

**Economic frameworks and values for regulatory assessment**

By

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Good morning, Chairman Hancock and members of the commission and thank you for the opportunity to speak to you today. I am James Sanchirico, a professor of environmental science and policy at the University of California at Davis and a Nonresident Fellow at Resources for the Future, a nonpartisan, independent research organization specializing in environment, energy, and natural resource issues in Washington DC. Prior to my appointment at UC Davis in 2007, I was a fellow then senior fellow at Resources for the Future for nine years. The opinions I offer today are my own and should not be attributed to the University of California or Resources for the Future.

The purpose of my remarks is to provide a brief overview of the types of economic analysis that can be used to quantify the economic benefits and costs of regulatory actions. Before discussing the different economic frameworks and methods, I would like to emphasize three points made in the written testimony of Prof. Stavins and Dr. Schatzki.

- First, while it is easy to think of economic analysis of rulemaking as a luxury good that is unaffordable, the time for ensuring that we, California residents, make wise investments in our future is never more pressing. Serious economic analysis that provides insights in the

design of regulations, considers alternative rules, and highlights when investing in a rule will provide negative net social benefits is essential, especially in these economic conditions.

- California does not need to reinvent the wheel. The U.S. Office of Management Budget has issued multiple guidance documents on the required use of the cost-benefit analysis (CBA) and cost-effectiveness analysis (CEA) along with information on best practices for calculating the net benefits of a rule or the particular cost-effectiveness of a potential alternative option. For example, OMB's circular A-4 on regulatory analysis issued in 2003<sup>1</sup>, requires both BCA and CEA for major rules whenever feasible.<sup>2</sup> OMB documents provide assistance to many Federal agencies, such as the Environmental Protection Agency, National Highway and Traffic Safety Commission, Food and Drug Administration, and Occupational Safety and Health Administration.
- The broad consensus is that the regulatory assessment process for Federal rules has improved the science of rulemaking, avoided unnecessary costs, and provided an important tool for policymakers to improve the effectiveness, efficiency and equity of substantial rules.

Why is economic analysis such an important part of regulatory assessment? Because the strong theoretical and empirical foundation of economics enables the measurement of quantitative, logically consistent, and directly comparable measures of benefits and costs,

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<sup>1</sup> Available at [http://www.whitehouse.gov/omb/circulars\\_a004\\_a-4/](http://www.whitehouse.gov/omb/circulars_a004_a-4/) .

<sup>2</sup> Executive order 12291 defines "major rule" as:

- (1) An annual effect on the economy of \$100 million or more;
- (2) A major increase in costs or prices for consumers, individual industries, Federal, State, or local government agencies, or geographic regions; or
- (3) Significant adverse effects on competition, employment, investment, productivity, innovation, or on the ability of United States-based enterprises to compete with foreign-based enterprises in domestic or export markets.

whether realized through organized market activity or outside of markets. Even in the absence of quantitative measures, an economic perspective can help clarify the set of decisions facing policymakers and reveal the potential unintended consequences of rules that reduce their effectiveness.<sup>3</sup>

There are a number of economic frameworks available to evaluate policy choices. *Cost Benefit Analysis* (CBA) is the most comprehensive and is specifically designed to quantify effects on social value and human welfare. The policy, which includes the level stringency and implementation method, with the greatest net social benefits is the most economically efficient. *Cost-effectiveness analysis* identifies the policy option that achieves a specific desired outcome at the least possible cost. One advantage of CEA is that unlike CBA, the analyst does not have to convert lives saved or another metric (e.g., biodiversity) into monetary units. Another framework is *economic impact analysis*, which measures changes in economic activity or its indicators (e.g., regional income, workers employed, etc.). Caution, however, is in order when interpreting economic activity measures. For example, job creation could occur in industries with large social costs.

Although economic costs and benefits are often associated with the exchange of market goods, economic analyses of rules should also include evaluation of changes in benefits from goods and services not bought and sold in markets (nonmarket benefits). In ocean and coastal management, these include the benefits received by individuals who directly utilize marine natural resources (e.g. by visiting a beach or engaging in recreational fishing), but also the benefits people receive that do not require direct use (e.g., the value that people place on

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<sup>3</sup>Unless otherwise noted, my testimony draws heavily on a forthcoming book chapter. Please use this citation: R. Johnston, J.N. Sanchirico and Holland, D., *Measuring Social Value and Human Well-Being*. In *Seas, Society, and Human Well-Being* (ed. R. Bowen, M. Depledge, C. Carlane, and L. Fleming). Jones and Bertlett Learning, Sudbury, MA. Forthcoming.

preserving wildlife and natural places even when they may never visit those animals or places). In environmental health rules, such as reducing fine particulate matter (PM), the nonmarket benefits include the mortality and morbidity risk reductions associated with the reduced ambient concentration of PM.

In the remainder of my prepared remarks, I will discuss the factors to consider in estimating the costs of rules and the estimation of nonmarket benefits, which can be difficult to measure but are an important source of human welfare, and often represent a significant portion of the potential benefits from a particular regulation. In economics, the concept for valuing both benefits and costs is opportunity cost, which is defined as the next best available use for a resource. Both the costs and benefits due to environmental regulation are defined relative to a baseline condition and entail significant uncertainties stemming from difficulties in measurement and future market conditions. In the economics profession, there is general agreement that the costs of compliance are easier to measure than the benefits. Having said that, research has shown *ex ante* estimates of costs are often much larger than the actual costs.<sup>4</sup>

With respect to costs of a particular rule, the analyst needs to consider the cost of compliance that includes the change in the use of materials, labor, and capital due to potential installation of new equipment and/or changes in production process (e.g., slower) or production locations (e.g., relocation due to increase in cost of business). Transitional losses should also be considered, such as job losses, refurbishing capital for uses in other parts of the economy, etc. The costs of compliance might also include changes in consumer benefits, if consumers face higher prices for goods due to the regulation. Other business sectors could also experience an increase in input prices.

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<sup>4</sup> Harrington, Winston, Richard D. Morgenstern, and Peter Nelson. 2000. On the accuracy of regulatory cost estimates. *Journal of Policy Analysis and Management* 19(2): 297–322.

On the benefit side, the most often utilized measure of opportunity cost is what an individual or household is willing to forgo to enjoy a particular benefit. This is known as willingness-to-pay (WTP). For example, a value of a statistical life (VSLs) measures the willingness to pay of a representative (average) individual for a reduction in a specified mortality risk. VSLs are either based on observations of wages across occupations with different risk profiles or from survey methods.

Using behavioral observations as a means to estimate willingness to pay is known as a revealed preference (RP) method. Examples of the method include *recreation demand models*, *hedonic property value*, and *hedonic wage models*. Hedonic property value (HPV) models, for example, estimate the impact of environmental attributes or other local public goods (e.g., education) on the observed value (selling price) of local property.<sup>5</sup> These studies estimate what purchasers are willing to pay on the margin for increased levels of the attributes. HPV models can also estimate WTP to avoid undesired attributes such as traffic or airport noise, views of industrial facilities, or proximity to a polluted area.

Stated preference (SP) methods use responses to carefully designed survey questions to estimate WTP. Examples of SP methods include *contingent valuation*, *contingent choice*, and *choice experiment methods*. Stated preference methods create a hypothetical market where none exists through survey questions that, in effect, allow respondents to —purchase nonmarket commodities in hypothetical situations. Because stated preference methods rely on survey responses, their WTP estimates can be more controversial than ones estimated using revealed preference methods. SP methods, however, are widely used in both applied and academic work, and have been accepted for use by Federal agencies and courts to inform policy choices.

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<sup>5</sup> Attributes can include land cover and use, characteristics of nearby water bodies, and characteristics of the property, structure, neighborhood, and location.

Nonetheless, analysts should be aware of the potential biases that may occur, particularly in studies with inadequately developed surveys or research designs.

A rigorous and quantitative assessment of benefits and costs within CBA is often complex, time-intensive, and expensive. When time or budget constraints prohibit full-scale analysis, significant insight is possible through the analysis of specific areas /sectors.<sup>6</sup> Most CBAs conducted by government agencies quantify only a portion of the many benefits and costs associated with a policy change. To prevent major omissions in such cases, one must make a particular effort to identify and quantify the primary areas of benefit or cost. For example, the U.S. EPA's non-road diesel rule in 2004, which set emissions standards for new engines and limited the amount of sulfur allowed in diesel fuel, measured many benefit and costs associated with controlling emissions, such as the monetary value in reductions in incidence of infant mortality, long-term exposure, hospitalizations due to asthma, work loss days for adults between 18-65, and improvements in visibility. The environmental impact statement, however, also discussed over 41 other potential benefits where information was not available to calculate the avoided incidence. Omitting these additional benefits did not impact the results, as EPA found that the social benefits outweighed the social costs with net benefits on the order of \$80 billion per year.

Finally, it is important to point out that different evaluation methods address different economic questions and that choosing the right tools can help ensure that the regulatory assessment process provides useful and relevant information. Inappropriate applications of economics, however, can lead to incomplete and often misleading perspectives on economic

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<sup>6</sup> In some cases, benefits transfer approaches, in which researchers use a valuation function estimated in another location to approximate values at another site can be used to develop a quantitative sense of the relative magnitudes of the benefits and costs without incurring the large upfront costs associated with new survey research.

benefits and costs. Consequently, as the committee has heard in the prior hearing on regulatory reform and is found throughout OMB guidance documents, regulatory assessments should be done by trained professionals and should be based on peer-reviewed science to the maximum extent possible. Any shortcomings with the analysis should also be made transparent to the policymakers and public.

Thank you.