

WHY WORRY ABOUT CLIMATE CHANGE?

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Ireland is subject to strict greenhouse gas emission reductions under EU climate policy. Part of the target will be met by buying offsets abroad, but the remainder will have to be realised domestically. The current economic crisis is reducing greenhouse gas emissions. This may get us close to compliance with our targets under the Kyoto Protocol. However, recession cannot be treated as a long-term answer to climate change problems. Policies aimed at keeping the growth of greenhouse gas emissions in check are needed. Such policies mean higher taxes and more expensive energy, transport and food. How can this be justified?

Carbon dioxide and methane are the two most important greenhouse gases, resulting from the burning of oil, coal and gas, and the production of dairy and beef, respectively. Greenhouse gases change the energy balance of the atmosphere, trapping more energy on the planet, and heating up the atmosphere. This is elementary physics, established in the early 19th century by among others John Tyndall from Co. Carlow. Although there are still people who argue that there are other processes in the atmosphere that will cancel out the enhanced greenhouse effect, the science is well-established and future global warming is beyond reasonable doubt.

For some people, this is sufficient reason for action. The planet is warming. This is humankind's fault. It has to stop. Such reasoning is wrong. Just because something is new and different does not make it wrong. Climate change will take us into uncharted territory, but so do many other things.

Other people emphasise the worst case scenario. That is just scaremongering. One can easily paint a dramatic picture of the impact of climate change. Sea level rise is a good example (Tol *et al.*, 2006). If Greenland melts and West Antarctica slides, sea level would rise by 15 metres. All the deltas would go under, including the coastal plains of Bangladesh and the Netherlands. Hundreds of millions of people would have to flee. This is scary – until one realises that this would happen, if at all, over a time scale of 1,000 years. The likely scenario for this century is a sea level rise of 50 cm – that is, half a centimetre per year. Coastal engineers should be able to keep up with that.

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The solution to the climate problem is not costless (Tol *et al.*, 2008). Climate policy will hurt the poor, it will hurt farmers, and it will hurt energy producers. Economists are able to design policies that would minimise costs, and even turn a small benefit. Engineers are even more optimistic about the costs of greenhouse gas emission reduction, pointing to the potential for substantial gains in energy efficiency at low cost. Unfortunately, such proposals work under ideal circumstances only. Because of political constraints, actual policies are never as sophisticated and smart as academics would like – and the costs to society are invariably higher than necessary.

The costs of climate policy are real and immediate. The exchequer has reserved €270 million for the period 2008-12 to finance greenhouse gas emission reduction abroad.¹ The forced growth of wind power is driving up the price of electricity in Ireland. How do these costs compare to the benefits of climate policy? Can these benefits be measured? Can they be compared to the cost? Such research has now been carried out for over 30 years, and the first robust insights are emerging.

Estimating the impact of climate change is a daunting task, first of all because climate has such a wide range of effects. Sea level rise is mentioned above, but climate change also affects the demand for winter heating, the demand for summer cooling, the supply of wind and water power, river floods, surface and groundwater resources, the demand for water, crop yields, agricultural pests and pathogens, farm animal welfare and productivity, and tourism flows. Climate change also affects human health, through heat and cold stress that enhance cardiovascular and respiratory problem, and through water-, food-, and vector-borne diseases such as salmonellosis and malaria. And climate change would have profound impacts on nature and biodiversity.

Estimating the impact of climate change is also difficult because climate change is so uncertain. The uncertainty begins with the future number of people, their wealth, their energy and their emissions, continues with the response of the atmosphere and oceans to greenhouse gas emissions, includes the vulnerability of future societies to climate change, and ends with the uncertainty about the impacts themselves.

The impacts of climate change are uncertain and vary between sectors, between countries, and over time. Depending on the impact, place, time, and study, one can find large or small impacts, and positive or negative ones. In order to provide an overall estimate of the seriousness of climate change, economists have aggregated all impacts, using money as the numeraire. For some impacts, e.g., the cost of dyke building, money is the

¹ Under the provisions of the Kyoto Protocol of the United Nations, countries are allowed to finance projects that reduce emissions in other countries and count these as their own emission reductions. In the Irish media, such payments are regularly portrayed as Kyoto fines. This is incorrect, first, because this is a normal market transaction and second, because there are no fines for non-compliance with targets of the Kyoto Protocol.

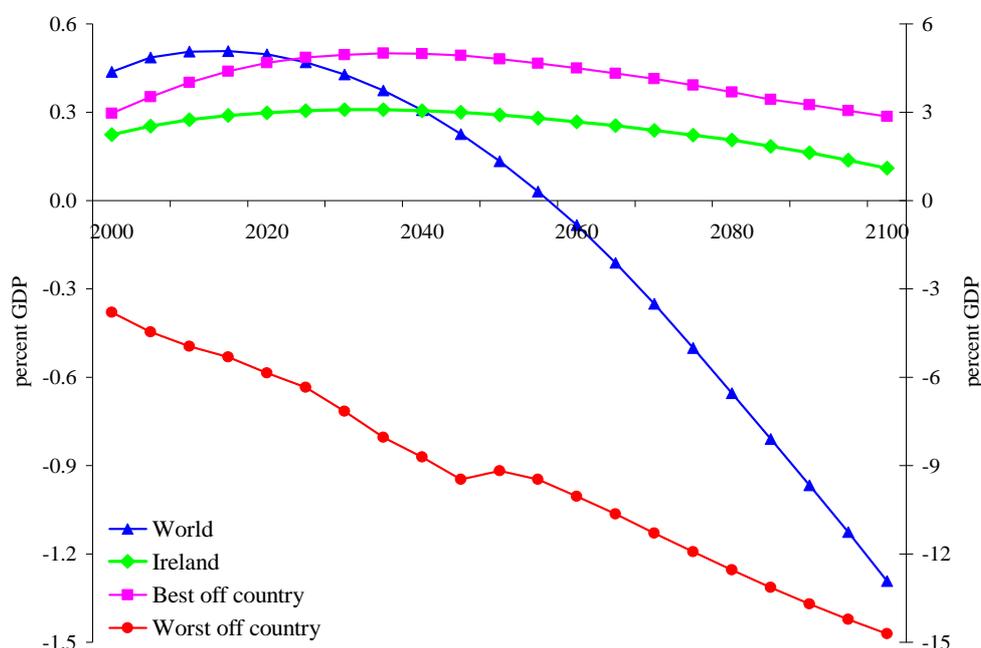
natural metric. For other impacts, e.g., the impact on human health, the methods of monetary valuation have to be used. This introduces additional uncertainty and even controversy into the analysis (Pearce *et al.*, 1996).

The following insights emerge from the economic literature on the impact of climate change (Tol, 2009):

1. The impact of climate change is relatively small. The average impact on welfare is equivalent to losing a few per cent of income. That is, the impact of a century worth of climate change is comparable to the impact of one or two years of economic growth.
2. Although the impact of climate change may be small, it is real and it is negative. Climate change is likely to have a positive impact in the first half of the 21st century, and impacts turn negative later. The initial positive impacts are irrelevant for policy. The workings of the climate system are so slow that they cannot be avoided even if emissions were to fall to zero tomorrow. The part of climate change that can be influenced by climate change, has net negative impacts.
3. Impacts are much more negative in poor countries than in rich ones. This is because poor countries tend to be in hotter places already, poor countries have a greater share of their economic activity in exposed sectors such as agriculture, and because poor countries have greater difficulty in successfully adapting to climate change.

Figure 1 illustrates these points. It depicts the total economic impact of climate change. The impact on Ireland is small, but this hides large positive impacts on winter mortality and heating, and large negative impacts on summer cooling and biodiversity, particularly coastal wetlands. For Ireland, the turning point is around 2035 – that is, incremental impacts are negative. For the world average, incremental impacts turn negative by 2020 already, and total impacts are negative as of 2060. Note that impacts do not exceed 1.3 per cent of GDP in the 21st century. The world average hides large differences between countries. Figure 1 also displays the impact on the best-off country (Canada) and the worst-off country (the Maldives in the first half of the century, and the Congo in the second half). The world average economic impact is positive at first because rich countries in the temperate zone dominate the world economy. The majority of the people on the planet are already negatively affected by climate change.

Figure 1: Welfare Gain or Loss from Climate Change: Ireland, the World and Countries Losing/Gaining Most from Climate Change, 2000-2100*



*Graphs show the total economic impact of climate change, expressed in welfare-equivalent income loss (per cent of GDP) for Ireland and the World (left axis) and for countries losing and gaining most (worst off/best off) from climate change. Based on Tol (2002a,b).

Estimates of the total economic impact of climate change are interesting, but not particularly relevant. Climate change cannot be altogether avoided, so the benefits of climate policy are but a fraction of the impact of climate change. In fact, any policy decision has only a minuscule effect on climate change. Therefore, the marginal impact of emissions is a more appropriate indicator for policy evaluation. This is commonly referred to as the social cost of carbon. It equals the net present value of the incremental impacts caused by a small increase in emissions.

There are many estimates of the social cost of carbon in the economic literature. A number of insights emerge from this literature (Tol, 2005):

- a) The social cost of carbon depends strongly on a number of ethical assumptions, particularly how much one cares about risk, about impact on other countries, and about the future. This is no surprise, as climate change is a long-term, global, and uncertain problem. However, decisions are made every day that reflect how much we care about the future, foreign lands, and risk. If one uses revealed preferences to set the value of these ethical assumptions, then one finds that the social cost of carbon is roughly equal to the current price of emission permits in the EU Emissions Trading Scheme.
- b) Studies that have been subject to peer-review tend to be more optimistic about climate change than studies that have had no

quality control. That is, a lot of the scaremongering is not based on sound science. The Stern Review is the best-known example of pseudo-scientific exaggeration (Yohe and Tol, 2007).

- c) Estimates have become less pessimistic over time.
- d) Uncertainties are large and negative surprises are more likely than positive surprises. That is, the risk premium is a large share of the estimated social cost of carbon cited above.

What does this all mean for Ireland? To date, Ireland's climate policy was determined by the European Union. This was one of the "grand bargains" of Europe, in which countries like Germany and the Netherlands set the environmental policy for the whole union in return for funding the agricultural and regional policies. No longer. Unless the current recession is worse than feared, Ireland will become a net contributor to the European Union, and Ireland can and should demand a greater say in the decisions made in Brussels. The estimates of the social cost of carbon cited above suggest that actual European climate policy is roughly on the right track – but note that the rhetoric in Brussels calls for much more stringent action.

As argued above, Ireland has little to fear from climate change. Climate policy in Ireland can only be justified by the moral obligation not to harm others. At the same time, Ireland can contribute only very little to international climate policy. Our emissions are too small to register. It is unlikely that carbon-free electricity or transport will be invented or commercialised on Irish soil. That implies that we in Ireland should do our bit for climate policy. Not more, because that would hurt the competitiveness of our industry, and not less, because that would be immoral.

"Doing our bit for climate" should be done in as simple, as cheap, and as effective a way as possible. This implies a carbon tax, and a carbon tax only. For as yet unregulated emissions, a carbon tax can be introduced in the next budget. It would bring welcome revenue. A carbon tax should not come on top of existing climate policy. A carbon tax should replace it. This would bring welcome savings in the government budget.

At the European level, Ireland should argue for a uniform carbon tax in all Member States. The success of this argument may be furthered by the double shock effect of Ireland taking the lead on climate policy, and Ireland proposing a harmonised tax. Eventually, a carbon tax should replace emissions trade. To date, emissions trade has been about hidden subsidies to selected companies rather than about emission reduction. The volatility of the permit price creates uncertainty and deters financiers from investing in research and development. A tax does not suffer that drawback.

Climate change is a real problem. The impact of climate change on Ireland is moderate. The effect of greenhouse gas emission reduction in Ireland on climate change is minor. Nonetheless, as a responsible nation, Ireland should make a constructive contribution to international climate

policy. A carbon tax, and a carbon tax only, would be a simple, cheap and effective way to reduce emissions and demonstrate good will.

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