

BY MATTHEW WELLS

Climate Change and the Economy

Richmond Fed senior economist Toan Phan has spent the past decade exploring the economics of climate change. His research in this area began as he was finishing graduate school in 2012, when he was struck by the potential economic implications of climate-related disasters like flooding and hurricanes. So, along with colleagues Riccardo Colacito of the University of North Carolina and Bridget Hoffmann of the Inter-American Development Bank, he began a project to understand the relationship between increasing temperatures and economic growth. The resulting article, “Temperature and Growth: A Panel Analysis of the United States,” garnered a great deal of attention from economists, the business world, and policymakers, as it showed that increasing temperatures throughout the United States are associated with reduced growth in the service industry and other sectors that comprise a significant portion of the economy, not just in agriculture as was previously thought.

The Fed has long sought to promote the stability of the financial system, and research initiatives like Phan’s seek to identify potential threats to that stability. As another example, Phan points to a growing research literature in climate finance documenting that financial markets have started pricing in transition risks, or the additional exposure to environmental regulations among carbon-intensive industries, potentially reducing the price of fossil fuel assets.

In other research, Phan recently partnered with Hee Soo Kim and Christian Matthes, both of Indiana University, on a working paper documenting that current extreme weather and climate-related natural disasters reduce the growth rate of industrial production while increasing unemployment and inflation in the United States, not just in developing countries, as had been suggested in earlier literature. He also has a working paper co-authored with Ranie Lin of Rice University and Lala Ma of the University of Kentucky indicating that minority populations in the United States are more worried about environmental issues, including global warming, than their nonminority counterparts, reflecting the potentially unequal effects of environmental problems across socioeconomic groups.

Phan’s work is part of a broader effort at the Fed and beyond to better understand climate change’s potential effects on the economy. The System Climate Network, an informal network of several hundred economists, bank supervision staff, and others within the Fed, has taken root with the aim of sharing ideas and research that will

further the Fed’s ability to understand the potential effects of climate change and climate risk on the financial system. Phan explains that “it felt very natural to be a part of this ecosystem,” noting that among other activities, he organized a virtual climate change economics conference at the Richmond Fed in November 2020. That same year, he and Glenn Rudebusch, Òscar Jordà, and Stephie Fried of the San

Francisco Fed and Michael Bauer of the University of Hamburg started an ongoing series of virtual seminars, where presenters explore a myriad of topics in climate economics and finance, including the implications of climate change for infrastructure planning, ways to measure the social cost of carbon dioxide emissions, and potential adaptation and mitigation policies including carbon taxes. Phan is also co-editor of the Fed’s System Climate Forum, an internal resource for Fed researchers working on climate issues.

There is also an emerging consensus among financial regulators that solving a global problem like climate change will require global cooperation. In late 2020, the Fed joined the Network for Greening the Financial System, an international group of over 100 central banks and bank supervisory agencies founded in 2017. Its goal is to improve the global financial system’s ability to manage the risks associated with climate change

through the sharing of ideas, best practices, and research by economists like Phan.

When reflecting on what’s next in climate economics research, Phan stressed that the field is young, and there is no shortage of questions to be answered. In particular, he pointed to ongoing efforts to put a monetary cost on each ton of carbon dioxide or greenhouse gas emitted into the atmosphere. He also is currently drafting a paper with Russell Wong, a Richmond Fed senior economist, and Laura Bakkensen of the University of Arizona that examines the effect of sea level rise on the mortgage market, a market that he views as an “elephant in the room” when it comes to the climate’s effect on financial stability.

Phan is also working with a group of researchers drafting the Fifth National Climate Assessment, a congressionally mandated report summarizing the rapidly growing research literature on estimating the effects of climate change in the United States, now and in the future. It will be up to policymakers to decide whether and how to act on the findings in the report, but Phan and his colleagues will continue to conduct research with the hope of shedding light on this complex and dynamic relationship. **EF**

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