In the last chapter, we imagined an asteroid hurtling toward earth, and asked how the burdens of intercepting and destroying the asteroid should be shared among the nations of the world. Many people would object that the asteroid example is misleading because it lacks a characteristic that is fundamental to the climate change problem. The asteroid is nobody's fault, it is argued, while climate change is the fault of the rich, industrial nations, which have contributed greenhouse gases to the atmosphere out of proportion to their population or their needs. The United States, for example, has 300 million people, but in 2005 contributed 18.4 percent of the carbon dioxide emissions (excluding land use change). By contrast, in that year India had over 1 billion people and contributed only 5 percent of the carbon dioxide emissions. If one looks at stocks rather than flows, the story is the same. Between 1950 and 2000, the United States contributed 17 percent of the current stock of greenhouse gas emissions; India has contributed well under 2 percent.

The upshot is a very ugly picture that depicts the citizens of wealthy countries, including the European countries, Canada, Japan, and Australia, as well as the United States, consuming wasteful goods such as SUVs and heated swimming pools over many decades, while people in the poorest countries have barely had enough to eat. Finally, after many decades of poverty, some developing nations are set to deliver reasonably comfortable standards of living to their citizens—although still far short of what prevails in the West—and then are told that they are going to have to pay a large share of
abatement costs to address a problem that is the result of the profligacy of the West. These abatement costs will come out of the pockets of the citizens of those still poor countries, in the form of taxes and higher prices for consumer goods. Wouldn't it be fairer for the wealthy countries to incur all or most of the abatement costs, while the poorer countries continue to catch up? The argument that rich countries should pay for climate abatement, or pay for most of climate abatement, because they are most responsible for the problem of climate change is an argument about what philosophers call corrective justice. According to corrective justice, if one person harms another person, the first person should provide a remedy, such as cash, to the victim. Applying this idea to the setting of climate change, developing countries and their supporters argue that because the United States and wealthy countries have caused, or mostly caused, the problem of climate change, they should provide the remedy. Some people have argued that these rich countries should literally pay compensation to people who are now suffering the ill effects of global warming, such as people who live in low-lying villages that are being flooded with greater frequency. But the usual argument is that the rich countries should pay most of the cost of greenhouse gas abatement—that is, the rich countries alone should be forced to limit their emissions, or (more plausibly) the rich countries should have relatively fewer greenhouse gas emission permits, so that they will have to pay poorer countries for their permits in order to continue to pollute.

The idea that the people who pollute should pay for the harm they cause to the environment is often called the "polluter pays principle." The polluter pays principle can be derived from the corrective justice argument and is often identified with it, but it can be given other normative justifications as well.

The corrective justice argument appeals to some powerful intuitions. However, we will argue in this chapter that it has serious flaws, and does not provide useful guidance for the design of a climate treaty. As we have seen in chapter 1, the argument encounters serious problems on the facts. As of 2005, for example, China accounted for 10 percent of cumulative emissions, and the developing countries were not far behind the developed ones in terms of total emissions. Recall too that explosive emissions growth is occurring in the developing world. By 2030, it will be hard to argue, on the facts, that the developed nations are largely responsible for the total harm. In addition, if one defines harm on a per-person basis rather than on a per-country basis, the richest nations are no longer the worst offenders— instead, some very poor nations are. We will return to these issues in due course.

It is true, however, that emissions in some countries have imposed serious risks on others, that the United States and China are expected to remain the world's leading contributors, and that some nations, including those in Africa, face serious risks even though their own emissions are trivial. India's emissions are hardly trivial, but that nation might also claim that it faces serious risks for which it is not responsible. Even so, the corrective justice argument faces serious difficulties. The reason, briefly, is that the argument, in the form described above, assumes that nation-states are the relevant moral agents, and that when one nation-state injures another nation-state, corrective justice requires that the first owes a remedy to the second. But the idea that nation-states can be moral agents is highly unappealing, as it relies on notions of collective responsibility that have been rejected by mainstream philosophers as well as institutions such as criminal and tort law. Collective responsibility implies that if one person in a group (say, the father in a family, or a soldier in a nation-state) commits a wrong against another person, then the victim has a remedy against other members of the group (the father's child, the soldier's co-citizens). Collective responsibility once played an important role in social organization, but over the centuries, it has been progressively squeezed out of domestic and international law. Although it sometimes has instrumental value, no one seems to defend it anymore as a matter of principle.

The corrective justice argument for putting the climate burden on the leading emitters can be resurrected in a morally appealing form, one that does not rely on notions of collective responsibility and instead makes the standard assumption of individualism. On this approach, we would need to identify particular individuals who,
through their activities (for example, driving), have caused damage to the climate that has harmed other individuals. In principle, we would allow the victims some type of remedy against the wrongdoers or, if this is difficult, we might permit a form of rough justice that, in some aggregate sense, ensures some kind of transfer from a sufficiently large fraction of the wrongdoers to a sufficiently large fraction of the victims. Although we cannot rule out such an approach, we will argue that it is also not appealing. The problem is that, on any realistic assessment of wrongdoing, the number of culpable contributors to the climate problem who are alive today is a modest fraction of all contributors, and the number of victims today (as opposed to in the future) is quite small; indeed, it may make little sense to say that any person is individually culpable, given the nature of the problem.

The Basic Argument

Corrective justice arguments are backward-looking, focused on wrongful behavior that occurred in the past. Corrective justice therefore requires us to look at stocks rather than flows. In the context of climate change, the corrective justice argument is that some nations have 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. On a widespread view, corrective justice requires that those nations devote significant resources to remedying the problem—perhaps by paying damages, agreeing to extensive emissions reductions, or participating in a climate pact that is not in their self-interest. India, for example, might be thought to have a moral claim against the United States—one derived from the principles of corrective justice—and on this view the United States has an obligation to provide a compensatory remedy to India. (Because the United States is the leading contributor to the existing stock of emissions, we use that nation as a placeholder for those who have inflicted harms on others; and because India is especially vulnerable to climate change, we use that nation as a placeholder for those at particular risk.)

This argument enjoys a great deal of support, and seems intuitively correct. We shall identify a large number of problems here, and the discussion will be lamentably complex. The most general point, summarizing the argument as a whole, is that the climate change problem poorly fits the corrective justice model because the consequence of tort-like thinking would be to force many people who have not acted wrongfully to provide a remedy to many people who have not been victimized. Some of the problems we identify could be reduced if it were possible to trace complex causal chains with great precision; unfortunately, this will not be possible.

The Wrongdoer Identity Problem

Corrective justice normally requires an injurer to compensate a victim for harm the injurer caused. For such an obligation to arise, we must be able to identify an injurer who behaved in a morally culpable way. We cannot simply label all Americans or all individuals who live in other developed nations as morally culpable injurers. Americans vary dramatically with respect to their individual emissions and whether they have behaved culpably.

Consider table 5.1, which shows the percentages of the current American stock of emissions that are the result of emissions since a particular year. According to the U.S. Census Bureau, 54.5 percent of Americans were born after 1975. These individuals are not responsible for the more than half of the U.S. emissions that occurred prior to this time. More than 27 percent of Americans are currently younger than twenty years old and are arguably not responsible at all for emissions—they do not get to choose where to live or what size house to buy.

As we will discuss later in this chapter, there is a further question about whether the people who have caused these emissions are morally responsible for them. Normally, moral responsibility requires culpability as well as causation. Yet many Americans today do not support the current American energy policy and already make some sacrifices to reduce the greenhouse gas emissions that result from their behavior. They avoid driving, they turn down the heat in their
Table 5.1.
Percentage of American Stock of Emissions by Quarter Century

<table>
<thead>
<tr>
<th>Year</th>
<th>Megatons of CO₂</th>
<th>% of Stock</th>
</tr>
</thead>
<tbody>
<tr>
<td>1850</td>
<td>342,603</td>
<td>100</td>
</tr>
<tr>
<td>1875</td>
<td>323,040</td>
<td>94</td>
</tr>
<tr>
<td>1900</td>
<td>314,772</td>
<td>92</td>
</tr>
<tr>
<td>1925</td>
<td>282,967</td>
<td>83</td>
</tr>
<tr>
<td>1950</td>
<td>236,035</td>
<td>59</td>
</tr>
<tr>
<td>1975</td>
<td>152,593</td>
<td>45</td>
</tr>
<tr>
<td>2000</td>
<td>28,988</td>
<td>8</td>
</tr>
</tbody>
</table>

* Calculations from Climate Analysis Indicator Tool (CAIT), available at https://cait.wri.org. The data represent the sum of emissions for the relevant time periods without accounting for the decay of greenhouse gases in the atmosphere. This is the same methodology used for computing stocks in Chapter 1.

homes, and they support electoral candidates who advocate greener policies. Holding these people responsible for the wrongful activities of people who lived in the past seems perverse.

To be sure, many Americans have made choices that do not adequately take climate consequences into account. But even among these Americans, we should distinguish between greenhouse gas emissions that occurred before the problem of anthropogenic climate change was widely known, or before that point at which reasonable people would have acknowledged the problem, and later emissions. When was that point? In the 1990s? In the 2000s? It can take quite a while for a scientific consensus to filter down to the general public. If so, the percentage of potentially “culpable” emissions in today’s U.S.-generated stock is down to a relatively small number.

Finally, there is a question of whether people are morally obliged to cut back on greenhouse gas emissions if others are not doing the same. This is a “moral collective action problem”—a problem to which we will return. For present purposes, the main point is that corrective justice usually distinguishes between people who are at least causally responsible for the problem (many of whom are dead), and more likely, those who are culpable, on the one hand, and those who are neither causally responsible nor culpable, on the other. “America” is not culpable: certain Americans may be. An approach that emphasized corrective justice would attempt to focus on particular actors, rather than Americans as a class, which would appear to violate deeply held moral objections to collective responsibility.

A natural 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 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 compensate or make whole 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, and citizens of different nations, in the position that they would have occupied if the wrongdoing had not occurred.

In the context of climate change, however, this argument runs into serious problems. The most obvious difficulty is empirical. It is true that many Americans benefit from past greenhouse gas emissions, but how many benefit, 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 gain 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? 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. The idea of corrective justice, building on the tort analogy, does not seem to fit the climate change situation.

Suppose that these various obstacles could be overcome and that we could trace, with sufficient accuracy, the extent to which current Americans have benefited from past emissions. As long as the
costs are being raked up, the benefits should 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 products that were consumed in foreign countries, for ex-
ample, and has driven technological advances from which citizens
in other countries have gained. Many of these benefits are positive
externalities, for which Americans have not been fully compensated.
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 neces-
sary, and it presents formidable empirical and conceptual problems.

In the context of slave reparations, the analogous points have
led to inextricable debates, again empirical and conceptual, about
historical causation and difficult counterfactuals. But caus-
tion arguments, used in court legal analysis and conventional
purposes of corrective justice, 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 conceptual and empirical questions
make it difficult to answer the question whether and to what extent
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.

The Analogy to Corporate Liability

Proponents of slave reparations have sometimes appealed to prin-
ciples of corporate liability. Corporations can be immune, and
many corporations today benefited from the slave economy in the
nineteenth century. Corporations are collectivities, not individuals,
yet they can be held liable for their actions, which means that share-
holders today are "punished" (in the sense of losing share value) as
a result of actions taken by managers and employees long before
the shareholders obtained their ownership interest. Indeed, lawsuits
against corporations and other entities that benefited from slavery
and other wrongdoing from the distant past have met with some
success. If innocent shareholders can be made to pay for the wrong-
doing of employees who are long gone, why can't citizens be made to
pay for the wrongful actions of citizens who lived in the past?

The best answer is that corporate liability is most easily justified on
grounds other than corrective justice. Shareholder liability can be def-
ded on the basis of consent or (in our view most plausibly) on the
welfarist ground that corporate liability deters employees from engag-
ing in wrongdoing on behalf of the corporate entity. A factor that
distinguishes shareholder liability based on corporate wrongdoing
from liability based on citizenship in a culpable state is that purchas-
ing shares is a voluntary activity and one does so with the knowledge
that the share price will decline if a past legal violation comes to light,
and this is reflected in the share price at the time of purchase. (One
also benefits if an unknown past action enhances the value of the
company.) But because the corporate form itself is a fiction, and the
shareholders today are different from the wrongdoers yesterday, cor-
nporate liability cannot be grounded in corrective justice.

Welfarist or related efficiency-based justifications for corporate
liability can also be given. If corporations are made liable for the
wrongdoing of employees, then shareholders are given an incentive
to encourage managers to monitor and discipline employees. Share-
holders cannot escape liability merely by selling their shares to third
parties, because third parties will pay less for shares if they believe
that managers have not sufficiently controlled employees. Such a
welfarist argument can also be applied to states, albeit in a highly
modified form—given the problem that citizens don't have as much
power over governments as shareholders have over management,
and cannot as easily exit—and that is what we will do in chapter 8.
For now, it is sufficient to observe that the welfarist argument and
corrective justice argument are not the same, and the practice of corporate liability does not provide an argument in favor of applying corrective justice arguments to states in the setting of climate change treaty negotiations.

The Victim/Claimant Identity Problem

As usually understood, corrective justice requires an identity between the victim and the claimant: the person who is injured by the wrongdoer must be the same as the person who has a claim against the wrongdoer. In limited circumstances, a child or other dependent might inherit that claim, but usually one thinks of the dependent as having a separate claim, deriving from the wrongdoer's presumed knowledge that by harming the victim she also harms the victim's dependents.

Who are the victims of climate change? Most of them live in the future. Thus, their claims have not matured. To say that future Indians might have a valid claim against Americans today, or Americans of the past, is not the same as saying that Americans today have a duty to help Indians today. To be sure, some people are now harmed by climate change. In addition, people living in low-lying islands or coastal regions can plausibly contend that a particular flood or storm has some probabilistic relationship with climate change—but from the standpoint of corrective justice, this group presents its own difficulties (a point to which we will return shortly). What remains plausible is the claim that future Indians would have corrective justice claims against current and past Americans.

A successful abatement program would, of course, benefit many people living in the future, albeit by preventing them from becoming victims in the first place or reducing the magnitude of their injury, rather than compensating them for harm. Such an argument does not rely on principles of corrective justice—it is forward-looking rather than backward-looking. It does reflect a concern about avoiding harm, but there is no deontological restriction on engaging in behavior that imposes risks on people in the future—virtually all behavior imposes risks on others, and some other principle is needed to distinguish between risky behaviors that are justified and those that are not. Governments generally take a welfarist approach to such behavior, banning or restricting activities that impose high risks of harm and permitting other activities.

One might justify the abatement approach on welfarist grounds: perhaps the welfare benefits for people living in the future exceed the welfare losses to people living today. That is the view that we defend in chapter 8. One could also make an argument that people living today have a nonwelfarist obligation to refrain from engaging in actions today that harm people in the future. The point for present purposes is that both arguments are forward-looking: the obligation, whether welfarist or nonwelfarist, is not based on past actions, and thus a nation's relative contribution to the current greenhouse gas stock in the atmosphere would not be a relevant consideration in the design of the greenhouse gas abatement program, as we have been arguing. By contrast, the corrective justice argument is that the United States should contribute the most to abatement efforts because it has caused the most damage to the carbon-absorbing capacity of the atmosphere.13

The Causation Problem

Corrective justice requires that the wrongdoing cause the harm. In ordinary person-to-person encounters, this requirement is straightforward. But in the context of climate change, causation poses significant challenges, especially when we are trying to attribute particular losses to a warmer climate.

To see why, consider a village in Alaska that was formerly protected from erosion by ice that blocked ocean waves but now must build expensive barriers or even relocate because the ice has melted. One might make a plausible argument that the ice would not have melted but for global warming. But it might well be impossible to show that greenhouse gas emissions in the United States “caused” the melting of the ice and the increased erosion, in the sense that they were a necessary and sufficient condition, and it would be difficult to show that they even contributed to it. If the erosion was in a
probabilistic sense the result of greenhouse gas activities around the world, its likelihood was also increased by complex natural phenomena that are poorly understood.

Causation problems are not fatal to corrective justice claims, but they significantly weaken them. In tort law, courts are occasionally willing to assign liability according to market share when multiple firms contribute to a harm—for example, pollution or dangerous products whose provenance cannot be traced. And it would be plausible to understand corrective justice, in this domain, in probabilistic terms, with the thought that victims should receive “probabilistic recoveries,” understood as the fraction of their injury that is probabilistically connected with climate change. It is unclear, however, that statistical relationships can be established with sufficient clarity to support a claim sounding in corrective justice.19

The Culpability Problem

Philosophers disagree about whether corrective justice requires culpability.19 Intentional, reckless, or negligent action is usually thought to be required for a corrective justice claim. While some people do support strict liability on corrective justice grounds, a degree of culpability is required to make the analysis tractable. Because multiple persons and actions (including those of the victim) are necessary for harm to have occurred, identification of the person who has “caused” the harm requires some kind of assignment of blame.6 At a minimum, the case for a remedy is stronger when a person acts culpably rather than innocently, and so it is worthwhile to inquire whether the United States or Americans can be blamed for contributing to climate change. Indeed, the notion that Americans have acted in a blameworthy fashion by contributing excessively to climate change is an important theme in popular debates.17

Negligence in General

The weakest standard of culpability is negligence: if one negligently injures someone, one owes her a remedy. Economists define negligence as the failure to take cost-justified precautions. Lawyers appeal to community standards: a person is negligent if she did not take the level of care that a reasonable person would have in the same circumstances. Today, a scientific consensus holds that the planet is warming 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 and greenhouse gases occurred in the 1950s, and the modern consensus is a product of the 1990s. Greenhouse gas emitting activities could not have become negligent, under existing legal standards, until a scientific consensus formed and it became widely known among the public—a fairly recent occurrence.19

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, for the purpose of determining negligence, of how much any particular activity actually contributes to climate change. Indeed, as we saw in chapter 1, 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—does it become negligent? It is easily imaginable that the costs of emissions abatement would be significant; it is also easily imaginable that the benefits of emissions abatement, in terms of diminished warming, would be close to zero. (Even very large emitters produce, in any particular period of time, little in the way of warming.) 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 (non-hybrid) 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 activities negligent? Even though the warming effects of the relevant emissions are infinitesimal?

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, under certain assumptions, the optimal carbon tax as of 2010 would be about $34 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 $34 per ton figure translates to an extra ten 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 if the benefit she obtains from driving is less than ten 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.

Many people do seem to be reducing their emissions on the basis of an assessment of roughly this kind. Those concerned about climate change rarely believe that they should altogether stop engaging in activities that produce greenhouse gases (a difficult task); instead, they think that they should cut back on activities that generate unreasonable emissions of greenhouse gases 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 reduction of greenhouse gas emitting activities is morally required—that it represents an emerging community standard or norm.

Even if this is so, there is a problem with this argument, which is that the calculation given above assumes that everyone around the world, or at least hundreds of millions of people, are also cutting back on greenhouse gas producing activities. If many or most people fail to pay a carbon tax or (as we argue) fail to act as if they pay it by cutting back on less important activities that produce greenhouse gases, then the contribution of Americans who do this is quite small. And if this is the case, it cannot be considered negligent for Americans to fail to reduce their 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 in moral terms.

the failure to act when other people are not acting, so that positive action would generate no benefit, does not seem to constitute negligence.

But our main point, for now, is that it is hard to argue that the stock of greenhouse gases in the atmosphere that can be attributed to the activities of Americans is the result of negligence, in either the moral or legal sense. Most of this stock was either produced before people understood the problem of climate change or was the result of activities, like heating one's house in the winter, that probably caused more good than harm, and in any event did not fall below community standards of care.

Negligent Government?

What about the U.S. government? Perhaps one could argue that U.S. climate change 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.

One problem with this argument 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. So even if the United States had ratified that protocol, the effect would have been minimal. In this light, the claim that American policy has been negligent, under prevailing legal standards, is far-fetched.

It is also worth noting that, if an economic understanding of negligence is used, the United States does not emerge as a particularly culpable nation. On the economic understanding, people are negligent if their activities create costs that are greater than the benefits. If an economy delivers a unit of value in the form of goods and
services, it produces benefits for consumers; if it does so while producing relatively few greenhouse gases, then those consumers may enjoy benefits greater than the costs to others. The greenhouse gas efficiency of an economy—in terms of minimizing costs on others for a given level of benefit—can be expressed as the ratio of emissions over GDP. As we saw in Chapter 1, the most culpable nations using this measure are Zambia, Belize, and Liberia. The United States ranks 126th. So one might praise Americans who, over the years, have produced immense benefits for themselves at relatively little cost to the rest of the world. Or if one instead looks at emissions per capita, on the theory that emissions per capita rather than efficiency should be the proper basis for evaluating culpability, Belize, Guyana, and Luxembourg are the most culpable, with the United States ranked tenth. Is it plausible that a climate treaty should penalize Belize? Should people in Belize be given a disproportionate burden under a climate treaty because they or their government have not engineered a greenhouse gas-efficient economy? The principle of corrective justice cannot be applied selectively: if Belize should not be punished, then neither should the United States and Europe.

A more reasonable and serious criticism of American policy until very recently is that the U.S. government did not take seriously the risk of climate change, may have deliberately downplayed the risks when government officials knew better, and did not try to use its diplomatic power to advance climate treaty negotiations as much as it should have.12 Maybe; but a reasonable alternative hypothesis is that the United States was just trying to exercise its bargaining power so that any eventual treaty would be more favorable to its interests than otherwise. It is farfetched to say that such common state behavior is negligent.

The Government versus the Public

Even if one could conclude that the U.S. government behaved negligently, it does not follow that the American people should be held responsible for their government’s failures. The government itself 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 electing or 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.

There is a strong impulse to blame members of the public for the failures of their political system. In some cases, the impulse is warranted, but in others, the impulse should be resisted. The last example of such a policy was the war guilt clause of the Versailles Treaty, which held Germany formally responsible for World War I and required Germany to pay massive reparations to France and other countries. Germans resented this clause, and conventional wisdom holds that their resentment fed the rise of Nazism. After World War II, the strategy shifted: rather than holding “Germany” responsible for World War II, the allies sought to hold the individuals who formulated German policy responsible—these individuals were tried at Nuremberg and elsewhere, where defendants were given a chance to defend themselves. The shift from collective to individual responsibility was a major legacy of World War II, reflected today in the proliferation of international criminal tribunals that try individuals, not nations.

To be sure, no one is accusing the American government or its citizens of committing crimes; nor has the idea of a “climate guilt” clause surfaced so far. But the question remains whether Americans should be blamed, in corrective justice terms, for allowing their government to do so little about greenhouse gas emissions. 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. It is certainly plausible to think that voting for politicians who adopt bad policies, or failing to vote for politicians who adopt good policies, is not morally wrong except in extreme or unusual cases. 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. And even if Americans had demanded that the United States lead the way on a climate treaty, it is unlikely that such a treaty
would have produced much of a benefit, given the entrenched opposition of developing countries to greenhouse gas restrictions on their own industry, until very recently.

**Rough Justice**

However appealing at first sight, corrective justice intuitions turn out to be a poor fit with the climate change problem—where the dispute is between nations, and where an extremely long period of time must elapse before the activity in question generates a harm. This is not to deny that a corrective justice argument can be cobbled together and presented as the basis of a kind of rough justice in an imperfect world.\(^{19}\) Even if not all people in developed nations are wrongdoers, and not all people in developing nations are victims, enough people in the first group are wrongdoers and enough people in the second group are victims, that transfers from developed nations to developing nations would do justice. The innocent payers should give up their rights so that the rights of so many others can be vindicated.

Perhaps the argument, while crude, is good enough to provide a factor in allocating the burdens of emissions reductions. Unfortunately, even that conclusion would rely on notions of collective responsibility that are not easy to defend. Most of the attractiveness of the corrective justice argument derives, we suspect, from suppressed distributive and welfareist assumptions, or from collectivist habits of thinking that do not survive scrutiny.

Another argument along these lines is that because people take pride in the accomplishments of their nation, they should also take responsibility for its failures. Americans who take pride in their country's contributions to prosperity and freedom should also take responsibility for its contributions to global warming. This argument, however, is especially weak. Many people are proud that they are attractive or intelligent, or can trace their ancestry to the Mayflower, or live in a city with a winning baseball team, but nothing about these psychological facts implies moral obligations of any sort. A person who is proud to be American, and in this way derives welfare from her association with other Americans who have accomplished great things, perhaps should be (and is) less proud than she would be if she were not also associated with Americans who have done bad things. She does not have any moral obligation, deriving from her patriotic pride, to set aright what other Americans have done wrong.

**Corrective Justice: Taking Stock**

In this chapter, like the previous one, we accepted for the purpose of argument the underlying moral principles—that wealth should be redistributed to the poor, that victims of wrongdoing should have a remedy. But whereas in the last chapter we made an argument about means—a climate treaty is not a good way to redistribute wealth—here we question whether principles of corrective justice are relevant at all to the problem of climate change. Our conclusion is therefore stronger. While it is conceivable (but unlikely) that a climate treaty could turn out to be a good way to redistribute wealth, it is inconceivable that a climate treaty would properly address a problem of corrective justice—unless, of course, the questionable premises of the rough justice argument are accepted.

For many developing countries, the rich world's contribution to the climate problem is just one in a long series of grievances that include complaints about depredations committed by imperialist countries in their colonies, unfair trade relationships, interference with sovereignty, hard-hearted refusal to make life-saving drugs available or to give adequate foreign aid, and so forth. Some of these grievances have merit, others do not. Much depends on the particular details of the relationship between one state and another, so lumping states together into a wrongdoing rich world and a victimized poor world makes little sense. To the extent that some nations have legitimate complaints against others, those complaints can be addressed only through state-to-state negotiations that involve the original wrongdoers and victims and that culminate in reparations, assistance, or apologies that are appropriate to the original wrong. The notion that these complex problems could be globally addressed in a climate treaty is just not realistic and wishes away the serious disagreements that would first need to be resolved.
For the time being, it is sufficient to observe that the developed world acknowledges few of these complaints and has done little to address them. It would be tragic if climate negotiations broke down because developing nations believed that only a treaty that rich countries found unacceptable could address their accumulated grievances. The developing nations would suffer the most in the event of such a failure. In international relations, as in domestic politics, progress can be made on one front only if participants agree in the meantime to put aside their disputes on other fronts.

We have noted that many people believe that the problem of climate change should be handled by an international cap-and-trade system. Under this approach, participating nations, and perhaps the entire world, would create a “cap” on greenhouse gas emissions. Nations would be allocated specified emissions rights, which could be traded in return for cash. Though most economists favor a carbon tax, a system of this kind would probably be adequate and appears to be more politically feasible.

By itself, however, the proposal for a cap-and-trade system does not answer a crucial question: How should emissions rights be allocated? It is tempting to suggest that the status quo, across nations, provides the appropriate baseline. On one view, emissions should be frozen at existing levels, so that every nation has the right to its current level of emissions. On a more aggressive view, generally captured in the Kyoto Protocol, all or most signatory nations should have to reduce their emissions levels by a specified percentage, again taking the status quo as the foundation for reductions. The status quo might seem to have intuitive appeal, but it is also somewhat arbitrary and raises serious questions from the standpoint of equity. Why should climate change policy take existing national emissions, and to what extent existing national energy uses, as a given for policy purposes? Should a nation with 300 million people be given the same emissions rights as a nation with one billion people, or 40 million people, simply because the emissions of the three nations, at the current time, are roughly equal?
Raising these questions, many observers have strenuously urged that in an international agreement, emissions rights should be allocated by reference to population, not to existing emissions. The intuition is that the atmosphere is a common resource of all humans and, therefore, every person on the planet should have the same right to use it; it should not matter whether people find themselves in a nation whose existing emissions rates are high. This intuition seems to reflect a commitment to a type of fairness—equality or equal division. Those concerned about the welfare of developing nations are especially interested in per capita allocations of emissions rights. Why should a poor nation, with a large population, be required to stick close to its current emissions level, when wealthy nations with identical populations are permitted to emit far more? Why should existing distributions of wealth, insofar as they are reflected in current emissions, be taken as the foundation for climate change policy? More bluntly: Why should the United States be given emissions rights that are roughly the same as China’s and dwarf those of India, both of which have much larger populations?

The significance of this controversy can hardly be exaggerated. Most notably, the per capita approach has been described as “the most politically prominent contender for any specific global formula for long-term allocations with increasing numbers of adherents in both developed and developing countries,” including India, China, and as many as 130 other countries, and the European Union. However, the United States has indicated discomfort with the per capita system, arguing that developing countries that are, or will soon be, industrial powers—including China, India, and Brazil—will have to accept significant mitigation obligations in a climate treaty. It is unlikely, we will argue, that a per capita system will satisfy the demands of the United States, one of the world’s leading greenhouse gas emitters on a per capita basis. Meanwhile, the per capita approach remains the reigning political and ethical paradigm for the distribution of permits because it has been largely unquestioned.

Our goal in this chapter is to examine the per capita system, in terms of both principle and feasibility. Our examination suggests that its current prominence and popularity are undeserved. Advocates of per capita allocations are correct on one point: In principle, there is little to be said for basing emissions rights on existing emissions levels. The most plausible defense of this approach is pragmatic. Nations are unlikely to sign an international agreement if they will be significant net losers, and wealthy nations might lose a great deal from any approach that does not use existing emissions as the baseline for reductions. But this pragmatic point shows only that powerful nations might well veto approaches that are better in principle; it does not show that those nations are correct to do so. As a normative matter, an approach based on per capita emissions rights seems preferable to one based on existing emissions, and there are strong intuitive claims, rooted in welfarist and other arguments, on behalf of such an approach.

As we shall also see, however, a per capita approach runs into powerful objections. Some of these objections are similar to the arguments about distributive justice we made in chapter 4; others are new. As we argued in chapter 4, there is no reason on distributive justice grounds to tie a climate treaty to a new multilateral foreign aid program. Instead, redistribution should be done in the best way possible, which, given its complexities, is unlikely to be as part of a climate treaty. For the same reason, a per capita allocation of permits is not required on distributive grounds. In particular, permit allocations inevitably will go to governments, not people. There is no ethical reason linking payments to governments to a climate treaty; instead, such payments must be compared to other methods of meeting distributive obligations.

Even if we were to include distributive concerns within a climate treaty—say on the grounds that the creation of emission permits is a unique event that allows transfers that might not otherwise occur—a per capita allocation would be a poor method of doing so. Although there is a correlation between per capita emissions and wealth, some rich nations have low per capita emissions and some poor nations have very high per capita emissions. Many poor nations would be hurt, possibly severely. Moreover, any emissions reduction agreement will impose a disparate array of costs and benefits, varying greatly across nations; per capita emission rights do not take into
account the variations in benefits from a climate treaty. From the standpoint of global redistribution—justified on grounds of either welfare or fairness—other approaches, more directly focused on the central goals, would be much better.

Many people support the per capita approach not on distributive justice grounds, but on the basis of a simple and plausible appeal to fairness. The atmosphere's carbon-absorbing features are naturally thought of as a common resource. Perhaps a common resource should be divided among all the people in the world on the ground that all people enjoy a right to equal opportunity or to equal human dignity. Indeed, the same type of argument has been made about mineral resources discovered under the high seas: as no particular state "owns" these resources, they should be divided on a per capita basis. And given the constraints of national sovereignty, the resources should be given to national governments on the basis of their states' share of the global population rather than divided up among individuals directly. We will argue that the analogy to common property is largely question-begging.

We shall also explore a series of welfare-related and pragmatic problems with the per capita approach, including its incentive effects with respect to future international agreements and population growth. A pervasive question involves feasibility. The problem of climate change cannot be successfully addressed without an international agreement that includes all or almost all of the major contributors. Per capita allocations would have the effect of redistributing hundreds of billions of dollars from wealthy nations, above all the United States, to developing nations. For this reason, insistence on per capita allocations would effectively doom any climate change agreement. We offer some brief remarks about the relationship between this pragmatic constraint and some of the underlying questions of principle.

Our conclusions are that on welfare grounds the per capita approach is at best a crude second-best, and that it faces decisive objections from the standpoint of feasibility. Insistence on that approach would doom an international effort to reduce the risks associated with climate change. Further, the principle of equal division and the analogy to property rights have little appeal.

The Effects of a Per Capita Permit System

Before examining whether a per capita allocation of permits is required by ethical theories of climate change, we need to examine its effects. As we noted in chapter 1, per capita emissions go up with wealth. Therefore, as a general matter, a per capita allocation of permits would redistribute income from wealthy nations to poor nations. A simple back-of-the-envelope calculation shows that, compared to a status quo allocation, the United States would lose hundreds of billions of dollars per year with a per capita allocation. China right now has about the average per capita emissions, so it would not win or lose relative to a status quo allocation. India, which has very low per capita emissions, would be a big winner. A number of poor and very poor nations, such as Malaysia, Papua New Guinea, Zambia, Indonesia, and Brazil, have high per capita emissions and would face large losses.

Table 6.1 is a list of countries ranked by per capita emissions in 2000 for the six Kyoto gases plus land use change. (Unfortunately, we do not have more recent data that includes land use change. The 2000 data for China in particular are significantly out of date, and we include the 2005 data for China, excluding land use change, in brackets.) We include the top thirteen countries, some major emitters in the middle ranks, and a selection of countries with the lowest per capita emissions. The global average emissions are around 5.5 tons per person, so nations with emissions above that amount would have to purchase additional permits on the global market. A rough estimate of the net inflow or outflow for a country is the difference in per capita emissions and the global average (5.5 tons per person), multiplied by the permit price and its population. For example, each person in the United States currently emits about 22.8 tons of carbon dioxide per year, so each person would, in effect, have to purchase permits for around 17 tons. If permits cost $50 and there are 300 million people in the United States, the total outflow from the United States to the rest of the world would be $2.55 billion per year. For Brazil, the outflow would be $7.5 billion per year.

A second important point is that anyone who favors a treaty that stabilizes greenhouse gas concentrations favors eventually moving
Table 6.1.
Per Capita Emissions in 2000, Six Kyoto Gases Plus Land Use Change

<table>
<thead>
<tr>
<th>Rank</th>
<th>Country</th>
<th>Ton CO₂ Per Person</th>
<th>Population (thousands)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Belize</td>
<td>43.9</td>
<td>292</td>
</tr>
<tr>
<td>2</td>
<td>Qatar</td>
<td>53.5</td>
<td>796</td>
</tr>
<tr>
<td>3</td>
<td>Guyana</td>
<td>53.2</td>
<td>739</td>
</tr>
<tr>
<td>4</td>
<td>United Arab Emirates</td>
<td>38.4</td>
<td>4,104</td>
</tr>
<tr>
<td>5</td>
<td>Malaysia</td>
<td>36.6</td>
<td>25,653</td>
</tr>
<tr>
<td>6</td>
<td>Papua New Guinea</td>
<td>28.9</td>
<td>6,070</td>
</tr>
<tr>
<td>7</td>
<td>Kuwait</td>
<td>28.4</td>
<td>2,535</td>
</tr>
<tr>
<td>8</td>
<td>Australia</td>
<td>26.5</td>
<td>20,400</td>
</tr>
<tr>
<td>9</td>
<td>Antigua and Barbuda</td>
<td>25.3</td>
<td>83</td>
</tr>
<tr>
<td>10</td>
<td>Bahrain</td>
<td>25.2</td>
<td>725</td>
</tr>
<tr>
<td>11</td>
<td>Zambia</td>
<td>25.2</td>
<td>11,478</td>
</tr>
<tr>
<td>12</td>
<td>Canada</td>
<td>24.9</td>
<td>32,312</td>
</tr>
<tr>
<td>13</td>
<td>United States</td>
<td>22.8</td>
<td>296,507</td>
</tr>
<tr>
<td>24</td>
<td>Indonesia</td>
<td>14.9</td>
<td>220,558</td>
</tr>
<tr>
<td>32</td>
<td>Russia</td>
<td>13.4</td>
<td>143,150</td>
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<tr>
<td>34</td>
<td>Brazil</td>
<td>13.3</td>
<td>186,831</td>
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<tr>
<td>47</td>
<td>United Kingdom</td>
<td>10.7</td>
<td>60,226</td>
</tr>
<tr>
<td>120</td>
<td>China</td>
<td>3.8 (5.5 in 2005)</td>
<td>1,304,500</td>
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<tr>
<td>162</td>
<td>Pakistan</td>
<td>1.7</td>
<td>155,772</td>
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<tr>
<td>163</td>
<td>Kyrgyzstan</td>
<td>1.7</td>
<td>5,144</td>
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<tr>
<td>164</td>
<td>Mozambique</td>
<td>1.6</td>
<td>20,533</td>
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<tr>
<td>165</td>
<td>Yemen</td>
<td>1.6</td>
<td>21,096</td>
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<td>166</td>
<td>Rwanda</td>
<td>1.6</td>
<td>9,234</td>
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<td>167</td>
<td>Tajikistan</td>
<td>1.5</td>
<td>6,550</td>
</tr>
<tr>
<td>168</td>
<td>India</td>
<td>1.5</td>
<td>1,094,583</td>
</tr>
<tr>
<td>169</td>
<td>Burundi</td>
<td>1.5</td>
<td>7,859</td>
</tr>
<tr>
<td>170</td>
<td>Swaziland</td>
<td>1.5</td>
<td>1,131</td>
</tr>
<tr>
<td>171</td>
<td>Lesotho</td>
<td>1.4</td>
<td>1,981</td>
</tr>
<tr>
<td>172</td>
<td>Eritrea</td>
<td>1.4</td>
<td>4,527</td>
</tr>
</tbody>
</table>

toward roughly equal per capita emissions. The reason is that to stabilize concentrations, emissions will eventually have to get very low. To stabilize concentrations at a modest level, this will have to happen relatively quickly. Once emissions are low, differences in per capita emissions largely disappear; if everyone is close to zero, then everyone has about equal per capita emissions. The debate over per capita emissions, therefore, is a debate over how fast the world moves to equal per capita emissions. This does not make it unimportant, however—a thirty- or forty-year difference in timing can involve trillions of dollars of transfers. Nevertheless, it is important to recognize that at least among those who favor stabilizing greenhouse gas concentrations, the issue is about how quickly we make the transition to equal per capita emissions rather than a fundamental disagreement about whether we ever get there.

A number of commentators have supported a slow move toward equal per capita emissions on the theory that a slow transition reduces disruptions, calling this approach one of "contraction and convergence." While these commentators purport to be in favor of equal per capita emissions allocations, they are not. Equal per capita emissions arise as an artifact of low global emissions. Because they favor a slow transition, in effect they reject the only important effect of equal per capita allocations.

There is a third and important effect of per capita allocations, which is that this approach does not allocate the net effects of a treaty on an equal basis. Although the costs would be allocated equally to all people, the benefits of a treaty are not equal. As we saw in chapter 1, the benefits of reducing emissions vary, depending on many factors, such as exposure to sea level rise or changes in weather patterns, dependence on agriculture, location of valuable mineral deposits, susceptibility to disease, and the likelihood of refugees from neighboring states. The net benefits under a per capita allocation, therefore, would not be equal.

For example, Thailand, Romania, and Jamaica all had roughly equal per capita emissions in 2000 and all are at the world average. If their emissions stay the same, they would have neither inflows nor
outflows from a per capita permit allocation, at least in the initial years. These countries, however, may experience very different effects from climate change. Jamaica may be exposed to changes in hurricane intensity in the Atlantic. Thailand may face changes in agricultural patterns. Both are exposed to sea level change, while Romania is not. The net effects of a climate treaty with per capita allocations would be quite different for these countries. A similar comparison can be made between Papua New Guinea and Kuwait, which have about the same per capita emissions (both among the highest in the world), between Afghanistan and Vietnam (both very low emissions), or between any number of other nations. To the extent that the allocation of permits is driven by a claim that a climate treaty should produce equality, per capita allocation would not meet this goal.

The Per Capita Approach in Principle from a Welfarist Perspective

The Case for the Per Capita Approach

In discussions about climate treaties, defenders of the per capita approach argue that this approach is fairer than likely alternative approaches, such as the status quo approach. This argument is especially prominent in the developing world, where it is asked: Why should wealthy nations be given an entitlement to their existing emissions rights? This question seems to be one of fairness, to which we will turn in due course. But it can also be translated into a plausible welfarist argument, to the effect that the per capita approach is more likely to increase social welfare than any imaginable alternative. It makes sense to begin with the welfarist argument, which is in some ways more tractable, and which will illuminate the fairness questions as well.

Welfarists care about two things: maximizing the size of the pie and distributing it equally. The larger the pie, the more that is available for everyone to consume, and all else equal, welfare should rise with consumption. At the same time, most welfarists believe that the welfare, or utility, that is obtained from an additional good is declining. If you have zero apples, you are willing to pay a lot for one apple. If you have ten apples, you are willing to pay much less, or zero, for an eleventh. Thus, if the entire pie is given to one person, social welfare is not maximized. Ideally, the pie should be maximized, and then it should be divided into equal pieces, each of which is given to one member of society—but only assuming no disincentive effects, which might decrease the size of the pie. We can easily see that if disincentive effects are small, welfarists would advocate redistribution of resources from wealthy nations to poor nations, or at least from wealthy people in wealthy and poor nations to poor people in wealthy and poor nations.

There is an argument that the pattern of emissions allocations should not affect the size of the pie. The reason is that a cap-and-trade system gives individuals and governments incentives to minimize their emissions of greenhouse gases regardless of how permits are allocated. Regardless of whether a polluter owns a permit or needs to buy one, if emissions reductions are available at less than the permit price, the polluter would reduce emissions. If emissions reductions cost more than the permit price, the polluter would purchase a permit. Efficiency requires that marginal abatement costs be equal across all polluters; this will occur regardless of how permits are initially allocated. Said another way, optimal incentives will depend on the quantity of permits but not how they are distributed. As long as decision makers choose the right quantity, the size of the pie will be maximized. We can think of this as ex post efficiency, in the sense that it focuses on the efficiency effects of permit allocations once they are allocated.

Thus, the welfare effects of different permit allocation schemes depend on their distributional effects; other things being equal, distribution to those who are poor will increase welfare. The per capita approach might well seem to have attractive distributional effects and for that reason attractive welfare effects. To the extent that low emitting countries tend to be poorer, the per capita approach will help poor people, and because poor people have the highest marginal utility for a dollar, helping poor people will maximize global welfare. Certainly compared to the status quo approach, per capita allocations seem supportable on welfarist grounds; at first glance, they seem to be the right way to proceed. The examples of the United
States on the one hand, and India and many African countries on the other, are highly salient, because the former is rich and the latter are poor by comparison. To the extent that the per capita approach would require the United States to give hundreds of billions of dollars to India and many African countries, it might seem desirable on welfarist grounds.

Objections and Concerns

Distribution

The claim that permits should be allocated on a per capita basis for distributive reasons has the same set of problems that we discussed in chapter 4, which considered the general connection between distributive concerns and climate change. A per capita allocation of permits would be akin to an efficient climate treaty with side payments. As we discussed, there is no reason to connect the climate change treaty and policies designed to fulfill distributive obligations to the poor.

In fact, there are good reasons for not doing so; given how difficult and complex both problems are, the chances of getting both right diminish when we try to do both at the same time. This concern applies with particular force in the case of per capita permit allocations. Because nations would be the negotiating parties to any treaty, the governments would inevitably receive the permits, not the citizens. Even governments of well-functioning democracies may not fully represent all of their citizens, and most governments are far less representative than this. Nearly all poor states have a class of wealthy elites, and these wealthy elites usually control the government or have considerable influence over it. Given that the governments in these states already are unenthusiastic about redistributing wealth from the elites to the poor, it is questionable whether they will use the wealth generated by the permit scheme to help the poor. As a method of redistributing to the poor, a policy of permit allocations to the governments of low-emitting nations seems particularly poorly designed.

A second problem is that a per capita allocation of permits is not well targeted to the poor (even assuming that the governments of poor countries are representative of their citizens). Under a per capita system, permits would be distributed to both climate change winners and losers. As we noted above, some poor states will become far poorer as a result of climate change; others are less vulnerable. Some rich states will face serious adverse effects from climate change; others are less vulnerable. Some poor states, and some rich states, may even be net gainers from climate change. Ideally, permits should be distributed in light of these consequences, but the per capita approach fails to take them into account. If distribution is our concern, why should two equally populated poor nations receive the same number of permits from a program from which one gains a lot and another a little—or from which one gains a lot and another actually loses?

The key point is that the intuitive attractiveness of the per capita approach depends on seeing it in isolation from all of the effects of a climate treaty and from other global policies, including other policies with distributive effects. Once we take these factors into account, the per capita approach appears far less attractive, and on plausible assumptions, indefensible from the standpoint of the very accounts that at first sight justify it.

We agree that as a matter of actual practice, these defects are not necessarily fatal to the per capita approach. Everything depends on the alternatives. One might argue in response not that the per capita approach is ideal, but that it is superior to a system that is its most likely alternative—one that uses status quo energy consumption as the baseline and thus favors people living in wealthy and wasteful countries. Perhaps this response is correct. But it must acknowledge the underlying problem, which is that the per capita system is only indirectly connected to the underlying normative goal.

A welfarist should favor redistribution to the world's poor to the extent that doing so is feasible and does not excessively reduce the total size of the pie. But if one is a welfarist, there is no reason to think that the per capita approach to climate regulation is the right way to redistribute wealth and thus to increase global welfare. It would be much better to redistribute all resources than to redistribute shares of the atmosphere's capacity to absorb greenhouse gases: it would be much better to redistribute resources to poor people than
to poor nations. From the welfarist perspective, a sensible redistributive policy would follow these general principles. If it is impossible—politically or technically—to redistribute all resources, then one needs to explain why it is possible—politically or technically—to adopt a per capita approach for a climate treaty.

**Efficiency**

Arguments in favor of per capita distribution have, so far, focused on what we have called ex post efficiency effects and neglected the possible ex ante effects of the distribution scheme. We discussed the ex post effects above, and showed that the ex post efficiency effects of the different schemes are identical (or nearly so). The same cannot be said for ex ante efficiency. From that standpoint, the effects are different, and the per capita approach has some significant drawbacks.

To understand the difference between ex post and ex ante efficiency, recall that any tax or cap-and-trade system that requires firms or individuals to internalize the social cost of their greenhouse gas emissions is efficient, in the sense that under these schemes firms and individuals will use energy only when the social benefits (including their own profits or consumption) are greater than the social costs (including the costs to the climate). We call this type of efficiency “ex post” because it addresses an existing problem, though, to be sure, one that will continue into the future.

The ex ante effect of a climate treaty refers to its effect on future programs, including those that have nothing to do with greenhouse gases. Any treaty will establish a precedent on which states will rely, at least in part, as they negotiate additional treaties in the future, treaties that will be needed to handle such global problems as terrorism, cross-border transmission of diseases, and nation-building efforts in failed states. For example, if the per capita approach is used for a climate treaty, then it will suggest itself as a basis for allocating the costs of a terrorism treaty.

Similar assumptions are routinely made about domestic programs. For example, the U.S. government could alleviate poverty by announcing one day that it will take most of the wealth of rich Americans and give it to poor Americans. Such a program is not inefficient in the ex post sense; given that the rich have already accumulated their wealth, they cannot retroactively be deterred from working hard. The program will have prospective effect, however. Even if announced as a one-time event, people will assume that if the government implements such a program today, it might do so again tomorrow. This assumption will influence people's ex ante behavior, reducing their incentive to work and save.

Suppose, then, that a climate treaty based on the per capita approach established a precedent. How might such a precedent influence behavior, compared to the baseline status quo approach? It would create two perverse incentives.

First, the per capita principle would establish that the most highly populated states would obtain the greatest benefits from international cooperation. Governments would be rewarded for pursuing fertility policies that maximize the size of the population.

To see why, consider a state with population X and another state with population 2X. Suppose that a future treaty would limit the spread of infectious diseases, creating benefits of Y. The states would need to negotiate a division of the surplus. With the per capita principle in place, the state with the larger population would be able to claim a larger portion of the surplus. Note that the problem is not that the per capita approach would necessarily encourage states to increase their populations in order to obtain more permits; that incentive can be avoided with a stipulation that the number of permits is fixed on the basis of the population at the time of treaty ratification or shortly before it. The problem here is one of creating socially harmful incentives to improve bargaining position for subsequent treaties that need no relation with climate policy.

From a redistributive perspective, this result might seem fair (unless the people in the larger state are richer), but in terms of prospective incentives, states now have one more reason to grow and to avoid shrinking. This incentive is especially pernicious from the perspective of climate change, because more people will consume more of the earth's resources (though, conceivably, more efficiently). On the other side, the climate treaty, to the extent that it fixes the initial number of
permits, could restrain population growth. And it is true that given the relatively limited amount of international cooperation, one might doubt that the incentive to expand population is particularly strong. To evaluate the extent of the problem, we need to know the magnitude and not merely the direction of the incentive effect. Still, it is a cost of the per capita system that should be kept in mind.

Second, to the extent that the per capita approach is used in the first place only because it favors poor countries, and hence the real principle is that poverty, not population, entitles countries to better treatment in treaty negotiations, governments that adopt sensible policies that promote economic growth would be penalized.

This incentive is also perverse. Most states get rich because they have good institutions, not because they are lucky enough to have natural resources. Citizens invest in creating and maintaining good institutions because good institutions deliver wealth and other benefits. A redistributive principle such as the per capita rule implicitly punishes states that do well, while rewarding states that do poorly.

The goal of development aid over the past decades was precisely the opposite: to give governments of developing countries an incentive to adopt sound economic policies that promote growth. Because of fears that foreign aid would provide incentives not to grow, donors made concerted efforts to condition aid on the adoption of sensible growth policies. The per capita principle—indeed, any redistributive principle—is at war with the lessons of development policy and would weaken the pro-growth incentives that are currently given to developing states.

What system, then, is optimal for ex ante efficiency? The ideal principle would give states an incentive to identify global problems in advance and negotiate treaties to solve them, and otherwise not affect their incentives to control their populations, invest in institutions, and so forth. Such a principle would be, at a minimum, a form of International Paretoism, so that states believe that they will not be made worse off by a legal solution, a belief that would discourage states from entering treaty negotiations.

But treaties that solve problems generate surpluses beyond the amount necessary to make states indifferent between entering and not entering a treaty. What should be done with the surplus? It is tempting to think that one can distribute the surplus without affecting incentives ex ante, but this is highly implausible. (If one can, then one would probably want to distribute the surplus to the poorest countries rather than on a per capita basis, which, as we have been arguing, is morally arbitrary.)

From an efficiency perspective, the best use of the surplus would be to reward the states that had taken steps in advance of the treaty to abate greenhouse gases. These states would probably be the European states that accepted binding reductions under the Kyoto Protocol, though there are complexities here, since not all European states accepted meaningful reductions and others were simply taking advantage of independent technological and demographic changes in their country.

The larger point is that such a distribution would establish a precedent to the effect that when a global problem exists, states that respond quickly and in advance of a treaty will not be penalized. With this principle in place, states would be more likely to act quickly and to negotiate a treaty regime rather than drag their feet. For example, if states ever need to enter a new treaty that regulates cybercrime, they will know that first movers that have implemented controls that reduce dangers to other states will not be penalized. Instead, the treaty will ensure that these states will be rewarded in some way.

Ex ante efficiency does not favor the per capita approach, but it also does not favor the status quo approach. Under the status quo approach, states that have acted least aggressively to reduce emissions do better, all else equal, than states that have acted more aggressively. We will address this problem in chapter 8, where we offer a modified version of the status quo approach that establishes a precedent favoring states that move first to address a global problem.

The Per Capita Approach from the Perspective of Fairness

Ideas about fairness are playing a significant role in debates over the proper approach to climate change. Fairness can be specified in multiple different ways. We present three specifications here in an effort
to see whether the per capita approach can be defended on fairness grounds.

**Fairness and the Veil of Ignorance**

As we noted in chapter 5, many people reject the idea that questions of global justice should be approached in welfarist terms. In their view, the goal is not to promote aggregate social welfare; it is instead to do what fairness requires, which can be specified using the "veil of ignorance" method. Consider a commonsense specification of this claim, adapted to the climate change problem. Some nations are much richer than others, in a way that violates the requirements of justice. Perversely, the status quo approach creates a kind of entitlement to the continuation of practices that violate those requirements. No such entitlement can be defended. Even if corrective justice does not require high emitting states to compensate those nations that are at special risk, a climate change agreement would be unacceptably unfair if it makes it more difficult for poor nations to develop—especially because development is designed to remove their citizens from difficult conditions and to achieve something closer to the threshold or to equality with wealthy nations. A per capita approach is the most fair, because it allows every citizen to count for no less and no more than one, in a way that respects the moral irrelevance of national boundaries.

We do not intend to challenge these general points about fairness here. Our basic claim is that if they are taken as a defense of the per capita approach, they run into serious difficulties. The reason is that the central objections to the welfarist argument materialize when fairness, understood in the stated way, is our guide. To the extent that some of the most populous states are wealthy, the per capita approach is not fair at all; to that extent, it has some of the virtues as the status quo approach. Per capita allocations also have the disadvantage of giving large numbers of permits to highly populated nations that have relatively little to lose from climate change. And it remains true that permits are allocated to the governments of poor states, not to the citizens of poor states, and allocations to such governments may not help those who are most in need. If fairness requires redistribution across national boundaries, the status quo approach runs into significant trouble, and the per capita approach is better; but those interested in global redistribution would hardly choose that approach among a menu of possibilities.

**Equality and the Atmosphere as Common Property**

There is another type of fairness argument, to the effect that the atmosphere, with its beneficial carbon-absorbing characteristics, is common property, belonging to everyone in the world. A climate treaty closes a commons, converting it to private property. It is only fair to distribute the parcels of property to the former users of the commons, namely, everyone in the world, on a per capita basis. One might draw an analogy to minerals discovered in the sea bed under the high seas, which are outside the sovereignty of any country. The Convention on the Law of the Sea provides that revenues from exploitation of these minerals should be distributed "equitably," although that term is not defined.

The analogy to property is superficially appealing but, on reflection, it turns out that it does little but muddy the waters by creating an unnecessary set of abstractions between normative goals and policy outcomes.

In law, a commons refers to a resource to which numerous people have a legal right to access. If the government owns the commons and seeks to convert it to private property, it merely blocks people from using it. If the people who use the commons have a legal right to use it, then the government—at least, in most modern legal systems—would have to compensate them for giving up their rights. Sometimes, the legal rights might be derived from customary use; in such a case, the government would probably have to compensate people deprived of their customary rights. If the closure of the commons generates revenue for the government, the government would have no legal obligation to funnel it to all citizens on an equal basis; nor does the government have an obligation to distribute the resulting pieces of private property to everyone on an equitable basis.
So much for law; what of ethics? Of course, one could argue that the government has an ethical obligation to distribute the costs and benefits from enclosure in a fair way. These ethical obligations are not specific to enclosure itself; they are the same ethical obligations that a government must follow when it does all the things that governments do—tax people, spend revenues, and so forth. The history of enclosure provides little ethical illumination. In British history, enclosure was controversial mainly because those who sought enclosure (usually, private individuals with land subject to customary rights enjoyed by locals) tried to avoid compensating people for the loss of their historical rights. Supporters of enclosure believed that it led to the more efficient use of resources; critics believed that it harmed those who held customary rights, often the poor.19

Currently, everyone has access to the atmospheric commons. Does it follow that when the commons is closed, everyone should have equal access to it? Certainly, the appeal to law or history does not help answer this question. When governments close commons, they do not—as far as we know—distribute shares of it to citizens on a per capita basis. As noted above, the beneficiaries could just as well be customary users of the commons. If the commons is a pasture, the normal instinct will be to compensate people who have used the pasture for their animals. The reason is that those people have made investments in reliance on continued access to the commons, and it would be unfair to deprive them of investments based on reasonable expectations about the continuation of existing property rights.

If that pattern were followed for the atmosphere, then the closing of the atmospheric commons would generate entitlements to its customary users—namely, the people who have historically emitted the most carbon. The principle would be the same as in the pasture case: those people who have arranged their lives around patterns of carbon-intensive production—for example, by moving to spread-out cities where automobiles are the cheapest form of transportation—are most vulnerable to a radical change in property rights, and they should be compensated for the lost investment that they made in the reasonable expectation that rights would continue as in the past.20

The response is that the ethical claims of the poor should trump the claims of traditional users. We sympathize with this argument but do not see what it has to do with ethical claims based on the nature of common property. Indeed, the argument is that property should be redistributed to the poor despite claims derived from the enclosure of a commons, not because of them. The better approach is to abandon the analogy to common property and address the ethical issues directly.

The commons argument also misleadingly draws one's attention to features of the environment that do not "belong" to any particular state. The atmosphere is a commons because no state has a right to the atmosphere; by contrast, forests are not commons, in an international relations sense, because they belong to the particular states on whose territory they are located. The commons argument suggests that the two should be treated differently; states with forests have no obligation to share the carbon-absorbing value of those forests with other states. From an ethical standpoint, this distinction cannot be sustained. People should not gain or lose because of the contingency of the location of their birth, and so there is no ethical reason for giving states control over resources that happen to be located on their territory.

The implications of such an argument are dramatic. States that enjoy valuable natural resources—oil reserves, like Saudi Arabia, or diamond deposits, like Botswana—would have no right to the revenues from those resources. They have an ethical obligation to share those revenues with everyone in the world on a per capita basis. From an ethical standpoint, all people in all states would need to pool the value of their natural resources, along with the value of common natural resources such as the atmosphere, and distribute that value on a per capita basis to everyone in the world.

All of this suggests that the reasons that states enjoy the value of their own natural resources lie elsewhere. Perhaps if states had to share these revenues, they would not have sufficient incentives to exploit resources efficiently, and the world as a whole would be worse off. Or perhaps states believe that the beneficiaries of such a redistribution would squander their transfers rather than use them to help
the poor. Or perhaps states simply refuse to engage in the type of massive redistribution that such an ethical theory implies because the people living in those states are selfish.

If these reasons explain why states do or should enjoy the value of “their” resources, then people making the commons argument need to explain why pragmatic reasons should not apply there as well. If states that would receive an abundance of permits under the per capita approach are unlikely to use these transfers wisely (just as they have failed to use foreign aid wisely in the past), then there would be no ethical obligation to adopt this approach. Or if states for selfish reasons are not going to agree to such massive transfers, then we need to think about how to solve the climate problem in a way that even selfish states would agree to. If relative power puts limits on realistic ethical claims about how states should share their resources, then it also puts limits on realistic ethical claims about how the atmospheric commons should be distributed. The appeal to common property does not help with this difficult issue.

Our limited point is that the analogy to common property does not provide an independent argument for per capita distribution of emission permits. It simply distracts from the ethical and pragmatic issues that a climate treaty must address.

Frugality, Profligacy, and Related Issues

Suppose that we understand the idea of fairness not in distributive terms, but as a requirement that similar people be treated similarly. As we saw above, the per capita system is not attentive to the differential distributional effects of climate change and abatement costs, but in effect gives every person the same asset. From one perspective, the main objection to this feature of the per capita system is that it means that wealth does not necessarily go to the poor. But holding wealth constant, it might seem unfair that frugal individuals who have produced few greenhouse gas emissions receive the same payout as profligate who have produced many. And it might seem unfair that people who are most hurt by climate change receive the same payout as those who are least hurt (or even benefited) by climate change. Finally, we might think people who are most hurt by the abatement efforts mandated by the climate treaty should receive some kind of compensation. Consider, for example, low-income workers who commute to work and must pay higher bus fares or fuel prices. One might argue that fairness requires that these people receive permits, so that they do not bear a disproportionate cost of the treaty regime.

These considerations obviously do not point in the direction of the per capita approach. But it also seems likely that any attempt to account for all such considerations would quickly get bogged down in wrangling over the details. One might argue, then, that the per capita approach might make sense as a second-best standard or kind of rough justice, along the lines of what we discussed in chapter 5. We turn to that argument next.

The Per Capita Approach as a Second-Best Standard

We have seen that in principle, significant global redistribution is plausibly justified by considerations of both welfare and fairness. But in practice, such redistribution is not occurring; for example, there is no evidence that the United States wants to transfer hundreds of billions of dollars to poor people in poor countries (existing foreign aid, most of it tied to particular types of reciprocal action, is much less). In these circumstances, defenders of per capita allocations might argue that their approach has three virtues. First, the per capita approach might be feasible even if a preferred form of redistribution is not. Second, such an approach might provide the basis for a kind of incompletely theorized agreement among those who have different moral commitments, or who are unsure about the appropriate moral commitments in the international domain. Third, per capita allocation might, because of its simplicity and attractiveness, provide a plausible focal point for political action—a basis for an international agreement to which many nations could subscribe, even if it would be fanciful to suggest that wealthy nations might sign an international agreement in which they agree to transfers hundreds of billions of dollars to poor nations. This is another type of rough justice argument.
Suppose nations acknowledge that certain moral principles guide international relations, or should, but that they disagree about what those moral principles are. If one believes the rhetoric of governments, one can identify a set of standard moral arguments. Among developing nations, some argue that the rich world has obligations to the poor arising from the history of colonial exploitation. Others argue that rich nations have obligations arising from particular policies that they have adopted in the recent past and that continue in the present—unfair tariffs that discriminate against agriculture, for example, or immigration rules that drain away poor nations' educated elite. Still others argue simply that resources that exist outside the sovereignty of each state should be shared. Some rich nations are willing to acknowledge that they have an ethical obligation to provide aid to the very poorest people; others say that they have an obligation to cooperate with poor nations or not to interfere with them but not necessarily to give them aid.

These different moral arguments have different implications. Even among the poor nations, whose views seem consistent at first sight, one can detect radically different implications of the different arguments. If one focuses on colonial exploitation, then the major beneficiaries should be former colonies (including rich states like Taiwan) and the major payers should be former empires (including Great Britain, Russia, and Portugal but not so much the United States). The idea of colonial exploitation suggests that former colonies should direct their claims at their former masters, not to the rich world as a whole. India's extra permits, for example, should come out of Great Britain's pocket. Similarly, if tariff policy is the source of complaints, one would need to determine which tariff policies were supported by whom, and which countries they harmed—and this is highly complex and controversial. And if tariff policies that have adverse effects on other nations (and what tariff policies do not have such effects?) should count, so should all other policies that have given rise to legitimate grievances. One would thus need to keep in mind the particular grievances that some poor countries have against other poor countries (India and Pakistan, Rwanda and Burundi) and allocate permits accordingly.

It would seem that even if the rich nations owe extra permits to poor nations, within the class of poor nations, permits would have to be distributed unequally to account for current and past injustices. Generous treatment, such as the rich nations’ contributions to the victims of the recent South Asia tsunami, would need to be subtracted, lest rich nations hoard their generous impulses as offsets to permit regimes. And all of this would need to be done in a manner that respected the views of those who care about redistribution on grounds solely of distributive justice or welfare maximization.

Within countries, moral disagreement of this type does not necessarily preclude policy, even on issues that divide people sharply along moral lines. Typically, the policy that emerges reflects an incompletely theorized agreement. People with different moral views agree on a policy that is consistent with their different interests and different moral views, while bracketing their remaining conflicts or putting them off until a later time. For example, in the United States some people support affirmative action as a way to overcome past injustices, while others defend it as a forward-looking policy for promoting certain social goals, such as stability. The moral views have different implications for how affirmative action should be designed and how long it will last, but those holding these different views can sometimes agree on enough to put their weight behind a program that furthers some of their goals but not others. Similarly, one might argue that the per capita approach could reflect an incompletely theorized agreement among nations and individuals with different but overlapping moral views about what nations owe each other.

This argument also is weak. None of the moral views described above would support the claim that greenhouse gas permits should be distributed according to population size, with the possible exception of the view that commons should be shared. But even that view does not clearly distinguish between per-nation sharing and per capita sharing. If there is a common threat among these theories, it is the view that richer nations have an ethical obligation to aid or cooperate with poor nations. But as we have seen, poor nations and populous nations are not the same.
Feasibility Issues

Thus far our focus has been on issues of principle. There is also a question of feasibility. The appealing features of the per capita approach—its simplicity, its apparently clear appeal to intuitions about fairness—come at a high price. Scientific and economic models indicate that, most likely, substantial cuts in greenhouse gas emissions will produce global benefits in excess of global costs. But it is obviously difficult to obtain agreement on emissions reductions if some nations are likely to benefit far more than others from such an agreement. If a specified level of reductions will give significant benefits to India, but more modest benefits to the United States and Russia, the latter nations might well be reluctant to accept that level of reductions, and might demand some kind of compensation. Even more troublesome, restrictions on greenhouse gas emissions will probably be most costly for large emitting nations, including the United States. Large emitters, facing significant costs from emissions reductions requirements, therefore will be unlikely to join a treaty unless the treaty uses their status quo emissions as the baseline from which to determine cuts. As a first approximation, nations care about the welfare of their own citizens, and the welfare of citizens in other places is not a primary consideration and may not matter greatly. A workable climate treaty will have to be one that serves the interests of the United States and other major industrial nations, including developing nations such as China and Brazil. As a practical matter, nations that are already the biggest greenhouse gas emitters will therefore not join a treaty that requires them to reduce their emissions to the level of very poor nations; nor would they enter a treaty that requires them to pay a lot of money for permits distributed to the poor nations.

Consider a few numbers in this regard. In 2006, the United States distributed almost $24 billion in foreign aid (a third of which was to Iraq). The politically unacceptable Kyoto Protocol would have cost the United States a substantially larger sum each year over the indefinite future—the equivalent of perhaps tens of billions of dollars per year. The per capita approach (as compared to the status quo approach) would cost the United States far more than that—possibly more than $200 billion per year for the indefinite future.

We acknowledge the tension between feasibility arguments and ethical arguments. We try to resolve this tension by making the following two assumptions. First, only a treaty that satisfies International Paretianism—that is, that advances the interests of all states relative to the status quo—is feasible. Second, among the many treaties that satisfy International Paretianism, ethical principles will have some sway. Any feasible treaty creates a "surplus"—equal to the gains from mitigating climate change minus the costs of abatement—and this surplus can be distributed according to ethical principles. The distribution can be built into the abatement obligations themselves, or could be effected through side payments. We will say more about this approach in chapter 8; for now it is sufficient to observe that the per capita approach falls so far short of International Paretianism that it has no chance to succeed. To insist on the per capita approach, then, is most likely to subvert the best chance for a climate treaty and hence to render the climate change problem intractable—a special difficulty for poor nations that are particularly vulnerable to that problem.

Fairness and the Per Capita Approach: Taking Stock

We have made two distinct points in this chapter. First, equality—in the sense of dividing equally, on a per capita basis, the "surplus" from a climate treaty—should be, at best, a weak consideration in the design of a climate treaty. It would be much better to design a treaty on the basis of fundamental normative principles, while taking into account feasibility constraints that arise from the state system. Second, the per capita approach, in particular, does not deserve as much prominence as it receives. It falls short on the basis of a number of normative criteria, including equality and distributive justice, and it is infeasible as well.