limiting the flow of useful, public information to developing countries.

In each of the three areas, penalties are summed, and then rescaled in the usual way, so that a penalty-free country would get a 10 and an average country in 2003, the benchmark year, would get a 5. Scores in the three areas are then averaged using the weights shown above. (See Table 22.) Finally, the results are combined in a 1:2 ratio with the scores for R&D support to yield overall technology scores. (See Table 23.) No country does spectacularly better than its peers on technology. The U.S. loses points for pushing for compulsory licensing bans, and the Europeans are penalized for allowing the copyrighting of databases containing data assembled with public funds.

Greece and Ireland lag considerably behind overall because of low government R&D subsidies. France, which spends a substantial 1% of GDP on government R&D, takes first. Canada, whose policies on IPRs are the least restrictive of the group, places second.

Table 20. Calculation of weighted R&D/GDP (million $)

Country	Agriculture production and technology	Control and care of the environment	Defense	Exploration and exploitation of space	Exploration and exploitation of the Earth	General university funds	Industrial production and technology	Infrastructure and general planning of land use	Non-oriented research	Other civil research	duction, distribution and rational utilization of energy	Protection and improvement of human health	Social structures and relationships	Total, weighted	Weighted R&D/ GDP
Australia	299	87	197	1	209	1,285	751	54	143	1	77	364	79	3,166	0.52%
Austria	41	26	0	4	37	965	191	34	235	2	12	71	34	1,591	0.60%
Belgium	38	28	7	219	12	351	670	12	466	60	40	34	74	1,819	0.56%
Canada	485	284	225	343	174	1,995	827	193	381	78	249	1,039	201	5,971	0.60%
Denmark	70	24	16	24	9	548	75	16	244	15	21	89	85	1,186	0.69%
Finland	98	32	38	30	17	436	424	30	250		81	109	94	1,470	0.94%
France	380	537	4,257	1,597	185	4,236	1,185	90	3,982	373	832	981	123	16,032	0.91%
Germany	354	624	1,054	923	326	7,288	2,284	338	2,957	114	505	780	704	16,940	0.72%
Greece	37	26	4	2	25	330	64	22	85	7	18	57	37	684	0.28%
Ireland	79	15			25	212	159	10	69		5	36	10	560	0.35%
Italy	192	235	416	753	194	4,512	1,053	43	1,376		375	723	451	9,710	0.65%
Japan	893	234	1,392	1,819	495	9,081	1,910	1,143	4,230		4,630	1,048	198	24,519	0.66%
Netherlands	179	111	78	131	14	1,836	382	229	423	188	129	133	110	3,732	0.72%
N. Zealand	116	3	3	0	65	90	49	3	18	0	5	23	11	344	0.50%
Norway	120	30	92	28	26	531	106	28	200		32	104	89	1,275	0.72%
Portugal	163	52	11	3	24	457	231	66	152	50	13	112	50	1,275	0.62%
Spain	427	181	1,708	267	86	1,719	2,036	326	542	406	128	745	140	7,208	0.67%
Sweden	68	45	507	14	5	1,138	162	63	309		73	24	160	2,238	0.84%
Switzerland	54	3	8	76	6	1,074	65	11	186	285	20	34	37	1,820	0.75%
U.K.	438	238	4,268	210	281	2,649	698	189	2,054	63	44	1,857	422	10,981	0.59%
U.S.	2,537	616	70,501	9,875	1,020		513	1,973	7,263		1,457	29,248	1,449	90,074	0.77%
Weight	75%	100%	50%	100%	100%	100%	75%	100%	100%	100%	75%	100%	100%		

Table 21. Calculation scores for government support for R&D

	A	B	C	D		
	Tax subsidy rate for R&D, manufacturers (average small/large companies)[1]	Business expenditure on R&D/ GDP (%)	Tax expenditure on R&D/ GDP (%), weighted[1]	Direct government R&D expenditure/ GDP, weighted (%)[2]	Total government support/GDP (%)	Score
Formula:			A×B×75%		C+D	
Australia	11.7	0.89	0.08	0.52	0.60	4.4
Austria	11.2	1.42	0.12	0.60	0.72	5.3
Belgium	–1.0	1.34	–0.01	0.56	0.55	4.0
Canada	24.8	0.99	0.18	0.60	0.78	5.7
Denmark	17.8	1.83	0.24	0.69	0.93	6.9
Finland	–1.0	2.45	–0.02	0.94	0.92	6.7
France	13.4	1.36	0.14	0.91	1.04	7.7
Germany	–2.4	1.75	–0.03	0.72	0.69	5.1
Greece	–1.5	0.19	0.00	0.28	0.28	2.0
Ireland	4.9	0.79	0.03	0.35	0.38	2.8
Italy	21.2	0.55	0.09	0.65	0.74	5.4
Japan	16.4	2.36	0.29	0.66	0.94	6.9
Netherlands	6.7	1.06	0.05	0.72	0.77	5.7
New Zealand	–2.3	0.49	–0.01	0.50	0.50	3.6
Norway	22.0	1.00	0.16	0.72	0.89	6.5
Portugal	28.3	0.26	0.06	0.62	0.67	4.9
Spain	44.1	0.57	0.19	0.67	0.86	6.3
Sweden	–1.5	2.95	–0.03	0.84	0.81	5.9
Switzerland	–1.0	1.90	–0.01	0.75	0.73	5.4
United Kingdom	10.1	1.24	0.09	0.59	0.69	5.0
United States	6.6	1.88	0.09	0.77	0.86	6.3
2003 average					0.68	

[1]A figure of 0 indicates that R&D spending can be fully deducted like other business expenditures. Positive values indicate active subsidization relative to this benchmark. Negative values indicate businesses cannot fully deduct in the year of expenditure. [2]From previous table.

Table 22. Calculation of scores for technology dissemination

	Patent coverage				Rights loss provisions				Other					
Country	Plant/ animal patents	Soft-ware pat-ents	Total	Score	Lack of revoca-tion for not working patents	Compul-sory li-censes not is-sued	Total	Score	TRIPS+ policy	Anti-circum-vention rules	Data-base Protec-tion	Total	Score	**Over-all score**
Australia	1	1	2	–1.4	1	0	1	6.5	0	1	0	1	6.7	**5.0**
Austria	0	0.5	0.5	7.2	1	1	2	3.0	0.75	1	1	2.75	1.0	**2.8**
Belgium	0	0.5	0.5	7.2	1	0	1	6.5	0.75	0	1	1.75	4.3	**5.5**
Canada	0	0.5	0.5	7.2	1	0	1	6.5	0	0	0	0	10.0	**8.4**
Denmark	0	0.5	0.5	7.2	1	1	2	3.0	0.75	1	1	2.75	1.0	**2.8**
Finland	0	0.5	0.5	7.2	1	0	1	6.5	0.75	0	1	1.75	4.3	**5.5**
France	0	0.5	0.5	7.2	0	1	1	6.5	0.75	0	1	1.75	4.3	**5.5**
Germany	0	0.5	0.5	7.2	1	1	2	3.0	0.75	1	1	2.75	1.0	**2.8**
Greece	0	0.5	0.5	7.2	0	0	0	10.0	0.75	1	1	2.75	1.0	**4.9**
Ireland	1	0.5	1.5	1.5	1	1	2	3.0	0.75	0	1	1.75	4.3	**3.3**
Italy	1	0.5	1.5	1.5	1	0	1	6.5	0.75	0	1	1.75	4.3	**4.4**
Japan	1	1	2	–1.4	1	0	1	6.5	0	1	0	1	6.7	**5.0**
Netherlands	0	0.5	0.5	7.2	1	1	2	3.0	0.75	0	1	1.75	4.3	**4.5**
New Zealand	1	0.25	1.25	2.9	1	0	1	6.5	0	0	0	0	10.0	**7.5**
Norway	0	0.25	0.25	8.6	1	1	2	3.0	0.75	0	1	1.75	4.3	**4.7**
Portugal	0	0.5	0.5	7.2	1	0	1	6.5	0.75	0	1	1.75	4.3	**5.5**
Spain	0	0.5	0.5	7.2	1	0	1	6.5	0.75	0	1	1.75	4.3	**5.5**
Sweden	0	0.5	0.5	7.2	1	1	2	3.0	0.75	0	1	1.75	4.3	**4.5**
Switzerland	0	0.5	0.5	7.2	1	1	2	3.0	0.75	0	1	1.75	4.3	**4.5**
U.K	1	0.5	1.5	1.5	1	1	2	3.0	0.75	0	1	1.75	4.3	**3.3**
U.S	1	1	2	–1.4	1	1	2	3.0	1	1	0	2	3.4	**2.3**
Average[1]			0.9				1.4					1.5		
Weight				20%				30%					50%	

[1]Average is based on the scores from the current methodology back-calculated to the 2003 CDI edition, i.e., based on data that would have been current in 2003.

Table 23. Summary of technology component

Country	Government support for R&D[1]	IPRs/ restrictions on dissemination[1]	Overall score
Australia	4.4	5.0	4.6
Austria	5.3	2.8	4.5
Belgium	4.0	5.5	4.5
Canada	5.7	8.4	6.6
Denmark	6.9	2.8	5.5
Finland	6.7	5.5	6.3
France	7.7	5.5	6.9
Germany	5.1	2.8	4.3
Greece	2.0	4.9	3.0
Ireland	2.8	3.3	3.0
Italy	5.4	4.4	5.1
Japan	6.9	5.0	6.3
Netherlands	5.7	4.5	5.3
New Zealand	3.6	7.5	4.9
Norway	6.5	4.7	5.9
Portugal	4.9	5.5	5.1
Spain	6.3	5.5	6.1
Sweden	5.9	4.5	5.4
Switzerland	5.4	4.5	5.1
United Kingdom	5.0	3.3	4.5
United States	6.3	2.3	5.0
Weight	67%	33%	

[1]From previous tables.

3. Overall results

As explained in section 1, the overall scores from each of the seven components are rescaled where necessary so that those in the benchmark year of 2003 average 5. The parameters of these transformations are held fixed over time, to allow meaningful comparisons of results over time. Component scores are then averaged across components to yield final scores. Table 24 shows the final results for 2006.

On the overall 2006 Commitment to Development Index, most of the Nordics and the Netherlands do well, buoyed by large aid flows, high contributions to security, and lower pollution rates. Western offshoots Australia, Canada, New Zealand, and the United States are another group with a common profile. They tend to be strong in areas where *lack* of government intervention, or else support for the private sector is rewarded—namely trade, migration, and investment—and weak in areas where government activism is rewarded, particularly aid and environment. The major exception to this pattern is security, where Australia, New Zealand, and the United States all do well; evidently this is one sphere where the political consensus in these countries is for government activism. Meanwhile, Japan's relatively inward orientation comes though in its low scores on aid, trade, migration, and security.

Since one purpose of the CDI is to track policy change over time, Table 25 back-calculates the 2006 methodology to 2003, the CDI's first year.[34] Not all of the underlying data could be "downdated" to 2003–05 in performing this back-calculation. For example, the net stock change of unskilled migrants from developing countries is for 1990–2000 throughout. The most important data for the trade component, the tariff estimates from CEPII, are for 2001 only. However, the textile and apparel quotas that Canada, the European Union, and the United States, abolished on January 1, 2005, are included for 2003 and 2004, using estimates of their export tax equivalents from Francois and Spinanger (2004).

The big picture in Table 25 is one of little change. This is not surprising since policies do not turn on a dime. The average CDI score climbed from a pre-determined 5.0 in 2003 to 5.3 in 2005, then fell to 5.2 in 2005. Still, the climb is real. Fourteen countries rose on the CDI and only seven declined. Several policy trends are behind the rise. Greece, Norway, Switzerland, the United Kingdom, and the United States gave more aid. Canada, the European Union, and the United States ended textiles and apparel quotas. Belgium, Denmark, Spain, and Sweden curtailed prohibitions against pension funds investing in developing countries. The phase-out of ozone-depleting substances continued, as ordained by the Montreal Protocol. Many countries adopted policies to limit illegal tropical timber imports.

One important question about the results is how sensitive they are to changes in the component weights. To investigate the effect of raising weights on individual components, I generate 63 non-standard versions of the 2006 CDI: first with the weight on aid raised to 2, then 3, and so on up to 10 (while weights on the other components are held at 1), then the same for trade, and then the other components. For each version I calculate the correlation of overall scores with the standard CDI, and the average absolute change in rank.[35] Figure 2 and Figure 3 show the results. The CDI proves reasonably stable despite large overweighting. For all the components, even tenfold overweighting yields a score correlation of 0.56–0.83. As for ranks, tenfold-overweighting any of the components except technology moves countries an average of 4.5–6.5 spots up or down in the standings. Whether these numbers are small or large is perhaps in the eye of the beholder. Since most countries are clumped in the middle of the score range, one would expect small changes in weights to disproportionately affect rankings, so that Figure 2 is more meaningful than Figure 3.

[34] The publicly available spreadsheet includes full details of these calculations. See www.cgdev.org.
[35] I am indebted to Michael Clemens for this technique. Details of these calculations are also in the public spreadsheet.

Table 24. Commitment to Development Index 2006: scores

Country	Aid	Trade	Invest-ment	Migration	Environ-ment	Security	Technol-ogy	Average	Rank	2005 rank by 2005 methodol-ogy
Australia	2.5	6.4	6.9	6.4	3.9	8.1	4.6	5.5	6	4
Austria	2.7	5.9	3.3	10.5	6.2	4.5	4.5	5.4	7	7
Belgium	5.1	5.9	6.5	2.6	6.6	3.4	4.5	4.9	15	15
Canada	3.3	6.8	7.7	4.7	4.5	3.0	6.6	5.2	10	10
Denmark	10.0	5.9	5.3	5.0	6.1	6.9	5.5	6.4	2	1
Finland	3.9	6.1	6.2	2.7	6.7	6.3	6.3	5.4	7	7
France	4.1	6.0	5.9	2.6	6.1	0.5	6.9	4.6	18	15
Germany	3.3	5.9	6.8	6.2	6.7	3.7	4.3	5.3	9	7
Greece	2.7	5.9	4.0	1.7	5.2	5.6	3.0	4.0	20	20
Ireland	5.9	5.7	2.5	4.6	7.5	5.9	3.0	5.0	13	18
Italy	1.6	6.1	5.5	3.2	4.8	3.9	5.1	4.3	19	18
Japan	1.1	-0.4	5.6	1.7	4.3	2.8	6.3	3.1	21	21
Netherlands	8.5	6.2	7.8	4.8	7.5	6.1	5.3	6.6	1	2
New Zealand	2.2	7.6	3.7	6.9	6.4	7.4	4.9	5.6	5	5
Norway	9.3	1.2	8.0	4.6	6.1	8.1	5.9	6.2	4	5
Portugal	2.3	6.1	6.2	1.4	6.4	6.2	5.1	4.8	16	13
Spain	2.5	6.0	6.7	5.2	3.8	3.5	6.1	4.8	16	17
Sweden	9.8	6.1	6.2	4.8	7.0	4.9	5.4	6.3	3	3
Switzerland	4.8	3.1	7.2	9.5	5.3	1.6	5.1	5.2	10	13
U.K.	4.6	5.9	8.6	2.6	7.8	1.6	4.5	5.1	12	10
United States	2.2	7.4	6.9	4.6	3.2	5.9	5.0	5.0	13	12
Average	4.4	5.5	6.1	4.6	5.8	4.8	5.1	5.2		
Standard dev.	2.7	1.9	1.6	2.3	1.3	2.1	1.0	0.8		

Table 25. Commitment to Development Index: 2003–06 scores using 2006 methodology

Country	2003	2004	2005	2006	Change, 2003–06[1]	Rank by improvement
Australia	5.8	5.7	5.7	5.5	–0.3	19
Austria	5.3	5.4	5.4	5.4	+0.0	12
Belgium	4.8	4.6	4.9	4.9	+0.2	12
Canada	4.9	5.1	5.3	5.2	+0.3	6
Denmark	7.0	6.9	6.7	6.4	–0.6	18
Finland	5.2	5.4	5.6	5.4	+0.2	9
France	4.7	4.8	4.8	4.6	–0.1	10
Germany	5.4	5.3	5.5	5.3	–0.1	15
Greece	3.7	3.9	4.1	4.0	+0.3	6
Ireland	4.7	4.8	4.9	5.0	+0.3	12
Italy	4.0	4.2	4.5	4.3	+0.3	4
Japan	2.7	2.9	2.8	3.1	+0.4	15
Netherlands	6.7	6.7	6.8	6.6	–0.1	15
New Zealand	5.9	5.6	5.6	5.6	–0.3	19
Norway	5.9	6.1	6.2	6.2	+0.3	10
Portugal	4.4	4.9	4.9	4.8	+0.4	4
Spain	3.9	4.4	4.7	4.8	+0.9	1
Sweden	5.9	6.5	6.6	6.3	+0.4	1
Switzerland	5.3	5.0	5.1	5.2	–0.0	21
United Kingdom	4.6	4.8	5.3	5.1	+0.5	1
United States	4.5	4.9	5.0	5.0	+0.5	6
Average	5.0	5.1	5.3	5.2	+0.2	

[1]For accuracy, figures shown are rounded changes in scores rather than the changes in rounded scores that are published in CGD and FP (2006).

Figure 2. Correlation of standard CDI with versions with higher weight placed on one component

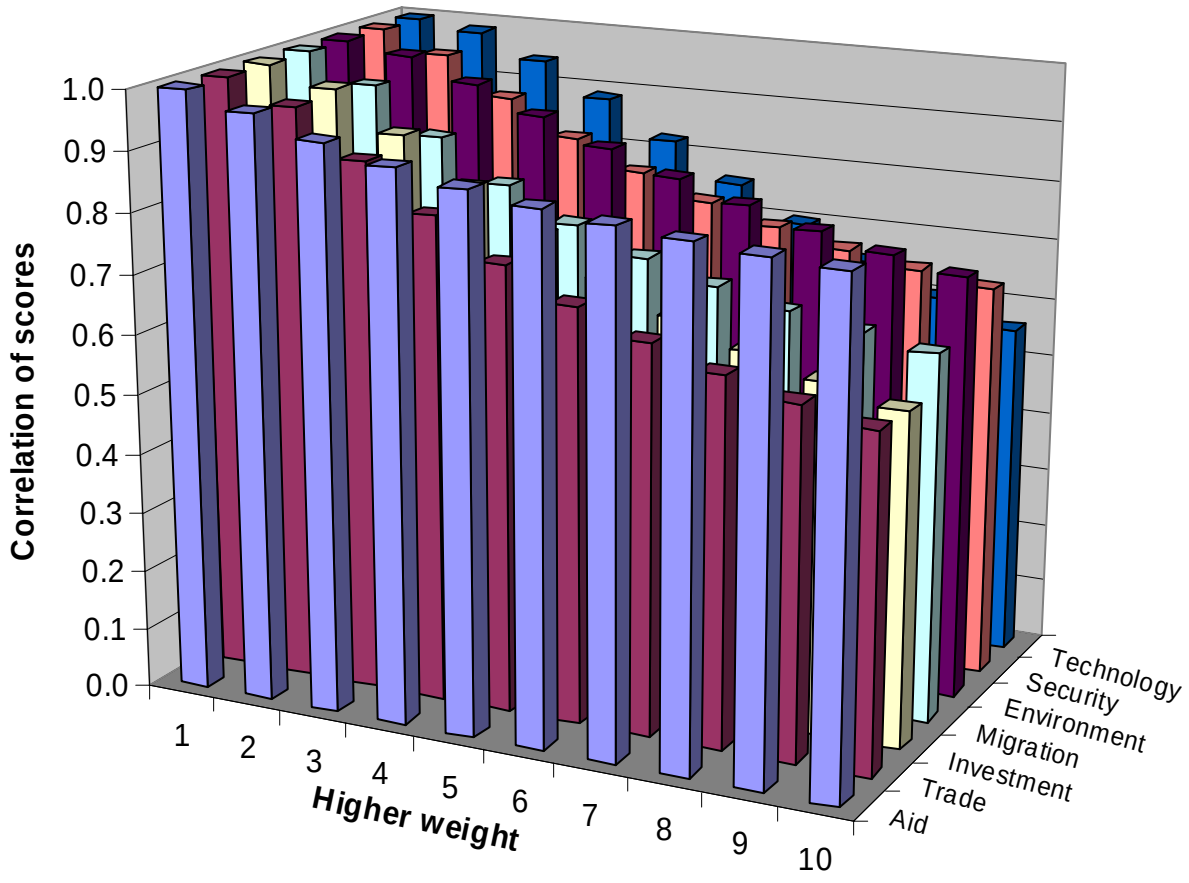
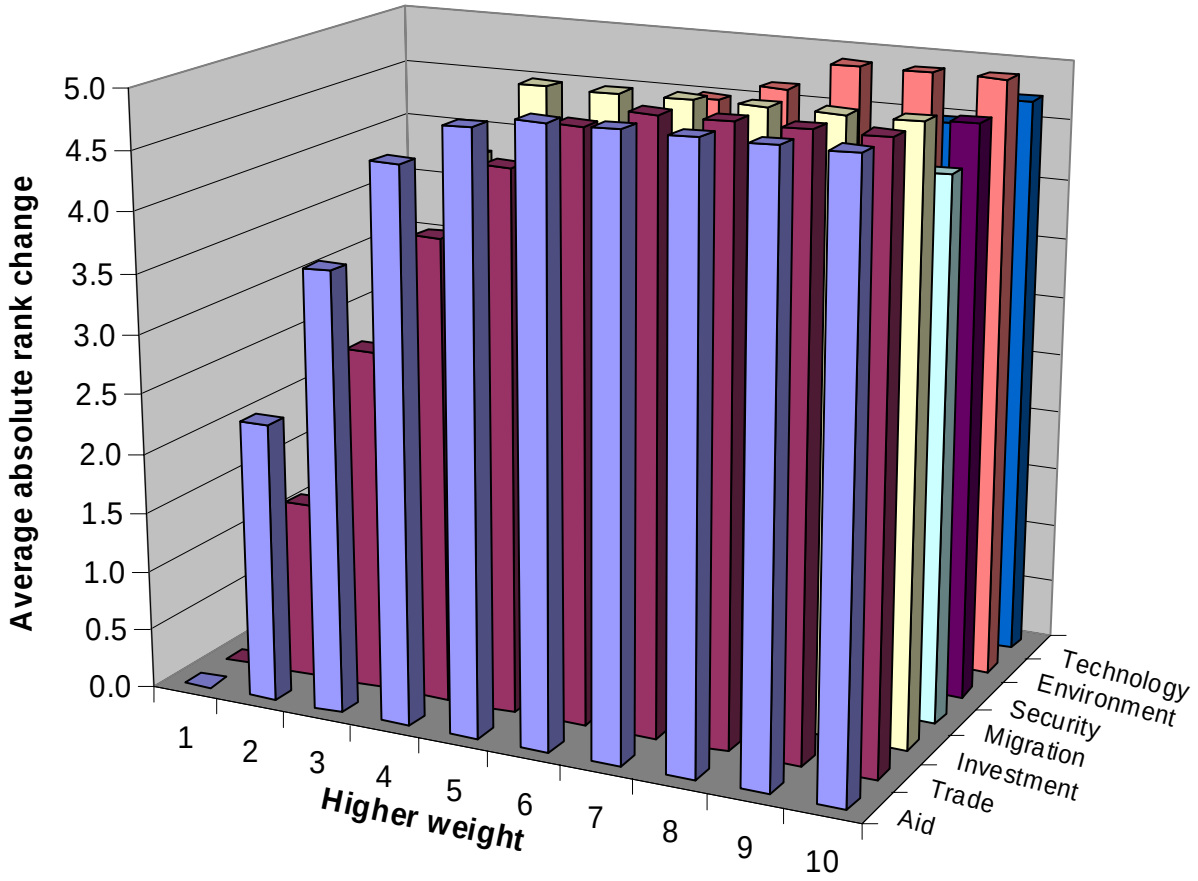


Figure 3. Average absolute change in CDI rank when higher weight placed on one component



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