

THE ENVIRONMENT



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IT IS GENERALLY BELIEVED THAT the annual emissions of greenhouse gases will increase with each passing year. Given this, a majority of scientists agrees with the two following hypotheses. First, humans are creating a thermal blanket capable of trapping enough heat to significantly raise the earth's surface temperature. Second, the global climate changes could lead to catastrophic consequences—including the flooding of low-lying areas and an increase in tropical diseases.

Despite the global nature of these phenomena, the economic and ecological consequences of global warming will not be identical across all countries, mainly because the various climatic systems around the world are affected in different ways. Moreover, crops and agricultural methods vary considerably in their ability to resist or adapt to changes in temperature and water levels. Some colder countries may even benefit from the global warming when it comes to their agriculture and forestry. Countries are therefore likely to have very different perceptions about the costs of global warming and thus about appropriate policy responses. These divergent perceptions may represent important obstacles in the search for co-operative solutions to the phenomenon of global-warming.

Plenty of Uncertainty

Scientific predictions about the extent of global warming remain imprecise and uncertain. It is not that scientists disagree that the earth is warming. Their debates centre on the *extent* of global warming, how much humans are responsible for it, and

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Will Kyoto Lead to World Trade in Pollution Permits?

what the consequences are likely to be. Not surprisingly, those disagreements have led to many opinions about what governments can and should do about global climate change.

Given the uncertainty of the effects of global warming, how large should preventive investments be? When deciding how to intervene, and by how much, governments must keep in mind that there is a trade-off between the cost of present measures (such as reductions in current output and income) and the benefits of reduced future risks. Excessively stringent measures impose a higher-than-necessary cost on current generations. On the other hand, excessively lax measures impose too much risk on future generations. Furthermore, the dangers of policy mistakes are clearly asymmetric should global warming become as serious as predicted by many experts; global warming may result in large *irreversible* damages to the environment, thereby inflicting permanent costs on future generations.

Assessments of the cost-effectiveness of various policies need to address both the prevailing uncertainty and the asymmetry of outcomes. Governments may thus hedge themselves by undertaking strategies to prevent and mitigate the likely consequences of global warming.

It was in this context of uncertainty that the recent Kyoto Conference on global warming took place. The challenge faced by the leaders of the 166 participants was colossal. Still, 38 industrialised countries were able to reach some agreement on reducing their overall level of greenhouse gases. But agreeing to reduce total greenhouse-gas emis-

sions was the easy part. At one point, the "Kyoto Protocol" almost collapsed under the weight of developing nations' vehement objections to a system of tradable emissions permits—a system considered crucial by the United States and Canada. In the end, it was decided that trading in such "pollution permits" will not start until trading rules and regulations are established at a follow-up conference.

The Case for Tradable Emissions Permits

The Protocol's tentative provision for a system of international emissions trading may represent the most important achievement resulting from the Kyoto conference. There are numerous advantages to such a scheme.

That a given amount of pollution abatement can be achieved at the minimum possible cost—to individual firms and society as a whole—represents the most important advantage of tradable emissions permits. Under an emissions-trading regime, firms within

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each country would be allocated emissions permits for greenhouse gases based on an internationally agreed-upon national allocation of emissions. These permits would then be tradable both nationally and internationally. Firms (of any nationality) that found it inexpensive to reduce their emissions to a level below their permitted levels would have the right to sell their unused permits on the open market. By purchasing these "pollu-

tion permits", the acquiring firm could then increase its emissions of greenhouse gases by an equivalent amount. The reduction in greenhouse-gas emissions would therefore be carried out by the firms that could do it most cheap-

ly, thus minimising the total cost of pollution abatement. Furthermore, as long as permits are able to be sold by low-abatement-cost firms and purchased by high-abatement-cost firms, overall cost minimisation would be achieved independent of the initial cross-country or cross-firm distribution of permits.

Though the initial distribution of permits does not affect the total abatement cost, it does have a direct impact on the international distribution of income. The current belief is that pollution abatement will cost developing countries a larger fraction of their wealth than it does developed countries. It may be that high-abatement-cost firms in developing countries purchase permits from low-abatement-cost firms in rich countries, thus allowing resources to flow from poor to rich countries. And therein lies the opposition from the developing countries for the entire emissions-reductions project. Perhaps surprisingly, this suggests the second advantage of tradable emissions permits—they can easily be used to address concerns over international equity. By simply giving a proportionately larger number of permits to firms in developing countries (than in developed ones), the emissions-trading scheme can result in transferring wealth toward developing countries rather than away from them. Developing countries could then use that greater wealth to make the switch to development paths less dependent on the production of greenhouse gases.

If these two advantages are not enough, tradable-emissions permits also provide a natural mechanism through which government or environmental groups can express their preferences. Those who believe that the aggregate level of emissions permits is too high can enter the market themselves and purchase some of the permits, thus removing the permits from the market and forcing up their price. As the price of permits increases, polluting firms will find it to their advantage to reduce their greenhouse-gas emissions rather than

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purchase new permits. Alternatively, if the managing body of the emissions-trading regime feel that the increased demand for permits should result in some relaxation in the level of pollution control, they could simply issue new permits, thereby increasing the supply and decreasing prices. By allowing the authorities to influence the price of pollution permits, the emissions-trading system offers the opportunity to easily adjust the pollution standards to reflect new information regarding the global-warming situation.

A system of tradable emissions permits is a better alternative to government intervention through emissions taxes. With a system of emissions taxes, polluting firms are required to pay for each unit of pollutant emitted. Designing such a system, however, is problematic. The authorities must first set the target level of pollution abatement. They then must estimate the level of emissions tax that will lead firms in the aggregate to achieve that target level. But this estimation process is fraught with errors and uncertainties. With a system of tradable emissions permits, however, there is no need to determine a tax rate. All that is needed is a set of targeted abatement levels; the free market in emissions permits will determine the price.

There are obviously preconditions for the successful operation of such a market. The emissions-trading system must be managed by a trusted international agency with the power to accept and certify any transfer of pollution rights. This would ensure that emissions limits within the agreement are binding—in the sense that no trade in permits would lead to an increase in aggregate emissions of greenhouse gases. For this to occur, the created international agency must be given real power to monitor and enforce the

“rights to pollute”. However, the price of permits would still be determined on the open market.

Costly Emissions Reductions?

How costly will it be for countries to reduce their emissions of greenhouse gases as determined by the Kyoto Protocol? Assessing the likely cost is fraught with uncertainty. Reductions in greenhouse gases will occur only as firms shift away from fossil-fuel-based technologies toward newer technologies. And since the costs of such changes are likely to depend on the nature of the new technologies, assessing the future costs of a given set of emissions reductions requires forecasts of both economic and technological evolutions. Given that emissions reduction will occur over decades, and that technology and politics are constantly changing, these forecasts will be anything but precise.

The Kyoto Protocol is therefore likely to cast a pall of uncertainty over the economies of participating countries, as well as over others outside the agreement. In the short term, this could reduce the growth rate of global output. But given the improvements in technology and the advantages of an emissions-trading regime, the reduction in greenhouse-gas emissions is unlikely to trigger a significant reduction in economic growth. Whatever effects the Kyoto Protocol may have on global output, there will be benefits to current consumers and businesses in the form of reduced pollution cleanup costs.

By specifying each firm’s “right to pollute”, a tradable-emissions system defines a global upper limit and, implicitly, transforms emissions into a scarce commodity. It thus places a market value on the air we breathe. The prespecified level of air purity can thereby be maintained at minimum cost—while respecting the incentive structures of individuals as well as firms. An emissions-trading scheme is an outstanding example of how society benefits by encouraging the mutual gains from trade. ♦

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