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Facing the Tradeoffs

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At international conferences, people speaking for the developing world insist that it is the developed nations that feel endangered by carbon emissions and want to retard elsewhere the kind of development that has been enjoyed by Western Europe, North America, and Japan. A reduction in carbon emissions in the developing world, they assert, will have to be at the expense of the rich nations. Their diagnosis is wrong, but their conclusion is right. Any costs of mitigating climate change during the coming decades will surely be borne by the high-income countries. But the benefits, despite what spokespeople for the developing world say, will overwhelmingly accrue to future generations in the developing world. Any action combating global warming will be, intended or not, a foreign aid program.

The Chinese, Indonesians, or Bangladeshis are not going to divert resources from their own development to reduce the greenhouse effect, which is caused by the presence of carbon-based gases in the earth's atmosphere. This is a prediction, but it is also sound advice. Their best defense against climate change and vulnerability to weather in general is their own development, reducing their reliance on agriculture and other such outdoor livelihoods. Furthermore, they have immediate environmental problems—air and water pollution, poor sanitation, disease—that demand earlier attention.

There are three reasons the beneficiaries will be in the developing countries, which will be much more developed when the impact of climate change is felt. The first is simple: that is where most people live—four-fifths now, nine-tenths in 75 years.

Second, these economies may still be vulnerable, in a way the developed economies are not, by the time climate change occurs. In the developed world hardly any component of the national income is affected by climate. Agriculture is practically the only sector of the economy affected by climate, and it contributes only a small percentage—three percent in the

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United States—of national income. If agricultural productivity were drastically reduced by climate change, the cost of living would rise by one or two percent, and at a time when per capita income will likely have doubled. In developing countries, in contrast, as much as a third of GNP and half the population currently depends on agriculture. They may still be vulnerable to climate change for many years to come.

Third, although most of these populations should be immensely better off in 50 years, many will still be poorer than the rich countries are now. The contribution to their welfare by reduced climate change will therefore be greater than any costs the developing world bears in reducing emissions.

I say all this with apparent confidence, so let me rehearse the uncertainties, which have remained essentially the same for a decade and a half. Arbitrarily adopting a doubling of greenhouse gases as a benchmark, a committee of the U.S. National Academy of Sciences estimated in 1979 that the change in average global surface atmospheric temperature could be anywhere from 1.5 to 4.5 degrees Celsius. (Note that the upper estimate is three times the lower.) This range of uncertainty has still not officially been reduced.

More important than the average warming is the effect it may have on climates. Things will not just get warmer, climatologists predict; some places will, but others will get cooler, wetter, drier, or cloudier. The average warming is merely the engine that will drive the changes. The term "global warming" is mischievous in suggesting that hot summers are what it is all about.

The temperature gradient from equator to pole is a main driving force in the circulation of the atmosphere and oceans, and a change in that gradient will be as important as the change in average temperature. Climatologists have to translate changes in temperature at various latitudes, altitudes, and seasons into changes in weather and climate in different localities. That is another source of uncertainty. Mountains, for example, are hard to work into climate models. Not many people live high in the mountains, so why worry? But India, Pakistan, Bangladesh, and Burma depend on snowfall in the Himalayas for their irrigation.

A further question gets little attention: what will the world be like 75 years from now, when changes in climate may have become serious? If we look back to 1920 and conjecture about what environmental problems then might be affected by climate changes over the coming 75 years, one problem high on the list would be mud. This was the era of muddy roads and narrow tires. Cars had to be pulled out by horses. People could not ride bicycles, and walking in the stuff was arduous. One might think, "If things get wetter or drier the mud problem will get worse or better." It might not occur to anyone that by the 1990s most of the country would be paved.

If the climate changes expected 75 years from now were to happen immediately, the most dramatic consequences would be in the incidence of parasitic and other tropical diseases. Temperature and moisture affect malaria, river blindness, schistosomiasis, dengue fever, and infantile diarrhea, all vastly more dangerous than the radioactive and chemical hazards that worry people in the developed countries.

Alarmists have weighed in with dire predictions of how a warming of tropical

and subtropical regions will aggravate the scourge of tropical diseases. But any changes in temperature and moisture need to be superimposed on those areas as they are likely to be 50 or 75 years from now, with better sanitation, nutrition and medical and environmental technology, cleaner water, and the potential eradication of vector-borne diseases.

Malaysia and Singapore have identical climates. There is malaria in Malaysia, but hardly any in Singapore, and any malaria in Singapore gets sophisticated treatment. By the time Malaysia catches up to where Singapore is now, many tropical diseases may have been tamed. One invasive tropical creature, the guinea worm, is already expected to follow smallpox into extinction.

THE MARSHALL MODEL

The modern era of greenhouse concern dates from the 1992 Rio Conference, attended by President Bush, which produced a "framework convention" for the pursuit of reduced carbon emissions. A sequel is set for Kyoto in December. Countries from the Organization for Economic Cooperation and Development (OECD) are groping for criteria and procedures to determine "targets and timetables." There are proposals for the formal allocation of enforceable quotas, possibly with trading of emission rights. There is disappointment with the lack of convincing progress in the five years since Rio. Many people wonder whether Kyoto will settle anything.

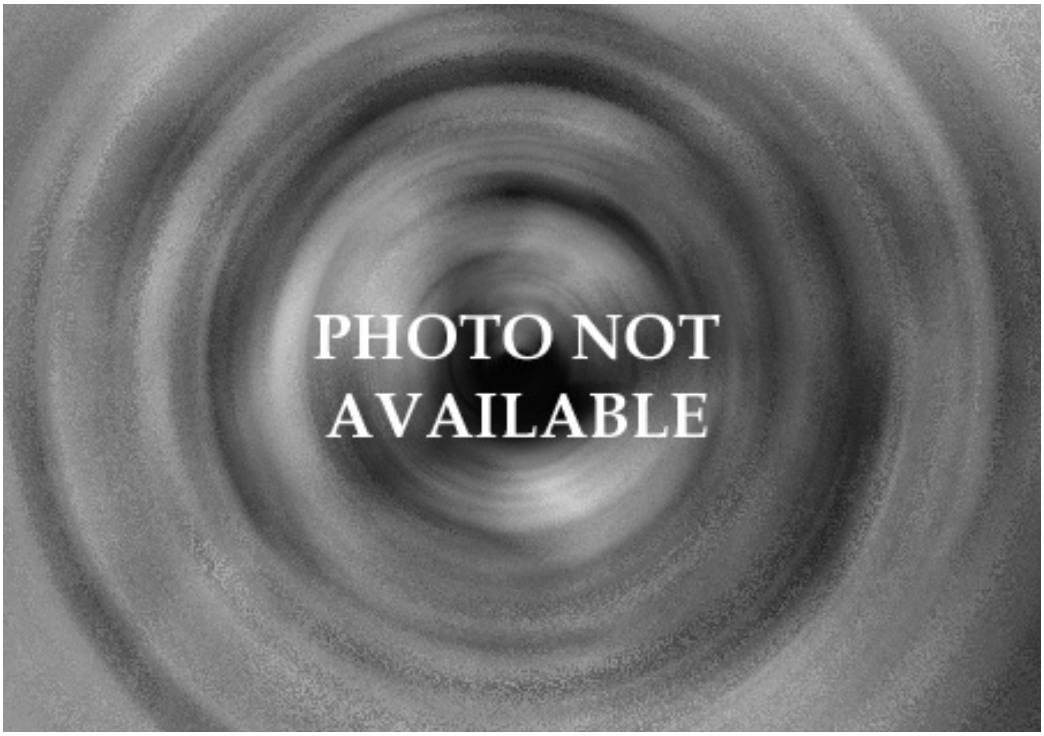
It will not. But five years is too soon to be disappointed. Nothing like a carbon emissions regime has ever been attempted, and it is in no country's individual interest to do much about emissions: the atmosphere is a global common where everybody's emissions mingle with everybody else's. The burden to be shared is large, there are no accepted standards of fairness, nations differ greatly in their dependence on fossil fuels, and any regime to be taken seriously has to promise to survive a long time.

There are few precedents. The U.N. budget required a negotiated formula, but adherence is conspicuously imperfect, and the current budget, even including peacekeeping, is two orders of magnitude smaller than what a serious carbon regime would require. The costs in reduced productivity are estimated at two percent of GNP—forever. Two percent of GNP seems politically unmanageable in many countries.

Still, if one plots the curve of U.S. per capita GNP over the coming century with and without the two percent permanent loss, the difference is about the thickness of a line drawn with a number two pencil, and the doubled per capita income that might have been achieved by 2060 is reached in 2062. If someone could wave a wand and phase in, over a few years, a climate-mitigation program that depressed our GNP by two percent in perpetuity, no one would notice the difference.

The only experience commensurate with carbon reduction was division of aid in the Marshall Plan. In 1949-50 there was $4 billion to share. The percentage of European GNP that this amounted to depends on hypothetical exchange rates appropriate to the period, but it was well over two percent, although differing drastically among the countries. The United States insisted that the Europeans divide the aid themselves, and gave them most of a year to prepare.

The procedure was what I call "multilateral reciprocal scrutiny." Each country



CORBIS - BETTMANN

Sun block: Sooner or later, China will get money from the West to shield it from the effects of global warming

prepared detailed national accounts showing consumption, investment, dollar earnings and imports, intra-European trade, specifics like per capita fuel and meat consumption, taxes, and government expenditures—anything that might justify a share of U.S. aid. There was never a formula. There were not even criteria; there were "considerations." There was no notion that aid should be allocated to maximize recovery, equalize standards of living, balance improvements in consumption levels, or meet any other objective. Each country made its claim for aid on whatever grounds it chose. Each was queried and cross-examined about dollar-export potential, domestic substitutes for dollar imports, dietary standards, rate of livestock recovery, severity of gasoline rationing, and anything pertinent to dollar requirements. The objective was consensus on how to divide the precious $4 billion.

Although they did not succeed, they were close enough for arbitration by a committee of two people to produce an acceptable division. After the Korean War, when NATO replaced recovery as the objective, the same procedure was used. Again consensus was not reached, but again there was enough agreement for arbitration by a committee of three to decide not only the division of aid but military burdens to be assumed. Multilateral reciprocal scrutiny proved effective, no doubt because an unprecedented camaraderie had been cultivated during the Marshall Plan. And remember, consensus had to be reached by countries as different in their development, war damage, politics, and cultures as Turkey, Norway, Italy, and

France. A similar procedure recently led to the European Union's schedule of carbon reductions for its member countries. A difference is that in the Marshall Plan it was for keeps!

Did the Marshall Plan succeed despite, or because of, its lack of formal quantitative criteria and its reliance on looser, more open-ended, pragmatic modes of discourse and argument? In the time available, plan participants could not have agreed on formal criteria. In the end they had to be satisfied with a division. Any argument over variables and parameters would have been self-serving arguments once removed; arguing explicitly over shares was more direct and candid. Had the process gone on several years, more formal criteria might have been forged. The same may occur eventually with carbon emissions.

SETTING THE CEILING

Two thousand American economists recently recommended that national emission quotas promptly be negotiated, with purchase and sale of emission rights allowed to assure a fair geographic distribution of reductions. This appears to be the U.S. position for the meeting in Kyoto. It is an elegant idea. But its feasibility is suspect, at least for the present.

One cannot envision national representatives calmly sitting down to divide up rights in perpetuity worth more than a trillion dollars. It is also hard to imagine an enforcement mechanism acceptable to the U.S. Senate. I do not even foresee agreement on what concentration of greenhouse gases will ultimately be tolerable. Without that, any trajectory of global emissions has to be transitory, in which case renegotiation is bound to be anticipated, and no prudent nation is likely to sell its surplus emissions when doing so is clear evidence that it was originally allowed more than it needed.

The current focus of international negotiation is extremely short-term. That is probably appropriate, but the long term needs to be acknowledged and kept in mind. If carbon-induced climate change proves serious, it will be the ultimate concentration of greenhouse gases in the atmosphere that matters. The objective should be to stabilize that final concentration at a level compatible with tolerable climate change. Emissions of the carbon-based gases are the current focus of attention, but the question of concentration is what needs to be settled.

If scientists knew the upper limit to what the earth's climate system could tolerate, that limit could serve as the concentration target. It would probably not matter much climatically how that limit was approached. The optimal trajectory would probably include a continuing rise in annual emissions for a few decades, followed by a significant decline as the world approached a sustainable low level compatible with the ceiling on concentration. That is no argument for present inaction: future technologies that people will rely on to save energy or make energy less carbon-intensive 10, 20, or 30 years from now will depend on much more vigorous research and development, much of it at public expense, than governments and private institutions are doing or even contemplating now.

The ceiling is variously proposed as 450, 550, 650, or 750 parts per million, compared with about 360 parts per million today. The Intergovernmental Panel on Climate Change, the scientific advisory

body associated with these conferences, has rendered no opinion on what level of concentration might ultimately become intolerable. Without that decision, there can be no long-range plan.

In the short run, there will almost certainly be innumerable modest but worthwhile opportunities for reducing carbon emissions. National representatives from the developed countries are counting on it. They are proposing reductions of 10 or 15 percent in annual emissions for most developed countries during the coming decade or so. If such reductions are seriously pursued—an open question—a rising trend in emissions would be superimposed on a short-term effort to limit actual emissions.

A program of short-term reductions would help governments learn more about emissions and how much they can be reduced by different measures. But the prevailing sentiment seems to be that emissions can be brought down and kept down in the OECD countries. It is not yet politically correct to acknowledge that global emissions are bound to increase for many decades, especially as nations like China experience economic growth and greater energy use.

When the OECD countries do get serious about combating climate change, they should focus on actions—policies, programs, taxes, subsidies, regulations, investments, energy technology research and development—that governments can actually take or bring about that will affect emissions. Commitments to targets and timetables are inherently flawed. They are pegged some years into the future, generally the further the better. Moreover, most governments cannot predict their policies' impact on emissions.

To pick an unrealistic example, if the United States committed itself to raising the tax on gasoline by ten cents per gallon per year for the next 15 years, any agency could discern whether the tax actually went up a dime per year, and the U.S. government would know exactly what it was committed to doing. But nobody can predict what that tax would do to emissions by the end of 15 years.

GREENHOUSE POLITICS

Slowing global warming is a political problem. The cost will be relatively low: a few trillion dollars over the next 30 or 40 years, out of an OECD gross product rising from $15 trillion to $30 trillion or $40 trillion annually. But any greenhouse program that is not outrageously inefficient will have to address carbon emissions in China, whose current emissions are half the United States' but will be several times the U.S. level in 2050 if left unchecked. The OECD countries can curtail their own emissions through regulation, which, although inefficient, is politically more acceptable than taxes because the costs remain invisible. The developed-country expense of curtailing Chinese emissions will require visible transfers of budgeted resources. It will look like the foreign aid it actually is, although it will benefit China no more than India or Nigeria. Building non-carbon or carbon-efficient electric power in China will look like aid to China, not climate relief for the world.

There remains a nagging issue that is never addressed at meetings on global warming policy. The future beneficiaries of these policies in developing countries will almost certainly be better off than their grandparents, today's residents of those countries. Alternative uses of

resources devoted to ameliorating climate change should be considered. Namely, does it makes more sense to invest directly in the development of these countries?

There are two issues here. One is whether, in benefits three or four generations hence, the return for investing directly in public health, education, water resources, infrastructure, industry, agricultural productivity, and family planning is as great as that for investing in reduced climate change. The second is whether the benefits accrue earlier, to people who more desperately need the help. Is there something escapist about discussing two percent of GNP to be invested in the welfare of future generations when nothing is done for their contemporary ancestors, a third of whom are so undernourished that a case of measles can kill?

If there were aid to divide between Bangladesh and Singapore, would anybody propose giving any of it to Singapore? In 50 or 75 years, when climate change may be a significant reality, Bangladesh probably will have progressed to the level of Singapore today. Should anyone propose investing heavily in the welfare of those future Bangladeshis when the alternative is to help Bangladesh today? People worry that the sea level may rise half a meter in the next century from global warming and that large populated areas of Bangladesh may flood. But Bangladesh already suffers terrible floods.

The need for greenhouse gas abatement cannot logically be separated from the developing world's need for immediate economic improvement. The trade-off should be faced. It probably won't be.