

Overview: Second Half of the Charge

Presentation to Economy-Wide Modeling Science Advisory Board Panel

July 19, 2016

Main topic areas for second half of the charge

- Can EPA use economy-wide models to inform **economic impacts** analysis?
- Is it defensible for EPA to **directly compare estimates of social costs, benefits, and economic impacts** generated through different approaches when estimating economic effects of regulation?

Use in Economic Impact Analysis

- Heightened interest in providing decision makers and public with information about short-run economic impacts
 - Short-run time horizons may be of particular interest when discussing economic impacts, but most CGE models are long-run models
 - Partial representation of costs and/or benefits in CGE models may affect ability to describe the full effects of some types of economic impacts
 - Transfers netted out in benefit-cost analysis may matter when evaluating economic impacts

Use in Economic Impact Analysis

- Other economy-wide approaches that do not estimate economic welfare could potentially yield information regarding impacts in input markets or other sectors
 - Input-output models map flows of goods and factors of production between sectors but assume fixed prices and technologies and impose no supply constraints
 - Many macro-econometric models lack micro-theoretic foundation; econometric basis raises question of whether useful for evaluating behavioral changes due to new policy (i.e., what is out of sample?)
 - OMB indicates that macro models may be best for capturing very large policy changes; individual EPA air quality regulation falls far below recommended threshold
 - CBO also reserves dynamic scoring for policies that are much larger than any individual EPA air regulation, at least when judged on the basis of cost
- Dynamic stochastic general equilibrium (DSGE) models have micro foundations but are used less frequently than CGE models in literature to evaluate regulations

Characterizing Results

- EPA has a lot of experience with using and evaluating results from engineering and partial equilibrium models in a regulatory context; understands how to
 - Verify and validate results;
 - Conduct sensitivity and formal uncertainty analyses to test key model assumptions; and
 - Characterize key limitations of these modeling approaches
- EPA has used CGE models infrequently in a regulatory context; even less experience with other economy-wide approaches to evaluate changes in welfare or economic impacts

White Papers & Memos

- To inform SAB discussion of the second half of the charge, EPA has prepared:
 - Two white papers on:
 - Economic impacts in CGE models
 - Uncertainty in economy-wide models
 - A memo on:
 - Competitiveness effects in CGE models

Economic Impacts White Paper

- Goal is to provide the Panel with a review of:
 - Types of economic impacts at EPA
 - Role of CGE models in economic impacts analyses, focusing on the subset of impacts categories highlighted in the charge
 - Overview of outside organizations studies that use economy-wide models to analyze EPA air regulations
 - Summary of key issues when analyzing economic impacts of environmental policy in academic literature
- Mainly discusses CGE modeling, though other economy-wide approaches are described when relevant

Competitiveness Memo

- Goal is to provide the panel with a review of:
 - How competitiveness is typically defined
 - How modeling needs differ from those for estimating domestic economic impacts of regulation
 - How incorporation of sectoral and regional detail in international model results in other model limitations
 - Summary of results from recent selected studies for the literature

Uncertainty White Paper

- Goal is to provide the panel with a review of:
 - Uncertainty in traditional cost & benefit estimates,
 - Key uncertainties in CGE modeling,
 - Quantitative approaches to address uncertainty,
 - Approaches for presenting uncertainty analysis,
 - Opportunities for model verification and validation.

Analysts currently have little guidance regarding...

- When CGE models are useful for evaluating economic impacts and for which types
- Whether CGE models can shed light on short-run impacts
- How to interpret CGE results when comparing them to engineering or PE estimates for impacts not captured in a CGE analysis
- How to ensure consistency across benefit-cost and economic impact analyses when using different modeling approaches
- Whether other economy-wide modeling approaches may add value and, if so, in what contexts
- How to characterize and communicate results from CGE or other economy-wide approaches
- How to verify and validate CGE or other economy-wide modeling results
- How to best explore key model assumptions/uncertainties and limitations

Thank you!