

Do we owe the world for climate change?

Global Warming and Social Justice

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Climate change raises serious questions of science and economics, but it also raises questions of justice. The United States has been the world's leading contributor to the problem, and it is also the wealthiest nation on the face of the earth. Because of its past contributions, does the United States owe remedial action or compensation to those nations, or those citizens, most likely to be harmed by climate change?

Questions of corrective justice are entangled with questions of distributive justice. Because of its wealth, should the United States be willing to sign an agreement that is optimal for the world as a whole — but not optimal for the United States?

Our goal here is to answer those questions. To motivate the analysis and to put those arguments in their starkest form, we start with two assumptions: First, the world, taken as a whole, would benefit from an agreement to reduce greenhouse gas emissions. Second, the costs and benefits of emissions reductions differ greatly across nations, and some nations — above all the United States — would not benefit, on net, from the agreement that would be optimal from the world's point of view. If the United States unilaterally reduced its own greenhouse gas emissions significantly, it would impose significant costs on itself while producing few benefits to its citizens or even to the world. While a global agreement would benefit the world (our first assumption), its costs and benefits will be radically different across nations. The recent discussions in Bali, showing dramatic divisions across nations, are impossible to understand without appreciating this point.

Suppose, for example, that the world settled on a specified carbon tax — say, \$70 per ton. Such a tax would be likely to impose especially significant costs on the United States simply because

its per-capita emissions rate is so high. Suppose, in addition, that the United States is not as vulnerable as many other nations to serious losses from climate change and that its expected damage, in terms of health, agriculture, and more, is comparatively low. If so, the United States might be a net loser from a specified worldwide carbon tax even if the world gains a great deal. Perhaps the optimal carbon tax for the world would be \$70 per ton, but the United States would do better with a worldwide carbon tax of \$30 per ton, or \$20 per ton, or even \$10 per ton.

We accept the view that in many domains, resources should be redistributed from rich nations and rich people to poor nations and poor people. Such redistribution might well increase aggregate social welfare because a dollar is worth more to a poor person than to a wealthy one. But as we shall see, significant greenhouse gas reductions are a crude and somewhat puzzling way of attempting to achieve redistributive goals. We stipulate that when people in one nation wrongfully harm people in another nation, the wrongdoers have a moral obligation to provide a remedy to the victims. But the application of standard principles of corrective justice to problems of climate change runs into serious problems.

These conclusions should not be misunderstood. We agree that an international agreement to control greenhouse gases would be a good idea. We would not object if the United States showed a degree of altruism in such an agreement, conferring benefits on poor nations at its own expense. The recent agreement in Bali, by which wealthy nations agreed to provide financial and technological assistance to developing ones, might reflect such altruism on the part of at least some wealthy nations. Our goal is only to show that, contrary to widespread beliefs, standard ideas about distributive or corrective justice poorly fit the climate change problem.

EMITTERS

To understand the issues of justice and the motivations of the various actors, it is important to appreciate the disparities in

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emissions across nations. We do not have clear data on the costs of emissions reductions for different nations, but it is reasonable to predict that the largest carbon emitters would bear the largest burdens from (say) a worldwide carbon tax. For a snapshot, consider Table 1.

As early as 2004, the United States and China emerged as the top emitters, accounting for nearly 40 percent of the world's total. If the goal is to understand the costs of controls, however, this table does not tell us nearly enough; we need to know future projections as well. Estimates suggest that the largest contributors are likely to continue to qualify as such — but that major shifts will occur, above all with emissions growth in China and India, and emissions reductions in Russia and Germany.

With existing trends, we can project changes to 2030, as shown in Table 2. At that time, the developing world is expected to contribute no less than 55 percent of total emissions, with 45 percent coming from developed nations. At that time, the United States is expected to be well below China.

The Table 2 projection is fairly recent, but with explosive emissions growth in China, it is already out of date. China surpassed the United States in carbon dioxide emissions in June 2007 or perhaps before.

DAMAGES AND LOSERS

Which nations are expected to suffer most from climate change? The precise figures are greatly disputed. The extent of the damage in 2100 cannot be specified now, in part because of a lack of information about each nation's ability to adapt to warmer climates. But it is generally agreed that the poorest nations will be the biggest losers by far. The wealthy nations, including the United States, are in a much better position for three independent reasons: First, they have much more adaptive capacity. Second, a smaller percentage of their economies depend on agriculture, a sector that is highly vulnerable to climate change. Third, the wealthy nations are generally in the cooler, higher latitudes, which also decreases their vulnerability.

To get a handle on the problem, let us assume that warming will be 2.5°C. Table 3 provides a prominent estimate of how the harms are likely to vary across nations and regions. To be sure, these rough estimates are at best only suggestive. We do not yet have anything like precise understandings of the effects of climate change on different regions of the world. But on these estimates, or any reasonable variation, it is readily apparent that some nations are far more vulnerable than others. According to influential analysts, the

Table 1

Share of Global Emissions 2003 and 2004

	2003	2004
United States	22.7%	22.0%
OECD Europe	16.9%	16.3%
China	15.3%	17.5%
India	4.1%	4.1%
Japan	4.9%	4.7%
Africa	3.5%	3.4%
Russia	4.2%	4.2%

United States, China, and Russia can be expected to lose relatively little from 2.5°C warming; indeed, Russia can be expected to gain.

By contrast, India and Africa are anticipated to be massive losers. India is expected to experience devastating losses in terms of both health and agriculture. For Africa, the major problem involves health, with a massive anticipated increase in climate-related diseases. Greater warming, for example 3.5°C, would be expected to impose even greater damage, and would likely ensure significant losses to the United States and China as

well. But cross-national differences, in the magnitude of the losses, would remain.

We can appreciate, in this light, why the United States was so reluctant to ratify the Kyoto Protocol. The United States would have borne at least half of the worldwide cost of the agreement (hundreds of billions of dollars and possibly much more). And because the developing world was exempted from the emissions limits of the Kyoto Protocol, its effects on climate change would be quite modest even if the United States had participated; any agreement failing to impose limits on China and other developing countries would do little about the problem. Among insiders, it is widely known that the content of the Kyoto Protocol, and the attitude of various nations toward it, had everything to do with domestic self-interest — and that the United States would have been, by far, the world's biggest loser from the agreement. We can also understand, in this light, why the United States was so cautious about accepting mandatory emissions reductions in Bali, even though a worldwide agreement, including the developing world, could do a great deal of good.

CLIMATE CHANGE AND DISTRIBUTIVE JUSTICE

From the standpoint of distributive justice, it is tempting to suggest that because of its wealth, the United States should be contributing a great deal to the climate change problem — far

Table 2

Relative Contributions of Annual Carbon Dioxide Emissions by Country/Region

Approximate percentage of worldwide emissions

	1990	2003	2004	2010	2015	2020	2025	2030
United States	23.5%	22.7%	22.0%	20.1%	19.4%	18.8%	18.7%	18.5%
OECD Europe	19.3%	16.9%	16.3%	14.6%	13.4%	12.4%	11.6%	10.9%
China	10.5%	15.3%	17.5%	21.1%	22.4%	23.9%	25.0%	26.2%
India	2.7%	4.1%	4.1%	4.2%	4.4%	4.7%	4.9%	5.0%
Japan	4.8%	4.9%	4.7%	4.1%	3.8%	3.5%	3.3%	3.0%
Africa	3.1%	3.5%	3.4%	3.7%	3.8%	3.9%	3.9%	3.9%

more than would otherwise be its fair share. Let us simply stipulate that it would be a good idea for wealthy people in wealthy nations to transfer resources to poor people in poor nations. Even if this is so, the claim from distributive justice runs into three problems in the context of climate change.

The first problem is that emissions reductions would help future poor people rather than current poor people. If the arc of human history is any guide, future poor people are likely to be far wealthier than current poor people. Why should rich nations help poor nations in the future, rather than poor nations now? If the goal is to help the poor, it is odd for the United States to spend significant resources to help posterity while neglecting the present.

The second problem is that emissions reductions are an in-kind benefit. Poor people in poor nations would in all likelihood prefer a cash transfer so they could use the money as they

areas continue to be extremely poor despite the increasing prosperity of the nation as a whole. These people are among the poorest in the world. For at least some of those people, climate change could well provide benefits by increasing the productivity of their land. In addition, many millions of poor people would be hurt by the cost of emissions reductions. They would bear that cost in the form of higher energy bills, lost jobs, and increased poverty. Recall too that industrialized and relatively wealthy European nations have been found to be at greater risk than the relatively poorer China. These points are not meant to suggest that climate change is not a problem; the point is that warmer temperatures will help many poor people and hurt many rich people.

It follows that, purely as an instrument of redistribution, emission reductions on the part of the United States are quite crude. True, a suitably designed emissions control agreement

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see fit. Perhaps India would prefer to spend the money on education, or on AIDS prevention, or on health care in general. If redistribution is really what is sought, a generous deal with respect to the threat of climate change is hardly the best way of achieving it. Analytically, that deal has some similarities to a grant of housing assistance to poor people when they might prefer to spend the money on food or health care. If redistribution is desirable, housing assistance is better than nothing, but it remains puzzling why wealthy nations should be willing to protect poor nations from the risks of climate change, while not being willing to give them resources with which they can set their own priorities.

The third problem is that many of the beneficiaries of emissions reductions are wealthy and many of the losers from emissions reductions are poor. Wealthy people in poor nations, such as China, will benefit from such reductions; the same is true of wealthy people in wealthy nations such as the United States and Germany. Warming will also produce monetary benefits in many places, above all as a result of increases in agricultural productivity – for example, in Russia. Indeed, millions of poor people are likely to benefit from climate change. Some of them will live when they would otherwise die from extreme cold. There is another point: In China, many millions of people living in rural

would almost certainly help poor people more than it would hurt them; recall that disadvantaged people in Africa and India are at grave risk. And true, such an agreement might well be better, from the standpoint of distributive justice, than the status quo. But if redistribution to the poor is the goal, emissions reductions are hardly the best means; there is a highly imperfect connection between distributive justice on the one hand and requiring wealthy countries to pay for emissions reductions on the other.

COUNTERARGUMENTS A legitimate argument for cutting greenhouse gas emissions as a form of distributive justice is that this step bypasses the governments of poor states more completely than other forms of development aid do. This might be counted as a virtue because the governments of poor states are, to a large degree, either inefficient or corrupt (or both), and partly for that reason, ordinary development aid has not been very effective. On the other hand, this form of redistribution does not, as we have stressed, help existing poor people at all; it can, at best, help poor people in future generations. In addition, a cap-and-trade system would provide governments of developing nations with considerable opportunities for corruption. They would be given valuable assets – pollution permits

Table 3

Damages from 2.5°C Degrees of Warming

Estimated percentage of GDP

India	4.93
Africa	3.91
OECD Europe	2.83
High-Income OPEC	1.95
Eastern Europe	0.71
Japan	0.50
United States	0.45
China	0.22
Russia	-0.65

— that they could hand out to cronies; they could also misuse revenues from the sale of permits and refuse to shut down politically connected businesses that lack permits.

A second counterargument is that greenhouse gas cuts could prevent a catastrophic loss of life. In light of the risk of catastrophe, perhaps emissions reductions are preferable to other redistributive strategies. To the extent that the risk of catastrophe is not low and to the extent that it is faced mostly by people living in difficult or desperate conditions, the argument from distributive justice gains a great deal of force. To the extent that the catastrophic scenario remains highly unlikely, the argument is weakened. Ultimately the strength of the argument turns on the extent of the risk.

The point for present purposes is that, in principle, redistribution through greenhouse gas cuts is hardly the most direct or effective way to help poor people or poor nations. We cannot exclude the possibility that the more direct methods are inferior, for example because it is not feasible to provide that direct aid; but it would remain necessary to explain why a crude form of redistribution is feasible when a less crude form is not.

CLIMATE CHANGE AND CORRECTIVE JUSTICE

Another influential argument takes as its starting point the principles of corrective justice. In the context of climate change, the corrective justice argument is that the United States wrongfully harmed the rest of the world — especially low-lying states and others that are most vulnerable to global warming — by emitting greenhouse gases in vast quantities. Just as a factory owner who injures residents by emitting harmful pollutants should pay damages to them, so a country that emits greenhouse gases should pay damages to other countries that have been harmed, or will be harmed, by climate change.

The apparent simplicity of this argument masks several serious difficulties. The United States is not a person, nor are the countries that suffer the worst effects of global warming. Countries are collectivities, not individuals. Once one examines the relevant actions of individuals, the difficulties become clear.

The current stock of greenhouse gases in the atmosphere is to a large extent a result of the behavior of people living in the past. Much of it is a result of the behavior of people who are dead. The basic problem for corrective justice is that dead wrongdoers cannot be punished or held responsible for their behavior, or forced to compensate those they have harmed. Holding Americans today responsible for the activities of their ancestors is not fair or reasonable on corrective justice grounds because current Americans are not the relevant wrongdoers; they are not responsible for the harm.

The best response to this point is to insist that all or most Americans today benefit from the greenhouse gas-emitting activities of Americans living in the past, and therefore it would not be wrong to require Americans today to pay for compensation or abatement measures. This argument is familiar from debates about slave reparations, where it is argued that Americans today have benefited from the toil of slaves 150 years ago. To the extent that members of current generations have gained from past wrongdoing, it may well make sense to ask them to make compensation to those

harmed as a result. On one view, compensation can work to restore the status quo ante, that is, to put members of different groups in the position that they would have occupied if the wrongdoing had not occurred.

However, this argument runs into serious problems in the context of climate change. How many Americans benefit from past greenhouse gas emissions and how much do they benefit? Many Americans today are, of course, immigrants or children of immigrants, and so not the descendants of greenhouse gas-emitting Americans of the past. Such people may nonetheless benefit from past emissions because they enjoy the kind of technological advance and material wealth that those emissions made possible. But have they actually benefited, and to what degree? Further, not all Americans inherit the wealth of their ancestors, and even those who do would not necessarily have inherited less if their ancestors' generations had not engaged in the greenhouse gas-emitting activities.

From the standpoint of corrective justice, another point may be still more fundamental. As long as the costs are being toted up, the benefits must be as well, and used to offset the requirements of corrective justice. If past generations of Americans have imposed costs on the rest of the world, they have also conferred substantial benefits. American industrial activity has produced goods that were consumed in foreign countries, for example, and drove technological advances from which citizens in other countries have benefited. To be sure, many citizens in (say) India have not much benefited from those advances, just as many citizens of the United States have not much benefited from them. But what would the world, or India, look like if the United States had engaged in 10 percent of its level of greenhouse gas emissions, or 20 percent, or 40 percent? For purposes of corrective justice, a proper accounting would seem to be necessary, and it presents formidable empirical and conceptual problems.

In the context of slave reparations, the analogous points have led to interminable debates, again empirical and conceptual, about historical causation and difficult counterfactuals. But-for causation arguments, used in standard legal analysis, present serious and perhaps insuperable problems when applied historically. We can meaningfully ask whether an accident would have occurred if the driver had operated the vehicle more carefully, but it is hard to answer the question whether white Americans today would have been worse off if there had been no slavery — and difficult too to ask whether Indians would be better off today if Americans of prior generations had not emitted greenhouse gases. In this hypothetical world of limited industrialization in the United States, India would be an entirely different country and the rest of the world would be unrecognizably different as well.

In addition, corrective justice ordinarily requires culpability, and it is not clear whether culpability is present in the context of climate change. The weakest standard of culpability is negligence: if one negligently injures someone, the negligent person owes the victim a remedy. Economists define negligence as the failure to take cost-justified precautions. Lawyers tend to appeal to community standards.

Today a scientific consensus holds that the planet is warm-

ing, and that this warming trend is a result of human activity. But this consensus took a long time to form. In the modern era, the earliest work on global warming occurred in the 1970s, and it was controversial. At a minimum, greenhouse gas-emitting activities did not become negligent, under existing legal standards, until a scientific consensus formed and it became widely known among the public — a recent occurrence.

Even today, it is not clear when and whether engaging in greenhouse gas-emitting activities is properly characterized as negligent. The scientific consensus does not answer the critical question of how much any particular activity actually contributes to climate change. Indeed, a lively controversy exists about the overall costs and benefits of climate change in particular regions. Suppose, for example, that a large company in New York emits a large volume of greenhouse gases — is it negligent? It is easily imaginable that the costs of emissions abatement would be significant; it is also easily imaginable that the

they should stop engaging in all activities that produce greenhouse gases; instead, they think that they should cut back on activities that generate unreasonable greenhouse gas emissions in light of whatever benefits they produce. Some people go further and purchase carbon offsets, but this type of activity seems, at present, supererogatory, whereas a case could be made today that a reasonable cutting back on greenhouse gas-emitting activities is morally required — that it represents an emerging community standard or norm.

Even if this is so, a significant problem remains. The calculation given above assumes that everyone around the world is paying the carbon tax, and thus also cutting back on greenhouse gas-producing activities. If many or most people fail to pay the carbon tax, or (as we argue) fail to act as if they pay it by cutting back on less important greenhouse gas-producing activities, then the contribution of Americans who do this is quite small. And if this is the case, it cannot be considered negligent for

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benefits of emissions abatement, in terms of diminished warming, would be close to zero. We all understand what it means to drive a car negligently so as to put other drivers and pedestrians at risk, but the claim that driving a car carefully is in fact negligent because of its impact on global warming, and the harm it causes to people living in India, is doubtful in light of the fact that the global warming cost of driving a car is trivial and the benefits, to the driver and others, may be significant. Heating a house, driving a car, running a freezer, taking an airplane — are all of these negligent? Even though the warming effects of the relevant emissions are essentially nil?

It would be possible to respond that, in fact, negligence has been pervasive. Although the harm caused by each of these activities in isolation is small, the cost of precaution is also often low. For example, William Nordhaus calculates that the optimal carbon tax as of 2015 would be about \$35 per ton. The calculation is based on the external cost of burning a ton of carbon as a consequence of greenhouse gas emissions. We calculate that this \$35 per ton figure translates to about an extra 10 cents per gallon of gas. Using the economic theory of negligence as the failure to take cost-justified precautions, we could conclude that a person is negligent when she drives rather than walks, when the benefit she obtains from driving is less than 10 cents per gallon consumed. The argument could be extended to the choice of driving rather than using convenient forms of public transportation, and to other activities as well.

Indeed, today many people seem to be reducing their emissions on the basis of an assessment of roughly this kind. Those concerned about climate change do not seem to believe that

Americans to fail to engage in cutbacks of greenhouse gas-emitting activities. Put differently, it is not negligent to fail to contribute to a public good if not enough others are doing similarly, so that the public good would not be created even if one did contribute. This is a “moral collective action problem” and, however it should be assessed, the failure to act when other people are not acting does not seem to constitute negligence.

NEGLIGENT GOVERNMENT? What about the U.S. government? Perhaps one could argue that U.S. climate change policy — which is to say not much in the way of policy — has been culpably negligent. The argument would be that, by failing to take precautions that would have cost the United States a lot but benefited the rest of the world much more, the U.S. government engaged in culpable behavior.

Some people draw an analogy between the depletion of the ozone layer and climate change. In the context of ozone-depleting chemicals, this particular argument was plausible. For such chemicals, the global cost of U.S. emissions exceeded, by a large measure, the global benefits. But in the context of climate change, the problem is that, as we noted above, it is far from clear that the United States could have taken unilateral action that would have created benefits for the rest of the world greater than the cost to the United States. Unilateral reductions in greenhouse gas emissions would have little effect on overall climate change — not so far from zero even if aggressive and effective, and zero or very close to it if industry simply migrated to foreign countries. The Kyoto Protocol imposed no obligations on China, now the biggest emitter, and placed

heavy burdens on the United States. In this light, the claim that American policy has been negligent, under prevailing legal standards, is far-fetched.

Nothing that we have said is inconsistent with the view that American policy has been wrong or misdirected — especially insofar as the United States has not sought to engage the world in reducing the problem. But it is not easy to say that the benefits of significant unilateral reductions would clearly exceed the costs.

THE GOVERNMENT VS. THE PUBLIC Even if one could conclude that the U.S. government behaved negligently, it does not clearly follow that the American people should be held responsible for their government's failures. The government itself

reduction takes place. (The Bali agreement suggests that the United States is indeed willing to do so, though the terms remain vague.) The problem is essentially one of dividing the surplus (the avoided costs of climate change minus global abatement costs). We can predict (and observe) that the United States, like other countries, will take account of its particular benefits and costs from climate change when staking out its bargaining position. Because climate change will have a differential impact around the world, different countries will advocate different levels of emission reductions.

As the Bali agreement also suggests, those (such as the European countries) that seek a higher level of emission reduction may have to find some way to pay those (certainly China and perhaps the rest of the developing world) that do not, in

It is far from clear that greenhouse gas restrictions on the part of the United States are the best way to help the most disadvantaged people of the world.

does not have its own money to pay the remedy; it can only tax Americans. To justify such a tax, one would need to conclude that Americans behaved culpably by tolerating a government that failed to take actions that might have conferred benefits on the rest of the world of greater value than their costs. It is one thing to blame individual Americans for excessive greenhouse gas emissions; it is quite another to blame Americans for the failure of their government to adopt strict greenhouse gas reduction policies. Recall in this connection that even if Americans had demanded that their government act to reduce greenhouse gas emissions in the United States, the effect of unilateral reductions on climate change would be very small.

WHAT SHOULD BE DONE?

Our goal here has been to investigate considerations of distributive justice and corrective justice. If the United States wants to use its wealth to help impoverished people in India or Africa or elsewhere in the world, there can be no reason for complaint. It is far from clear, however, that greenhouse gas restrictions on the part of the United States are the best way to help the most disadvantaged people of the world.

Many people are treating climate change as a kind of tort, committed by the United States against those who are most vulnerable. But the principles of corrective justice have an awkward relationship to the problem of climate change. Many of the relevant actors are long dead, and a general transfer from the United States to those in places especially threatened by climate change is not an apt way of restoring some imagined status quo.

What should be done, then? If, as seems clear, the global benefits from a specified reduction of greenhouse gas emissions would exceed the costs, then the United States should participate in a global treaty regime that ensures that such a

return for their consent to a treaty that does not otherwise serve their interests. If they refuse, they will need to accept abatement levels that are closer to those that are in the interest of China — and the United States.

To the extent that the United States believes that some of its foreign aid goals can be achieved by taking a more generous position in climate change negotiations than ordinary national interest considerations would suggest, then it should not hesitate to do so. And if the United States believes that it can effectively assist vulnerable people through climate change policy, it should also be encouraged to do so. But in their usual forms, concerns about redistributive and corrective justice muddy the picture and threaten to interfere with efforts to negotiate an effective climate treaty in the future. **R**

Readings

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