

## Climate Change and the Economy

Policies to reduce the emission of greenhouse gases need not hobble the economy

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Addressing climate change and the economic damage it will likely bring presents policymakers with a dilemma. The benefits of policy action are uncertain and would accrue largely to future generations, whereas the costs of policies run the risk of being more immediate and extensive. At the same time, the costs of inaction are irreversible, potentially catastrophic, and likely to hit poorer countries harder than developed ones. Moreover, even if the greenhouse gas (GHG) emissions that accumulate in the atmosphere and warm the climate stopped immediately, temperatures would rise for some decades because of the emissions already accumulated.

For these reasons, economic policymakers increasingly recognize that policies will have to be adopted both to mitigate global warming, by slowing and ultimately reversing the growth of GHG emissions, and to adapt to the effects of the emissions that have already occurred and will occur in the coming decades. And they agree that mitigation policies in particular can have rapid and wide-ranging consequences.

To shed light on how mitigation policies would affect countries' economies, the IMF recently undertook a study comparing alternative policy designs—taxes on GHG emissions, emissions permit trading, and hybrid schemes combining elements of both policies. The encouraging news is that the analysis shows that climate change can be addressed without either hurting macroeconomic stability and growth or putting an undue burden on the countries least able to bear the costs of policies. In other words, if policies are well designed, their economic costs should be manageable.

### 1. Facilitating adaptation

**Economic and institutional development.** Development helps countries diversify away from heavily exposed sectors; improves access to health, education, and water; and reduces poverty. Higher-quality institutions also strengthen countries' abilities to adapt to climate change.

**Fiscal self-insurance.** Government budgets must allow for adaptation expenditures, and social safety nets must be strengthened, especially in countries that will be severely affected. External financing may be needed to help poorer countries whose domestic resources are far short of what are needed—on this front, the UN has just launched an effort to provide such financing, a step in the right direction.

Financial markets. These markets can reduce the macroeconomic costs of adapting to climate change by generating price signals that create incentives for people to move to lower-risk areas and reallocating capital to newly productive sectors and regions (see “The Greening of Markets” in this issue). The financial markets’ capacity to diversify costs and spread the risks to those most willing and able to bear them will also help reduce the social costs of adaptation.

## 2. Curbing GHG emissions

But adaptation is not enough. To mitigate the consequences of global warming, GHG emissions must be reduced. If a price is put on GHG emissions commensurate with the damage they cause, consumers and businesses would have incentives to shift from producing and consuming goods that give rise to large quantities of emissions to creating clean goods and technologies. Such a price for GHG emissions is often called a carbon price, reflecting the fact that, among all GHGs, carbon dioxide is the main contributor to the climate problem. Many policy instruments have been considered for mitigation purposes. They include, among other things, taxes on GHG emissions (carbon taxes); cap-and-trade schemes, in which the government restricts the quantity of emissions firms can produce but allows firms to trade their emissions rights; and hybrid policies combining elements of carbon taxes and cap-and-trade schemes.

Which mitigation policies are best? Carbon taxes have a big advantage over cap-and-trade schemes because they result in a stable price for emissions, which is critical for firms making long-term decisions about investment in low-emissions technologies. They also generate revenues that can be used to enhance efficiency (by lowering other taxes) or equity (by compensating groups disadvantaged by policy). However, under carbon taxes, the quantity of emissions reductions is uncertain, and taxes may be politically difficult to implement. That said, there are ways to reduce the disadvantages of cap-and-trade schemes—in the process, creating a hybrid instrument. Price volatility, for example, can be reduced by introducing safety valves that would allow the government to sell some temporary permits when they exceeded some prespecified “trigger” price. Hybrid policies can also provide for a simultaneous targeting of emissions prices (over the short run) and emissions levels (over the long run).

## 3. Guiding principles

What lessons can we glean for policymakers trying to contain the potentially adverse macroeconomic effects of mitigation? Carbon-pricing policies must

- Be long-term and credible. It is important to establish a steadily rising time path for carbon prices that people and businesses believe in. Increases in world carbon prices then need not be large—say a 1 cent initial increase in the price of a gallon of gasoline that rises by an additional cent every two years. Such gradual increases, if started early, would allow the cost of adjustment to be spread over a longer period of time.
- Require all groups of countries—advanced, emerging market, and developing—to start pricing their emissions. Any policy framework that does not include emerging and developing economies (particularly, large and fast-growing economies such as Brazil, China, India, and Russia) would be extremely costly and politically untenable, because 70 percent of

total emissions during the next 50 years are projected to come from these and other emerging and developing economies.

- Establish a common world price for emissions. This would ensure that emissions are reduced where it is least costly to do so. Emerging and developing economies, in particular, are likely to be able to reduce emissions much more cheaply than advanced countries. For example, if China and India have access to technologies similar to those available in Japan and Europe, they could cut emissions dramatically by improving the efficiency with which they use energy and by reducing reliance on coal. The difference in costs can be significant—for the world as a whole, costs will be 20–40 percent lower if carbon prices are common across countries. Countries would have to harmonize the rate of carbon tax, coordinate trigger prices for the safety valve under a hybrid policy, or allow international trading of emissions permits under a cap-and-trade scheme.
- Be sufficiently flexible to accommodate cyclical economic fluctuations. In periods of high demand, it would be more costly for firms to reduce their emissions, whereas the opposite would be true when demand is low. Abatement costs would be lower if firms could vary their emissions over the business cycle. That would allow achievement of a given average level of emissions reductions over the medium term. In contrast to carbon taxes and hybrid policies, cap-and-trade could prove restrictive in periods of higher growth because of increased demand and prices for emissions permits, unless provisions are made to control price volatility.
- Distribute the costs of mitigation equitably across countries. Some mitigation policies—for example, a uniform tax, a cap-and-trade scheme where permits are allocated based on countries' share of emissions, or a hybrid policy—would impose high costs on some emerging market and developing economies. Substantial cross-border transfers may be needed to encourage them to participate and to help them deal with the negative impact. Using border tax adjustments to induce countries to join could elicit a protectionist response that would detract from mitigation efforts.

In addition, countries may need to complement carbon pricing with appropriate macroeconomic and financial policies. For example, under a global cap-and-trade regime, transfers from industrial countries that buy permits to emerging and developing economies that sell them could be potentially large—several percentage points of GNP. Such transfers would reduce the costs of carbon pricing policies for emerging and developing countries and would encourage them to participate. However, the transfers might also cause real exchange rates in the recipient countries to appreciate considerably, making some sectors of the economy less competitive. Such macroeconomic effects can be reduced if countries save a portion of these inflows, continue to improve the business environment, and, depending on their exchange rate regime, allow appreciation to take place at least partly through the nominal exchange rate rather than through inflation.

Finally, capital and technology flows can help reduce the costs of mitigation by helping allocate abatement to the least costly destinations while making abatement easier to achieve through the use of modern technology. And initiatives by major advanced economies to subsidize the transfer of clean technologies to emerging and developing countries can usefully complement a global commitment to contain carbon emissions through a broadly accepted global carbon-pricing framework.