The Mansueto Institute
Lunch Colloquium Series

A Social Cost of Carbon for Global Energy Consumption

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The global marginal damage caused by emitting a single ton of carbon dioxide CO2, or its equivalent, is key to climate policy, but our current understanding of its value is based on spatially-coarse theoretical-numerical models that are not tightly linked to data. We develop the first architecture that integrates best-available data, econometrics, and climate science to estimate climate damages worldwide at the local level, as well as aggregated global marginal damages. Here, we apply this architecture to construct the first global empirical estimates of the impact of climate change on total non-transport end-use energy consumption. In 2100, we project global electricity consumption to rise roughly 4 EJ for each 1C increase in global mean temperature, reflecting increased cooling demand, while consumption of other fuels declines 10.1 EJ per 1C, reflecting reduced heating. Together, these estimates indicate that emission of 1 ton of CO2 today produces global net savings in future aggregate energy consumption of about $1 in net present value (3% discount rate). This finding is largely driven by the fact that for most of the 21st century, much of the world is expected to remain too poor to increase energy consumption in response to warmer temperatures. By end-of-century, emerging economies in the tropics (e.g. India) are projected to increase electricity consumption dramatically, but these rising costs are offset by heating reductions in the wealthy economies of North America and Europe.

Thursday, March 5
Searle Chemical Laboratory
Suite 240A
12:00 - 1:30pm
Lunch will be provided

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