Chapter 13: Final Comments

WILLIAM NORDHAUS:

I very much enjoyed the comments. I learned a lot, as I always do, from this very talented group of people. And as far as Jeff Sachs is concerned, one of the things I've learned over the years, following him through wage and price rigidity, Russian reform, hyperinflation, development, debt crises, and now the earth, is that he's almost always right. The other thing I've learned is that Jeff engages in what you might call aspirational economics, and so, while I might not agree with all of his redefinitions and recalibrations, I think his are reasonable goals. We've been interchanging on this now for a couple of months, and I've learned a lot.

WILLIAM CLINE:

First let me take up a statement that Jeff Sachs made. I think he essentially said that there's really not that much difference among estimates of the carbon tax. I think there's quite an extreme difference. The Stern Review, my analysis, and Jeff's own diagnosis all come up with about the same number for what the carbon tax should look like in the fairly near future, and that's $25 to $30 per ton of carbon dioxide, which is about $100 to $120 per ton of carbon. While Bill Nordhaus and Rob Mendelsohn may have raised their estimates, the last time I looked, their optimal carbon taxes were much lower. Bill had $20, which is a lot lower than $120. And Rob had an even lower figure, I think, of $1.1 rising to $10 over 50 years or so. So, there is a difference. I don't think that difference should be lost sight of, and I think it's important to reach a view on what's the right way to go.

Second, as regards the Stern Review, I continue to be uneasy that more than 95% of the damage-avoidance benefits are not felt until after 2200. I guess by implication Nick is comfortable with this?

SCOTT BARRETT:

I don't think the biggest issue is deciding *what* we should do about the climate change problem. I think the bigger challenge for the world is, once we've decided what

we want to do, *how* do we do it. I think this challenge is greater than any the world has faced before. Because the need is to transform technology worldwide when the market wouldn't want to do this on its own.

I think those global institutions that were established after World War II have really been neglected. If you don't use them and you don't believe in them they start to fall apart. But I draw hope from an agreement on protecting the oceans from oil pollution, whose first negotiations began in the 1920s. The first such agreement was actually reached in the 1950s, 30 years later. That agreement never entered into force because no one could see how it could be made to work. Then a new agreement was negotiated in 1973. That also was not going to enter into force until finally, in 1978, a totally different approach was tried, which began with a unilateral policy by Jimmy Carter. That approach has worked extremely well, and the agreement has been revised over and over again, most recently to require double hulls for oil tankers.

So, when I think about climate, I would share Jeff Sachs's ultimate optimism.

JEFFREY SACHS:

I think we all agree that there are two big issues for policy design.

One is R&D, because climate change is intrinsically an issue about technological change—not only about technology adoption, but introducing new technologies. And we know that that is a very rich institutional environment because of the public-goods nature of knowledge. Remarkably little real effort is being made right now to design decarbonized energy systems. In the US, every recent State of the Union address has paid lip service to the need but the actual level of effort is tiny. So, there needs to be a significant scaling up of research and development funding. And how to do that effectively is a very practical issue where both theory and the nitty-gritty details are helpful.

The second issue for policy design is that cap-and-trade is the dominant mechanism for getting a price of carbon into the market. This issue is raised by the Stern Review, but I have reservations about what seems to be the great momentum that cap-and-trade has acquired. I worry that cap-and-trade gives no signals for the future that are at all adequate, and I'd much rather have a tax and a price that's set for many years to

come. What's interesting about the carbon price is what it's going to be in 15 and 20 years' time, not what it is today. The carbon price has a big impact on the kind of power plants that get built. In the United States, it gets incorporated into the prospectuses that go to the state regulatory agencies for the utilities, for example. The utilities have to justify why they're going to invest in an IGCC plant that captures carbon versus not, and that justification has to do with the prices they expect to face. They're going to argue that today's price on cap-and-trade is the one they're going to use to differentiate a carbon-capture plant from one that's not. But that won't work. We need longer-term signals, and I don't think we've done a very good job of thinking about that.

We have three kinds of instruments for influencing emissions. Two of them are similar: taxes and cap-and-trade. We know that under certain conditions these are the same and under other conditions they're related. The third is standards. Economists don't like standards, but I think standards are going to play a very important role here. How much carbon is emitted—say how many tons of carbon per quad of energy produced in a power plant—is going to be the kind of standard that will be adopted, just as we have fuel efficiency standards for automobiles. What are the cement, the steel, the power industry going to do in terms of industry standards? It's pretty clear that this is a part of policy design that we need to think much more about.

A further policy issue is that the whole damage and adaptation side is miserably underrepresented. Mitigation is fun, clean, and not so site-specific (except that, say, in windy places you can put up wind turbines and in sunny places you might do concentrated solar power). But adaptation is very, very site-specific. It's deeply ecologically based. It depends on characteristics of local hydrology, precipitation, topography, and 100 other very basic things: crop type, climate system, and so forth. It's very complicated and nobody has really done very much about it. We don't have good practice in climate management, even in responding to climate variability, El Niño variability—even things where there is a known signal. Poor countries in the line of fire just wait. They do very little adaptation to begin with. El Niño hits, and then they have floods and disasters. At least in my experience there are hugely nonlinear social effects from such events, just as there are hugely nonlinear ecological effects. Societies may collapse when climate change goes above a certain point. You get a bad harvest, the

banking system fails, the government falls, and you end up getting a huge multiplier in the social consequences from what looks like a moderate ecological or hazard shock.

Part of the reason why nobody has really gotten started on adaptation is that until very recently we have had too little detailed climate knowledge to allow us to make downscaled projections. There are certain things we could do on adaptation even without downscaled climate models; for example, we already know that the Himalayan snow melt is going to cause huge changes in water supply on the Indian subcontinent. But a great deal more needs to be done.

I would also make two interconnected practical points, which are my favorites and not always so well received. One is that intrinsically this is a cross-disciplinary topic and the work absolutely should proceed in cross-disciplinary teams, and universities should support all of us to be able to do that better. Mechanisms ought to be created so that engineers and climatologists and economists and public-health specialists don't just talk to each other at meetings, but actually constitute teams for targeted output.

The other practical point is that practice and theory are inextricably linked in this case. This is, again, sometimes a minority opinion within universities, but I would advise faculty and students to get out there and advise a government on its actual negotiations in COP 13 (the Conference of the Parties of the UN Framework Convention on Climate Change). Take on a real challenge, learn how incredibly tricky it is, be told, "yeah, we know the theory stuff, but here's our real problem….", and start getting deeply into the nitty-gritty of it. And doing this will also open up a whole theoretical world that I believe we often miss.

So, I think that on the climate change issue, theory has been hugely important, and what Bill Nordhaus started us on quite a long time ago remains essentially how we think about the issue today. But at this point it's really the facts that count. It's the detailed knowledge that we ought to be discussing, not the overall framework.

ERNESTO ZEDILLO:

Thank you. We have a time restriction, and I had to take a decision between allowing audience members to speak and ask questions or to listen, as we have, to our

panelists. And, as you see, I opted for the second. So I will just ask for a final comment, and then proceed to close the meeting.

NICHOLAS STERN:

Thank you all very much. That's the most important comment. I've learned a lot today, and I've enjoyed today, and I've enjoyed the interactions with members of the panel over these last months and years, so thank you. Thank you, Ernesto and Haynie and everybody who put all this together.

Bill Cline raised a question on the weight in the far end in our calculations in the Review—that is, the finding that most of the damage avoidance benefits are not felt until after 2200. My suggestion would be to raise the value of η (the elasticity of marginal utility) a bit. If η goes up from one to two, then the proportion of damage-avoidance benefits that comes from the far end falls to about 11 percent. Bill, you and I seem to be settling on η equals 1.5 or thereabouts. I'll be with you on that. And that calculation still yields the result that the damages are much bigger than the cost of action.

Finally, I'll tell you what I'm going to do. I'm going to work on the kinds of problems a number of people raised on adaptation and the importance of looking at adaptation in a particular place, and, similarly, the problems of moving to a low-carbon technology in a particular place. And the particular place I'm going to work on is India because that's where I enjoy being, and that's a country that is vital to this whole story. Thank you.