



## Which Social Cost of Carbon? A Theoretical Perspective

Harvard Kennedy School Energy Policy Seminar Series, Spring 2017

Monday, March 27, 2017

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Speaking just a day before President Trump's executive order calling for abandoning the Clean Power Plan and revising the estimate of the social cost of carbon and its use in government cost benefit analysis, Yale professor Matthew Kotchen argued that there is a need for a stronger theoretical foundation for calculations of the social cost of carbon (SCC), one which enables a richer discussion of what costs should be internalized by countries in their estimates of the SCC.

An initial theoretical puzzle related to the social cost of carbon has to do with how countries typically use the global social cost of carbon (GSCC), rather than limiting themselves to consideration of the strictly domestic costs of their carbon emissions, which is what is done in the cost-benefit analysis of most other kinds of public policy. This choice is often not clearly defended, and, in some cases, it seems that analysts may not be aware of its significance, Kotchen suggested.

In an effort to explore this "cognitive dissonance," Kotchen went on to ask whether there is a logical explanation for why a country might choose to use the global cost of carbon rather than the domestic cost of carbon (DSCC) in setting its policy.

As a global "public bad," Kotchen suggested, it is possible to think about choosing a global social cost of carbon from the perspective of game theory. In a repeated game, a country might benefit from choosing a cost of carbon higher than their domestic cost of carbon, if that choice makes it more likely that other countries will reciprocate.

The game is complicated, Kotchen noted, by the fact that the optimal global cost of carbon is different for different countries. Those countries most impacted by climate change and those countries whose economies already have low emissions will have a higher preferred carbon price than countries whose economies are more carbon intensive and/or which are less likely to suffer from climate change impacts. Taking as an input assumption an overall global cost of carbon of \$40 per ton, Kotchen analyzed the optimal global cost of carbon for different countries and regions, finding a range of optimal values, from a low of \$13 in Eurasia to a high of \$91 in India. The optimal global cost of carbon for the U.S. came in at \$29. The optimal GCC for China was only \$17.

This difference between optimal global costs of carbon, Kotchen observed, "provides the rationale for transfers in the form of climate finance." However, he pointed out, the transfers suggested by his figures are not the same transfers as those most frequently discussed in climate negotiations, given that countries such as the U.S. have a relative low target value, and other developing countries like India may have a high target value. China, notably, would be worse off overall at a global carbon price of \$40, but could be compensated by countries that would benefit from a higher price.

Kotchen concluded by suggesting that his analysis might benefit from additional work to understand the implications of a "repeated games" framework for this analysis. However, he suggested that his analysis could be used as a "first step towards more theoretical work" on questions related to the social cost of carbon.



Kotchen spoke as part of the Kennedy School's Energy Policy Seminar Series, which is sponsored by the Consortium for Energy Policy Research of the Mossavar-Rahmani Center on Business and Government.