

## How carbon cutbacks will affect the economy

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To prevent severe climate change, greenhouse gas emissions must stabilize in less than 10 years and then be reduced by 80 percent or more by midcentury. Some people say the costs of such actions will devastate the economy. Others say cutting emissions before the problem becomes extreme will have moderate costs or may actually benefit the economy. Whom should we believe?

Having managed a number of environmental policy economic assessments over the years, I know that the assumptions one makes at the start shape the conclusions reached at the end. Follow the assumptions, and you can usually predict the outcome.

Robert Repetto, an economist working with the Yale University School of Forestry, recently analyzed thousands of policy simulations from 25 economic models being used to predict the economic impacts of reducing U.S. carbon emissions. The analysis found that seven key assumptions account for most of the differences among the models in their predicated outcomes.

The key assumptions built into assessments that predict modest economic liabilities, or even benefits, include:

Left uncontrolled, climate change will damage the U.S. economy.

The U.S. economy would adjust efficiently to higher energy prices caused by emission reductions.

If the United States adopts a national policy to limit emissions, it would use international carbon trading mechanisms to reduce costs.

Once fuel prices rise high enough, renewable energy such as wind and solar energy will become economically competitive with fossil fuels.

Limiting emissions will produce ancillary benefits, for example, reducing economic damages caused by other air pollutants such as sulfates and fine particles.

Higher fossil fuel prices will trigger innovation that will increase energy efficiency and make renewable energy less expensive.

Either in the form of a carbon tax or auctioned sales of emission permits, policies to reduce emissions will yield government revenues that offset impacts on the economy.

Assessments that predict widespread economic harm from emissions reductions tend to be based on a contrary set of assumptions:

The United States will not be damaged by climate change.

The economy would not efficiently adjust to higher energy prices.

The United States would forego international trading mechanisms and instead pursue emission cuts on its own.

Renewable energy sources will become increasingly more expensive as their use increases.

Emissions reductions will not have ancillary benefits.

Technological improvements will not increase as a result of higher prices.

Government will not see increased revenues — or if it does, these revenues will not be used to offset economic impacts.

Given these assumptions, it should be no surprise that different studies produce widely divergent predictions. The first set of assumptions is based on the view that the U.S. economy is dynamic and adaptive, and that engaging with the international community will help everyone reduce the costs of cutting emissions.

The latter set of assumptions assumes the economy is languid and inflexible, and that the United States should not work cooperatively with the international community.

I'll leave it to you to decide which assumptions make the most sense.

The most important finding of the Yale study is that even under the most adverse assumptions, the U.S. economy would continue to experience strong growth even as greenhouse gas emissions are reduced. Under the more positive assumptions, the U.S. economy would expand even more rapidly if emissions were reduced than if no cuts were made.

In other words, no matter what assumptions are used, the economy will continue to grow.

This finding is consistent with the conclusions of an economic team led by Nicholas Stern, former chief economist of the World Bank, that found that if we act quickly the “costs” of resolving global warming would be about 1 percent of future annual gross domestic product. The global economy has been growing at about 4 percent each year, so this means that fighting global warming would still produce a 3 percent growth rate.

Stern found that waiting until global warming becomes acute, on the other hand, will substantially raise the costs of fixing the problem. And not acting would cost between 5 and 20 percent of global GDP each year, now and forever.

Certainly, there will be winners and losers in the transition, but don't let the economic doom-and-gloom arguments confuse you. Acting quickly to cut emissions will not cause the economy to shrink. To the contrary, reductions are vital to continued

economic wellbeing.

At the Yale Study Web site, you can plug in your own assumptions and see the results: [www .climate.yale.edu/seeforyourself](http://www.climate.yale.edu/seeforyourself).

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