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**U.S. Environmental Protection Agency
Science Advisory Board
Economic Guidelines Review Panel (EGRP)**

**Preliminary Comments submitted by Dr. Josh Linn on the
EPA's revised Guidelines for Preparing Economic Analyses**

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Chapter 8

Major comments

1. In practice, RIAs use the compliance cost and partial equilibrium approaches more commonly than the CGE approach. This chapter would be strengthened by adding specific discussion about when it may be reasonable to use a partial equilibrium or compliance cost approach, rather than CGE. Frequently, the chapter says something like CGE is appropriate when the regulation may affect multiple sectors. But when is that likely to happen? Can the chapter provide some rough criteria to help practitioners understand when CGE would be preferable?
2. Textbox 8.1 is informative and provides a useful discussion about the challenges facing retrospective analysis. However, the text appears to include the assumption that such retrospective analysis will use some sort of econometric analysis. However, structural or computational models could be used (including whatever model(s) EPA might have used for the prospective analysis), which could circumvent some of the econometric and data challenges that the textbox discusses. Of course, the structural and computational models have their own limitations, and the suggestion here is to provide some balance here, discussing pros and cons of the different approaches.
3. There should be much greater discussion of imperfect competition—both for the market being regulated as well as input markets. As shown in Fowlie, Reguant, and Ryan (JPE 2016), welfare effects of a regulation may differ in the short and long run depending on the extent of market power. This is an important point that the chapter does not make as clearly as it should, because it is probably relevant to a wide range of EPA regulations, such as many regulations for the industrial sector. Fowlie et al. also discuss the possibility that regulation can affect market structure and competition, and that these effects can have important welfare consequences. This possibility is discussed only briefly in 8.2.3.6. Finally, the literature on the Acid Rain Program has highlighted the importance of imperfect competition in input

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markets, such as coal, and more broadly, standard IO textbooks discuss double marginalization. Considering the attention that the chapter devotes to pre-existing distortions due to taxes, it would be appropriate given the recent literature on imperfect competition to elevate that topic to roughly the same level. In other words, accounting for imperfect competition could have profound welfare consequences that would be missed if one assumes price-taking firms and consumers.

4. In general, the chapter does a good job contrasting pros and cons of the compliance cost and partial equilibrium approaches. The discussion of CGE models is somewhat less balanced, however. For example, and continuing the theme of imperfect competition, most CGE models assume price-taking firms and consumers, which contrasts with many partial equilibrium models in which firms have market power. This limitation of CGE models should be noted in textbox 8.2 as well as table 8.2. Moreover, the end of 8.3.3 does not list the disadvantages of CGE models that were discussed in the preceding text, such as aggregation across firms, sectors, and regions as well as a simplified characterization of abatement opportunities. Some of those limitations are discussed elsewhere in the chapter, such as aggregation bias in 8.4.1, but the full set of limitations is not discussed compactly in 8.3.3. This contrasts with the summaries at the end of the subsections on compliance costs and partial equilibrium, which include both advantages and disadvantages. These summaries may be useful to practitioners, and the summaries at the end of the sections should include the full set of pros and cons of each approach.
5. The section on model parameterization includes some important suggestions. However, the section muddles the point that the empirical strategy for parameter estimation needs to be consistent with the model being used for the cost analysis. The statement that “inconsistencies between the underlying structure of the model and the empirical analyses from which values are drawn can lead to inaccuracies” may be unclear to some readers, and it should not be stuck in the middle of the paragraph. Footnote 304 offers a solution to this problem, but that should be stated more clearly in the text rather than in a somewhat confusingly written footnote. Moreover, the problem pertains not just to situations in which parameters are taken from the literature. It is also relevant when the analysts estimate the parameters themselves rather than taking the estimates from the literature. In that case, the assumptions used to identify the parameters need to be consistent with the assumptions in the model being used for the welfare analysis. The recent light-duty fuel economy/GHG RIA makes this mistake in the estimation of vehicle scrappage and purchase decisions.
6. Also regarding the section on parameterization, the text should emphasize the need to include the most recent data available and parameters estimated using recent data. These points may appear to be obvious, but they are particularly relevant in the current context of deregulatory actions. In fact, the chapter might benefit from including a section (or text box) about particular issues that arise when considering deregulation (or, potentially, re-regulation). In this situation, analysts should update assumptions on model inputs to incorporate the best available information, and they should distinguish sunk costs that have already been incurred from other costs—i.e., the issues that appear to have been ignored in the recent MATS rule.

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Minor comments

1. Footnote 241. The footnote states that producer surplus is the area between the market price and the marginal cost curve. This ignores fixed costs, which are often substantial in the context of pollution abatement. It would be clearer to refer to profits rather than producer surplus—defining profits to include revenue, fixed costs, and variable costs—both in this footnote and throughout the chapter.
2. Page 8-3, line 8. The reference to “market power” in the parentheses should be deleted. The rest of the paragraph is correct, that partial equilibrium may be accurate if markets outside the analysis aren’t affected. But the existence of market power is really a separate issue and including it as an example may be confusing.
3. Figure 8.2. Delete the shaded region for deadweight loss. The DWL is really the forgone social welfare if there is an unregulated externality.
4. Figure 8.3. Might it be instructive to add a second panel to 8.3 that shows a labor market without a pre-existing distortion, to clarify how much larger is the change in DWL when there’s a pre-existing distortion?
5. First full paragraph of 8.2. The text states that costs incurred to meet other regulations are not included in the incremental costs of the regulation being analyzed. This is certainly true. But it would also be appropriate to exclude future costs expected to be incurred for other regulations, but which haven’t already been incurred. For example, there will be costs of meeting tier 3 tailpipe standards in the future, which shouldn’t be included in the incremental costs of a hypothetical tier 4. Footnote 259 hints at this point, but this should be more explicit in the main text.
6. Section 8.2.1.1. Footnote 263 defines sunk costs, which is useful. The text should explain that typically a large share of fixed costs are sunk, such as R&D costs. As noted above, the text should discuss how to treat sunk costs in an RIA for a deregulatory action.
7. Section 8.2.2, first two paragraphs. The paragraphs also refer to a utility function, which comes out of nowhere, since previous discussions of consumer welfare in this chapter referred to consumer surplus without referencing an underlying utility function. The text should discuss pros/cons of focusing on consumer surplus—that is, integrating under a demand curve—vs. welfare-based measures like EV and CV that are derived from a utility function.
8. Section 8.2.3.2. Another reason to conduct a dynamic analysis is that the effects of the regulation itself may vary over time. For example, a regulation may cause some firms to exit, which would increase equilibrium output prices unless/until other firms enter the market or remaining firms increase production. Other parts of the chapter discuss transitional costs, which is related to the point here about entry and exit.
9. Section 8.2.3.4. In the first full paragraph, references to unbiased and biased technical change may be cryptic to some readers. These terms should be defined, or perhaps replaced with less technical language.

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10. Section 8.2.3.6. Both in the section heading and the main text, there should be a more careful distinction between two issues related to market power and competition. The first is that market power can create distortions that have large welfare consequences—see in particular Fowlie et al. referenced in a previous comment. This point could be made by adding a graph similar to 8.3 that shows the pre-existing wedge that exists between price and marginal costs in an imperfectly competitive market. The second issue is that the regulation itself may affect market structure. This point is already made in the text, but it would be helpful to distinguish it more clearly from the first.
11. Introduction to section 8.3. The introduction to this section has a useful list of criteria for selecting an appropriate model. Whether a model has been peer-reviewed, either in the academic literature or otherwise, is also a consideration that should be added to this list. That may be obvious, but it wouldn't hurt to state it in these guidelines.
12. Text box 8.4. This text box contains a nice discussion about separability of benefits and costs, although it could be helpful to provide the example of climate change. In particular, a policy that reduces GHG emissions causes global temperature to drop, which can affect factor prices and compliance costs.
13. 8.4.2.1. It may be worth noting that the timing of compliance decisions may be affected by whether expectations are forward looking. Because of discounting, this can affect the PDV of costs.
14. 8.4.4. It would be helpful if this subsection can include some suggestions about how to characterize uncertainty. Typically, RIAs using deterministic models report results under alternative sets of parameter assumptions, which is fine. Some partial equilibrium and CGE models include uncertainty explicitly, which can be an important advantage of these models over deterministic ones.