

**How Do the BRICs Stack Up?
Adding Brazil, Russia, India, and China to the Environment Component of the
Commitment to Development Index**

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The Commitment to Development Index (CDI) ranks 21 rich countries on how much their policies help or hurt developing countries (Roodman 2007). The starting point for the CDI is the observation that rich and poor countries are linked in many ways—not just by foreign aid, but also through international trade, investment, migration, technology, military affairs, and the environment. The CDI therefore rates rich-country policies in all these areas.

The focus on wealthy countries reflects the mission of the Center for Global Development itself. CGD pursues this mission not out of a belief that rich nations dominate the complex processes of change in poorer countries that we loosely call “development”—ultimately, the fate of each country lies mostly in its own hands—but because rich countries’ policies offer leverage points. Small changes in U.S. immigration policy, for instance, can have large effects on the economies of Latin America.

From the point of view of this argument though, the line drawn in the CDI between the rich 21 and the rest is arbitrary at the margin.¹ Rapid economic growth in India and China, the renewed geopolitical clout of Russia in an era of expensive oil, and the *de facto* declaration of financial independence by Brazil and its neighbors from the International Monetary Fund all remind us of the global stature of nations outside the traditional circle of developed countries. By dint of their size, these economic giants too influence the lives of millions of poor people beyond their own borders.

While these countries may have less moral responsibility to help others while they are struggling with their own development challenges, it is nevertheless worth examining how well they are doing by the developing world as a whole. The reasons are two. First, it matters whether India, say, is embarked on an energy policy likely speed the flooding of densely peopled deltas of Egypt, Bangladesh, and Vietnam, not to mention turn much of its own farmland into a dust bowl. Second, scoring developing countries puts a mirror to the truly affluent nations. If it makes them look bad, then it dramatizes the need for leadership from those nations in the fashioning a global order that supports sustainable prosperity for all people.

As always with policy indexes, there is a large gap between the ideal and the practical. Extending all seven components of the CDI to major countries outside the Organisation for Economic Co-operation and Development (OECD) is at this point essentially impossible for lack of data. There is hardly any information, for instance, on how much foreign aid China gives. So in this paper, we take an incremental step, adding four countries to one CDI component. The four are Brazil, Russia, India, and China, or the BRICs, as Goldman Sachs calls them (Wilson and

¹ The 21 are the members of the Development Assistance Committee minus Luxembourg.

Purushothaman 2003). The component is that on environmental policy, which is getting special emphasis in the 2007 CDI launch, and most of whose indicators derive ultimately from U.N. sources, which tend to have global coverage.

The design of the CDI environment component originated with Roodman (2004), and absorbed additional indicators from the proposal of Amy Cassara and Daniel Prager (2005) of the World Resources Institute (WRI). The current version, summarized in Roodman (2007), comprises 10 indicators broken into three groups: global climate, sustainable fisheries, and biodiversity and global ecosystems. All but two were available for the BRICs. Information on fishing subsidies proved impossible to obtain. The figures on imports of endangered species, self-reported by governments to the secretariat of the Convention on International Trade in Endangered Species (CITES) were implausibly low, especially for China. These two indicators therefore get no weight in the restricted environment component described here, instead of the 5% and 10% weights that they get on the standard version.

To maximize continuity between the two versions, the weights of the remaining eight indicators are not directly adjusted. But the final scores take into account the fact that the weights now sum to 85%. For example, greenhouse gas emissions per capita still gets a preliminary 10% weight, but its effective weight is $10\%/85\% = 11.8\%$.

As explained in Roodman (2007), since different environmental indicators are measured in different units—dollars or tons per person, cents per gallon, etc.—each indicator is converted into a score, on a scale where 5 means average. For a “good” indicator such as gasoline taxes, where a higher value is rewarded, the original value is divided by the average for the CDI 21, then multiplied by 5. For a “bad” indicator such as tropical timber imports per capita, these two steps are carried out and then the result is subtracted from 10, so that the higher the number on the original indicator the lower the resulting score. Thus a complete lack of a “good” earns a score of 0 while complete lack of a “bad” maps to a perfect 10. In both cases, an average score earns a five. To allow meaningful comparisons over time, however, this “average” is always that of the 21 countries in the first edition of the CDI (2003). This assures that if all countries improve on an indicator, so that none improves relative to the group average, their scores will in fact rise.

The text below reviews the indicators in the restricted environment. The text closely follows the environment section of Roodman (2007) while elaborating on data sources and calculations for the BRICs. Results are shown in the original units in Table 2 and on the standardized scale in Table 3.

Global climate (weighted 60% out of 85% total)

Greenhouse gas emissions per capita (10%)

The risks of climate change bear particularly on developing countries. Climate change will affect agriculture and cause the spread of diseases such as malaria and cholera. The numerator of the indicator used here includes many different gases converted to carbon dioxide–equivalent amounts based on relative warming potential. It also counts net carbon dioxide emissions from land use and land use change, such as from deforestation and reforestation. 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 of the interaction of policy and private decisions. But policies ranging from land use planning to utility regulation do affect emissions, and are themselves hard to quantify.

Primary data on emissions from the BRICs are from WRI's Earthtrends online database. Because the latest figures on net carbon emissions from land use and land use change, as well as on non-carbon emissions, are for 2000, they are assumed to have been constant since then. WRI's figures on carbon from fossil fuel burning stop in 2002, so they are updated to 2005 using growth rates implied in gas, oil, and coal consumption figures from British Petroleum (2007).

By far the largest uncertainty within these figures concerns net emissions from deforestation in Brazil. WRI puts Brazil's carbon dioxide emissions in 2000 at 0.337 gigatons from fossil fuel burning and 1.372 gigatons from land use and land use change. The latter figure is huge—roughly a quarter of U.S. carbon dioxide emissions—and also approximate since it is hard for scientists to precisely measure deforestation and estimate its carbon impacts. The imprecision here is large enough to introduce significant uncertainty into Brazil's overall environment score.

India has the lowest greenhouse gas emissions among the BRICs, estimated at 2.3 tons carbon dioxide equivalent in 2005. That is one-fifth the average among the CDI 21, earning India a score of 9.0 on the indicator (where 10.0 would mean no emissions). China's emissions of 5.9 tons per person are also well below the CDI 21 average, earning the country a 7.6. But Russia's inefficient and industrial economy emits carbon above that average—13.6 tons. And destruction of the Amazon rainforest gives Brazil nearly the same score.

Average annual change in greenhouse gas emissions per unit GDP, last 10 years (15%)

In most countries, the value of economic output is growing faster than greenhouse gas emissions, so that greenhouse gas *intensity* (emissions/GDP) is falling. Among rich countries, differences in the rate of decline appear to be driven mostly by policy. To reduce sensitivity to aberrations such as a cold winter in the start and end years over which decline rates are computed, those used here are “least squares” ones for the last 10 years of available data, 1995–2005. If the 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, they are not, so log emissions/GDP is regressed on time to find the best fit, and the corresponding average decline rate. The GDP figures are converted to dollars on a purchasing power parity (PPP) basis.

The BRICs do strikingly well on this indicator given that most of them are briskly building power plants and expanding their fleets of cars. Both the China's and Russia's economies grew 4.7% faster per annum than their emissions. That is more than twice the CDI 21 average, giving these countries scores of 10.7 and 10.8. India's growth has been more carbon-intensive, with only a 2.9% gap between economic and emissions growth, but that still puts it above the CDI 21 average, for a score of 6.7. The difference for Brazil is 2.5%. In the data, its emissions are assumed to be about constant, dominated as they are by the uncertain emissions from deforestation. Meanwhile, its economy has grown at a relatively slow at 2.4% a year.

Because of the great interest in these first two indicators, the penultimate column of Table 3 shows weighted averages of just the two. China comes out on top with a 9.5 while Brazil scores only a 5.1, about average by rich-country standards.

Gasoline taxes in dollars per liter (15%)

Gasoline taxes are indicative of motor fuel taxes in general, the other major fuel being diesel.² In turn, motor fuel taxes are 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).

The gasoline tax estimates for the CDI 21 come from the International Energy Agency (IEA, 2007, pp. 308–10, 335–37). Since this source does not cover the BRICs, and good data on gasoline taxes are not available for the four BRICs, a simple expedient is used to estimate them. First, the pre-tax gasoline price in the 21 CDI countries is calculated from IEA data on taxes and retail prices. These figures are reassuringly consistent, concentrating between 55 and 65 U.S. cents per liter for the most common grade, premium unleaded, and averaging 61¢. Assuming the pre-tax price in the BRICs is also 61¢/liter lets us estimate the taxes as the differences between this pre-tax benchmark and the retail prices, which are taken from GTZ (2007, p. 7).³ (See Table 1.)

The BRICs tax gasoline less than most rich countries. Brazil's 65¢/liter tax is close to the CDI 21 average, earning it a 4.8. India's 40¢ tax translates to a score of 3.0. But Russia's tax is only 16¢, not surprising since that oil-rich regime often suppresses retail energy prices. And China's is only 8¢. For comparison, the average U.S. tax is 11¢/liter.

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 treaty requires developing countries to cut consumption too, but with longer lead times.

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 CO₂-equivalent tons of greenhouse gas emissions, allowing comparison of several different chemicals. The total includes chlorofluorocarbons (CFCs), hydrochlorofluorocarbons (HCFCs), and methyl bromide.⁴ For the BRICs, it also includes carbon tetrachloride and halons, chemicals that have been almost completely phased out in rich countries. As with greenhouse gases, consumption of ozone-depleting substances is divided by population. Since the European

² Brazil also consumes substantial amounts of ethanol from sugar cane.

³ These estimated taxes may include value-added tax (VAT) as well as motor fuel-specific levies. This is consistent with the figures for the CDI 21, which also include VAT or sales tax.

⁴ Data on other ozone-depleting substances is available but domestic consumption in rich countries is now very low. According to the U.N. Environment Programme, in fact, consumption of some of these chemicals is substantially negative because rich countries are exporting existing stocks, and consumption is defined as domestic production minus net exports. These negative values lead to strange results if included in the CDI.

Union reports as a single country under the Montreal Protocol, all 14 scored EU members scored receive the same mark.

China turns out to be a major per-capita consumer of ozone-depleting chemicals by today's standards, second only to the United States. However, by the standards of 2001, the year whose data is used in the benchmark 2003 CDI, its consumption is below average, so its score ends up above 5, at 6.1. The other BRICs consume much less, scoring around 9.

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. All four BRICs have ratified the accord. Among them, only Russia is listed in Annex I of the Protocol, marking it as an industrial nation subject to the agreed emissions limits in 2015. In fact, Russia's ratification in November 2004 triggered the Protocol's entry into force 90 days later.

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. All the BRICs get 10's.

Fisheries (weighted 5% out of 85% total)

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%)

Marine fisheries are most heavily exploited by rich countries, in some places 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).

The U.N. fisheries agreement helps nations coordinate management of fish stocks that migrate or are in international waters, including whales. Negotiated in 1995, it entered into force in 2001. It enshrines the precautionary principle into international oceanic law: decisions about how much fish catch to allow should be made conservatively, with an appreciation for the limited scientific understanding of the full impacts. It requires that parties respect all regional fisheries-related agreements, even ones they have not directly ratified. And it empowers all parties to board and inspect vessels flying flags of other parties to the agreement (McGinn 1998). As of July 2007, 67 countries have ratified it, including 20 of the CDI 21, who earn 10 points each. Three of the BRICs have too, but China has resisted, like Japan, which signed only in 2006. Meanwhile, rising affluence in China is combining with a traditional taste for exotic fish to put deadly pressure worldwide on fish species such as sharks.

Biodiversity and global ecosystems (weighted 20% out of 85% total)

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. All the CDI 21, except the United States, and all BRICs have ratified it.

Value of tropical timber imports per capita (15%)

Perhaps no commodity import from developing countries is associated with as much environmental harm 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, in most 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 rich-country policy, but Cassara and Prager (2005) 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. Indeed, some have adopted policies to limit imports of illegally cut timber, but strength of enforcement varies.

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.⁵ 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, for 2005, are from the United Nations Commodity Trade Statistics Database.

On a per capita basis, BRICs import little tropical timber compared to rich countries. This is unsurprising in the case of Brazil, a hotspot of tropical deforestation itself. But Russia’s and India’s imports are also very low. China’s are somewhat higher, at \$2.01 per person, but still modest enough for a score of 8.9.

Overall results

The BRICs stack up well on the CDI environment component (in the restricted form calculated here, missing two components). If Brazil, Russia, India, and China are thrown in with the usual

⁵ Tropical timber is defined as all goods in Harmonized System 2-digit codes 44 and 45 coming from non-CDI countries.

21, they rank second, fourth, fifth, and eleventh. (See Table 3 and Figure 1.) They generally perform well on the greenhouse gas emissions, consumption of ozone-depleting substances, and tropical timber imports. And they have joined important international environmental accord. As a group, their major weakness is low gas taxes. In addition, Amazon deforestation and heavy fossil fuel use pull Brazil and Russia, respectively, below the CDI 21 average on greenhouse emissions per capita. And China's abstention from the U.N. fisheries agreement puts it a half point below the other BRICs.

What do these results tell us about the world? By the measures presented here, most of the CDI 21 are worse environmental stewards than the BRICs. Moreover, their affluence puts them in a better position to bear the costs of developing new, environmentally friendly technologies that can be used worldwide. Given the serious threat of global warming, a problem to which North and South are now contributing in roughly equal shares in terms of total emissions, this ranking does run the risk of handing the BRICs a rationale for inaction. But as my colleague David Wheeler points out, even if the North's ceased emissions tomorrow—indeed, even if they had never put carbon into the air—the South's emissions are increasing rapidly enough that atmospheric concentrations will reach any given level only a few decades later than they will otherwise. Thus, just as the Netherlands should not take too much pride on its #1 standing on the overall CDI, none of the countries on this environment component, rich or poor, should use the results as an excuse for complacency. All countries can do better, and will particularly need to in order to avert the risks of serious climate change.

Table 1. Estimation of gasoline taxes in BRICs, 2005

Country	Grade	A. Price (\$/liter)	B. Taxes/ price	C. Price before taxes	Taxes (PPP \$/ liter)
Formula:				A × B	A – C
Australia	Premium unleaded (95 RON)	1.00	37.8%	0.62	0.38
Austria	Premium unleaded (95 RON)	1.37	55.7%	0.61	0.76
Belgium	Premium unleaded (95 RON)	1.70	61.1%	0.66	1.04
Canada	Premium unleaded (95 RON)	0.93	30.3%	0.65	0.28
Denmark	Premium unleaded (95 RON)	1.61	62.1%	0.61	1.00
Finland	Premium unleaded (95 RON)	1.62	63.7%	0.59	1.03
France	Premium unleaded (95 RON)	1.55	64.0%	0.56	0.99
Germany	Premium unleaded (95 RON)	1.62	64.6%	0.57	1.04
Greece	Premium unleaded (95 RON)	1.09	49.0%	0.56	0.53
Ireland	Premium unleaded (95 RON)	1.40	57.0%	0.60	0.80
Italy	Premium unleaded (95 RON)	1.61	60.5%	0.64	0.98
Japan	Regular unleaded	1.18	43.9%	0.66	0.52
Netherlands	Premium unleaded (95 RON)	1.78	63.8%	0.64	1.13
New Zealand	Premium unleaded (95 RON)	1.05	39.7%	0.63	0.42
Norway	Premium unleaded (95 RON)	1.79	62.7%	0.67	1.12
Portugal	Premium unleaded (95 RON)	1.64	59.8%	0.66	0.98
Spain	Premium unleaded (95 RON)	1.28	52.6%	0.61	0.67
Sweden	Premium unleaded (95 RON)	1.56	63.4%	0.57	0.99
Switzerland	Premium unleaded (95 RON)	1.31	51.8%	0.63	0.68
United Kingdom	Premium unleaded (95 RON)	1.68	66.6%	0.56	1.12
United States	Premium unleaded (95 RON)	0.71	14.9%	0.60	0.11
Formula:				<i>Rich-country average¹</i>	A – C
Brazil	Premium unleaded	1.26		0.61	0.65
China	Premium unleaded	0.69		0.61	0.08
India	Premium unleaded	1.01		0.61	0.40
Russia	Premium unleaded	0.77		0.61	0.16

¹Based on the 20 countries where 95 RON premium unleaded is sold.

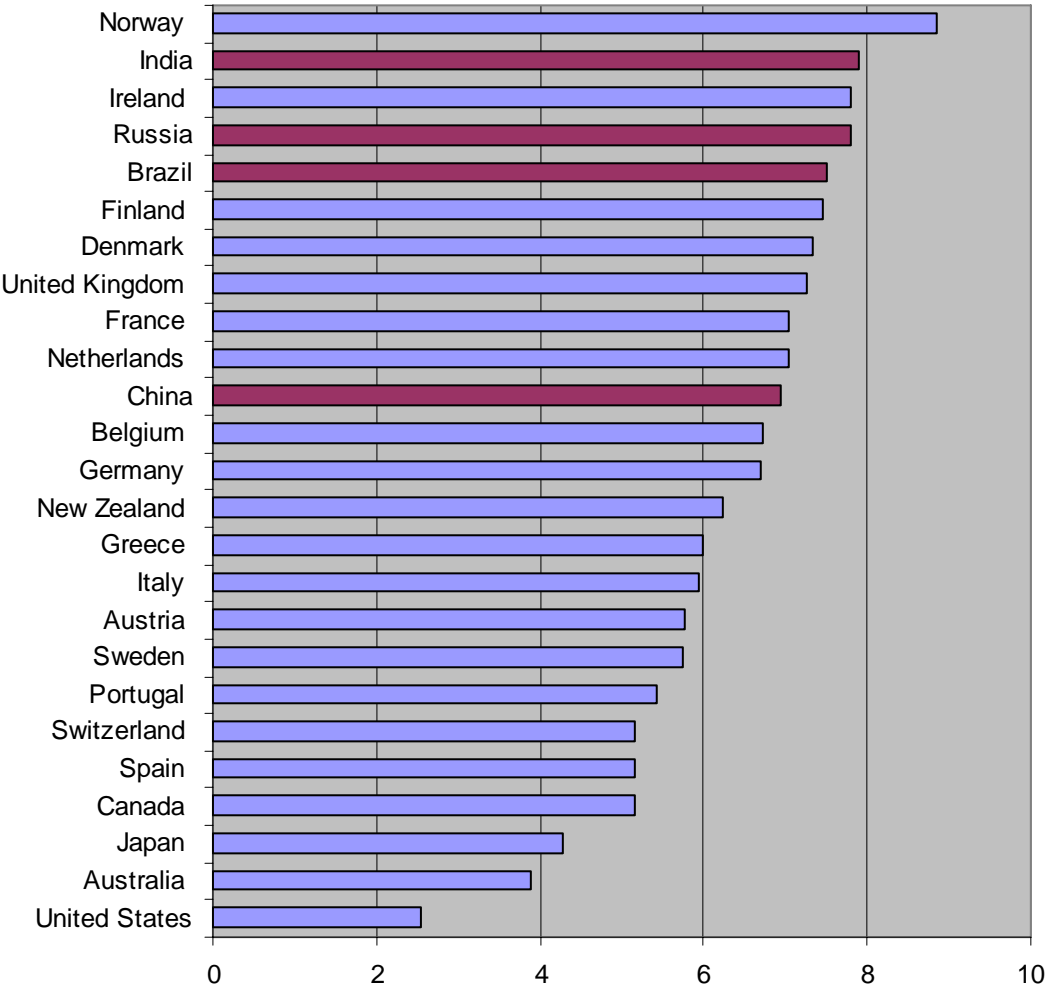
Table 2. Indicators used in environment component

	Global climate				Fisheries	Biodiversity and global ecosystems	
	Greenhouse gas emissions/capita, 2005 (tons CO ₂ equivalent)	Annual change in greenhouse gas emissions/PPP GDP, 1995–2005 (%)	Gasoline taxes, 2006 (PPP \$/liter)	Consumption of ozone-depleting substances/capita, 2004 (ODP metric tons)			Kyoto Protocol ratification, end-2006
Australia	26.0	-2.0	0.38	11.1	✓	✓	14.04
Austria	9.3	-0.7	0.76	11.8	✓	✓	14.02
Belgium	13.8	-2.7	1.04	11.8	✓	✓	14.02
Canada	25.7	-1.4	0.28	18.8	✓	✓	6.76
Denmark	11.8	-4.1	1.00	11.8	✓	✓	14.02
Finland	7.3	-3.8	1.03	11.8	✓	✓	14.02
France	8.2	-3.0	0.99	11.8	✓	✓	14.02
Germany	11.7	-2.4	1.04	11.8	✓	✓	14.02
Greece	12.3	-2.3	0.53	11.8	✓	✓	14.02
Ireland	17.3	-6.6	0.80	11.8	✓	✓	14.02
Italy	8.1	-0.3	0.98	11.8	✓	✓	14.02
Japan	10.0	-0.8	0.52	19.1	✓	✓	25.10
Netherlands	13.1	-3.1	1.13	11.8	✓	✓	14.02
N. Zealand	13.0	-1.9	0.42	9.6	✓	✓	7.83
Norway	5.9	-5.8	1.12	-7.8	✓	✓	14.02
Portugal	8.5	1.0	0.98	11.8	✓	✓	14.02
Spain	9.7	0.5	0.67	11.8	✓	✓	14.02
Sweden	7.0	0.4	0.99	11.8	✓	✓	14.02
Switzerland	7.1	-0.1	0.68	-0.1	✓	✓	14.02
U.K.	10.8	-3.4	1.12	11.8	✓	✓	14.02
U.S.	21.7	-2.1	0.11	47.6	✓	✓	12.68
Brazil	13.7	-2.5	0.65	7.3	✓	✓	0.03
China	5.9	-4.7	0.08	23.5	✓	✓	2.01
India	2.3	-2.9	0.40	4.0	✓	✓	0.75
Russia	13.6	-4.7	0.16	5.4	✓	✓	0.11

Table 3. Summary of environment component

	Global climate					Fisheries	Biodiversity and global eco-systems		Green-house gas score (from first two columns)	Overall
	Greenhouse gas emissions/capita	Annual % change in greenhouse gas emissions/GDP	Gasoline taxes	Consumption of ozone-depleting substances	Kyoto Protocol ratification		UN Fisheries Agreement ratification	Convention on Biodiversity ratification		
Australia	-0.7	4.7	3.1	8.1	0.0	10.0	10.0	2.7	2.5	3.9
Austria	6.2	1.6	5.7	8.0	10.0	10.0	10.0	2.7	3.4	5.8
Belgium	4.3	6.1	7.7	8.0	10.0	10.0	10.0	2.7	5.4	6.7
Canada	-0.6	3.2	2.1	6.8	10.0	10.0	10.0	6.5	1.7	5.2
Denmark	5.2	9.4	7.4	8.0	10.0	10.0	10.0	2.7	7.7	7.3
Finland	7.0	8.7	7.6	8.0	10.0	10.0	10.0	2.7	8.0	7.5
France	6.6	6.8	7.4	8.0	10.0	10.0	10.0	2.7	6.8	7.1
Germany	5.2	5.4	7.7	8.0	10.0	10.0	10.0	2.7	5.3	6.7
Greece	4.9	5.3	4.0	8.0	10.0	10.0	10.0	2.7	5.2	6.0
Ireland	2.9	15.0	5.9	8.0	10.0	10.0	10.0	2.7	10.2	7.8
Italy	6.7	0.6	7.2	8.0	10.0	10.0	10.0	2.7	3.0	5.9
Japan	5.9	1.8	3.8	6.8	10.0	10.0	10.0	-3.1	3.4	4.3
Netherlands	4.6	7.1	8.4	8.0	10.0	10.0	10.0	2.7	6.1	7.1
N. Zealand	4.6	4.4	3.1	8.4	10.0	10.0	10.0	5.9	4.5	6.2
Norway	7.6	13.2	8.3	11.3	10.0	10.0	10.0	2.7	11.0	8.9
Portugal	6.5	-2.3	7.3	8.0	10.0	10.0	10.0	2.7	1.3	5.4
Spain	6.0	-1.1	5.0	8.0	10.0	10.0	10.0	2.7	1.8	5.2
Sweden	7.1	-0.9	7.3	8.0	10.0	10.0	10.0	2.7	2.3	5.7
Switzerland	7.1	0.2	5.0	10.0	10.0	0.0	10.0	2.7	2.9	5.2
U.K.	5.5	7.8	8.3	8.0	10.0	10.0	10.0	2.7	6.9	7.3
U.S.	1.1	4.9	0.8	2.0	0.0	10.0	0.0	3.4	3.3	2.5
Brazil	4.3	5.7	4.8	8.8	10.0	10.0	10.0	10.0	5.1	7.5
China	7.6	10.7	0.6	6.1	10.0	0.0	10.0	8.9	9.5	6.9
India	9.0	6.7	3.0	9.3	10.0	10.0	10.0	9.6	7.6	7.9
Russia	4.4	10.8	1.2	9.1	10.0	10.0	10.0	9.9	8.2	7.8
Weight	10%	15%	15%	10%	10%	5%	5%	15%		

Figure 1. Restricted CDI environment component with BRICs, 2007



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