

Economy-Wide Modeling SAB Meeting – EPA Staff Comments on Latest Draft Response from the Panel
5/24/2017

- Consistency issues between ES and other sections of the report:
 - o Advice on linking economy-wide with sectoral models
 - Section 1.1.6 (page 12, lines 20 -23) highlights the option of embedding detailed technology representation directly into a CGE model but section 3.6 discusses a broader array of acceptable methods such as the summary function and sequential calibration approaches (e.g., the summary function approach is described as “attractive for repeated analysis” page, 61, line 12).
 - Also notes that directly embedding technology into a CGE model is a way to achieve full consistency between a bottom up model and CGE model – is this still true if one has a highly heterogeneous representation of different technologies (e.g., ~1,500 technologies as well as seasonal or time of day variation); in some cases, wouldn’t one be required to make decisions regarding aggregation of representation in order to get the CGE model to solve? When (or when not) would this be an issue?
 - o Ability of a spatially-disaggregated CGE approach to model future decisions about locations of plant closures and new facilities
 - Section 1.2.1 (page 13, lines 13-16) notes that this would be particularly challenging/very difficult to do with any precision but sections 1.3.1 (p. 18, line 16) and (p. 96, lines 35-36) seem to suggest that a linked CGE-PE model could be used to identify facility-level ramifications of a policy such as plant openings and closings.
 - o Description of how well or how poorly CGE models capture equilibrium labor markets
 - Section 1.3.1 notes that “evaluating equilibrium labor market impacts is a core strength of CGE models” (p. 19, line 5). This seems like a particularly strong statement given the acknowledged substantial limitations (lines 7-10). If someone were to only read the ES it might give the reader the impression that CGE models capture labor markets quite well as-is. If that is the intention of the panel, then clarifying when this is (and is not) the case would be helpful.
 - Language in other parts of the document instead discuss the advantages of using a CGE modeling approach (endogenous supply of labor – p. 45; interactions across markets/factor price effects – p. 104) while also acknowledging the disadvantages or limitations.
- Expanding on research priorities
 - o Since the Panel elected to rank order them, it would be helpful to understand the criteria used to develop them
 - o More detail on the top priorities would be helpful. For instance, since capturing involuntary unemployment in CGE models is the top research priority identified by the

panel it would be useful to understand the panel's opinions on what are particularly promising or unpromising avenues to pursue in fleshing out a research agenda.

- Consistency between different sections of the report
 - o Section 5.61: there are a number of instances where criteria were used in previous sections of the report to reject certain types of models. These criteria seem potentially valid for evaluating their use for evaluating economic impacts; if there are reasons to deviate in the way they are applied for SC vs. EI an explanation for these differences would be useful.
 - Lack of micro-foundations as well as several other limitations of I-O models were cited as a reason for recommending against their use in the SC section (p. 63, lines 1-4, 9-11) but is not cited as a sufficient reason for rejecting them for the evaluation of economic impacts (p. 112-113)
 - The Lucas critique was cited as a reason to reject REMI and macro-econometric models for more than short term forecasting (p. 63, lines 13-20) but not in section 5.6.3 on econometric models (p. 114) or section 5.64 on hybrid models (p. 117)
 - Lack of micro-foundations and the Lucas critique are also cited as a reason for rejecting use of the Keynesian closure rule for the labor market (p. 110, lines 1 – 8)
 - The discussion of DSGE on p. 121 makes it sound as though they are much easier to apply in their current form than what is described on pages 21 (lines 32- 37), 62 (lines 26-32) and 110 (lines 34-38).
- Incomplete or unclear definitions/statements might benefit from further expansion/clarification
 - o Section 1.3.2 discusses international competitiveness effects and states that identifying channels for such effects “might be quite important” but depend on the nature of the regulation. It would be helpful to understand when the Panel anticipates these channels to be important (or which regulatory attributes might lead to them being important).
 - o The text notes four possible options for choosing a CGE model but leaves out two possibilities, using an existing CGE model that is not well suited to the task; and modifying an existing model to better capture the rules likely effects (p. 45, lines 23 – 28 and p. 10, lines 10 – 15 in ES); considering both of these possibilities may help refine/give nuance to subsequent discussion on when to consider developing a new CGE model.
 - o It is not always clear whether various employment/unemployment terms are being used consistently throughout the document, and whether some of these terms are subsets or substitutes for other terms. One way to clarify their use would be to add the following terms to the glossary: Structural unemployment, involuntary unemployment, frictional unemployment, and full employment.
 - o Further explanation for why REMI can model non-price mechanisms in a way that other models cannot would be helpful (p. 117, lines 14 – 17); we found no specific statement

along these lines in the referenced paper (Wei and Rose, 2014) and therefore interpret the citation as an example where the details of the regulation have been captured using REMI. It strikes us that this type of detail can also be captured in a CGE framework by linking a PE and CGE model? If this is the case, then perhaps it makes sense to clarify the sentence and add a cross-reference to the linkages discussion in section 3.6?

- Is the simple structural CGE model described on page 123 (line 30) the same as what the Panel has in mind on p. 132 (lines 36- 38) when it describes a simple economy-wide model, perhaps along the lines of the DICE model? In other words, is the panel recommending EPA develop a simple one or two sector model to test intuition?
- Section 6.2.2 (p. 131) raises the possibility that PE and GE models be used to “back cast” outcomes of the policy but does not answer the question it raises: whether this is advisable or not.
- P. 132 refers to a public vetting of models; can you clarify what you mean by this?
- Section 6.4.2 notes that performing Monte Carlo simulation on “all models of the same type, using the same underlying probability distributions for parameters” is best practice given sufficient funding and time. Is this a best practice – we do not know of any examples where this has been done - or an ideal against which other efforts are measured?