2 Do not ask for morality

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Private morality and its limitations

Each of us ought to avoid emitting greenhouse gas. We have a moral duty not to harm other people, and particularly not to do so for our own benefit. The greenhouse gas we emit spreads around the world and contributes to global warming, which is harmful. Emitting greenhouse gas harms people by this means, so morality requires us not to do it.

True, there are exceptions to the duty not to harm other people. You may harm someone in self-defence, for example. It is sometimes claimed that there is an exception when the harm is trivial; it is said to be morally permissible to do trivial harms to other people if it brings you significant benefits. That may be so. But the harm done by an individual's greenhouse gas emissions is not trivial. They do only a very little harm to each person, but added up over everyone it amounts to a significant harm. I estimate that the gas each of us emits during our lifetime will shorten people's lives in total by a few months. This is not trivial. So the harm done by greenhouse gas does not fall under the triviality exception, if there is one, and nor does it fall under any of the other exceptions to the duty not to harm. Morality does indeed require us not to emit greenhouse gas. I recommend you to meet this duty by reducing our emissions and offsetting any that cannot be eliminated.

The moral duty not to harm other people is a duty of *justice*. This means we owe it to people, as individuals, not to harm them, and they have a right not to be harmed by us. Besides moral duties of justice, we also have moral duties of *beneficence* (Broome 2012). These are duties to make the world better and not worse, so far as we can. In emitting greenhouse gas, we are probably also failing in a duty of beneficence, because our emissions probably make the world worse on balance, and we could reduce them.

You might think the duty of justice to avoid doing harm is merely a part of the duty of beneficence, because to make the world better you must avoid doing harm. But actually the duty of justice is distinct. Sometimes you should avoid doing harm even if you do it in order to make the world better on balance. This is shown by a well-known example invented by Judith Thomson (1985): a surgeon has in her hospital five patients, each needing an organ transplant.

One needs a liver, one needs a heart, one a lung and so on. Each will die unless he or she gets the organ they need. The surgeon kills an innocent visitor to the hospital, extracts her organs and uses them to save the five patients. In this way she saves five lives at the cost of one. So she makes the world better on balance. Nevertheless, what she does is plainly wrong. How so? Because she violates her duty of justice towards the innocent victim. She has a duty not to harm her, even though by harming her she can do more good on balance. This shows that the moral duty of justice is different from the moral duty of beneficence, because justice can pull against beneficence.

I conclude that our emissions of greenhouse gas are immoral on two counts: they are unjust, and they violate our duty of beneficence. If we as individuals were all to do our moral duty, we would not emit greenhouse gas, and the problem of climate change would be solved. So should we aim to control climate change by promoting morality? This is a question about the generic 'we': the community. Should we aim at reducing climate change by promoting people's morality, making people virtuous?

No. Perhaps we should try to make people virtuous. But we should not try to use this as our means of controlling climate change. The reason is that we would fail. According to the Intergovernmental Panel on Climate Change, to have a reasonable chance of keeping climate change within reasonable bounds, emissions of greenhouse gas by the end of this century must be zero (IPCC 2014). This means that nearly all of us in the world would need to be virtuous by then, if we were to solve climate change that way. But we cannot achieve that. We cannot possibly persuade nearly all of the world's population to be virtuous. We cannot even get the message to very many people, and few of them would be persuaded anyway.

It is similarly immoral to drive very fast on the roads; it exposes other people to danger. But we do not rely on morality to make the roads safe. Why not? Because it would not work. People are in practice not influenced enough by moral considerations. Instead we employ the power of the state to compel people to drive more slowly. We impose speed limits and punish people who exceed them. Dealing with climate change also requires the power of the state to compel people to reduce their emissions.

The need for the state to deal with climate change is much stronger than it is for safety on the roads. It is easy for people to drive more slowly, but it is extremely hard for people to cut their emissions of greenhouse gas to zero by their own efforts. Given the way the world is now, it would require a huge sacrifice of their quality of life. Indeed it cannot be done at all without a restructuring of society and without new technology. For example, how could you survive through the winter without emitting greenhouse gases? You could not use fossil fuels for keeping warm. You could use biomass that you grow during the summer, or wind power, or something else. But these renewable sources of energy need more space than most people have access to. So you probably cannot survive the winter using only your own resources. You need the opportunities of a new economic infrastructure to supply you with carbon-free energy. To build a new infrastructure requires social cooperation on a large scale.[1]

Government morality and its limitations

We therefore cannot deal with climate change by appealing to the morality of individuals. A successful response can come only from social organizations of many people together. In practice it will have to come from nations. How can we get nations to act on climate change? Again, we could ask for a moral response. Morality applies to nations as much as to individuals. Just as there are moral reasons why an individual should not emit greenhouse gas, there are moral reasons why a nation should not. Moreover, nations, like individuals, can be motivated by moral reasons. For example, European governments recognize that their citizens should reduce their emissions, and they use their coercive power to make sure they do. European governments use regulations and taxation to achieve this result.

Is this the right way to deal with the problem of climate change: to appeal to the morality of nations? This has been the main appeal for the past twenty-five years of international negotiations, and it continues. At the UNFCCC meeting in Paris in 2015, nations were asked to present voluntary plans for reducing their emissions. Many made promises. Many are already implementing policies to reduce emissions. Why do they do that? It is not in the direct interest of any of them to do so. Each nation emits greenhouse gas because it benefits from doing so: its emissions provide energy for its citizens to use for their own benefit. A nation's emissions do harm by causing climate change, but most of the harm is borne by people elsewhere rather than by the nation's own citizens. Most of the people who will suffer from the effects of greenhouse gas are not yet even born. So it is not in any nation's interest to reduce its own emissions. Why do they do it, then? I assume they are morally motivated to some extent. They recognize the damage their emissions are doing to the world and to future generations. They recognize that, on moral grounds, they ought not to do this damage, and they volunteer to reduce it. They are willing to impose on their citizens the cost of reducing emissions for moral reasons.

So it seems that some nations, represented by their governments, are not without morality. They are encouraged to act morally by the moral actions of some of their own citizens. This is perhaps the most effective sort of moral action an individual can take in response to climate change. As individuals, we cannot do much directly towards solving the problem by reducing our own emissions, because too few of us will actually do it. But reducing emissions has the further effect of showing that we care about controlling climate change. By this demonstration, individuals can have an indirect effect that is much greater than our direct one. We can influence our governments to act morally. They can do so by imposing emissions reductions on all the individuals who make up the nation.

So the morality of nations, like the morality of individuals, has the potential to solve the problem of climate change. However, this is not a realistic prospect. Nations are responding morally to climate change to some extent, but not enough. In the face of what has to be done, existing efforts have been far too

little. The promises made at the Paris UNFCCC meeting were too small. Twenty-five years of negotiations have achieved little. Nations may be willing to ask their people for some sacrifices, but not sacrifices on the scale that are required. We need a different approach from the moral one.

Appealing to self-interest

It is very commonly assumed that, in order to deal with the problem of climate change, a sacrifice is required from the present generation, for the sake of improving the lives of people in the future. A burden must be borne to control climate change. For some time, the aim of international negotiations was described as 'burden-sharing'. But an elementary piece of economics shows that this assumption is mistaken. Greenhouse gas is what economists call an 'externality'. When you are deciding whether to do something that causes greenhouse gas to be emitted (take a flight or buy a computer, say), you balance the cost of doing so against the benefit you expect from it. But you do not bear all the costs of what you do. The gas spreads round the world and does harm everywhere. This harm is part of the cost; it is called an 'external cost'. Those who emit greenhouse gas generally ignore its external cost. Either they do not know about it, or they do not care about it: they care only about the cost to themselves. So in their decision-making they do not correctly balance the benefit of their act against its true cost.

The result is that people cause more greenhouse gas to be emitted than is efficient in the economists' special sense of 'efficiency'. Economists call a situation 'inefficient' when a change could be made that would make things better for some people without making them worse for anyone (they call this a 'Pareto improvement'). When there is an externality, the outcome is inefficient in this sense (though there are a few exceptions, and I shall mention one). Because greenhouse gas is an externality, it leads to a situation that is inefficient in this sense. It would therefore be possible to eliminate the inefficiency without a sacrifice on anyone's part. The present generation does not need to make a sacrifice.[2]

People are so used to thinking that a sacrifice is required that they are often surprised by this, so I shall spend some time explaining it. It is helpful to use an analogy. Imagine two islands. The wind blows from Windward Island to Leeward Island. The Windward Islanders have some industry that brings benefit to themselves but it creates smog. The wind carries the smog down to Leeward Island, where it does harm to the Leeward Islanders. This harm is an external cost of the Windward Islanders' industry. The Windward Islanders are analogous to the present generation, their smog is analogous to greenhouse gas, and the Leeward Islanders are analogous to future generations.

Because of the externality, the situation for the Islanders is inefficient. It would be possible to improve the lives of some people without anyone making a sacrifice. Here is how. The Leeward Islanders could pay the Windward Islanders a fee to reduce their emissions. They could choose a fee that is sufficiently small

to make it worth their while to pay it for the sake of reducing the smog. The Windward Islanders have till now been emitting smog at no cost to themselves, so even a small fee would make it worth their while to reduce their emissions. The Windward Islanders would then be better off because they would be more than compensated by the fee for reducing their emission. The Leeward Islanders would be better off because the cleaner air they receive would more than compensate them for the fee they pay. There would be a Pareto improvement.

How does this work between generations? You will immediately see a defect in the analogy. Later generations cannot pay a fee to earlier generations to reduce their greenhouse gas emissions. To create a Pareto improvement a transfer would be required from later generations to earlier ones, and later generations cannot make this transfer. Imagine now that the wind blows so strongly from Windward Island to Leeward Island that the Leeward Islanders cannot send anything against the wind to the Windward Islanders. They cannot pay them a fee, and so cannot compensate them for reducing their emissions. No Pareto improvement is possible in this new situation. The externality is still there, but this is one of those exceptional cases where an externality does not create inefficiency. It seems analogous to the situation between generations.

But let us extend the analogy some more. Suppose that, as well as sending smog to the Leeward Islanders, the Windward Islanders regularly send them nice gifts, which they float down on the wind. Now the inefficiency reappears. The Leeward Islanders cannot send the Windward Islanders a fee to compensate for reducing their emissions, but the Windward Islanders could compensate themselves by withholding some of their gifts. They could decide on their own account to reduce their emissions and compensate themselves that way. Provided they do not withhold too much, they will improve life for the Leeward Islanders. The Leeward Islanders will receive fewer gifts, but they will be more than compensated by their cleaner atmosphere.

Our intergenerational situation is analogous to this one. We regularly send gifts to future generations. We leave them artificial capital in the form of economic infrastructure: roads, factories, farmland, cities and so on. We also leave them natural resources that we could have used for ourselves but choose to leave in the ground for them. So here is something we could do: we could reduce our emissions of greenhouse gas. Other things being equal, that would be a cost to us: it costs something to build wind farms and solar farms, and to transform our way of life to one that does not depend on fossil fuel. But we could compensate ourselves for this cost by leaving fewer gifts to our descendants: we could reduce the amount of other natural and artificial resources that we bequeath them.

Look at it this way. As economists classify things, the goods produced each year by an economy are divided into two parts. One part is consumption: these are the goods that are used by people to give themselves a good life. The other part is investment: these are the goods that are used to build the potential for making more goods in the future. We can change the nature of our investment. Instead of conventional investment in cities, infrastructure and so on, we can start investing more in reducing emissions of greenhouse gas by insulating

buildings, constructing windmills and so on. We can switch from conventional investment towards green investment that reduces emissions. Looked at in this way, it is easy to see how the change can be made without a sacrifice on our part. We switch investment but leave our own consumption alone. To be sure, we shall have to change the sorts of things we consume. We shall have to consume fewer goods that are produced with fossil fuel. But, by consuming other sorts of goods instead, we can ensure that the benefit we get from our consumption is not diminished.

Dealing with climate change can bring a great benefit to the world by removing the externality, and this benefit can be distributed to everyone. Nobody in any generation need suffer. It is really true that the present generation does not need to make a sacrifice in responding to climate change. We therefore do not have to appeal to anyone's morality.

There can be a Pareto improvement. But we must recognize that this opportunity is limited by the ability of the present generation to compensate itself for reducing its emissions. I have mentioned one means of compensation, to reduce its conventional investment. Were investment controlled by a world government, that could easily done: the government could simply make the switch in investment. In our capitalist world it is not so easy. I shall come later to practical means of making it possible. But there are moral issues to think about first.

Injustice

A Pareto improvement is possible. It does not follow that we should aim for a Pareto improvement as our strategy for dealing with climate change. Climate change damages the human world in several ways. Two of its bad consequences are that it leads to injustice, and it contributes to the global maldistribution of well-being. A Pareto improvement does not directly address either of these bad consequences. This is as an objection to the strategy of aiming for a Pareto improvement. How important is it?

Injustice first. Suppose you regularly inflict harm on someone unjustly. Perhaps you prevent your neighbour from sleeping by making a lot of noise. Suppose now that your neighbour pays you to stop the noise. If you accept her offer, the result is a Pareto improvement. You are better off, because you evidently think it worth stopping for the sake of the payment. Your neighbour is better off because she would not have paid you to stop if they had not thought it worthwhile. But the outcome is unjust. The harm you did was unjust to begin with, and the Pareto improvement does not correct the injustice. It perpetuates it.

For the same reason, the Pareto improvement I have described for climate change does not correct injustice between people. People who emit greenhouse gas do harm to others, and this is unjust. The Pareto improvement involves a transfer from those who are harmed to those who do the harm. It makes both better off, but it does not correct the injustice; it perpetuates it.

This injustice caused by climate change is mainly between people who live at the same time. For more than one reason, there is less injustice between people

of different generations. One of the reasons can be revealed by the islands analogy again. If the Windward Islanders float gifts to the Leeward Islanders, they compensate them to some extent for the harm caused by smog. This helps to cancel the injustice the Windward Islanders cause; compensation is a way of cancelling injustice. If the gifts are enough, they may fully cancel the injustice. Analogously, we are passing resources to future generations through our conventional investment. Indeed, it may be that we fully compensate them for the harm we do them. Common opinion among economists is that the world economy will continue to grow despite climate change, and that future people will be better off than we are. Since growth is caused by investment, this suggests that we are more than fully compensating our successors for the damage we do them through climate change.

Still, even if there is no intergenerational injustice, there is a genuine injustice between contemporaries. This will be perpetuated if those who suffer from greenhouse gas emisssions end up paying those who emit it to reduce their emissions. The big emitting nations already owe compensation to other nations for the harm they are doing them, so justice requires a payment in the opposite direction.

However, it is possible to mitigate and perhaps even eliminate this injustice. A very great benefit is to be gained by removing the externality of greenhouse gas. This benefit is available to be shared among contemporary people. Those who have emitted a lot of greenhouse gas should not expect a big share of it. Most of the benefit should go to those who have suffered the most; I see no reason why it should not be enough to compensate them fully for past injustices. In effect, it means that future generations within the emitting nations are able to compensate those who have suffered from past injustice.

Maldistribution

Next maldistribution of well-being. Maldistribution is often called 'distributive injustice', but it is distinct from the injustice I have just considered. Think about the islands once again. The Windward Islanders send pollution to the Leeward Islanders. This is an injustice done to them because it harms them. But this injustice may not add to maldistribution. Indeed, it may actually improve the distribution of well-being. Perhaps the Leeward Islanders are much better off than the Windward Islanders. If so, the pollution reduces the degree of inequality between the islands. It benefits the worse-off people and harms the better-off, making the distribution more equal. This is an improvement in distribution.

Maldistribution is a bad feature of the world. Reducing maldistribution is a way of making the world better. The moral duty to reduce maldistribution is a duty of beneficence rather than a duty of justice. In the case of the islands, if the Leeward Islanders are much better off, the Windward Islanders' pollution may actually improve the world. If it does, the duty of beneficence is in favour of this pollution because it reduces maldistribution. But the pollution is nevertheless unjust; it is opposed by a duty of justice. The Windward Islanders should not

harm the Leeward Islanders, because doing so is unjust. This is similar to the surgeon example, where justice and beneficence pull against each other.

How does climate change affect maldistribution? There is great maldistribution among contemporary people, and climate change contributes to it. By and large, the big emitters of greenhouse gas are better off than those who suffer from the effects. So climate change adds to inequality within the present generation, contributing to maldistribution. However, climate change is not a major source of our present maldistribution. That arises from the long history of colonialism and 200 years of very unequal economic development. The effects of climate change are too recent to have added greatly to maldistribution among contemporaries.

Between generations things are different. Common opinion among economists is that, despite climate change, future people will on average probably be better off than present people. Our economic activity, which benefits us, creates climate change that diminishes the quality of life of future people. Since those future people will be better off than us, climate change diminishes intergenerational inequality. This might seem to be an improvement in distribution, since inequality is a bad thing.

But to draw that conclusion is to ignore another consideration. Equality of well-being is not all that matters. The total of people's well-being is also a value that we should care for as part of beneficence. This means that there is something to be gained by delaying consumption of goods. We possess a productive technology that can, in effect, convert a quantity of goods at one time into a greater quantity of goods at a later time. Delaying consumption of goods consequently adds to the total of goods that are eventually consumed. It is therefore better on balance to allow future generations to consume more than earlier ones. The best distribution, taking account of the two values of total well-being and of equality in well-being, gives more well-being to future people than to present people.

Therefore, by damaging the well-being of future people, climate change may actually increase maldistribution between generations, even though it increases equality. Whether or not it actually increases maldistribution between generations depends on what the intergenerational distribution would be if there were no climate change. This counterfactual judgement seems impossible to make.

But cost–benefit analysis done by economists does give us a related piece of information. It tells us that the best way of responding to climate change, aiming to achieve the best possible distribution of well-being, involves a sacrifice by the present generation. Nicholas Stern (2007) and William Nordhaus (2008: 180) – leading economists who have investigated this question – agree about this, even though their conclusions are quantitatively very different. Stern's conclusion implies a much greater sacrifice by the present generation than Nordhaus's does, but they both favour a sacrifice. The agreement between these authors is perhaps one of the reasons why the pressure in international negotiations is towards sacrifice by the present generation. If your aim is the best outcome, a sacrifice is called for.

These economists' conclusions are illustrated in Figure 2.1. The horizontal axis of the diagram shows the consumption of the present generation; the vertical axis the consumption of a future generation. Given the world's resources and technology, some combinations of present and future consumptions are possible and others are not. The less one generation consumes, the more the other can consume. The downward-sloping line in the diagram is a 'possibility frontier', which marks the boundary of the combinations that are possible. This line slopes more steeply than 45 degrees because reducing present consumption by some amount allows future consumption to be increased by a greater amount.

'Business as usual' in the diagram marks the position where nothing is done about climate change. Because climate change leads to inefficiency, it is below the possibility frontier; it is possible to increase both generations' consumption together. A Pareto improvement is possible.

The curves in the diagram illustrate schematically the values that underlie Stern's and Nordhaus's cost–benefit analyses. They are contours of value: they connect together points in the diagram that these economists respectively consider to be equally valuable. Both contours are bowed downwards to reflect the value each economist gives to equality between generations. Nordhaus's curve is generally steeper than Stern's because Nordhaus gives less value than Stern does

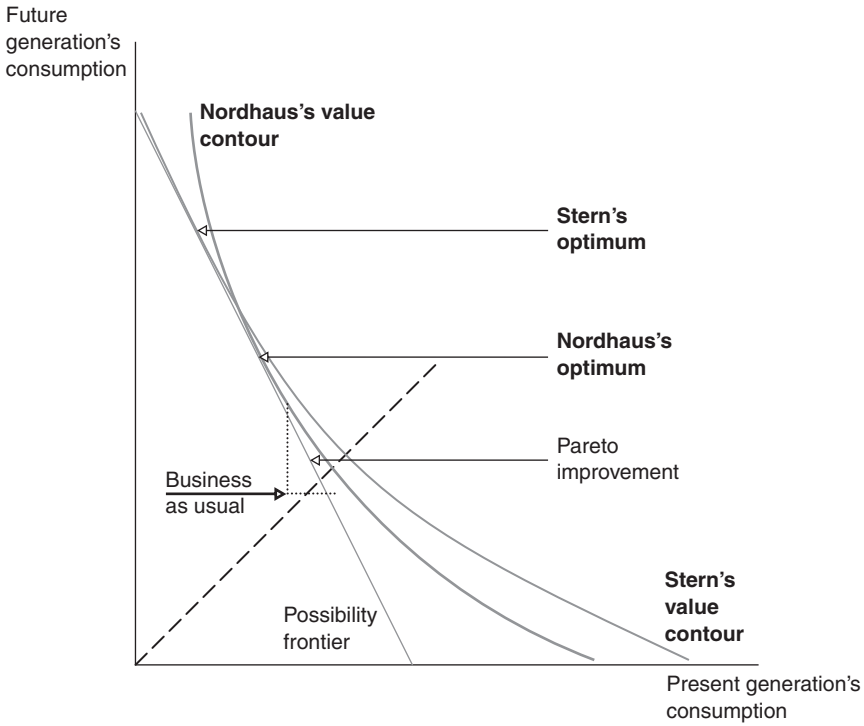

Figure 2.1 Future generation's consumption.

to future consumption compared with present consumption. The points where the two contours touch the possibility frontier represent the best possible outcomes from the two economists' respective points of view. Both points lie to the left of business as usual. This shows that the best response to climate change demands a sacrifice of consumption from the present generation, according to both economists.

So, although a Pareto improvement is possible, according to Stern and Nordhaus it would not be the best response. The best response calls for a sacrifice from the present generation. The Pareto improvement leads to maldistribution of well-being. It leads to a distribution that gives more to the present generation than is ideal.

Just as the injustice of a Pareto improvement can be mitigated, this maldistribution can also be mitigated by an appropriate distribution of the great benefits that will be realized by removing inefficiency. Most of the gains can be directed towards less well-off people and towards future generations. Nevertheless, it remains true that a Pareto improvement will not achieve the best result. It will lead to maldistribution. This undoubtedly counts against it.

But not enough to reject it. The history of failed negotiations about climate change shows that, if we aim for the best result, we shall not achieve it. The best result requires a shift of resources from the present towards the future. This is unattainable. To continue to strive for it is to make the best the enemy of the good. We have a much better chance of attaining an agreement that does not ask for a sacrifice from anyone.

One of the problems facing the world is climate change; another is the maldistribution of well-being. Both are very hard to resolve. If we continue to aim for the best result from our response to climate change, that is in effect to try and resolve both problems together. To aim for the best is to weigh down the effort to deal with climate change with the further aim of correcting the world's maldistribution. If climate change were largely responsible for maldistribution, there would be a case for doing so. But it is not. Maldistribution arises from a long history and has little to do with climate change. The problem of climate change requires a solution very urgently. Maldistribution should be tackled separately.

Dealing with maldistribution requires a moral response by governments. It requires them to sacrifice some of their people's well-being for the sake of others'. But dealing with climate change does not require a moral response. Climate change can be dealt with in a way that promotes everyone's self-interest. At present we are asking unsuccessfully for morality. We should abandon this high-minded approach in favour of self-interest.

The need for borrowing

Abandoning this approach will make the negotiations easier, but it will not make them easy. At least three difficulties remain. First, there is the commons problem. I have explained that a Pareto improvement is possible. This means that reducing emissions of greenhouse gas can be in everyone's interest. But it is

not in any nation's individual interest to reduce its own emissions. Each nation can benefit from activities that cause emissions, and it does not itself bear all the costs of the emissions it causes. The costs are borne by all the people who suffer the effects of climate change. So each nation has an incentive to emit more, even though it would be good for every nation if every nation emitted less. The atmosphere is a sort of common resource, into which nations can freely dump their greenhouse gas. Because it costs them nothing to do so, they have an incentive to overuse the common. This is the commons problem. It has to be overcome.

The only solution to the commons problem is international cooperation. Nations must agree together to reduce their emissions, and must trust each other to do so. Each nation must agree through negotiation to some particular reduction. This is not burden-sharing among nations, because they will all end up better off, bearing no burden. It is sharing the benefit of dealing with climate change, rather than sharing the burden. But still it is a problem of distribution between nations. It is a matter of bargaining, and a good result cannot be guaranteed. I hope that bargaining about the distribution of a benefit will go more smoothly than bargaining about the distribution of a burden. But it is not easy. That is the second difficulty.

The third difficulty is one of economic practice. How is it possible to implement the Pareto improvement I have described? We know what has to be achieved in gross terms. Investment has to be shifted away from conventional investment in roads and bridges to green investment in wind farms and insulation. How can that be achieved in practice?

If there were a world government that controlled investment, it could just make the switch. It could command a redirection of investment. This simple fact tells us that the difficulty is not one of the real economy. From a real, technological point of view, the switch is possible. The difficulty is a financial one: how to achieve the switch in a capitalist economy where decisions about investment are made by capitalists who choose the most profitable investments. At present conventional investment is most profitable. How are capitalists to be persuaded to switch to green investments instead?

First, there will have to be a carbon price. On this nearly all economists agree. The externality problem is that people do not pay the full cost of the greenhouse gas they emit. That causes inefficiency. Efficiency will not be achieved except by internalizing the externality, as economists put it. People must be made to pay the full cost of their emissions, including the external cost they impose on other people. Emissions must have an appropriate price attached to them. This can be achieved by means of a carbon tax, by cap and trade or in some other way. Once there is a carbon price, it will give an incentive to people to live their lives in a less carbon-intensive way. They will look for ways of reducing their emissions. This will make green investment more profitable, and give capitalists an incentive to switch to it.

However, a carbon price is in itself against people's interests. When people who previously paid nothing for emitting greenhouse gas find they have to pay a

price to do so, that makes them worse off. But we are aiming for a Pareto improvement, where no one is worse off. To achieve this result, people will have to be compensated in some way for paying the carbon price. This can be done. Their other taxes, such as income taxes, can be reduced, or some compensating subsidy can be given them. But this compensation will cost money. The revenue from the carbon tax itself will be available to finance some of the cost, but it will not be enough to pay for all the subsidy that is required. So how can the compensation be financed?

By loans. Governments will need to borrow. They will need to issue bonds, and to pay interest on them that is sufficient to persuade capitalists to buy them. An inevitable effect of governments' borrowing will be to push up interest rates. This in itself discourages conventional investment. In effect, it offers capitalists an alternative asset to invest in. Rather than building conventional capital, they can buy bonds instead. When they do, the capitalists' money will end up in the hands of governments. Governments can then use it to compensate people for paying the carbon price. They could also use it directly to build wind farms and other green investments.

The conclusion is that to manage the switch of investment in a capitalist economy will involve government borrowing. People sometimes describe this as borrowing from the future. Since future people will benefit from green investment, we get them to pay for it. But it is not literally borrowing from future people. We cannot do that. Borrowing is always a transaction between contemporaries, and so is repaying a loan. When the government loans come to be repaid in the future, they will not be repaid by a future generation as a whole. The repayment will be made by some members of a future generation (the inheritors of the debt) to others of their contemporaries (the inheritors of the bonds).

Because of the need for borrowing, this way of managing the transition will require an increase of government debt. It is conventional wisdom these days, particularly in Europe, that governments cannot bear more debt. That is false at present in Europe, where many governments are able to borrow at trivially low interest rates. But it will indeed be difficult for governments to borrow a sufficient amount of money for the very long-term projects that are required to improve the climate. A government can borrow only if investors trust it to repay the debt when it falls due. The bonds issued by governments to finance green investment will have to be extremely solidly founded. Few governments have the stability and credibility to issue these bonds. They will need to be supported by a new, international financial institution that has enough solidity to bear them.

We already have a World Bank and an IMF, which were created to help finance the reconstruction of the world's economy after the Second World War. We now need a World Climate Bank. A well-founded World Climate Bank would make it possible to respond to climate change in a way that requires sacrifice from no one. Creating this bank should be a central aim of international negotiations about climate change.

Conclusion

We should give up trying to solve the problem of climate change by appealing to the morality of governments. Instead we should concentrate on building the institutions that will make it possible to solve the problem without asking for morality.

Notes

1 This chapter was originally a talk given at the conference 'How to Think the Anthropocene' in Paris in November 2015. I owe a great deal to Duncan Foley, who first brought me to see the point. A fuller version of the argument appears in our joint paper "A world climate bank" in *Institutions for Future Generations* (forthcoming), edited by Iñigo González-Ricoy and Axel Gosseries. Research was supported by ARC Discovery Grant DP140102468.

2 This point has been particularly stressed by Duncan Foley (for example, see Foley 2009).

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