A Challenge for the World: Take Notice of Economics

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Of course, the world's biggest challenge is to control climate change. We shall not succeed in meeting this challenge unless we take note of some vital lessons that economics teaches us. The world is in danger of ignoring these lessons, and as a result may fail to meet the challenge.

The first lesson is that an excellent means of influencing people's behaviour is through the prices of the goods they buy and sell. Setting a price on emissions of greenhouse gas is an excellent way of getting people to emit less. William Nordhaus says:

> Whether someone is serious about tackling the global warming problem can be readily gauged by listening to what he or she says about the carbon price. Suppose you hear a public figure who speaks eloquently of the perils of global warming and proposes that the nation should move urgently to slow climate change [...] but nowhere does the proposal raise the price of carbon. You should conclude that the proposal is not really serious and does not recognize the central economic message about how to slow climate change. To a first approximation, raising the price of carbon is a necessary and sufficient step for tackling global warming. The rest is at best rhetoric and may actually be harmful in inducing economic inefficiencies.

I agree with most of this. I do not agree that a carbon price is sufficient for dealing with global warming. The market can be slow to have its effect, whereas the economy needs to change profoundly and quickly. Governments will need to plan for radical changes in the infrastructure. For example, green electricity will soon be need in large quantities for electric cars and electric space heating. So a carbon price is not sufficient. But it is practically necessary.

The simplest way to create a carbon price is by imposing a carbon tax. To an extent, this is relatively easy. Most greenhouse gas emissions originate from fossil fuels that are extracted from the ground. Others originate in the quarrying of limestone for cement. These extraction processes are large-scale industries and can be easily identified. There should be a tax on each tonne of carbon that is extracted from the ground. Other sources of greenhouse gases are harder to tax because they are more dispersed; they include cutting down trees and digging up peat, and also the release of nitrous oxide and methane by farming. Conversely, those who return carbon to the ground after capturing it from the air should be paid the same amount per tonne for doing so. All this can be managed, at least if the tax can be imposed internationally. It is harder to impose a carbon tax in a single country, because imports and exports of carbon will have to be accounted for.

Those who extract fossil fuel and pay tax to do so will pass the tax on to their customers, who will pass it on in turn to their own customers. Virtually everything that is sold has been produced using some carbon. It must be sold at a price that includes the tax on its embodied carbon. But no one has to calculate how much that is. So long as the original sources are properly taxed, the operation of the market will ensure that every commodity will have the cost of its embodied carbon included in its price.

The market is a refined sort of computer. Another of the important lessons economics has taught us is that the market plays this epistemic role. It effectively processes the detailed technical

information that determines the carbon content of each commodity. This information is dispersed around the economy and never needs to be brought together because the market does that for us.

The carbon tax should be set at a level equal to the external cost of carbon emissions. That is to say, equal to the harm that greenhouse gases do as they spread around the world and warm the atmosphere. Sadly, because these costs are simply dumped on people, who cannot demand payment for bearing them, the information about the external cost of carbon cannot be gathered by the computing mechanism of the market. Instead it has to be estimated by economists. In making their calculations they have to set a value on all the harms that are done. To do so, they have to make contentious assumptions, and they do not always agree with each other about their results. The correct level for the carbon tax is very hard to work out.

The level of the carbon tax will determine the total amount of carbon that gets taken out of the ground and eventually put into the atmosphere. So it determines the future course of climate change. If we knew the correct level of the carbon tax, we could apply the tax at that rate, and allow climate change to take its consequent course. If we do not know the correct level, we can reverse the direction of determination. We might settle by some other means a target for the future course of climate change, and allow the target to determine the correct carbon tax. The world's international system has chosen to take at least the first step of this alternative approach. It has set a target of 1.5 or perhaps 2 degrees.

Each target temperature implies a carbon budget. This is the amount of carbon that can be released into the atmosphere without breaching the temperature target. The scientific basis for the idea of a carbon budget was the discovery that the final level of global warming is determined almost entirely by the total of greenhouse gas that is released. It is very little affected by the rate of its release. An implication of this discovery is that the world has eventually to reach net zero of emissions. Keeping within a particular carbon budget is another sort of target – a more direct target than temperature. An alternative target is a particular date for attaining net zero emissions.

How are we to attain the target, whatever it is? One means is by a carbon price. A correct carbon price would be one that discourages people from burning carbon so much that the carbon budget is met. A benefit of achieving the target this way is that it maintains efficiency. Organizations that find it very expensive to reduce their emissions will reduce them less than those that can do so easily. When net zero is finally reached, some organizations will still be emitting greenhouse gas, while others will be removing it from the atmosphere. By this time the carbon price will be at such a high level that companies will spring up ready to do the removal.

The carbon price could be implemented by a tax, but it would be hard to estimate what the level of the carbon tax should be in order to meet the target. An alternative is to use the market once again to set a price. This can be done by means of a cap and trade system. A carbon budget fits cap and trade very well. The budget itself constitutes an overall cap for emissions – not an annual cap but a cap for all time. It can be divided up and distributed among emitters of greenhouse gas. Those who extract carbon from the ground can be required to have permits for doing so. These permits should be tradeable. A number of permits equal to the carbon budget should be sold by the world's governments. The market will then establish a carbon price. Governments have simply to enforce the permit system. If they do properly, the world is guaranteed to meet the carbon budget.

What other ways are there of meeting a target? Governments can use regulations and subsidies and occasional special taxes. For example, they can require good insulation in buildings, and they can

forbid the sale of fossil fuel cars. They can subsidize solar panels and tax airline tickets. This approach leads to a mishmash of policy instruments. It is likely to be dreadfully inefficient.

A good example is a crude idea for attaining net zero. If the world has to achieve net zero emissions by a particular date, then why not just require every country and every organization in every country to achieve net zero by that date? That will meet the target.

It would be the right way to meet the target if net zero emissions implied actual zero emissions. Actual zero emissions requires no greenhouse gas to be emitted by anyone. But net zero does not imply actual zero. Negative emissions are possible: greenhouse gas can be removed from the atmosphere. Our present technology for doing so is expensive, but it will develop. Indeed, it has to develop, because the evidence is that we shall not be able to bring climate change under control without using removal on a large scale. So net zero can be achieved even while some parts of the world's economy continue to emit greenhouse gas. Other parts will have to remove the same amount. Since some industries will find it very hard to emit no greenhouse gas at all, this is likely to be the most efficient way to achieve net zero. Some countries may not be able to develop without emitting greenhouse gas for a while, while other countries are well placed to remove it. It would be wrong for each of them to have to aim at net zero.

Still, the target of net zero is being widely distributed. An example appears in a recent report from the UK's National Health Service. The NHS has adopted a target of net zero by 2045. The report gives no indication of why this is thought to be a good idea. Why should funds allocated by the government for health-care be spent on reducing carbon emissions? The report gives no account of the costs of achieving net zero in the NHS. As for benefits, it mentions some benefits to the health of the UK population, but those are a tiny part of the real reason for reducing emissions in the UK. They are just window-dressing. The real reason is the enormously greater benefit to the world as a whole, and that is not mentioned in the report. To know whether the NHS should adopt a target of net zero, the costs of doing so must be compared with the benefits. But actually it seems to have adopted this target with no consideration for costs or benefits. Maybe it should aim for net zero and maybe it should not; we have no way of telling.

If there was a carbon price, the carbon embodied in the NHS's activities would be automatically accounted for. The point of using a carbon price for controlling climate change is to promote efficiency. Efficiency is not just a fetish of economists. The mishmash approach of regulations and subsidies wastes so many resources that it makes it much harder to attain net zero. We might not attain it at all.

But setting a price on carbon is unpopular. This is not surprising; people do not want to pay more for the things they buy. Some countries have managed to implement a carbon price, but many have not. A solution to the unpopularity problem is to make sure that people are compensated by other means for paying the price of carbon. For example, their other taxes can be reduced. British Columbia successfully introduced a carbon tax by promising that it would be 'revenue-neutral': any revenue raised by the tax would be returned to people by other means.

Another vital lesson from economics is that full compensation is possible. Greenhouse gas is an externality. People who emit greenhouse gas through their activities do not pay the full cost of what they do. Some of the cost is paid by the people all over the world who suffer the harm that the emissions cause. Economics teaches us that externalities cause inefficiency. This means in particular

that it is possible to nullify the externality in a way that is better for some people and no worse for anyone. No one has to make a sacrifice in responding to the externality.

This is surprising but true. So why is the idea not universally adopted? Why have not all countries imposed a carbon tax and compensated their people for paying it? For various reasons. One is that the process of compensation involves transfers between people, which can encounter resistence. In particular, the main beneficiaries of a carbon tax are the people who will live in the future. They will benefit from cleaner air. It is therefore they who need to pay compensation to earlier generations, who reduce their greenhouse gas emissions to make the air cleaner. Intergenerational compensation can be accomplished by public borrowing. It implies an increase in countries' national debt, which many countries have until recently been frightened of doing. This may change. Because of covid, countries have recently been borrowing vast amounts of money. They may notice that no harm results from doing so, and become more willing to borrow in order to defeat climate change.

Also there are powerful interests arrayed against the attempt to reduce greenhouse gas emissions. These are the owners of fossil fuels and the workers in the fossil fuel industries. They face the prospect of losing their fortunes or seeing their livelihoods drying up. The fossil fuel interests have vast resources, which they deploy in lobbying governments and spreading disinformation about climate change. These interests are too powerful to be defeated. But they can be bought out. The fossil fuel interests are not excluded from the economic theory that tells us no one need make a sacrifice in responding to climate change. The theory tells us that the fossil fuel interests can be fully compensated for any loss they make.

Compensating the owners of fossil fuels is distasteful to many people. Many of them are bad people. The fossil fuel companies have promoted climate change, often by bribery and by telling lies. It is natural to think they should be expropriated without compensation. But that will not turn out to be possible. Governments are not powerful enough to defeat these people. The only solution is buy them out.