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(mostly) environmental economics

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#MeetTopEnvEcon – Robert Stavins

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Robert Stavins

Professor of Energy & Economic Development at John F. Kennedy School of Government, Harvard University, USA.

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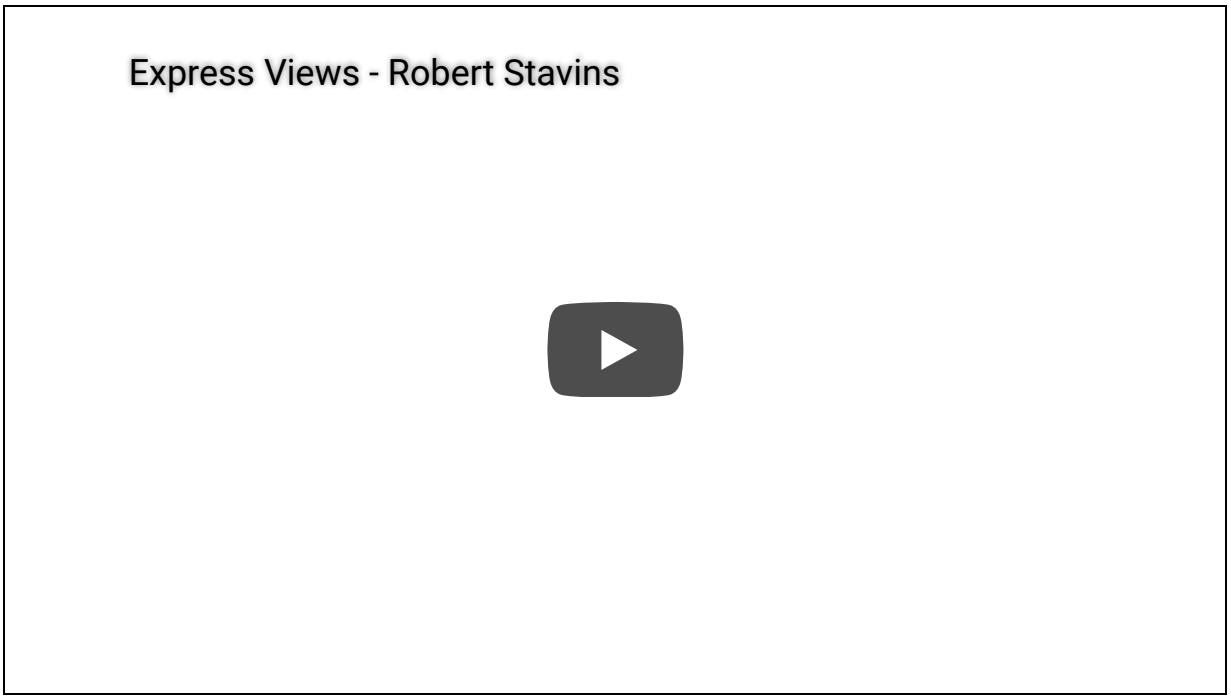
It provides me with a great pleasure to present to you Professor Robert Stavins in the *Meet Top Environmental Economists* interview series. Robert is a Professor of Energy & Economic Development at John F. Kennedy School of Government, Harvard University, in the United States. He published more than 100 scientific articles in journals such as the *American Economic Review*, *Quarterly Journal of Economics*, *Science*, *Nature*, or the *Journal of Environmental Economics and Management*, and has edited a larger number of books on climate policy and regulation. Rob has also advised an impressive long list of international and national organizations, governments and companies. He is also the author of the blog "An Economic View of the Environment", which I suggest everyone to take a close look at. It always contains interesting discussions and valuable insights.

As the interview shows, Rob took – for a professor in economics – a somewhat unusual career path: after studying he worked for quite some while for the US Peace Corps in rural Sierra Leone, and only upon his return he went into full-time academia. He wrote a number of seminal articles on technical change, innovation and energy efficiency that are on the reading list of every good graduate course, and was also one of the lead authors of the 2014 IPCC report. He has helped shape environmental economics during the past years like few others have, and the insights in his articles are always worthwhile to keep in mind.

Here is the **video of the Express Views interview**:



Express Views with Robert Stavins

Here is the **podcast version of the Express Views interview**:

0:00 / 7:59

Podcast: Express Views with Robert Stavins

And now I am very happy to present you the **Meet Top Environmental Economists interview**:

(Date of interview: December 2021)

(download interview as pdf)

Could you let me know about your background and what motivated you to become an environmental economist.

I took what may be a strange route: rather than having an interest in economics and then coming to environmental economics, I had an interest in environment and then came to economics. My undergraduate work was in philosophy and in astrophysics, and when I graduated, I immediately joined the US Peace Corps. This is a government agency that sends thousands of young people a year, usually right out of college, to developing countries to work on the ground on very practical projects. I worked in Sierra Leone in West Africa on paddy rice development. Living in Sierra Leone, I witnessed for the first time, not in a formalized way, not theoretical, just with my eyes and ears, the trade-offs between economic development and environmental quality. When I left the Peace Corps, after about four and a half years, I spent a year developing irrigation in Israel.

I then came back to the United States and I decided that I wanted to work not on philosophy, but on something where I could really make a difference because I had been inspired. I wanted to work on economic development. I started out in graduate school at

Cornell to work on economic development, but then something happened: there was a very prominent nuclear accident in the United States, at Three Mile Island. That got me very interested in environment, and so I decided that rather than working on economic development, I wanted to work on the economics of an environmental issue. After my master's degree program at Cornell, I went to the University of California to work on an environmental economics research project, which was on the use of herbicides in commercial forestry.

I knew that I wanted to do something further and more activist. I eventually joined the Environmental Defense Fund, which is an advocacy organization. But while I was there, I became frustrated by the fact that, without having the certification of a PhD degree, I was limited in what I could do in terms of testifying, authoring things, et cetera. So it wasn't that I wanted the knowledge that would come with a PhD degree, I just wanted the certification. And so I applied to programs and I decided to accept an offer of admission at Harvard University into the economics department. I came into Harvard with this strong interest in environmental economics, but at Harvard, there was really no such thing as environmental economics.

I got my PhD in economics, specializing in econometrics, and then wrote a dissertation in environmental economics. It was on the unintended consequences of particular government policies of the depletion of forested wetlands in the United States. I then had an offer to become an assistant professor at the Kennedy School of Government. And I accepted that offer.

How did you feel, was it difficult for you to do this step from philosophy to economics?

It was a gradual process, and it wasn't difficult because something that was true about me, beside the fact that I did a bachelor's degree in philosophy, is that I was sort of strong in math and interested in mathematical approaches to things. So after Peace Corps, when I came back and decided to enroll in the Cornell master's degree program, it just fit me like a glove. It was very natural because suddenly I could study more mathematics and apply it to something I cared about.

After all these, let's say, hands-on work that you did in Sierra Leone, how difficult was it for you orto get back into academia? And did you actually see any use in academia after you had all these practical experiences?

It was difficult more broadly to reintegrate into US society after living in a small, mud hut in a tiny village in West Africa, no running water, no electricity, no one speaking English or any other European language. So the readjustment to the Western world was as difficult, if not more difficult, than what my adjustment had been four and a half years earlier to living in the tribal society in Sierra Leone. But after that, what eventually became reintegrating into the academic world, it was again a gradual process because of Cornell. My master's degree was very professional oriented, it was a terminal master's degree. So, if it's not an oxymoron to say this, it was a master's degree that was not heavily academic. But then when I came to Harvard, that was a significant adjustment because that was very much a conventional PhD in economics.

I found what happened to me, for better or for worse, is that I became socialized. And so, although I came in simply wanting to get certification, to finish as quickly as possible, go

back to the Environmental Defense Fund to do my advocacy work, what happened is that I became socialized into this new academic environment, and because I did well in the program, I internalized the thinking of my faculty mentors: if you can become an academic, when you finish the program, then that's what you should do. That's what the "cream of the crop" does. And I came to believe that, for better or for worse. And so, although in my first year it was clear that I justed wanted to get my degree and get out, by my fourth and fifth (final) year, it was clear to me that I wanted to take an academic route.

Are you happy about this or do you sometimes believe that the more hands-on version would'vesuited you as well, and allowed you to do more?

That's a great question, but the honest truth is that I've never regretted it for a single moment. I also had an offer to stay as an assistant professor in the Economics Department at Harvard. That I might have regretted because I would not have been able to do, at least not successfully, the kind of work I wanted to do. But at the Kennedy School, which not only celebrated primarily my academic research (I wouldn't have gotten tenure without it), my first Dean, Graham Allison, and subsequent deans up until the present, took very seriously what I refer to as outreach work. Working in the real world, whether it means testifying to the US Congress, working in the US administration, working in the Intergovernmental Panel on Climate Change or the United Nations, any of those, that's taken very seriously and celebrated for faculty members at the Kennedy School.

Let's talk a bit about what you achieved, focusing on your own personal view of which academic or policy contributions you are most proud of.

I suppose for what academic contribution I'm most as proud of, I'd probably always say my most recent one, but I actually believe this. I recently wrote an NBER working paper, different parts of it are coming out in different journals. That took a what I think is a neutral approach to assessing the two key carbon pricing instruments, carbon taxes and cap and trade. I say this because back in approximately 2007, I was asked by what's called the Hamilton Project at the Brookings Institution: "We would like you to write a proposal for a cap and trade system." And this wass for what would be the new incoming administration of Barack Obama, a Democratic administration, because the Hamilton project is geared toward moderate market-friendly Democrats. And I responded, "No, I don't want to do that. What I'd like to do is to write a paper, which is on carbon taxes and cap and trade. Both of them, the two carbon pricing instruments, and show the similarities and the differences, because that's the way I teach it in class."

And they said, "No, that's not what we want. We're going to find someone else to write the proposal for a carbon tax." And that turned out be my friend Gilbert Metcalf of the Tufts University Economics Department. So they told me "we want you to write the strongest proposal you can for the cap trade system." So I did that. And in the process of doing that I came to be perceived, and to some degree became, an advocate for cap and trade. Years later, namely in about 2019, when an opportunity came up from the National Bureau of Economic Research to submit a proposal for the first conference they were doing on environment and economics in Washington, I submitted a proposal for what I wanted to do in the first place. And that is to step back, take an unbiased view of these two instruments, both normatively and in terms of positive political economy, compare their merits, and compare what the outlook is for each. And so that's what I did in the NBER working paper, which is available at my website.

One part of that paper is coming out in the *Review of Environmental Economics and Policy* on purely the normative aspects. And then with Jeffry Frieden in the Government Department at Harvard, which is our Political Science department, I'm co-authoring an article on the positive political economy of these two instruments.

In terms of contributions to policy it would be the same one, it would be the paper I did for the Hamilton Project in 2007. The reason is that it turned out to be the starting point during the transition for the first term of the Obama administration for its proposal for a national cap and trade system in what came to be called the Waxman-Markey Legislation, which passed the House of Representatives and then never got a vote in the Senate. But the fact that I contributed to that very important legislation to that degree, I still take great pride in.

I'm surprised that you didn't mention one of your most cited publications, the one in QJE on innovation.

I love that paper and there are others. I mean, I could also, in terms of where they appeared naturally, I'd gravitate towards the several articles I've had in the *American Economic Review*, that one in the *Quarterly Journal of Economics*, the *Journal of Economic Literature*, the *Journal of Economic Perspectives*, and other journals. And I guess actually that *QJE* article, which is together with Adam Jaffe and Richard Newell, Richard now being president of Resources for the Future. I put in that plug because he was my first PhD student and also I'm on the Board of Directors of Resources for the Future. So that article has been highly cited, it still gets cited quite a bit whenever someone is writing about the so-called energy paradox or energy efficiency gap, and I recall that it won an award from the Association of Environmental and Resource Economists for a "publication of enduring quality" or some such thing.

Let's go back to that later. In your line of research, what would you say should be a list of articlesthat young researchers should have read?

Well, if it was in environmental economics, then what I would want them to read are the latest articles that have come out, that are sort of pushing the frontiers, and this will be work by Michael Greenstone, and other lead young people in the field. I would also want them to read some of the fundamental articles of the field. And for that, I would go back to, for example, within the regulatory area and environmental policy, to Marty Weitzman's "Prices versus Quantities," because it's a remarkable article that he wrote mainly having in mind the choice in centrally planned economies between controlling prices, dictating prices to the factories, or dictating quantities to the factories. And it has turned out to be incredibly important for regulatory economics. It's a marvelous article. I would place that very, very high on the list.

What would you say to a policymaker without their technical backgrounds? What book should they read or what journal article should they read to get the information that they need?

Well, if by policymakers, we mean staff, so not the elected officials, for example, in the US Senate or the US House of Representatives, but the staff who work for them, then, on climate change policy, I would recommend two relatively recent books that came out at the same time, and both are really excellent. One is by Lawrence Goulder from Stanford and Marc Hafstead from Resources for the Future: Confronting the Climate Challenge. It's on carbon pricing, and utilizes their CGE model in order to analyze alternative climate change

policies. The other is Gib Metcalf's book, Paying for Pollution, which contains more advocacy and more of a strong policy perspective. He argues in favor of a carbon tax, which he sees as clearly superior to a cap and trade system. Whether or not I agree with him, doesn't matter. It's an excellent book, and I recommend both of these, because in both of these books, there's virtually no math and the little math there is you can read around and still get all of the essence.

You have worked in environmental economics and in policy in regulation for a long time now. How do you perceive the field has changed and what are the most important new developments?

I got into the field in the late 1980s when I got my PhD. The field has grown immensely; for example, there was no such thing as environmental economics at Harvard. When I entered the economics department, environmental economics in the United States existed only within what are referred to usually as Departments of Agricultural and Resource Economics. Now, that's completely changed, it was a gradual change over time. It was accelerated by interest in climate change, which brought greater interest to environmental economics. And so environmental economics has gone from being a very small, very peripheral subfield of economics, to a major area of work in economics. Likewise, at the same time, we went at the National Bureau of Economic Research from not having any kind of a program in environmental and energy economics to now having a program which I believe in the Summer Institute is the largest of all the programs.

If we went back to looking at Job Opportunities for Economists, which is published by the American Economic Association, and you look for positions in environmental economics, when I was on the job market in 1988, there were at best a handful, if that. There may have been zero listed as such, and now it's a very substantial job market, and in fact it's one of the best job markets. I always tell our PhD students at Harvard that you shouldn't worry about getting a job, you'll be able to decide among job offers and where you want to live and what kind of work you want to do. So that's been a huge change. It's also gone from being theoretical in the US to much more empirical.

My casual observation is that European environmental economists tend to focus more on theory than US ones do. In the US, it's highly empirical, so that's brought in all sorts of pathbreaking and new methodologies. The wonderful thing about environmental economics is that it brings challenges to economics, because of the global commons nature of the problem, and because of this breathtaking, inter-temporal asymmetry of upfront costs for policy compared to delayed benefits because of the stock nature of carbon dioxide in the atmosphere. It brings challenges to benefit-cost analysis. And that means that the research has not only been good for environmental economics, but there have been positive spillovers to economics more broadly.

What I see is that a lot of empirics is being done without theory. And it seems to me that lot of these interdisciplinary programs are the cause of that.

I would distinguish between interdisciplinary programs and multidisciplinary programs. I agree with you completely, in terms of interdisciplinary programs, like the idea of a PhD in environmental studies or a PhD in climate change policy that can add up to being nothing better than three or four master's degrees. And after one master's degree, the marginal value of the following ones is close to zero in my view.

I want to distinguish that from a multidisciplinary PhD program, one example of which is the PhD program I chair at Harvard, which is a PhD in Public Policy in which students come into a track. One of the tracks is economics, another is essentially political science. We have two additional ones beyond that, but for purposes of our discussion, it's those two that matter.

Students wind up studying for what you could think of as a PhD in Applied Economics. They're required to do the first year PhD coursework in microeconomic theory, statistics and econometrics that you would do in any of those departments, and then field courses. It could be a field course in environmental economics, it could in labor economics, whatever. And then their dissertation is a three-essay dissertation. Their job market paper will be virtually indistinguishable from a job market paper that someone would write coming out of an economics department. The difference is that there are three essays we will allow – even sometimes encourage – one of those essays will take a broader political view of the problem, but two out of three would be conventional economics.

I think that's a fantastic approach. That's how it should be. Europe has much to learn in this regard. Let's talk a bit more about policy. If we talk about developments in the field, a result of one of your papers, the one in the QJE that we already alluded to, was that a sizeable portion of efficiency improvements in energy technologies appears to have been autonomous. Does this mean that there is little role for policy, or that the limited finances from policy might be better used for something else?

Well, I think the first thing it indicates is just to be modest about that or any analysis, and that we were able statistically to associate only a limited share of the change to specific policies. But that said, it's true that a substantial amount of technological change takes place separate from policies. That doesn't mean it's economically exogenous, because in any economy, energy comes at a cost. We have to pay for oil or natural gas, nuclear power, or electricity. And so there already is a baked-in incentive in a market economy for technology diffusion, therefore for innovation, and even for invention of new technologies that can deliver services at a lower cost. And that inspires technological change.

If through a public policy we can increase either the explicit cost of energy, as through a carbon tax or carbon cap and trade, or the shadow price through a conventional regulatory approach, then that's going to spur even greater technological change.

This brings me to a related question. In one of your recent papers in Science *you suggest that we should stick to the social cost of carbon. Does this mean that we should rely only on instruments such as the carbon tax, or would you also want to see other regulations put in place?*

Oh, so that's a very good question. And the answer is no, it does not mean that. What we're arguing for in that recent article – with Joseph Aldy, Matthew Kotchen, and James Stock – is the use of the social cost of carbon –an estimate of the present discount of value of the future stream of avoided damages – as a measure of the benefits of a climate change policy. But we're not arguing that governments should use necessarily a carbon-pricing instrument; that's a completely separate issue.

Now having said that, I, like most economists, would label a carbon-pricing approach as the approach which is most likely to be effective and feasible in terms of affecting the millions of diverse sources in a modern economy. I can't see us trying to hit all of those sources through conventional regulations, let alone technology standards. Those instruments also

won't be cost-effective, because the marginal cost of abatement of CO2, for example, is highly heterogeneous.

I see carbon pricing very favorably. However, in certain countries such as the United States, carbon pricing faces massive political challenges. I know it's faced political challenges and continues to in the European Union, but not to the degree I think that we've experienced here. In the US, carbon taxes are completely off the table because of the word "tax," and then cap and trade was successfully demonized back in the early Obama administration by labeling cap and trade as "cap and tax."

So, both of those are now politically unappealing, and elected officials, at least in the US, don't like to pass out costs, which is what a carbon pricing regime does. They like to pass out only benefits, and subsidies or regulations that hide the costs are much more attractive.

Thus, in my latest research I'm asking, how can economic thinking and incentives be used to improve command and control policies, to move them closer to being economically cost-effective and environmentally effective? Thus, overall, I am certainly not arguing that carbon pricing is the necessary and only way to go.

What would you say is the main reason for which there's such a difference in acceptance between a carbon tax in the US and let's say Europe?

Well, the honest answer is, I don't know. When I look at these two parts of the world, I notice a couple of things. One is the very significant difference in forms of government. Compared with the approach we have in the US, where it is frequently the case that the executive branch is controlled by one party and one or both of the bodies in the bicameral legislature, the upper house and the lower house, are controlled by the other party. And that means that we frequently see profound disagreements and the impossibility of going forward with any approach which is not acceptable to both parties. And carbon taxes, because of the fact that they place a very visible cost on society, tend not to be supported. And that's happened also with cap and trade.

So that's one reason, but there's something that goes beyond that, and I don't understand it, it's been there for a long time. And that is that some European countries, particularly the Northern European countries, particularly the Scandinavian countries, but also, I'd say Belgium, France, Germany, and then less so, as we get to the Mediterranean the Southern European countries, have just been much more accepting of the notion of using taxes to achieve social purposes than is the case in the United States, where the history of this country, as you may know, going back to the revolution in the 18th century was based in large part upon opposition to taxes. And it's still quite profound.

I agree that this kind of social inertia might be one of the major reasons. We talked a bit about what is most important in the field, we talked about how the field has changed, what future direction would you envision for the policy side of environmental economics? And what kind of obstacles would you see there?

One thing I see happening – and I hope this is not simply because that's a direction in which I'm moving – in this recent project with Joe Aldy, but I've heard it in conversations regularly with other economists, particularly colleagues around Harvard: the time has passed for environmental economists to think about climate policy only in terms of carbon

pricing instruments. We really need to broaden our perspective and to bring our expertise to other kinds of policy instruments. We need to make carbon pricing instruments more politically feasible, although second best in design, and make non-pricing instruments more effective and more cost-effective. I see that as the future now, but I want to recognize that it may be because of the psychological bias that I am already working on this.

In addition, I perceive that this trend towards more reliance on empirical work is going to continue. I think, fortunately, the obsession in economics with mathematics may have peaked. In saying that, I recognize that I got tenure because of the highly quantitative work that I did in the *AER, QJE*, and elsewhere, but I think that it peaked around that time. It peaked in the 1990s or maybe in the 2000s. And I think we're seeing more interest in work that is driven by the policy problem, as opposed to by methodological innovation alone. Now it's too soon to say whether this is also a blip or whether it's actually a trend, but I think I see it as a likely trend.

I think that one of the reasons for that is just simply the availability of all these new data sets.

That's a very good point. Yes, when I was in graduate school, if one wanted to do some work in environmental economics, one had to collect the data. For my dissertation, for example, I needed land use data in the United States. I went down to Arkansas, Louisiana, and Mississippi to the Army Corps of Engineers and got out these physical maps of the flood plains, and then I had to measure these physically and then input that into a computer.

I did the same in London where I had to go to the library to get these statistical yearbooks. And then when you go to the next year of statistical yearbook, then there would be the update for e.g. the data on GDP from the year before, which sometimes changed by 5 or 10%. It was absolutely ridiculous. You talked a bit about the students and that a lot has changed. What advice would you give if to young students who want to work in the same field?

The advice I would give to them is, for your first year, or the first two years even, try to remember why you went to graduate school, what was it that interested you in environmental economics? And in order to remember why you went to graduate school, go to a seminar every other week that's on environment, or environmental economics to maintain your sanity. But that's just to maintain your sanity, what you really need to do in those first two years is to build a foundation. And the foundation are the fundamental microeconomic theory courses. In some cases, the macroeconomic theory courses, and surely the basic courses in mathematical statistics and econometrics. Those are the fundamental building blocks. And if you don't get those building blocks down firmly, then just like any foundation, when you start building the upper stories of the construction, it's going to collapse.

So that's my first bit of advice, maintain your sanity but give your attention to what you need to do in the first years, which is purely those required courses in the PhD programs. And in the second year, the field courses in your chosen fields. But then, my advice would be in terms of the dissertation stage, which comes next, is to start with a policy problem, not with a methodology, start with a policy problem. And then search around, what's the refutable hypothesis you can specify? Is there a theoretical model that you can construct that then can be tested empirically with available data, rather than starting with the data and asking, "Okay, what question can I ask with these data?" Give yourself one chance to

start with the policy problem. But then when you're getting to the point, last bit of advice, of trying to decide, "Okay, I'm working on different things, which should become my job market paper, which at least in the US context is all important for getting the best possible post-doctoral fellowship or assistant professorship?"

You then have to think in terms of a very important concept that I think is valuable throughout life, which is comparative advantage. Think about where your comparative advantage lies, and if your comparative advantage is not theory, don't go with a theoretical paper because there are other people who are going to do that, and they're going to be able to do it better than you. If your comparative advantage is in terms of particular empirical approaches, then go with that. Or if your comparative advantage is really qualitative political economy, then go with that. It'll mean a different path going forward in terms of decisions. But if it's your comparative advantage, that's what you're going to be best off with, that's what you're going to be most successful with in your career.

That's a valuable advice, especially because lots of students don't do that. They're just following their PhD supervisors, and they're not stuck with something that they don't like and something that they might not even be able to do. You have done an amazing amount of policy work. Economists in Europe tend to have the feeling that they have a very limited impact on policy. Do you think the situation is different in the US?

Yes. I think in the US, if we make a mistake, if anything it is in the opposite direction. I think environmentally economists may think they have more of an effect on policy than they really do (Joe Aldy wrote about this recently in a paper in the journal *Climate Change Economics*. It's because there are lots of avenues that are open to environmental economists. So, for example, the Environmental Protection Agency, which is the agency of the executive branch which works most in this area, has a whole large office called the National Center for Environmental Economics, staffed by PhD economists. And they always want input. There are all sorts of task force and agencies that want input.

Also, we have a very important structure in the executive branch, which is the Council of Economic Advisors, which is giving advice to the president of the United States, from the economics community. And the Council of Economic Advisors, which has three members, those three members are tenured economics faculty on leave from their university. And then one notch down are what are called senior staff economists. And those tend to be junior economists from a faculty who are getting very close to tenure. They're also taking a leave of absence for one to two years from their university. We have this whole structure that draws academics in, and then importantly, those academics go back to their universities with a renewed sensitivity and interest in policy.

And then, of course, there's the legislature. Regularly I'm getting phone calls from congressional committees to testify. Many of my colleagues are getting even more phone calls than I do. There are lots of avenues in which economics is being brought to bear. If I can give a promotion for one article of mine, it's the one I just mentioned, which is together with Joseph Aldy. We wrote an article on Nordhaus' contributions to policy in the journal *Climate Change Economics*. In this we looked in more generic terms at how economists influence policy, whether it's directly by serving in a job like those jobs I just mentioned, whether it's because a model you developed is actually being used directly, or through more indirect means. And it turns out that our view is that the indirect means and the serving in a job, that's the way economists in general are most effective in the

environmental realm.

It is actually impressive that in the US there's a much tighter link between policy work and researchers compared to Europe. Do you have any intuition why that is the case?

I think some of it is structural. Because of the fact that you've got EPA that has this Center for Environmental Economics, that you have the Council of Economic Advisors, which since it was set up in the post World War II period, has always had economists from academia go in for a short period of time and then leave. The other one, which is both a good trait and a bad trait, is that we in the US tend to think we can do anything, extremely self-confident as people, at least in the past. That may contribute to this notion that academics think they can add something of practical value to government policy. There's a distinct lack of modesty on the part of US academics in wanting to promote their work among policy makers.

Do you know the concept of holidays, or do you take your academic articles with you to your beach?

Well, before I had tenure, to be honest, I thought I just had to work on my research constantly, as much as possible, at all times. And for that reason, because of that pressure, partly internalized from the process, I did work all the time. Post-tenure, I find that, although I usually will not work after dinner on any day of the week, I find that I still work on weekends on Saturdays and Sundays, but it's not because of external pressure, it's because I want to, I find it interesting and enjoyable. So when we go on vacation, to tell the truth, I always take my laptop computer.

Could you suggest someone else who you would like to see in this series of interviews?

I would think that for a very interesting discussion, my colleague, Joseph Aldy, because in addition to doing scholarly research at Resources for the Future, and more recently at Harvard, has also spent very substantial time in government. He was the Special Assistant to President Obama for energy and climate, and was really on the inside of the corridors of power in this area. So he would be a very interesting person. Another superb candidate would be Professor Ottmar Edenhofer of the Technical University of Berlin, the Potsdam Institute, and the Mercator Research Institute. He's great. And speaking of academic economists who are closely involved in real-world public policy, there's no one in Europe who better personifies that than Professor Edenhofer.

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