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PUBLIC INTEREST COMMENT

DRAFT SUPPORTING MATERIALS FOR THE SCIENCE ADVISORY BOARD PANEL ON THE ROLE OF ECONOMY-WIDE MODELING IN US EPA ANALYSIS OF AIR REGULATIONS

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INTRODUCTION

The Regulatory Studies Program of the Mercatus Center at George Mason University is dedicated to advancing knowledge about the effects of regulation on society. As part of its mission, the program conducts careful and independent analyses that employ contemporary economic scholarship to assess rulemaking proposals and their effects on the economic opportunities and the social well-being available to all members of American society.

SUMMARY

This comment addresses the Environmental Protection Agency's request for advice in "developing an 'analytic blueprint' of materials on the technical merits and challenges of using economy-wide models to evaluate the social costs, benefits, and economic impacts associated with the EPA's air regulations."[1] The agency plans to present these materials to a new Science Advisory Board (SAB) panel with "expertise in economy-wide modeling."

The Environmental Protection Agency (EPA) wishes comments to evaluate whether the agency has identified the "most relevant technical materials in the analytic blueprint to help inform the SAB panel in its deliberations" and if the agency has "identified the most relevant charge questions to the SAB regarding the technical merits and challenges of using economy-wide models" in this context.

1. "Comment Request; Draft Supporting Materials for the Science Advisory Board Panel on the Role of Economy-Wide Modeling in US EPA Analysis of Air Regulations," 79 Fed. Reg. 24 (Feb. 5, 2014), 6899–90.

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The quality of the results from simulation models, including economy-wide models of the sort considered by the agency here, are strongly dependent on the quality of the input. Transparency in modeling efforts is critical, as is avoiding poorly designed models. Economy-wide models should be used to study the employment effects of regulations, which often extend into occupations and industries beyond the one directly regulated. The SAB panel should also consider the issue of modeling nonmarket benefits and distributional effects. Most economy-wide models are static, and the panel should offer advice to the agency on attempting to model dynamic effects of regulations. The trade liberalization literature can offer considerable insight to economy-wide modeling, and these materials should be included in presentations to the SAB panel.

DRAFT CHARGE QUESTIONS

There are five key areas in which the draft charge questions may be divided: transparency, quality, employment effects, benefits, and dynamics.

Transparency

The use of simulation models of any type (single market models, input-output models, multisector models, or Computable General Equilibrium models) is more an exercise of applied economic theory than an evaluation of empirical evidence. For this reason, transparency is extremely important and the Science Advisory Board Panel should offer advice on

- how the EPA can achieve the maximum possible transparency in their modeling efforts—especially economy-wide modeling—when they do their analysis
- how to ensure that the particular thought experiment of each EPA modeling effort is made explicit so that outside readers of the Regulatory Impact Analyses can judge each of the following:
  - the appropriateness of the model scenarios used in the analysis
  - whether the right questions are being asked by the modelers
  - the appropriateness of the choice of models
  - the appropriateness of the linkages emphasized in the economy-wide modeling
  - the appropriateness of the parameters used in the models[2]
- how the EPA can ensure public comment on all of the above choices that they have to make in running simulation models
- how the EPA sometimes can use more than one modeling approach in a complementary fashion to estimate different aspects of the impact of particular regulatory changes.

Quality

The Science Advisory Board Panel should offer advice on how the EPA can maintain and evaluate the performance of their economy-wide models. This is especially needed to make public the empirical foundation for their modeling choices, especially choices about parameter values that characterize how markets are likely to respond to regulatory changes.

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2. Xiao-guang Zhang, "Armington Elasticities and Terms of Trade Effects in Global CGE Models," (Staff Working Paper No. 0601, Productivity Commission, Government of Australia, 2006).

This is where the real empirical aspect of this work comes into play and why economy-wide modelers often use the acronym GIGO (Garbage In, Garbage Out) to describe the problem of poorly run modeling efforts with improper empirical foundation for their parameters.

This is another area where public comments can be important. Commenters should be allowed to offer alternative empirical evidence for parameter values that the EPA is using in their economy-wide modeling.[3]

Employment Effects

The employment effects of regulatory changes are extremely important. To examine the employment effects properly, economy-wide models need to be adapted to allow the estimation of the adjustment costs for workers due to changes made by regulation. There is considerable evidence that job displacement for any reason—including regulatory changes—causes significant and sustained earnings loss. The panel should weigh in on this and how the EPA can develop methodology for the reasons below.

- When regulation results in higher production costs, regulated industries raise prices and therefore lose sales. While this may possibly result in increased use of compliance occupations, it will certainly result in lost employment in production occupations. The EPA needs a way to take the next step with their economy-wide models and estimate the likely number of lost production jobs from regulatory changes.

- There is considerable evidence—particularly from estimating the effects of price changes due to trade liberalization—that the indirect effects on other, nonregulated industries can be much greater than on the regulated industry itself. Adequately estimating the adjustment cost for displaced workers will generally require an economy-wide model.

- Economy-wide modeling will need to be adapted to educate the EPA and the public on the likely number and types of workers displaced if costs increase due to regulation.[4]

Benefits

Many of the benefits from regulation are nonmarket effects. As a result, there are much fewer indirect benefits missed when an economy-wide model is not used in a benefit-cost analysis. For example, regulation that impacts households directly does not need a market model like the economy-wide models to describe the likely impacted households. In other words, if the benefits are not delivered through markets, the household distributional effects can still be estimated without a multimarket model. The Science Advisory Board Panel should weigh in on this issue and make recommendations on whether and when economy wide-modeling should be applied to nonmarket effects.

Dynamics

For the most part, economy-wide models estimate the static or one-time impact of regulatory changes. The Science Advisory Board Panel should offer advice to the EPA on how these models can be adapted to shed some light on the following:

- The adjustment costs of regulatory changes.

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3. Azusa Okagawa and Kanemi Ban, "Estimation of Substitution Elasticities for CGE Models," (Discussion Papers in Economics and Business No. 16, Osaka University, Graduate School of Economics and Osaka School of International Public Policy, 2008).
4. Hielke Buddelmeyer et al. "Linking a Microsimulation Model to a Dynamic CGE Model: Climate Change Mitigation Policies and Income Distribution in Australia," *International Journal of Microsimulation* 5, no. 2 (2012): 40–58.

- The dynamic effects of regulatory changes. That is, how regulation can impact the following:
  - industry access to specialized capital goods
  - human and other capital accumulation
  - the matching of the skills of the existing labor supply to job demand in the economy
  - economic (and therefore job) growth
  - introduction of new products
  - other possible dynamic effects of regulation identified in the economic literature

DRAFT CHARGE BLUEPRINT

- The Science Advisory Board Panel should be offered some of the materials on economy-wide modeling as used in trade policy analysis. In particular, there is some literature on how dynamic effects of trade liberalization can be included in economy-wide modeling. This methodology should be equally appropriate for the analysis of regulatory changes.

- Similarly, the panel can be given some of the literature from international trade on how to model the effect of nontariff barriers on trade and on trade in services. Many of these barriers are regulation related. For example, see US International Trade Commission, "The Dynamic Effects of Trade Liberalization: A Survey," February 1993 for the former and Drusilla Brown and Robert Stern, "Measurement and Modeling of the Economic Effects of Trade and Investment Barriers in Services," *Review of International Economics* 9, no. 2 (2001) for the latter.

- The Science Advisory Board Panel should be offered some of the empirical literature on the dynamic economic impact of regulation. For example, see David Parker and Colin Kirkpatrick, "The Economic Impact of Regulatory Policy: A Literature Review of Quantitative Evidence" (OECD Expert Paper No. 3, August 2012).