

Decarbonizing Economics

Interview with Peter Christensen

by Thomas Vendryes

While public authorities currently seem to prefer to use incentives rather than constraints to reduce greenhouse gas emissions, economists are developing increasingly effective tools to measure the effectiveness of these policies.

Peter Christensen is an applied microeconomist and studies how public policy and technological interventions can be used to improve social and environmental outcomes in cities around the world. He dedicated his 2023-24 fellowship to experimental work on behavioral mechanisms underlying the impacts of decarbonization strategies in the transportation and buildings sectors and the development of an evidence base that can help guide policy decisions on equitable climate policy. Christensen is an associate professor at the University of Illinois, Urbana-Champaign. He directs BDEEP, a research team that combines data science and economic methods at the National Center for Supercomputing Applications. He is a Faculty Research Fellow at the National Bureau of Economic Research and a faculty affiliate with the Poverty Action Laboratory (J-PAL).

Books and Ideas: How can economists help us deal with climate change?

Peter Christensen: The first thing I would say about this is that climate change is a big and complex problem, of course. Our paths to mitigating greenhouse gas emissions, potentially getting to net zero emissions by mid-century, is an absolutely

enormous challenge. The science is changing all the time. And this is really going to require and has required, an interdisciplinary effort.

Policies are being made around the world. We need to rely not only on ex-ante projections of the types of policies that will get us potentially to net zero and cost-effectively reduce emissions, we also need to true up those policies using ex-post evaluations. The way to really think about that is we need a guide. We have to understand what portfolio of policies and programs to implement. But then, since many of these programs are completely unprecedented, technologies are changing all the time, and of course, we have human behavior at the center. We then need to follow up as policies are being implemented and programs are being rolled out, and evaluate them very carefully to be able to understand, especially in this early phase with very significant investments being made, which are the most cost effective? What are their distributional impacts, within the US and around the world? How are they being implemented in ways that are equitable? So that we can refine the portfolio of policies and programs through learning over the next couple of decades. Economics is really at the center of the evaluation part. It's not the only field that is working on this, but thanks to some very significant methodological innovations over the last couple of decades, we now have the ability for the first time to rigorously and credibly develop an evidence base that can guide policymaking.

Books and ideas: Which criteria are used by economists to assess climate policies?

Peter Christensen: The primary efficiency criterium that economists are using to evaluate climate policies currently is their cost-effectiveness. Without getting too much into the weeds here, we want to be thinking about the value of reducing greenhouse gas emissions in terms of avoided future damages. And we want to compare that to the level of spending on a given program. And since we have lots of different potential programs that can be implemented to increase the adoption of a whole range of technologies, change the behavior of firms, households and individuals that are interacting with the economy, and actually restructure the global economy. We want to be comparing different types of approaches on the basis of this sort of basic cost-benefit criteria.

Books and ideas: What incentives could make these policies more effective?

Peter Christensen: There is an evidence base that, is growing, and growing very rapidly right now regarding the impacts of incentive based programs, of market based instruments, of nudges, as you say, what we really need to understand, though, is not just the types of programs and policies and interventions that lead to small, marginal changes in terms of greenhouse gas emissions reduction, but those that lead to very large changes.

However, given such a complex problem, we really have a need to go out and take an experimental approach. There is going to be many policies and programs that are developed on the basis of relatively little information, because the energy transition, by definition, is going to lead us to places that are outside the sample, outside our ability to predict within our standard models. This is true for the labor market, this is true for technological innovation, and this is true for understanding damages from climate change.

Books and ideas: What can your tools reveal about climate policies?

Peter Christensen: We do now have a suite of tools that we simply didn't have two decades ago. And in my view, and I think in the view of many of those who are both developing the tools and applying them, this is transformative. I like to use the metaphor of the microscope in developing the microbial theory of disease. We're able to actually, now, implement a policy or decarbonization program, and directly attribute the emissions reductions to that particular program. In other words, we can disentangle the impacts of one particular program from lots of other trends that are simultaneously affecting greenhouse gas emissions around the world, production and consumption activities that are leading to those emissions. That is extremely powerful, because when we're able to make that direct attribution, rather than, implementing a policy and then simply looking at the trends in emissions, we're able to understand what is working, what the specific magnitudes of the response are. We need to understand the magnitudes, because we need to understand how close we are to achieving our targets and commitments under, for example, the Paris Climate Accord. Different countries who are acting in this space, who are making very substantial investments to reduce emissions and decarbonize their economies, absolutely have to be able to make a direct attribution between the programs that are implemented and emissions reductions that are achieved. That, we simply could not do it rigorously 20 years ago. Today, we can do that.

One additional element here that's very interesting, and where I see a lot of potential, is the relationship between measurement tools and methods that are being

developed, for example remote sensing using satellite imagery, extracting data from mobile phones, digital markets where producers and consumers are revealing information about preferences, revealing information about behaviors, our ability to measure the emissions from all the cars on the road or the transportation fleet. There has been a sea change in our ability to do measurement over the last couple of decades

Books and ideas: How to improve the collaboration between economists and policymakers?

Peter Christensen: In this phase of addressing the climate problem, where we're rolling out many programs on much larger scales than we have been before, and where we simultaneously have to learn really rapidly, we're moving up the S curve in terms of our ability to decarbonize the economy. That means rapid learning. That is going to depend on the effectiveness with which we can collaborate between policy and science. What that actually looks like in practice depends on the particular question at hand and the community that's involved. But within my area of research, what this really looks like is partnerships that allow researchers to get involved at the early stages of policy design, and implementation, so that we can begin to measure and evaluate the effectiveness and the cost-effectiveness and a variety of different impacts of that policy as it's being rolled out, and provide information. That allows policymakers to then potentially refine or test their own ideas or our ideas about how to intervene to make it more effective.

So another thing I would say here is that we're still learning how to collaborate effectively between policy-making and scientific evaluation. It's challenging. It's challenging because, many times, incentives aren't necessarily aligned, timelines aren't necessarily aligned, training is not necessarily aligned. These are things that make us complementary, and create strong complementarities in our partnerships. But they also create a lot of behind-the-scenes work, to be able to engage effectively in collaboration.

Sometimes people ask me about how optimistic I am, based on the level of understanding things that economics has developed, as well as other fields, in terms of what might work or might not work and achieving emissions reductions at low cost and moving us forward in the energy transition. What I would say is that there are real reasons for pessimism, and there are real reasons for optimism. It's early. We, of course, don't have a ton of time, we don't have the ability to spend two more decades waiting around to see what happens, so as I think it's true of any other critical problem, it depends on the particular moment and aspect of the challenge, that might lead to a

moment of pessimism or a moment of optimism. But I will add, I will absolutely say that from the perspective of somebody who is involved in the science of evaluation, what we have been able to develop over the last two decades and the position that we are in now in terms of measurement and evaluation and conducting credible research, to understand the direct and broader impacts of climate policy is just stunning. It's absolutely stunning. It gets me up every day, primarily because I care about the problem, but also because it's an area of intense innovation that many of us are extremely excited about. We have a huge opportunity here. You know, like many people, listening to or watching this, I am right here and excited to see where this goes tomorrow and next year and, over the course of my professional lifetime, we'll all be doing this together.

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