Individual Peer Reviewer Comments on Proposed OMB Circular No. A-4, "Regulatory Analysis"

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Introduction

Since 2003, OMB *Circular A–4: Regulatory Analysis*[1] has provided guidance to Federal agencies on the development of regulatory analysis as required under Section 6(a)(3) of Executive Order (E.O.) 12866 (Regulatory Planning and Review),[2] the Regulatory Right-to-Know Act,[3] and a variety of related authorities. OMB is drafting proposed updates to the Circular, available at https://www.whitehouse.gov/wp-content/uploads/2023/04/DraftCircularA-4.pdf, as well as a preamble that offers further context for prospective public commenters and peer reviewers, https://www.whitehouse.gov/wp-content/uploads/2023/04/DraftCircularA-4Preamble.pdf; public comments on these materials is being solicited via a separate notice and, in addition, the proposed updates will be peer reviewed in accordance with OMB's Final Information Quality Bulletin for Peer Review (the Bulletin)[4] and the Regulatory Right-to-Know Act.

[1] Office of Mgmt. & Budget, Exec. Office of the President, Circular A–4, Regulatory Analysis (Sept. 17, 2003), available at https://www.whitehouse.gov/wp-content/uploads/legacy_drupal_files/omb/circulars/A4/a-4.pdf.
[2] Exec. Order No. 12866, 58 FR 51735 (Oct. 4, 1993).
[3] Public Law 106–554, section 624, 114 Stat. 2763A–161 (codified at 31 U.S.C. 1105 note).
[4] Office of Mgmt. & Budget, Exec. Office of the President, OMB M–05–03, Final Information Quality Bulletin for Peer Review (Dec. 16, 2004), available at https://www.whitehouse.gov/wp-content/uploads/legacy_drupal_files/omb/memoranda/2005/m05-03.pdf.

Charge to Peer Reviewers of the Proposed Update of OMB Circular A-4

Please review the draft update to OMB Circular A-4 (available at https://www.whitehouse.gov/wp-content/uploads/2023/04/DraftCircularA-4.pdf), as well as the preamble discussion (available at https://www.whitehouse.gov/wp-content/uploads/2023/04/DraftCircularA-4Preamble.pdf), which provides additional context and asks more detailed questions about the changes being proposed. Peer reviewers may also consult any public comments on the draft Circular.[5] The reviewers are asked to draft their individual reports in response to the questions posed below, consistent with each reviewer's experience and areas of expertise.

Whereas peer reviewers are welcome to comment on any aspects of the draft guidance, including addressing questions raised in the preamble, this list of topics cover some of the notable proposed updates to Circular A-4:

(1) discount rate;

(2) distributional analysis;

(3) scope of analysis, including geographic scope;

(4) development of analytic baselines;

(5) unquantified impacts; and

(6) uncertainty.

Questions:

Note: throughout the charge questions presented below, the term "the guidance" refers to the "*proposed update of OMB Circular A-4*" at the URL identified above.

1) Please comment on whether the recommendations in the guidance are supported by the leading theoretical and empirical peer-reviewed academic literature in economics or other relevant disciplines, and if not, please provide alternative recommendations that would be (and citations to support them).
2) Where the guidance reflects assumptions, are they supported by the theoretical and empirical peer-reviewed academic literature in economics, or other relevant disciplines? If unsupported assumptions are identified, are there alternatives you would recommend? Please provide supporting references for both parts of the response—concerns about assumptions, if any, and suggested alternatives.
3) Does the guidance appropriately recognize and account for potential challenges for implementation (e.g., technical feasibility or constraints on data availability or other resources)?
4) Do you have any other suggestions for improving the completeness, objectivity, and/or transparency of agency regulatory analyses? If so, how might these be incorporated into guidance?
5) What practices might be identified in the guidance to encourage accounting for non-monetized (possibly also non-quantified) effects?
6) Do you have suggestions that would improve the clarity and logical presentation of the guidance and/or ease execution of analyses?

[5] Docket number: OMB-2022-0014, Circular A-4 Modernization Updates, available at www.regulations.gov.

7) Should the guidance include suggestions of broadly useful data sets? If so, which data sets, and how should this information be presented in the guidance? How should the guidance reflect best practices related to data quality (including timeliness of data)?

We welcome additional recommendations for ensuring that the guidance and associated methodologies are supported by the theoretical and empirical peer-reviewed academic literature in economics, or other relevant disciplines.

Individual Peer Reviewer Comments: Joseph Aldy

I commend OIRA and the interagency process for their working in drafting a revision to Circular A-4. Overall, this is a quality guidance document that generally reflects well the state of knowledge in the academic literature and recognizes the relevant conditions and constraints that influence agency production of regulatory impact analyses. In general, the integration of new guidance within existing guidance that is still relevant is well done, and preferred to a completely new Circular A-4. Let me offer a comment on structure and highlight a few comments on substance of the draft circular.

First, the draft circular is nearly double the length of the 2003 version. Much of this material – explaining and justifying a recommendation – could be moved to the preamble. A streamlined circular A-4 – clearly guiding agencies with what they *should do* in conducting their regulatory impact analyses – would be a more effective resource. The circular does not need to present a full array of perspectives – such as in the discussion of discount rates and equity weighting. If this information is deemed necessary, then it can be move to the preamble, and also made available on www.evaluation.gov or similar public resource. Some of this reads as an abstract guidance – and lengthy guidance – for hypothetical scenarios that would be rare for most agencies. For example, the discussion of equity weighting – with the exception of the final paragraph of section 10 – ignores the practice of using population averages for most monetizations of quantified impacts in federal RIAs.

Second, the guidance employs a fairly dated discussion of the value of statistical life. This single impact category is the majority, indeed the vast majority, of monetized benefits across executive branch agency RIAs. Some of the discussion – by using language from the 2003 circular – does not accurately represent the current state of knowledge in the academic literature. Moreover, some agency practice has lagged the academic literature. In particular, the Environmental Protection Agency still draws from studies published before 1992 for its value of statistical life. The guidance should emphasize the importance of regularly updating impacts measures in light of the evolving peer reviewed literature.

Finally, the draft circular is silent on what is a critically important part of regulatory analysis – retrospective regulatory analysis. Given the increased attention to this through a series of executive orders over the years, as well as guidance through multiple recommendations of the Administrative Conference of the United States, and the emerging practice of evaluating policy performance through the implementation of the Foundations for Evidence-based Policymaking Act, this is a prime opportunity for guiding agencies on the planning for retrospective analysis of regulations. In the spirit of modernizing regulatory review, it's critical to incorporate the review of regulatory performance. As noted in the literature and ACUS recommendations, the effective evaluation of regulatory performance can be delivered through planning for such evaluation at the rule development stage. OIRA can draw from the text of ACUS recommendations – as well as relevant literature cited below – to guide agencies on how they can craft regulatory performance evaluation plans and incorporate them in the preamble of regulatory proposals and regulatory impact analyses. Such retrospective evaluations would best address the fundamental question posed at the start of the draft circular on the need for analysis to inform the public, policymakers, and stakeholders on the effects of the regulatory proposal.

Please provide your responses to the charge questions below (see separate "Circular A-4 Peer Review Charge" document).

1. **Please comment on whether the recommendations in the guidance are supported by the leading theoretical and empirical peer-reviewed academic literature in economics or other relevant disciplines, and if not, please provide alternative recommendations that would be (and citations to support them).**

Value of Statistical Life

In the discussion of fatality risks on pp. 49-51, I recommend two significant changes. First, OMB should task agencies to ensure that they are drawing on the recent, highest-quality peer-reviewed literature for how they value reductions in fatality risks. This is consistent with the more general principle that agencies should use the best peer-reviewed evidence to support its decision-making. Given that monetized mortality risk benefits are the single largest category of monetized benefits in executive branch rule-makings, it is all the more important that agencies rely on the most recent evidence. Some agencies, such as the Department of Transportation, regularly update their guidance on the VSL. In contrast, EPA has not updated its VSL – except for inflation adjustments – since the 1990s. EPA's VSL guidance is based on 26 estimates from studies published before 1992 that draw from, on average, income data and risk tradeoffs from 1978. Not a single one of the labor market hedonic papers employs measures of occupational fatality risk based on the BLS Census of Fatal Occupational Injuries, which BLS initiated in 1992. As noted in Viscusi (2004), occupational fatality risk data that pre-date the CFOI suffer from numerous deficiencies that undermine statistical estimation. Empirical methods applied to risk-wage tradeoffs have likewise improved since these studies were undertaken. The contingent valuation studies also predate significant improvements in contingent valuation methods. Moreover, 5 of the 26 studies address risk-income trade-offs in non-U.S. contexts, which further raises questions about their applicability for U.S. policy and regulatory analysis.

Second, the discussion on p. 50 states that "the empirical evidence on age and VSL is mixed" with no reference to the literature, except for a cite to a 2003 OMB memorandum. This is a case where the literature has evolved quite substantially since the 2003 guidance, and simply repeating what was in old guidance does a disservice to the agencies relying on this guidance. It is also confusing to state that agencies "should not use an age-adjustment factor in an analysis using VSL estimates" (p. 50), and then immediately follow this with a discussion of VSLY and age-adjusted VSLY. VSLYs adjust for age (to be more specific, for life expectancy), and to claim that senior citizens should have higher VSLYs requires a citation to literature beyond the 2003 OMB memorandum.

The theoretical literature includes an extensive number of papers that present simulations calibrated to U.S. labor market and household data. Shepard and Zeckhauser (1984) illustrates the two common findings in the applied theory literature: the value of reducing mortality risk may decline over the life cycle or may take an inverted-U shape over the life cycle. The balance of this extensive literature falls within these two cases and illustrate how the life-cycle pattern of consumption coupled with life expectancy influences the life-cycle pattern of willingness to pay to reduce mortality risk. The bottom line is that at some point in the life cycle, WTP to reduce mortality risk begins to decline for a given population of individuals as they move from middle age to later ages in the life cycle. See: Aldy and Smyth (2014), Arthur (1981), Cordoba and Ripoli (2017), Hall and Jones (2007), Johansson (2002), Murphy and Topel (2006), Rosen (1988), Shepard and Zeckhauser (1984).

In terms of revealed preference papers, Viscusi and Aldy (2003) reviewed the early hedonic wage literature on how labor market compensating differentials varied with age. In the eight papers that tested empirically for such a relationship – using an age-risk interaction in the estimation models – five found negative, statistically significant coefficient estimates on the interaction. The three insignificant findings are for an Indian sample (used in two papers) and a Canadian sample in the other. A number of more recent papers have included more flexible empirical models for estimating how the VSL varies over the life-cycle, with many finding empirical support for an inverted-U shape over the life cycle. See: Aldy (2019), Aldy and Viscusi (2008), Evans and Schaur (2010), O'Brien (2018), Viscusi and Aldy (2007). The

stated preference literature has been mixed, and Krupnick (2007) is one source for a review of many of these studies.

The claim that VSLY is not age-invariant is consistent with several papers in the literature, including the simulation in Hall and Jones (2007) and the wage hedonic model in Aldy and Viscusi (2008).

Equity Weighting

The discussion and proposal of equity-weighted estimates of benefits and costs appear to be a solution in search of a problem. The discussion of equity weights focuses on approaches that would increase the weight of low-income households' willingness to pay for benefits (or the costs they would bear). This presumes that the status quo practice in agency RIAs assigns benefit measures for specific outcomes that vary with income. This is rarely the case in practice.

By far the single largest monetized outcome in executive branch RIAs is reduction in mortality risk, which is monetized with the value of statistical life (VSL). Agencies apply a common VSL to affected populations – at least within a given point in time. By applying a common VSL across all populations affected by a regulation, regardless of differences in income or other factors that may influence willingness to pay to reduce mortality risk (such as age), agencies status quo practice reflects an implicit, equity-weighted approach to valuing benefits. The recent paper by Kniesner and Viscusi (2023) does a nice job of illustrating this. The database of EPA Clean Air Act RIAs over 1997-2020 compiled and reviewed in Aldy et al. (2021) presents monetized values for benefits and costs by pollutant and outcome category. Not a single RIA out of the nearly 50 RIAs produced by EPA for final Clean Air Act rules over this time period monetizes an outcome measure as a function of income (or other sociodemographic characteristic). (This excludes adjusting the population-wide VSL for income growth over time.) This point is acknowledged in the last paragraph of section 10 in the context of the VSL, but it is applicable to many other benefits categories as well.

I also have a concern about how the increased demands on analysts in conducting RIAs may cause them to opt to undertake an equity-weighted BCA at the expense of presenting more detailed information about the distribution of benefits and costs. For example, a time- and resource-constrained agency may claim that it doesn't really need to present the distribution of impacts if it has already undertaken an equity-weighted BCA. The problem is that an equity-weighted BCA risks appearing as a black box and does not convey information on whether a rule is expected to deliver more benefits than costs for the lowest income decile, for example, or delivers benefits in a progressive manner, or some other way of interpreting the distributional impacts of a rule.

The guidance should emphasize the importance of presenting the distribution of benefits and costs in a clear, tabular manner. For example, OMB could provide a template for distribution of impacts by income decile, for example analogous to Table 6 in Treasury's analysis of a carbon tax (Horowitz et al. 2017). This would enable the interested reader to apply their preferred distributional analysis lens (or social welfare function) – net social benefits for those with lowest incomes, progressivity of benefits across income deciles, etc. – to interpret the impacts of the rule.

2. **Where the guidance reflects assumptions, are they supported by the theoretical and empirical peer-reviewed academic literature in economics, or other relevant disciplines? If unsupported assumptions are identified, are there alternatives you would recommend? Please provide supporting references for both parts of the response—concerns about assumptions, if any, and suggested alternatives.**

Analytic Baselines and Alternatives

At the start of section 4 on p. 12, the list of potential examples of ways in which conditions will change absent the regulation should also include other public policies. For example, tax policy, state/local regulatory actions, and regulatory actions by other federal regulators could influence how conditions would change in the absence of the regulation. Recommending rewriting the sentence in question to read: "In other cases, particular attention should be paid to ways in which conditions will change absent the regulation – e.g., technological advances, demographic changes, changes in the economy, **other policies and regulations**, or alterations to the climate – that will significantly affect the estimated effects of the regulation."

Related to this, I recommend that the discussion of Alternative Regulatory Approaches in section 6 emphasize the value of considering other policy instruments in an alternatives analysis. The circular should call on agencies to identify one policy strategy beyond the scope of their regulatory authority as an alternative to evaluate. As written in the draft, this is merely mentioned as an option on p. 23 in sub-section a. Such an analysis could illustrate how statutory reform could lower the costs, increase the benefits, or improve the distribution of impacts of making progress remedying the identified market failure. In doing so, it could serve to illustrate how regulators can inform legislators on crafting more effective statutes. Such an analysis may also help illustrate how other policies and regulations may influence the construction of the baseline for the analysis of the preferred regulatory action.

For example, the RIA for EPA's 2015 Clean Power Plan (rule at 80 FR 64662 and RIA here) does not address the production tax credit for wind and other renewable power or the investment tax credit for solar. These tax expenditures had long been a part of the internal revenue code, subject to frequent sunsets and extensions. An alternative to the CPP could have been a modeled long-term extension of these tax credits. Such an analysis would have been feasible with the EPA modeling tool used for the CPP, and would have been insightful given the tax credit extensions in the December 2015 law, Consolidated Appropriations Act, 2016 (P.L. 114-40) and the August 2022 law, Inflation Reduction Act of 2022 (P.L. 117-169). EPA could have undertaken an extended tax credits scenario as a policy alternative and/or as the basis for an alternative baseline.

The discussion of Different Enforcement Methods, sub-section c, could also task agencies to explain how a regulation is designed to facilitate 100% or near-complete compliance. Instead of taking the default approach of 100% compliance – without explanation – such a requirement could require the regulator make the case for 100% compliance. For those agencies taking compliance seriously at the regulatory design stage, such a requirement should impose little additional burden on them. For more on the importance of accounting for compliance at the rule-writing stage, refer to Giles (2022).

Cost Estimation and Competition

The cost estimates should explicitly note what is assumed about the nature of competition in the relevant markets influenced by the proposed regulation. In many RIAs, the regulator generates estimates of resource costs without discussion of how these influence competition, including market entry, market exit, mark-ups, etc. As a result, the full welfare costs of the regulation are not identified in the RIA. The circular should require agencies to specify their assumption about competition in the discussion of this issue on page 56.

Imperfect Information

The draft circular groups imperfect information and asymmetric information into a single category of market failure. This is incorrect. Asymmetric information is clearly a market failure, although the explanation of it is much too narrow in the second sentence of sub-section iii on p. 18. Asymmetric information – adverse selection and moral hazard – is about much more than "negotiating a transaction." Asymmetric information undermines market efficiency and reduces social welfare. Hence, the case for policy intervention to remedy asymmetric information (assuming the information can effectively remedy the market failure and increase social welfare). Imperfect information, however, does not "lead to inefficient markets." It creates an incentive for buyers and sellers to search for and acquire necessary information. I recommend splitting asymmetric information and imperfect information into separate discussions. If the discussion of imperfect information is maintained, it should be reframed in the context of behavioral biases in sub-section iv.

3. **Does the guidance appropriately recognize and account for potential challenges for implementation (e.g., technical feasibility or constraints on data availability or other resources)?**

Scope of Analysis

The geographic scope of analysis is generally quite good. In discussing when it is appropriate to include effects experienced by those residing abroad, it would be valuable to task agencies to: (a) explicitly reference the relevant effects that motivate this consideration; and (b) explicitly note how this information will be conveyed to other countries / relevant international institutions. For example, the agency should explain why the action has a material impact on the well-being in other countries – such as the reduction of GHG emissions causing climate change, or enhanced public health surveillance that reduces infectious disease transmission, or compliance with multilateral trade agreements. If such a measure is justified by either the third or fourth bullet on page 10, then the agency should also explain how it would communicate the use of a broader-than-domestic measure to other countries and institutions in order to leverage action or demonstrate compliance. For example, the agency could indicate that it will report the use of a global social cost of carbon through the U.S. government's regular reporting under the Article 13 transparency mechanism of the Paris Agreement, or that it would report its consideration of other countries' impacts under a regulation relevant to U.S. trade obligations (e.g., WTO) through the WTO's Trade Policy Review Mechanism.

In the abstract, I support the consistency principle elaborated on page 10 that calls for a consistent geographic scope for costs and benefits. In practice, however, I recommend a de minimis exception to the consistency guidance. By its very nature, EO 12866 and this draft circular embrace the concept of exempting rules from analysis if their economic impacts are expected to be small (e.g., less than $100 million in annual impacts). The value of economic analysis is likely lower for regulatory interventions with small economic impacts. Likewise, the value of extending an assessment of benefits and costs globally for a regulation, if one outcome has meaningful global impacts, may be small if all other benefits and costs categories likely have modest impacts. The circular could suggest that agencies undertake a preliminary assessment to determine if any other outcome categories have more than de minimis impacts and, if any do, then recommend that they conduct a fuller analysis of these impacts. The circular could task agencies with defining de minimis – it may differ across various agencies and regulatory contexts – or it could establish a default standard – such as a preliminary assessment that accounting for global impacts for a given benefit or cost measure would alter its monetized value by more than X percent relative to the domestic monetized value for that outcome. The choice of X – just as the choice of $100

million in annual impacts – is arbitrary. A reasonable default for X could be 10 percent, but other reasonable defaults could be identified as well.

4. **Do you have any other suggestions for improving the completeness, objectivity, and/or transparency of agency regulatory analyses? If so, how might these be incorporated into guidance?**

Discount Rates

Given the empirical evidence of declining market rates in recent years, the revision down of the primary discount rate for RIAs is reasonable. I have some concerns about the use of one rate, as opposed to multiple rates to convey uncertainty in the appropriate discounting of the future streams of benefits and costs. The extensive discussion of discount rates – running about ten pages in the draft circular – could be streamlined considerably. Most agency analysts will simply want to know what estimate or estimates for the discount rate that should be used in their rulemakings.

Retrospective Analysis

While the subject of the draft Circular A-4 is "Regulatory Analysis," it would be more accurate to introduce the circular, as written, with the subject "Prospective Regulatory Analysis." On page 2 of the draft, the third sentence under 1.a. should then be rewritten (edit in bold) so that it reads "A high-quality regulatory analysis is designed to inform policymakers, other government stakeholders, and the public about the **expected** effects of alternative actions." In the spirit of modernizing regulatory review, however, this draft circular misses a major opportunity to institutionalize guidance for retrospective regulatory analysis.

EO 12866 states "each agency shall submit to OIRA a program, consistent with its resources and regulatory priorities, under which the agency will periodically review its existing significant regulations to determine whether any such regulations should be modified or eliminated so as to make the agency's regulatory program more effective in achieving the regulatory objectives, less burdensome, or in some greater alignment with the President's priorities and principles set forth in this Executive order (Section 5(a)). Retrospective review of regulations have occurred through every administration since the Carter Administration, although the impact of doing so has been hampered by lack of rigorous analysis, insufficient culture of review (in contrast to prospective analysis), and absence of guidance for undertaking retrospective analysis.

With the Foundations for Evidence-Based Policymaking Act – and extensive guidance from OMB on its implementation to the agencies, as well as multiple recommendations from the Administrative Conference of the United States that draw from academic expertise (including 2014-05 and 2021-02), there is now the institutional basis and the intellectual guidance to inform OIRA guidance on retrospective regulatory analysis. This could likewise build on EO 13563. Relevant research papers and related scholarship relevant to doing so include: Aldy (2014), Bennear and Wiener (2021), Coglianese (2012), Greenstone (2009), and Sunstein (2011).

Given the resource demands – and need for agencies to develop expertise and learn from experience – guidance on retrospective analysis could establish a standard for identifying those major regulations that merit planning for retrospective analysis. For example, a regulation with ex ante estimated impacts of at least $1 billion per year could be required to undergo such planning for retrospective analysis. Agencies may also have the option to develop a retrospective analysis plan for smaller rules where they believe there could be substantial learning that would benefit future agency rulemakings (whether on the statutory

authority in question, or other statutory authorities). More generally, refer to the recommendations under paragraph 5 of ACUS Recommendation 2014-05.

The RIA and associated regulatory preamble could present the retrospective analysis plan. As noted in the papers cited above as well as in the ACUS recommendations and the OMB guidance on the Evidence Act, planning for evaluation at the policy design stage will facilitate the collection of necessary data, enable more rigorous analysis, and enhance agency incentives for undertaking retrospective analysis. Paragraph 2 of ACUS Recommendation 2014-05 provides a roadmap for agency development of a retrospective analysis framework for any given regulatory proposal. Such a plan for evaluating regulatory performance would also illustrate both the most important impacts of a regulatory proposal and those areas of uncertainty that could be addressed through regulatory evaluation.

5. **What practices might be identified in the guidance to encourage accounting for non-monetized (possibly also non-quantified) effects?**

The guidance does a good job in discussing and addressing non-monetized / non-quantified impacts.

6. **Do you have suggestions that would improve the clarity and logical presentation of the guidance and/or ease execution of analyses?**

Cost-Effectiveness Analysis

The circular should present even stronger guidance on the default presumption that agencies should conduct benefit-cost analysis in lieu of cost-effectiveness analysis. The traditional justification – challenges in monetizing benefits – is weaker today than in the past. The emergence of a richer literature, tools, and data for monetizing a quantified outcome, or in transferring a benefits measure from a related context to the regulatory context, will result in fewer cases where the regulator can quantify a given benefits outcome but cannot identify an appropriate way to monetize this quantified benefits outcome. The draft circular provides several examples over pages 5-7 that attempt to illustrate how to generate a cost-effectiveness measure for a quantified benefits outcome that is typically monetized. For example, at the top of page 5, the draft refers to energy savings associated with new technologies – which are typically represented as benefits in RIAs for DOE appliance efficiency standards, DOT fuel economy standards, and EPA tailpipe CO2 emissions standards; and the discussion of "lives saved" and "life years" on page 7 – which are typically monetized with a VSL or VSLY, such as in RIAs by EPA or, in the past, FDA.

The value in cost-effectiveness analysis lies in learning about the relative value across multiple regulations affecting the same or a similar set of benefits outcomes. For example, several academic papers have compared the cost per life saved across various government regulations (e.g., Viscusi and Gayer 2002). The circular could task agencies to present key cost-effectiveness measures that are common across regulations – e.g., reduced mortality risk, energy savings, reducing greenhouse gas emissions, etc. – to facilitate an assessment of the cumulative impact of regulatory interventions. Significant dispersion in such cost-effectiveness measures could provide evidence of where future statutory or regulatory reforms could realize a given quantified benefit outcome at lower cost. Alignment in costs per quantified benefit outcome could show how the set of regulatory interventions affecting a given benefit outcome are cost-effective.

7. **Should the guidance include suggestions of broadly useful data sets? If so, which data sets, and how should this information be presented in the guidance? How should the guidance reflect best practices related to data quality (including timeliness of data)?**

Given the extensive length of the draft circular – and the need to shorten it to increase its clarity and value to agencies – I do not recommending adding new references to relevant data sets. As an alternative, OIRA could work with its OMB colleagues to make available relevant and regularly updated data sets and related resources on www.evaluation.gov.

8. **Do you have any additional recommendations for ensuring that the guidance and associated methodologies are supported by the theoretical and empirical peer-reviewed academic literature in economics, or other relevant disciplines? If so, please provide them here.**

In addition, please feel free to provide a general summary of your comments and recommendations.

References

Aldy, J. E. 2014. Learning from experience: an assessment of the retrospective reviews of agency rules and the evidence for improving the design and implementation of regulatory policy. Report produced for the Administrative Conference of the United States.

Aldy, J. E. 2019. Birds of a feather: Estimating the value of statistical life from dual-earner families. *Journal of Risk and Uncertainty 58*(2-3): 187-205.

Aldy, J.E. and Viscusi, W.K. 2008. Adjusting the value of a statistical life for age and cohort effects. *The Review of Economics and Statistics 90*(3): 573-581.

Arthur, W. B. 1981. The economics of risks to life. *The American Economic Review 71*(1): 54-64.

Aldy, J., Kotchen, M. J., Evans, M., Fowlie, M., Levinson, A., & Palmer, K. (2021). Cobenefits and regulatory impact analysis: Theory and Evidence from federal air quality regulations. *Environmental and Energy Policy and the Economy*, *2*(1), 117-156.

Bennear, L. S., & Wiener, J. B. 2021. Institutional roles and goals for retrospective regulatory analysis. *Journal of Benefit-Cost Analysis*, *12*(3), 466-493.

Coglianese, C. 2012. Moving forward with regulatory lookback. *Yale J. Reg. Online*, *30*, 57.

Evans, M. F., & Schaur, G. 2010. A quantile estimation approach to identify income and age variation in the value of a statistical life. *Journal of Environmental Economics and Management 59*(3): 260-270.

Giles, C. 2022. Next generation compliance: environmental regulation for the modern era. Oxford University Press.

Greenstone, M. 2009. Toward a culture of persistent regulatory experimentation and evaluation. *New perspectives on regulation*, *111*, 116-19.

Hall, R. E., & Jones, C. I. 2007. The value of life and the rise in health spending. *The Quarterly Journal of Economics 122*(1): 39-72.

Horowitz, J. K., Cronin, J. A., Hawkins, H., Konda, L., & Yuskavage, A. 2017. *Methodology for analyzing a carbon tax*. Department of the Treasury. Working Paper 115.

Johansson, P. O. 2002. On the definition and age-dependency of the value of a statistical life. *Journal of Risk and Uncertainty 25*(3): 251-263.

Kniesner, T. J., & Viscusi, W. K. 2023. Promoting Equity through Equitable Risk Tradeoffs. *Journal of Benefit-Cost Analysis*, 1-27.

Krupnick, A. 2007. Mortality-risk valuation and age: stated preference evidence. *Review of Environmental Economics and Policy 1*(2): 261-282.

Murphy, K. M., & Topel, R. H. 2006. The value of health and longevity. *Journal of Political Economy 114*(5): 871-904.

O'Brien, J. 2018. Age, autos, and the value of a statistical life. *Journal of Risk and Uncertainty 57*(1): 51-79.

Rosen, S. 1988. The value of changes in life expectancy. *Journal of Risk and uncertainty 1*(3): 285-304.

Shepard, D. S., & Zeckhauser, R. J. 1984. Survival versus consumption. *Management Science 30*(4): 423-439.

Sunstein, C. R. 2011. Empirically informed regulation. *U. Chi. L. Rev.*, *78*, 1349.

Viscusi, W. K. 2004. The value of life: estimates with risks by occupation and industry. *Economic Inquiry*, *42*(1), 29-48.

Viscusi, W. K., & Aldy, J. E. 2003. The value of a statistical life: a critical review of market estimates throughout the world. *Journal of risk and uncertainty*, *27*, 5-76.

Viscusi, W. K., & Gayer, T. 2002. Safety at any price. *Regulation*, *25*, 54.

Individual Peer Reviewer Comments: Glenn Blomquist

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Benefit-Cost Analysis in Regulatory Impact Analysis

Credit to the many scholars and practitioners who have contributed to regulatory analysis during the more than 20 years that preceded 2003 Circular A-4 and the 20 years of guidance under it. They have made the endurance of the fundamentals of benefit-cost analysis at the heart of that guidance remarkable.

Like the existing guidance, the proposed 2023 revision to Circular A-4 is intended to aid agencies in their analysis of benefits and costs of regulations. Like the existing guidance, the proposed revision is intended to inform policymakers, other government stakeholders, and the public about the effects of alternative actions. Elaboration in the proposed revision leads to a document that is nearly twice the length of the original. Credit to the contributors for updating and for offering recommendations that reinforce existing guidance and others that would change guidance. I share the goal of shaping a revision that will endure 20 years as did its predecessor and offer my thoughts on how to do it.

The expanded proposed guidance includes some recommendations and examples that will aid agencies in performing quality benefit-cost analysis and that are favorite points of emphasis when I teach benefit-cost analysis.

- Benefit-cost ratios are not meaningful indicators of net benefits and should not be used for that purpose. (page 4)
- Be cautious using cost-effectiveness ratios and try to use willingness to pay estimates in valuing health risks. When those preferred estimates are unavailable there is a registry of CEA estimates in the Center for the Evaluation of Value and Risk in Health at Tufts University. (pages 6-7)
- It is difficult to show positive net benefits for price controls, quotas, mandatory uniform quality standards and controls on entry to employment or production. (page 27)
- Results should include presenting total and incremental net benefits for alternatives with different degrees of stringency. (page 27)
- Results should be presented with estimates of benefits and costs in constant dollars indexed to the same year expressed in discounted dollars. (pages 27-28 and 74)
- The sections on revealed preference, stated preference, and benefit transfer methods are excellent in that they reflect progress made in estimating methodology and technique. (pages 31-38).
- Estimates of benefits and costs should include gains or losses of time and discomfort or inconvenience. There was a time when the National Highway Safety Administration refused to include time costs of the 55 mph speed limit on rural highways or acknowledge discomfort and inconvenience costs of safety belts and shoulder harnesses that did not adjust automatically. (page 52)

This valuable guidance reflects best practice. I applaud their inclusion in this much-anticipated proposed revision to Circular A-4.

Benefit-Cost Analysis - Fundamentals

Benefit-cost analysis is a protocol for assessing alternative public policies in terms of efficiency primarily. BCA is guided by economic and econometric theory. Efficiency is assessed in terms of net benefits. Policies are identified that would maximize net benefits, i.e., the greatest good for the greatest number. Evaluation is in terms of the goodness of consequences and outcomes. Tradeoffs with equity and other

non-efficiency values are identified and estimated when feasible and important. Social norms set the boundaries for acceptable alternatives.

A widely used definition consistent with the one above is that benefit-cost analysis "is a policy assessment method that quantifies in monetary terms the value of all consequences of a policy to all members of society … The broad purpose … is to help social decision-making and to increase social value or, more technically, to improve allocative efficiency."[6]

An essential element of benefit-cost analysis is valuing impacts by monetizing them as benefits and costs. Benefits are policy impacts that are valued in terms of individuals' willingness to pay, often reflected in their estimated demand. Costs are the opportunity cost of producing the impact. They are often measured by the value of the resources in the next best alternative as reflected in the supply of the resources. They are a vital part of the estimate of net benefits of the policy impact on efficiency.[7]

A complementary element of benefit-cost analysis is estimating distributional impacts to show net benefits (changes in benefits less changes in costs) for groups or subgroups. The 2003 Circular A-4 guidance is: "Your regulatory analysis should provide a separate description of distributional effects (i.e., how both benefits and costs are distributed among sub-populations of particular concern) so that *decision makers can properly consider them along with the effects on economic efficiency. Executive Order 12866 authorizes this approach* (my italics*)*. Where distributive effects are thought to be important, the effects of various regulatory alternatives should be described quantitatively to the extent possible, including the magnitude, likelihood, and severity of impacts on particular groups." (page 14). The biggest advantage of this practice is keeping the focus of benefit-cost analysis on efficiency and yet enabling decisionmakers to weigh the importance of the estimates of changes in efficiency and changes in distribution together.

If distributional effects are anticipated to be important for a regulation or policy, estimating net benefits to groups or subgroups is warranted regardless of any weights that one might want to use to combine the efficiency and distributional impacts. However, estimating the distribution of net benefits can be a challenge.

Distributional Effects Estimation is Hard

The proposed 2023 revision of Circular A-4 encourages use of distributional weights on estimated benefits and costs, recommends a specific weighting scheme, and shows how to use it. Reaching consensus on the use and specific weighting scheme will be a challenge, but based on my experience, estimation of distributional effects can be even more challenging. Rigorous estimates should incorporate credible baselines, private behavior, and markets for housing, labor, and amenities. Homeownership and locational mobility can matter especially over time.

Consider the pioneering work by V. Kerry Smith et al. done at the time the 2003 Circular A-4 was written. They estimated a general equilibrium willingness to pay for policy scenarios that improve air quality in the Los Angeles area. Benefits were evaluated taking account of the initial air quality, relocation based on changes in ozone, and price changes, particularly rents. An advantage of this approach is that they could rank the 103 school districts by average income and estimate net gains from the air quality improvement at the new equilibrium. They find households in the lowest ranked community lose despite the cleaner air, and that households in high income Beverly Hills gain the most in absolute value. Comparisons of

[6] Anthony E. Boardman, David H. Greenberg, Aidan R. Vining, and David L. Weimer, *Cost-Benefit Analysis: Concepts and Practice.* 5th ed. (New York: Cambridge University Press, 2018), page 2.
[7] A.C. Harberger, "Three Postulates for Applied Welfare Economics: An Interpretive Essay" Journal of Economic Literature, 9,3 (1971): 785-797.

willingness to pay estimates are made to benefit estimates using a damage function approach with the inherent assumption that households do nothing different in response to the changes in environmental conditions.[8] Today we have better sorting models, econometrics, computing power, and data, but estimating distributional effects well is still hard.

Estimating distributional effects of environmental regulations has been challenging in understanding environmental justice and related policies. Correlations between pollution exposure and income or pollution and race may be documented, but the mechanism that produces them matters for estimating distributional effects. If correlation exists as a result of residential sorting and residents move and resort as a result of a new regulation, members of the disadvantaged group can be worse off due to gentrification. They initially benefit but then must pay too much more for the housing with more amenities to stay. Spencer Banzhaf, Lala Ma, and Chris Timmins review this effect as well as the effects of going to the nuisance (because of lower rents), Coasian bargaining and others. They write:

"Given the current distribution of pollution exposure, the direct effects of environmental improvements will generally be progressive in the sense that the improved quality of life and health should be enjoyed especially by those of lower socioeconomic status. But on the other side, the indirect effects of environmental improvement on housing prices (gentrification) and energy prices may be especially burdensome to the poor."[9]

Estimating distributional effects of proposed regulations is demanding and can produce effects that differ in sign from those based on correlations. Estimating only distributional effects for benefits and failure to estimate distributional effects for costs can distort estimates of net benefits that make advantaged and disadvantaged groups worse off.[10] If ex ante analysis indicated that unwanted result, it would suggest the regulation be modified or combined with another public program that mitigates the undesired distributional effect.

Distributional analysis of subsidies can be more manageable than that for regulations when characteristics of the recipients of rebates and those who pay for the rebates can be identified and measured. For example, the net distributive effect for plug-in electric vehicles in California has been estimated ex post by Arthur Ku and John Graham.[11] Their distributive analysis shows that the overall net financial impacts of the electric vehicle rebate program are regressive. The cost distribution is slightly progressive, but the distribution of financial benefit distribution is highly regressive. Again, distributional analysis suggests future subsidy programs be (further) modified to mitigate the undesired net effect.

Distributional analysis that incorporates distributions of regulatory costs as well as regulatory benefits could have motivated EPA to combine promulgation of a new regulation with funding under a nonregulatory program. Caroline Cecot describes a notable example of how EPA acknowledged what she calls a potential equity blindspot with its plans to regulate per- and polyfluoroalkyl substances (PFAS)

[8] V.K. Smith, Holger Sieg, H. Spencer Banzhaf, and Randall P. Walsh, "General Equilibrium Benefits for Environmental Improvements: Projected Ozone Reductions under EPA's Prospective Analysis for the Los Angeles Air Basin" *Journal of Environmental Economics and Management* 47 (May 2004): 559-584. Smith was a peer reviewer of the 2003 Guidance.
[9] Spencer Banzhaf, Lala Ma, and Christopher Timmins, "Environmental Justice: The Economics of Race, Place, and Pollution," *Journal of Economic Perspectives* 33,1 (2019): 185–208. Quote on page 203.
[10] Spencer Banzhaf, Lala Ma, and Christopher Timmins, "Environmental Justice: The Economics of Race, Place, and Pollution," *Journal of Economic Perspectives* 33,1 (2019): 204.
[11] Arthur L. Ku, John D. Graham, "Is California's Electric Vehicle Rebate Regressive? A Distributional Analysis" *Journal of Benefit-Cost Analysis* 13,1 (2022): 1-19.

contamination in drinking water when it announced that there would be limited availability of funds to communities that would have difficulty complying.[12]

Overall benefit-cost analysis of regulations can be challenging enough for agencies. Ex ante distributional analysis of net benefits to selected disadvantaged groups or subgroups is harder. It is particularly hard to estimate distributions of regulatory costs. Much work remains before confidence in estimates on the distribution of net benefits becomes the norm.

Recognition of the importance of making progress in distributional analysis of regulatory costs is evidenced by the choice of topic for the Society for Benefit-Cost Analysis (SBCA) organized session at the Allied Social Sciences Association annual meetings to be held January 5-7, 2024, in San Antonio, TX.

Title: "The Missing Piece: How are Regulatory Costs Distributed?"

Abstract: Much attention is now focused on better understanding how regulatory impacts are distributed across advantaged and disadvantaged populations, yet little attention is being paid to methods for assessing the distribution of costs for individual rules. Understanding how costs initially imposed on industry are distributed across individuals in different income or other groups is essential to estimating the extent to which net benefits aggravate or ameliorate existing inequities. Some researchers have investigated the distribution of aggregate costs across many regulations or assessed the general equilibrium effects of large individual regulations. Little is known, however, about the extent to which the costs of smaller regulations are passed on as price increases, wage decreases, or reduced returns to capital. The distributional effects of passing on costs via each pathway are also not well-understood. The heightened attention to distribution stems in part from increasing awareness of existing inequities and in part from President Biden's Modernizing Regulatory Review executive order and update of the best practice guidance in OMB's Circular A-4, "Regulatory Analysis." However, similar emphasis can be found in presidential executive orders dating back to 1993, and reviews suggest that little analysis of distributional impacts has been completed.

This roundtable brings together leading experts across policy areas to discuss possible methodological improvements, focusing on U.S. regulations. The panel will also discuss issues related to agency authority to address any inequities they find when they conduct these analyses, given that the lack of such authority may inhibit attention to assessing and addressing these impacts. Moderator: Lisa A. Robinson (Harvard University). Panelists: Lori Bennear (Duke University), Don Kenkel (Cornell University), Joshua Linn (University of Maryland), David Mitchell (Washington Center for Equitable Growth), and Ann Wolverton (U.S. Environmental Protection Agency).

The point is that distributional analysis of regulatory costs is hard, and much work should be done to advance best practice.

Distributional Weights and Benefit-Cost Analysis

Distributional analysis should be part of any complete benefit-cost analysis so that decisionmakers can make informed decisions about tradeoffs between expected changes in efficiency and distribution.

The proposed 2023 revision of Circular A-4 and the Preamble to it emphasize distributional analysis in benefit-cost analysis of regulations. Guidance is given that will likely aid agencies present distributional analysis qualitatively and quantitatively when possible. Given how hard it is to estimate distributional net

[12] Caroline Cecot, "An Equity Blindspot: The Incidence of Regulatory Costs" *Journal of Benefit-Cost Analysis*, 14,1 (2023): 35-43.

effects, this guidance will be useful. The Guidance departs from standard benefit-cost practice in the US by allowing *primary* estimates of net benefits be based on analyst-weighted estimates of benefits and costs with net benefits based on market values relegated to *supplementary* estimates (page 65). OMB has determined that 1.4 is a reasonable estimate of the income elasticity of marginal utility for use in distributional analysis of regulations in which annual income is the measure disadvantage (page 65). The Preamble particularly makes the case for distributional analysis done this way.

A balanced perspective would not yield as strong a case for a primary estimate of net benefits using analyst-weighted estimates based the 1.4 parameter. For example, the description of diminishing marginal utility as representative of consumer behavior is too limited. The additional unit of a good may be less valuable to a person as they have more of it when describing a good such as an ice cream cone. It is less intuitive when thinking about the myriad of market goods and services such as types of foods, clothing, housing, communication devices, travel, entertainment, hobbies, and nonmarket goods such as location specific amenities, philanthropic contributions, bequests, and more.

Comparison of marginal utilities among individuals is controversial and diminishing marginal utility does not imply that marginal utility from a specified dollar gain in income for a high-income person will be less than the marginal utility from the same specified dollar gain in income for a person with less income.[13] The implication is for two situations for one person, not two different individuals.

It is worth keeping in mind that even with diminishing marginal utility of consumption, income matters. *If* one is willing to make comparisons among individuals with similar levels of happiness or emotional well-being, a recent study by Matthew A. Killingsworth, Daniel Kahneman, and Barbara Mellers shows that happiness increases with log(income) throughout almost the entire range of income. At the bottom of the happiness distribution, happiness rises fastest at low levels of log(income). But, beyond low levels of income, very happy people gain much more with more income than unhappy people. The top part of the distribution of happiness increases with log(income) more quickly at non-low levels of income compared to the lower 20% of the happiness distribution which gains little additional happiness.[14]

Based on my experience, I recommend primary estimates of net benefits be based on market values and that any estimates based on distributional weights, such as weights using 1.4 as an estimate of the income elasticity of marginal utility, be offered as supplementary estimates. The first reason is that distributional analysis of net benefits is hard and likely to be estimated with less precision and confidence than overall net benefits. Mixing the distributional estimates with the overall estimates will reduce transparency and convey less useful information to the decisionmaker.

[13] See H. Spencer Banzhaf, Comment on proposed revision to OMB Circular A-4, (June 16, 2023), https://www.regulations.gov/comment/OMB-2022-0014-0158. He writes: 'As already suggested, a second problem with the current draft is that it moves too quickly to weighted benefit-cost analysis (sub-section e). Weighted BCA has the potential to be a valuable tool in distributional analysis. But it also raises many uncomfortable questions. In particular, it introduces—even imposes— judgements about the relative value of different groups, judgements which cannot be grounded in facts in the same way as can other aspects of BCA. For example, even if the "curvature" of individuals' cardinal utility functions is known, it is a philosophical leap from there to the required weights, as Lionel Robbins explained many years ago.* This leap is illustrated by the preamble, which makes the common mistake of stating, "a standard assumption in economics is $100 for poor increases welfare more than $100 for a rich person." Actually, the standard assumption is that the same person would value a $100 more if poor than if rich. The leap is from that claim to the interpersonal comparisons." * Lionel Robbins, *An Essay on the Nature and Significance of Economic Science*, 2nd ed., 1935, London: Macmillan.

[14] Matthew A. Killingsworth, Daniel Kahneman, and Barbara Mellers. "Income and Emotional Well-being: A Conflict Resolved" *PNAS* 2023 Vol. 120 No. 10, pp 1-6.

The second reason is to preserve the core of benefit-cost analysis that has provided crucial information about allocative efficiency effects of regulations. It may be the sole source of information about overall efficiency in the policy process. The primary net benefit estimate should be based on this core analysis. This core benefit-cost analysis is the regulatory analysis that has survived more than forty years under seven different presidents. Mixing analysis that weights net benefits based on analyst-specified values risks the integrity of the BCA that has made it useful.

In a plenary talk at the 2022 Annual Conference of the Society for Benefit-Cost Analysis, Spencer Banzhaf characterized the tension benefit-cost practitioners face as dealing with the twin callings of scientific objectivity and the art of political economy. Proper balance avoids the clumsiness of recommendations that destroy analytical credibility and avoids overcaution that risks irrelevance. He expressed his concern about assigning distributive weights: "We provide the best service by being as transparent as possible about the ways values influence BCA reasoning, without arrogating political decisions. But if we pick one "preferred" social welfare function to introduce into BCA, that is exactly what we'd be doing. Instead, we can focus on the descriptive, showing the tradeoffs among groups."[15]

Anthony Boardman et al. offer the same recommendation to treat distributional impacts separately from effects on allocative efficiency. Their view is that combining them into a single metric obfuscates the importance of each and reduces the value of the analysis to decisionmakers. They see no agreement on the most appropriate social welfare function or its parameter values. They suggest multi-goal analysis that takes into account effects on efficiency and distribution and possibly other factors that could be used to complement the primary core of benefit-cost analysis.[16]

By design OMB influences the type of regulatory analysis that will be done within the agencies that promulgate regulations. In revising Circular A-4 OMB should be sensitive to the possible types of roles that agency economists and analysts will be induced to play. They may view themselves as objective technicians equipped to perform benefit-cost analysis according to the highest professional standards. They may view themselves as advocates of causes they embrace. They may view themselves as team playing proponents of policies adopted by their agencies.[17] By encouraging agency analysts to use distributional weights in the primary analysis of net benefits OMB is pushing them to rebalance their roles toward more team playing at the potential cost of scientific objectivity that allowed benefit-cost analysis of regulations to endure through agencies serving many administrations.[18]

[15] Spencer Banzhaf, "Distribution and Disputation: Net Benefits, Equity, and Public Decision Making, *Journal of Benefit-Cost Analysis*, 14,2 (forthcoming 2023).
[16] Anthony E. Boardman, David H. Greenberg, Aidan R. Vining and David L. Weimer, "Efficiency without Apology: Consideration of the Marginal Excess Tax Burden and Distributional Impacts in Benefit–Cost Analysis" *Journal of Benefit-Cost Analysis*, 11,3 (2020):457–478.
[17] These characterizations and their implications for behavior are based on: Hank C. Jenkins-Smith, "Professional Roles for Policy Analysts: A Critical Assessment" *Journal of Policy Analysis and Management*, 2,1 (1982): 88-100.
[18] A public comment has been submitted by Paul Joskow and 11 colleagues at MIT, see https://www.regulations.gov/comment/OMB-2022-0014-0096. Due to problems associated with using income to rank households and others they do not support the routine use of distributional weights. Instead, they recommend: "when distributional effects are relevant to the agency's decision, you should summarize your results and describe your analysis in a manner that supports transparency and comprehensibility for policymakers and the public." Providing distributional tables similar to those provided by the Joint Committee on Taxation when assessing the impacts of revisions to the tax code."

To me, primary estimates of net benefits must be based on the core of benefit-cost analysis. Distributive weights in regulatory benefit-cost analysis for supplementary estimates can be one way to present distributional effects.

Scope of Analysis

The 2003 Circular A-4 covers scope of analysis with one paragraph under General Issues (page 15):

"Your analysis should focus on benefits and costs that accrue to citizens and residents of the United States. Where you choose to evaluate a regulation that is likely to have effects beyond the borders of the United States, these effects should be reported separately. The time frame for your analysis should cover a period long enough to encompass all the important benefits and costs likely to result from the rule." (my italics)

The proposed 2023 revision of Circular A-4 devotes approximately three pages to scope of analysis. Most new material is related to environmental and energy regulation designed to address carbon emissions and climate change. Regulatory effects are described to include domestic effects from regulations on foreign firms, effects on changes in foreign ecosystem services that affect U.S. citizens and residents, effects on U.S. strategic interests, and effects when they affect U.S. citizens residing abroad. Supplementary analysis could include effects on noncitizens residing abroad. Effects on noncitizens residing abroad can be included in the primary estimates of benefits and costs under some conditions including when they are not easily separated from effects on U.S. citizens.

The change in scope to include noncitizens residing abroad is huge, and it matters for estimates of benefits of regulation. My assessment is that the issue is mostly an issue of standing, i.e., whose benefits and costs count in the benefit-cost analysis. The proposed change is potentially prodigious if the agency determines that effects on citizens and residents and beyond the borders of the US cannot be separated from effects on "noncitizens residing abroad" in a practical and reasonably accurate manner. The implication is that all global effects should all be included in the primary analysis (page 10). For example, an estimate of social cost of carbon increases roughly 7-fold when scope is expanded from domestic to global.[19]

A preferred approach would be to have the focus of the primary analysis be on benefits and costs about which we know the most in terms of direct effects and on the value of them to U.S. citizens and residents within the borders of the US. Regulations that reduce carbon emissions are a public good with global effects, but the value of the effects U.S. citizens and residents depends on where risks of floods, fires, hurricanes, heat waves, and other consequences of climate change take place. Attempts to estimate how much more benefits are than the domestic value or how much less benefits are than the global value should be guided by the willingness to pay by U.S. citizens and residents.[20]

Willingness to pay to reduce risks of such unwanted events are likely greater for avoiding them within the borders of the U.S. than in other hemispheres. They would be akin to use values in willingness to pay for

[19] Kevin Rennert and Cora Kingdom, *Social Cost of Carbon 101*, Resources for the Future, (August 1, 2019), https://media.rff.org/documents/SCC_Explainer.pdf

[20] Art Fraas, John Graham, Kerry Krutilla, Randy Lutter, Jay Shogren, and Linda Thunström offer a detailed public comment on the proposed 2023 Guidance, https://www.regulations.gov/comment/OMB-2022-0014-3917 . They note that exclusive focus on global benefit and costs estimates is tantamount to assuming that U.S. citizens and residents and policymakers are indifferent whether effects occur within the U.S. or anywhere else in the world. They envision modeling at a regional scale "soft-linked" to an Integrative Assessment Model in order to estimate domestic and global estimates. They urge that both domestic and global estimates be made to inform policymakers.

recreation at U.S. parks. Use value could extend beyond U.S. borders where direct links exist because of spatial proximity. For example, U.S. citizens might have willingness to pay to reduce Canadian forest fires that produce hazardous air quality in the U.S.

The willingness to pay values of U.S citizens and residents of the types and magnitudes of regulatory effects on noncitizens residing abroad compared to values within US borders are also likely to depend on spatial proximity to the U.S. Effects on noncitizens residing in Canada and Mexico, for example, are likely to be valued by individuals and decisionmakers in the US more than effects on noncitizens residing on other continents. They are neighbors close by.

Evidence exists that distance matters. A recent stated preference study by Christian Vossler et al. estimated total economic value (use and nonuse) for a range of aquatic ecosystem improvements that varied by location, spatial scale, and scope of water quality change. They found people were willing to pay twice as much for an improvement in a watershed nearby compared to one further away. In addition, they found that extending the spatial scale beyond the home watershed did not yield additional benefits to the household.[21] Willingness to pay declines with distance for regional water quality improvements. Willingness of U.S. citizens and residents to pay for reduced risks of climate related unwanted events is also likely to decline with distance from the U.S. It will also depend on special features. People contribute to the Nature Conservancy to protect the Amazon, for example.

The willingness to pay values by U.S. citizens and residents of the types and magnitudes of regulatory effects on noncitizens residing abroad compared to values within U.S. borders are also likely to depend partly on geopolitical factors. Effects on noncitizens residing countries such as Canada, Mexico, Germany, Finland, and Sweden are likely to be valued by individuals and decisionmakers in the U.S. more than effects on noncitizens residing on some other countries. U.S. relations with them are good. Effects on noncitizens residing in sanctioned countries such as Iran, North Korea, and Russia are likely to be valued less.

The 2023 proposed revised Guidance allows regulatory effects expected to be experienced by nonresidents residing abroad to be included in the primary estimates of net benefits. They are allowed if regulating an externality on the basis of global effects supports a cooperative international approach that potentially could induce other countries to follow suit (page 10).

The willingness to pay values by U.S. citizens and residents to adopt a global value of benefits to increase the probability of more desirable international agreements to which all countries comply may be positive. However, those values are likely to depend on the probability of reaching an agreement and expected compliance. Expected compliance matters because, given the absence of a global governmental sovereign, compliance has an inherent voluntary component. An estimate of willingness to pay of U.S. citizens and residents for expected benefits to them of greater international cooperative might inform international negotiations. Given the difficulty in estimating such a benefit, a qualitative description might be more useful to decisionmakers than including it in a supplemental quantitative analysis.[22]

[21] Christian A. Vossler, Christine L. Dolph, Jacques C. Finlay, David A. Keiser, Catherine L. Kling, and Daniel J. Phaneuf, "Valuing Improvements in the Ecological Integrity of Local and Regional Waters Using the Biological Condition Gradient" 120,18 *PNAS* (2023): 1-8. See also Robert J. Johnston, Klaus Moeltner, Seth Peery, Tom Ndebele, Zhenyu Yao, Stefano Crema, Wilfred M. Wollheim, and Elena Besedin, "Spatial Dimensions of Water Quality Value in New England River Networks, *PNAS* 120,18 (2023): 18 1-9.

[22] Economic and legal issues regarding benefits and costs beyond U.S. borders are analyzed for social cost of carbon and other environmental regulations, see Ted Gayer and W. Kip Viscusi, "Determining the Proper Scope of Climate

The primary analysis should focus on benefits and costs to U.S. citizens and residents within the borders of the U.S.[23]

As a postscript, I add that there is an almost unique piece of (soft) evidence that willingness to pay by U.S. citizens and residents exists beyond private contributions to organizations such as Nature Conservancy. The *Wall Street Journal* bills it as the largest public statement of economists in history; 3,640 of us economists in the U.S. have signed "The Economists Statement on Carbon Dividends", see https://clcouncil.org/economists-statement/ . Two recommendations are particularly important for me.

"A sufficiently robust and gradually rising carbon tax will replace the need for various carbon regulations that are less efficient. Substituting a price signal for cumbersome regulations will promote economic growth and provide the regulatory certainty companies need for long- term investment in clean-energy alternatives." Benefit-cost analysis would continue to be useful for remaining regulations.

"To maximize the fairness and political viability of a rising carbon tax, all the revenue should be returned directly to U.S. citizens through equal lump-sum rebates. The majority of American families, including the most vulnerable, will benefit financially by receiving more in "carbon dividends" than they pay in increased energy prices." I have described how difficult it can be to estimate distribution effects well, especially for the costs of regulations. The equal lump-sum rebates will mitigate undesired distributional costs. Success in implementing the set of stimulus payments during the Covid pandemic showed that we make payments directly to citizens.

This evidence is not from a revealed or stated preference study, or a lab or field experiment, of from a representative population, but as a proxy for informed, heterogeneous U.S. citizens and residents it is a meaningful signal that people are willing to pay to mitigate unwanted effects from climate change. It is not a signal about the willingness to pay for net benefits beyond U.S. borders.

Discount Rates

The 2003 Circular A-4 draws on OMB Circular A-94 that a real discount rate of 7 percent should be used as a base-case for regulatory analysis. It is an estimate of the average before-tax rate of return to private capital in the U.S. economy (page 33). Circular A-4 goes on to say that over the last 30 years (before 2003) the real rate on long-term debt has averaged around 3 percent on a pre-tax basis. The guidance given is that for regulatory analysis, you should provide estimates of net benefits using both 3 percent and 7 percent (page 34). For regulations expected to have important intergenerational benefits or costs guidance is given, that you might consider a further sensitivity analysis using a lower but positive discount rate in addition to calculating net benefits using discount rates of 3 and 7 percent (page 36).

Change Policy Benefits in U.S. Regulatory Analyses: Domestic versus Global Approaches," *Review of Environmental Economics and Policy* 10, 2 (2016): 245-63.

[23] In public comment, V. Kerry Smith contends that expanding the scope of a benefit cost analysis to include effects on noncitizens residing abroad without a specific international agreement, approved by Congress, changes the nature of the policy being evaluated. Domestic policies concerning global externalities or public goods should be evaluated based on effects on citizens and residents of the U.S. and noncitizens residing abroad do not bear the costs of U.S. policy. His view is that discretion regarding standing converts the analyst to the policymaker and undermines the value of the benefit-cost analysis to the policymaker, see https://www.regulations.gov/comment/OMB-2022-0014-0079.

The proposed 2023 revision of Circular A-4 sets a default rate for social rate of time preference of 1.7% real discount rate based on a 30-year average of the 10-year real U.S. Treasury note rate. It applies to effect up to 30 years in the future. Long-term discounting is covered in an additional section.

The default rate of 1.7% is 530 basis points below the 2003 base-case rate of 7% and 130 basis points below the alternative 2003 rate of 3%. Discounting is not an area in which I have done research, but based on my understanding, the 1.7% simply seems too low for representing tradeoffs for the U.S. society. Rereading Arnold Harberger and Glenn Jenkins on the social discount rate offers one explanation. It is that a low rate such as 1.7% rate probably does not reflect rates for all members of society. It can reflect time preference for those who supply funds to the capital market through Treasury Inflation Protected Securities (TIPS). The relevant rate for all of society, however, should include the many persons who do not invest in TIPS. It should also include borrowers for whom the relevant rates are their credit card rates and mortgage rates.[24] Especially given the emphasis on distributive effects in the proposed 2023 revision, care should be given to include persons facing rates much higher than 1.7%. Harberger and Jenkins judge that the social rate of discount that includes all members of society is well in excess of 2 or 3% in real terms and an estimate for advanced countries such as the U.S. the rate averages about 8%.[25]

The guidance for a default rate should be higher than 1.7% and one that reflects all members of society. I suspect an inclusive rate would be higher than the TIPS rate. Given a lack of consensus, guidance should be given for at least one alternative rate for sensitivity analysis of this crucial input into the benefit-cost analysis.

William Nordhaus public comment https://www.regulations.gov/comment/OMB-2022-0014-0089 deserves careful consideration. His contributions and influence on U.S. and international science of climate change and economics more broadly are vast. His comment goes deep into finance, but I understand several key points. He is skeptical of the methodology used to support the proposed guidance on rulemaking, including discounting, because it is not settled science. By relying on the consumption capital asset pricing model (CCAPM) approach, the risk premium on investments that have returns correlated with aggregate market and correlated risks. It reflects a "capital-premium puzzle" analogous to the "equity-premium puzzle." There is no evidence in the proposed 2023 guidance that would lead to selecting as a default discount rate the risk-free rate of return rather than the returns associated with average investment. The bottom line is an appropriate discount rate would be a real risk-free rate of about 1% plus a risk premium of about 3% or 4% for a discount rate for analysis of about 4% or 5%.

The Harberger and Jenkins analysis and Nordhaus analysis, at least my reading of them, imply that the suggested default rate of discount should be at least twice the proposed 1.7%.

Behavioral Biases and Nudges

The 2003 Circular A-4 mentions behavioral economics only once in the context of willingness to pay and willingness to accept measures of value (page 18). The proposed 2023 revision of Circular A-4 adds

[24] Art Fraas, John Graham, Kerry Krutilla, Randy Lutter, Jay Shogren, and Linda Thunström offer a detailed public comment on the proposed 2023 Guidance, https://www.regulations.gov/comment/OMB-2022-0014-3917 . Their view is that the market for TIPS is not an appropriate way to measure discount rates for U.S. households because only a small share holds these Treasury securities. They report that for families below the 60th percentile, 99 percent have zero direct bond holdings for 2019. Holdings of certificates of deposit and savings bonds are less that 8 percent for families below the 60th percentile. They recommend adopting a real discount rate of 3% with 5% for sensitivity analysis.

[25] Arnold C. Harberger and Glenn P. Jenkins, "Musing on the Social Discount Rate" *Journal of Benefit-Cost Analysis* 6,1 (2015): 6-32.

addressing behavioral biases as motivation for regulation on a par with traditional market failures. Behavioral biases are described as limits on information processing and decision-making biases (pages 15 and 18). Informational approaches and nudges are offered as one alternative regulatory approach. Guidance is given that specific regulatory measures should be matched to the underlying problem and that specific regulatory measures are subject to benefit-cost analysis like other regulatory actions (pages 25-26).

Behavioral economics has contributed to our understanding of the choices people make. Nudges have been used to increase contributions to retirement plans and vaccination rates. Stefano Della Vigna and Elizabeth Linos analyze data from two Nudge Units and make comparisons to nudge results from studies published in academic journals. Both types of studies show increases in the take-up effect, but the average impact of 8% is much smaller for the larger RCTs than the 33% impact for the academic studies. They attributed most of the difference (about 70%) to selection in the academic journal publication process.[26] The meta-analysis by Maximilian Maier et al. of more than 200 studies of nudge interventions find no evidence that nudges are effective tools for behavior change.[27]

I claim little expertise on nudges, but these results point to the onus on making the case the specific nudge will successfully address the perceived problem just as the onus is on a specific regulatory measure will successfully address a perceived market failure.[28] The proposed 2023 revision to Circular A-4 already has useful references such as works by David Weimer[29] and Lisa Robinson and James K. Hammitt.[30] It would be more helpful to agencies with the addition of two more references to augment the current list.

Kip Viscusi and Ted Gayer extend the concept and practice of benefit transfer to "behavioral transfer" with emphasis on the challenge of applying results from a behavioral study in one context to another potentially different subpopulation or broader population. They discuss behavioral transfer for discounting anomalies, biases in risk beliefs, ambiguity aversion, and experienced utility.[31]

John List, Omar Al-Ubaydli, and Dana Suskind offer "BIG5" factors to consider in order to get behavior interventions to work when scaled up from smaller settings, i.e., high voltage impact. The factors are inference from intervention replications, representativeness of the population, representativeness of the situation, spillovers and general equilibrium effects, and economies and diseconomies of scale.[32]

[26] Stefano Della Vigna and Elizabeth Linos, "RCT to Scale: Comprehensive Evidence from Two Nudge Units," *Econometrica* 90,1 (2022): 81-116.
[27] Maximilian Maier, František Bartoš, T. D. Stanley, David R. Shanks, Adam J. L. Harris, and Eric-Jan Wagenmakers, "No Evidence for Nudging after Adjusting for Publication Bias" 119,31 *PNAS* (2022): 1-2.
[28] Don Kenkel has provided comprehensive on the proposed 2023 Guidance with an extensive section on behavioral economic and benefit-cost analysis, https://www.regulations.gov/comment/OMB-2022-0014-3910 . He reviews early warnings from Camerer about paternalistic regulations and Bernheim and Rangel the danger of using value judgments to determine if there are behavioral failures. Difficulties applying behavioral welfare economics to tobacco regulation and automobile fuel efficiency regulation are recounted. They exemplify reasons for the onus on those who propose a specific nudge or intervention. His recommendation is to not allow agencies to use behavioral bias or internalities as a key motivation for regulation or as a key part of quantification of regulatory benefits.
[29] David L. Weimer, Behavioral Economics for Cost-Benefit Analysis: Benefit Validity When Sovereign Consumers Seem to Make Mistakes, Cambridge University Press, 2017.
[30] Lisa A. Robinson and James K. Hammitt, "Behavioral Economics and the Conduct of Benefit-Cost Analysis: Towards Principles and Standards" *Journal of Benefit-Cost Analysis* 2,2 (2011): 1-51.
[31] W. Kip Viscusi and Ted Gayer, "Rational Benefit Assessment for an Irrational" *Journal of Benefit-Cost Analysis* 7,1 (2016): 69–91.
[32] Omar Al-Ubaydli, John A. List, and Dana L. Suskind, "What Can We Learn from Experiments: Understanding the Threats to Scalability of Experimental Results" *American Economic Review* 107,5 (2017): 282-286 and

These sources along with the guidance given in the proposed 2023 Circular A-4, could increase the probability of regulatory nudges that work and generate desired net benefits.

Monetizing Health and Safety Benefits and Costs

Keeping in mind that no changes are anticipated for this section of Circular A-4, I have but a few additions and updates.

Page 48, section i: Add Trudy Ann Cameron, J.R. DeShazo. "Demand for Health Risk Reductions," *Journal of Environmental Economics and Management* Volume 65, Issue 1, January 2013, Pages 87-109.

Page 49, footnote 82: Add H. Spencer Banzhaf, "The Value of Statistical Life: A Meta-Analysis of Meta-Analyses" *Journal of Benefit-Cost Analysis* 13,2 (2022: 182-197.

Risks to Children: Guidance that monetary values of changes in risks to children be at least as large as values for adults is still good. Evidence available since 2003 hints that values for children are greater, but agencies should take care that it is useful for the regulation being considered especially if the same regulation affects persons other than children.

Page 51, footnote 87: Add Lisa A. Robinson, William J. Raich, James K. Hammitt, and Lucy O'Keeffe, "Valuing Children's Fatality Risk Reductions" Journal of Benefit-Cost Analysis, 10,2 (2019): 156–177.

Marginal Cost of Public Funds

The proposed 2023 revision to Circular A-4 discusses treatment of transfers and advises against adjusting the estimates of net benefits of a regulation due to changes in government spending (pages 57-61). Part of the rationale is that regulations are not expected to produce large changes in government spending compared to publicly funded expenditure programs to build transportation infrastructure or provide health care to children. The discussion on page 61 might be read to imply that agencies can ignore the marginal cost of public funds.

Anthony Boardman et al. advise that the marginal cost of public funds should be included when there are substantial changes in expenditure and review existing estimates. The midpoint estimates for the U.S. range from 1.1 to 1.4.[33] Jorge Luis García and James Heckman also advise including effects of marginal excess tax burden associated with government expenditures and include it their benefit-cost estimates.[34] I note that the Best Journal of Benefit-Cost Article Award for 2022 went to Irwin Garfinkel et al. for their article "The Benefits and Costs of a Child Allowance"[35]. Adjustment is made for the marginal cost of public funds.

Changes in government expenditures associated with regulations might become more important as agencies consider pairing new regulations with new funding. In the section on the difficulty in estimating distributional costs of regulations, I briefly noted an example of EPA coordinating a new regulation on

John A. List, "The Voltage Effect in Behavioral Economics" in *The Behavioral Economics Guide 2021*, Alain Samson, ed., Behavioral Science Solutions, pp. VI-XI. https://www.behavioraleconomics.com/be-guide/the-behavioral-economics-guide-2021/

[33] Anthony E. Boardman, David H. Greenberg, Aidan R. Vining and David L. Weimer, "Efficiency without Apology: Consideration of the Marginal Excess Tax Burden and Distributional Impacts in Benefit–Cost Analysis" *Journal of Benefit-Cost Analysis*, 11,3 (2020): 457–478.

[34] Jorge Luis García and James Joseph Heckman, "Three Criteria for Evaluating Social Programs" *Journal of Benefit-Cost Analysis* 13,3 (2022) 281–286.

[35] Irwin Garfinkel, Laurel Sariscsany, Elizabeth Ananat, Sophie Collyer, Robert P. Hartley, Buyi Wang, Christopher Wimer, "The Benefits and Costs of a Child Allowance" *Journal of Benefit-Cost Analysis*, 13,3 (2022): 335-362.

PFAS that can contaminate drinking water with funds to communities that would have difficulty complying.[36] Presumably benefit-cost analysis would consider these as two parts of a single action since both are within the same agency.

Changes in government expenditures should be considered across jurisdictions (page 64, footnote 110). A regulation can impact tax collection at the state and local level in addition to the federal level. Different tax structures in different jurisdictions can lead to different distributive impacts across different states, cities, and rural areas. Financing of public schools could be impacted. Distributional analysis should include these effects when important.

Nonmonetized Benefits and Costs

Any measurement and valuation of human dignity, civil rights, liberties, or indigenous cultures would have to be done with care and sensitivity. Any such effort would have to be done with appropriate safeguards and approvals. A suggestion is to continue to watch for progress in estimating benefits and costs in money terms. Some exploratory efforts have been made by Maria Ponomarenko and Barry Friedman to incorporate these values into benefit-cost analysis of policing practices. Some policing practices potentially involve tradeoffs between dignity, civil rights, and liberties for expected reductions in crime.[37] Richard Carson and Jordan Louviere offer a study design meant to measure the tradeoffs.[38]

Guidance: Past, Present, and Future

After years of teaching benefit-cost analysis and pointing to Circular A-4 as exemplary in many ways, I am pleased to see the effort to update the Guidance. Advances in benefit estimations, especially in valuation using stated preferences, as well as other areas make updating worthwhile. My view is that some but not all proposed changes are as well grounded. The proposed 2023 C-4 and Preamble present and make the cases for changes in distributional analysis, scope, discounting, and motives for regulation that go beyond updating. Rationale and references are provided to support those cases, as we expect in a key document. My review acknowledges them and provides additional rationale and references that do not always support updates. Based on my assessment of all the information I recommend retaining the relevant sections of the current Circular A-4.

I offer my perspective on the proposed revisions with the hope that a new Guidance may have the enduring success of the 2003 Guidance. This past May 9th, the Society for Benefit-Cost Analysis and the GW Regulatory Studies Center offered a discussion of recent proposed changes to regulatory practices and analysis, see https://regulatorystudies.columbian.gwu.edu/revising-regulatory-review-expert-insights-biden-administrations-guidelines-regulatory-analysis . The two panel sessions included Richard Revesz, Administrator, Office of Information and Regulatory Affairs, Paul Ray, Boris Bershteyn, Susan Dudley, Sally Katzen, Bridget Dooling, Howard Beales, Randy Lutter, Dominic Mancini, Sabeel Rahman, Shayna Strom, and Caroline Cecot. I heard various views on different parts of the proposed revisions. At the same

[36] Caroline Cecot, "An Equity Blindspot: The Incidence of Regulatory Costs" *Journal of Benefit-Cost Analysis*, 14,1 (2023): 35-43.
[37] Maria Ponomarenko, Barry Friedman. "Benefit-Cost Analysis of Public Safety: Facing the Methodological Challenges" *Journal of Benefit-Cost Analysis* 8,3 (2017): 305-329.
[38] Richard T. Carson and Jordan J. Louviere. "Estimation of Broad-Scale Tradeoffs in Community Policing Policies" Journal of Benefit-Cost Analysis 8,3 (2017): 385-398.

time, I heard widespread admiration for the current Guidance that has survived more than 20 years and hope that the final version of the new Circular A-4 is as successful.[39]

Circular A-4, whether in its current version or revised, can provide valuable guidance in performing benefit-cost analysis of proposed and existing regulations. What it cannot do is provide specific guidance to situations when possible outcomes of decisions cannot be identified and when high (positive or negative) payoffs are associated with these outcomes, called consequential amazing developments (CADs) by Devjani Roy and Richard Zeckhauser. They illustrate ways in which literature, because it mirrors life, provides a rich available universe of decisions that helps us anticipate and confront CADs. Such thinking can be a valuable complement to regulatory guidance of the future.[40]

Short Additions and Edits

Page 3: Distribution effects should be listed as a key step in producing a regulatory analysis. Distributional analysis is part of the 2003 Circular A-4 (page 14), and the proposed revision gives greater emphasis to distributional analysis. It should be identified as a key element.

Page 16, line 4 of 1st paragraph: "(when applicable)" awkward and seems unnecessary.

Page 18, footnote 31: A helpful additional reference would be: John Cawley and Tomas Philopson, "An Empirical Examination of Information Barriers to Trade in Insurance," *American Economic Review*, 89, 4 (1999): 827-846.

Pages 19 and 20. Editorial Comment. The two short sections Promoting Distributional Fairness and Advancing Equity and Protecting Civil Rights and Civil Liberties or Advancing Democratic Values seem out of place. They deal with laudable goals but offer no guidance to agencies regarding promulgating regulations.

Page 20, 2nd paragraph in section b: "If the analysis goes beyond the need for regulation you should endeavor to describe it." If it is not on the list of the reasons for regulation, what is unique about the situation so that it is not recognized as a reason for regulation?

Page 20, 2nd paragraph in section b: "You could also integrate estimates of distributional effects into your analysis." If done, for transparency I recommend that it be a separate, supplemental analysis presented along with the traditional analysis with market values and does not use weights chosen by the agency.

Page 23, top: Need a citation to the 1998 DOE energy efficiency standards. Was there an ex post BCA done on the standard? If so, what did it show?

Page 29: Explanation of the key concepts needed to estimate benefits and costs would be strengthened by with reference to two standard publications. One is a classic article by a past President of the American Economic Association, see A.C. Harberger, "Three Postulates for Applied Welfare Economics: An Interpretive Essay," *Journal of Economic Literature* 9,3 (1971): 785-797. The other is the chapter on basic economics of benefit-cost analysis in Anthony E. Boardman, David H. Greenberg, Aidan R. Vining, and David L. Weimer, *Cost-Benefit Analysis: Concepts and Practice.* 5th ed. (New York: Cambridge University Press, 2018).

[39] In a public comment submitted, Susan Dudley describes the remarkable durability and stability of regulatory impact analysis in the U.S., see https://www.regulations.gov/comment/OMB-2022-0014-0129.
[40] Devjani Roy and Richard Zeckhauser, "Grappling with Ignorance: Frameworks from Decision Theory, Lessons from Literature" *Journal of Benefit-Cost Analysis* 6,1 (2015): 33-65.

Page 40, footnote 72: Accounting for effects in other locations can matter even without distortions in related markets. A study of the effects of building interstate highways on economic activities in different locations that illustrates this importance well is the following article: Amitabh Chandra and Eric Thompson. "Does Public Infrastructure Affect Economic Activity? Evidence from the Rural Interstate Highway System" *Regional Science and Urban Economics* 30,4 (2000): 457-490. Reference to it might be helpful to agencies.

Page 66, 114. "An appropriate weighting for effects on government budgets depends on the use or source of funds, which will often be indeterminant in regulatory contexts." Indeterminant does not mean effects are zero.

Pages 69 bottom-70 top: Clarification or correction is warranted. For regulations with projected annual economic effects of $1 billion or more ... present a formal quantitative analysis. Then, for regulations with projected gross annual benefits, costs, or transfers of $200 million to $1 billion, you should seek to use more rigorous approaches … What is more rigorous than a formal quantitative analysis and why call for more rigor for the regulations with smaller projected impacts?

Individual Peer Reviewer Comments: Cary Coglianese

The Office of Management and Budget's (OMB) Circular A-4 on regulatory analysis states that it is intended to help agencies prepare "high-quality and evidence-based analysis" (p. 2).[41] That purpose necessarily invites an additional question: What is the purpose of analysis itself? The opening section of Circular A-4 provides an excellent answer: "[H]igh-quality regulatory analysis is designed to inform policymakers, other government stakeholders, and the public about the effects of alternative actions" (p. 2). The Circular continues that "[r]egulatory analysis can help agencies in developing regulations by clarifying the likely effects of a regulation under consideration" (p. 2). It can also "inform the public about the anticipated consequences of government action (and alternatives)" (p. 2).

Referring to Executive Order 12,866, which has been in effect since 1993, Circular A-4 treats *benefit-cost analysis* as the principal form of regulatory analysis for agencies to use. Benefit-cost analysis ultimately aspires to identify for decision-makers alternative regulatory actions that will maximize net benefits to society. But it too has the same main purpose of any kind of regulatory analysis: to inform decision-making. As Circular A-4 properly puts it, benefit-cost analysis "provides policymakers and the public with information about the important advantages and disadvantages of different courses of action" (p. 3).

Understood this way, benefit-cost analysis's purpose is, at its core, little different from the purpose articulated by Benjamin Franklin 250 years ago for weighing "pros" and "cons" as part of any "moral or prudential algebra" for making important decisions.[42] It is useful to remember that, under Executive Order 12,866, the estimated benefits of new regulations need not necessarily *outweigh* the estimated costs; rather, the benefits must instead *justify* the costs, based on a "reasoned determination." Benefit-cost analyses are thus not determinants of regulatory decisions, but instead they are intended to inform decisions as well as provide a basis for justifying them.

In light of the importance of analysis in informing and justifying regulatory decision-making, it is rather astonishing that Circular A-4 has not been updated in twenty years. Admittedly, consistency and continuity in the standards for regulatory analysis would counsel against unduly frequent updates. Still, it is clear that Circular A-4 is now long overdue for an updating. OMB is thus to be commended for initiating this update process, inviting public comment on a proposed update, and seeking an independent peer review.

The following peer review comments on the proposed update are supportive of changing the Circular. Nevertheless, they are also intended to suggest ways to help an updated Circular A-4 better fulfill its purpose of helping agency analysts produce analyses that can better inform decisions. The comments in this peer review report aim to encourage OMB to do more to make Circular A-4 more accessible to agency personnel and more effective in promoting analysis that is informative both to those who make regulatory decisions and to those in the public affected by these decisions.

These comments are based on my review of the proposed changes to Circular A-4 and on an accompanying preamble to the proposed update. They have also benefited from helpful discussion among the members of the peer review panel at a meeting organized by ICF. Nevertheless, they reflect my own

[41] References to portions of the proposed update to Circular A-4 and to its accompanying Preamble are provided with in-text parenthetical page references, with numbers referring to each document respectively. References to other work are provided in footnotes in this document.

[42] The Papers of Benjamin Franklin, vol. 19, January 1 through December 31, 1772, ed. William B. Willcox. New Haven and London: Yale University Press, 1976, pp. 299–300.]

independent judgment about the strengths of the proposed update as well as opportunities for its further improvement.[43]

In the report that follows, two main themes stand out. First, given the important position that Circular A-4 occupies in guiding agency analysts (and others) about how to perform regulatory analysis, OMB would do well to make additional efforts to keep the document as clear as possible and to improve its digestibility and organizational coherence. The 2003 version of Circular A-4 was 48 pages long, while the proposed update is now 91 pages in length.[44] That fact alone should suggest that there are opportunities in revising the proposed update to clarify, reorganize, and streamline the document to make it more useable. After 20 years, OMB ought to find ways not merely to bring Circular A-4's methodological and analytical recommendations up to date but also make the document much more cogent and user friendly.

Second, when it comes the various methodological and analytical issues over which OMB is proposing changes and seeking comment—such as on discount rates, scope of analysis, and distributional analysis—the Circular should adopt as its key guiding recommendation that agencies produce analysis that will best inform decision-makers. This means that regulatory analysis should generally provide as complete an analysis as possible—with more information, not less. Rather than using a single discount rate, for example, agencies should continue to be encouraged to use more than one rate as a means of testing the sensitivity of estimates to reasonable differences in rates.[45] So too with other assumptions and analytic choices. Analysis should not be aiming for a single formula that gives a regulatory proposal a green light. Instead, analysis should aim to illuminate the ramifications of one alternative decision over another. Toward this end, analysis will generally better inform decision-makers when it provides more complete and credible information about whether and how different assumptions or analytic choices affect expected outcomes with different regulatory alternatives.

Most of the comments that follow are organized around each of these two themes: improving clarity, and encouraging completeness of information. In Part I, I offer some general observations on opportunities to improve the overall clarity and completeness of the proposed update by creating a section that articulates overall principles for high-quality regulatory analysis.

In Part II, which comprises the longest section of these peer review comments, I offer specific suggestions on how to improve the clarity of the Circular and improve its emphasis on expanding the completeness of information. These specific suggestions are organized according to each of the six "notable topics" listed in the Charge to Peer Reviewers, namely (a) discount rates, (b) distributional analysis, (c) scope of analysis (including geographical scope), (d) analytic baselines, (e) unquantified impacts, and (f) uncertainty.

The two themes of clarity and completeness that are addressed in Part II respond to two of the questions posed in the "Charge to Peer Reviewers" document. Question 6 asks for ways to "improve the clarity and

[43] These peer review comments do not draw upon or respond to any of the submitted public comments on the proposed update to Circular A-4, as I made the deliberate decision not to read any of these comments before preparing this peer review. Although OMB permitted peer reviewers to read public comments, I viewed my charge as being one to review the draft update, not to review others' comments on the draft update. In any event, in the time allotted for my peer review, I would have had the opportunity to read no more than, at most, a small fraction of the nearly 200 unique comments that apparently had been submitted during the public comment period.

[44] The 2003 Circular contained 30 footnotes, while the proposed update contains 188.

[45] Doing so would be one way of adhering to Circular A-4's appropriate admonition that agencies "should aim for transparency about the key methods, data and other analytical choices you make in your analysis" (p. 4).

logical presentation of the guidance"[46]—which tracks the theme of improving clarity. Question 4 asks for "suggestions for improving the completeness, objectivity, and/or transparency of agency regulatory analyses"[47]—which tracks the theme of encouraging analysts to provide more complete information. The answers to these questions in Part II present OMB with a range of opportunities to improve the usefulness of its update of Circular A-4. It is hoped that these comments can help OMB better achieve the Circular's purpose of assisting agency analysts in producing high-quality, informative analysis.

Recognizing that the Charge to Peer Reviewers also included other questions, Part III of this peer review concludes by providing responses to the remaining questions in the Charge. These responses are made with respect to topics in Circular A-4 other than the six "notable topics" addressed in Part II.

I. The Need for Principles of Regulatory Analysis

The first update of Circular A-4 in 20 years provides an opportunity not merely to bring the Circular's assumptions and analytic recommendations into better alignment with prevailing research, but it also provides a historic opportunity to make the document more readable and useful to agency analysts with a wide range of levels of experience. The efforts to reorganize pats of the Circular and to insert cross-references to sections are thus welcome and appreciated additions in this new version. In making further revisions as it finalizes its changes to Circular A-4, OMB should strive further to improve the clarity and cogency of the document.

I have long been struck that, even though Executive Order 12,866 begins with a helpful statement of the principles *of regulation*, Circular A-4 never contained a corresponding section on the principles *of regulatory analysis*. Arguably, the part of the opening of the 2003 Circular labeled "Key Elements of a Regulatory Analysis" did serve the purpose of a statement of principles. In that brief opening section, for example, the original Circular stated that "[a] good analysis is transparent"—and then it proceeded to discuss what transparent analysis entails.[48] Yet it is notable that not only does the proposed update to the Circular still lack a section on the principles of regulatory analysis, but the proposed update has also moved some of the content from the "Key Elements" section to a new section blandly labeled, "Developing a Regulatory Analysis." This new section does call for specificity of analysis and recommends (without saying more) "transparency about the key methods, data and other analytical choices" (p. 4). But it is a step backwards that the statement from page 3 of the 2003 version—namely, that "good analysis is transparent," along with its accompanying elaboration—has now been moved to *page 84* of the proposed update.

Both the old Circular and the proposed update do refer to "principles of full disclosure and transparency that apply to other elements of your regulatory analysis"—page 39 in the 2003 Circular, whereas page 67 of the proposed update. And both do emphasize in various parts the need for analysis to be grounded in evidence and presented with clarity. The proposed update also contains helpful bullet points expressly presenting "principles" for agencies to consider when relying on revealed and stated preference studies (pp. 31-32, 35-36). Given that OMB recognizes the importance of principles in some parts of the Circular, it would be a missed opportunity for the finalized update of the Circular not to contain a set of overall principles at its outset. Such a statement of principles could clearly and explicitly lay out what OMB sees

[46] The full Question 6 is: "Do you have suggestions that would improve the clarity and logical presentation of the guidance and/or ease execution of analyses?" Charge to Peer Reviewers of the Proposed Update of OMB Circular A-4 (June 9, 2023).
[47] *Id*. The full Question 4 is: "Do you have any other suggestions for improving the completeness, objectivity, and/or transparency of agency regulatory analyses? If so, how might these be incorporated into guidance?"
[48] Circular A-4 on Regulatory Analysis (September 17, 2003), at p. 3.

as characterizing high-quality regulatory analysis. A statement of principles might even provide a kind of expository glue that could help hold the rest of the document together even more effectively.

In a similar vein, even though the proposed update to Circular A-4 proclaims to offer guidance on producing "evidence-based" analysis (p. 2), it is notable that attention to the quality of such evidence is woefully underemphasized in the document. According to its current organizational structure, the proposed Circular A-4 leaps right into developing valuation estimates with virtually no consideration of the kind of evidence to use in identifying and quantifying the anticipated impacts in the first place. Moreover, notwithstanding Executive Order 13,563's emphasis on retrospective review, as well as the existence of recommendations by the Administrative Conference of the United States on retrospective analysis of regulations,[49] the proposed update contains only two minor passing mentions of retrospective analysis. In its current form, the proposed update to Circular A-4 clearly misses an opportunity to explain how findings from rigorously conducted retrospective regulatory evaluations can provide an evidentiary basis for prospective regulatory analysis.[50]

Overall, the proposed update only addresses the importance of "accurate, reliable, and unbiased" evidence starting on page 83—at nearly its very end. Since the quality of any analysis ultimately depends on the quality of the evidence on which it is grounded, a discussion of evidence deserves placement front and center before any discussion about valuing benefits and costs. The quality of agency information about regulatory impacts is ultimately what provides the foundation for any credible, useful regulatory analysis. If the final updated Circular were still only to address considerations of evidence at nearly its end, it would continue to make these considerations appear almost an afterthought, rather than matters that deserve the highest priority.[51] A statement of overall principles of regulatory analysis should therefore include attention to the quality of evidence used in agencies' analysis in addition to other principles, such as full disclosure and transparency.

II. Clarity and Completeness in the Treatment of Notable Topics

A statement of principles should also speak to clarity and completeness—qualities of regulatory analysis that parallel the two themes that, as noted above, undergird this peer review report. Just as one principle of high-quality analysis should be for it to aim for as much clarity as possible, OMB should similarly aspire to improve the clarity in its own proposed update to the Circular. It should also encourage agency analysts to provide decision-makers and the public as much credible information as possible to inform their decisions. For each of the six "notable topics" specified in OMB's Charge to Peer Reviewers,[52] I offer in this Part a series of comments intended to help OMB improve the Circular's clarity and then to

[49] Admin. Conf. of the U.S., Recommendation 2014-5, *Retrospective Review of Agency Rules*, 79 Fed. Reg. 75114 (Dec. 17, 2014); Admin. Conf. of the U.S., Recommendation 2017-6, *Learning from Regulatory Experience*, 82 Fed. Reg. 61738 (Dec. 29, 2017).

[50] Cary Coglianese, "Thinking Ahead, Looking Back: Assessing the Value of Regulatory Impact Analysis and Procedures for its Use," 3 *KLRI Journal of Law and Legislation* 5-27 (2013); Cary Coglianese & Lori Snyder Bennear, "Program Evaluation of Environmental Policies: Toward Evidence-Based Decision Making," in National Research Council, Social and Behavioral Science Research Priorities for Environmental Decision Making 246-273 (National Academies Press, 2005).

[51] I recognize that the "general considerations" subsection introducing the benefit-cost analysis section does contain some acknowledgment of the need to consider whether benefit and cost estimates are "uncertain" or "scientifically defensible" (p. 28). But these kinds of relatively brief statements and allusions, of which others can be found tucked into the text throughout the proposed update, do not substitute for giving a place of primacy in Circular A-4 to a discussion of high-quality evidence and why it is so important.

[52] Again, these topics are: (a) discount rate, (b) distributional analysis, (c) scope of analysis (including geographical scope), (d) analytic baselines, (e) unquantified impacts, and (f) uncertainty.

help it encourage agency analysts to provide more complete information to decision-makers and the public.

A. Discount rates

OMB will undoubtedly receive other input from the economists on the peer review panel with respect to the substantive merits of adjusting the discount rates used in regulatory analyses. Although I am supportive of making adjustments (a seven percent discount rate strikes me as high, for reasons like those enumerated in the proposed update), I offer here two comments that apply no matter what new rates OMB may select.

i. *Improve clarity*. The first comment is that OMB should do more in the final Circular to make clearer exactly what it is recommending agencies do with respect to discount rates. The current version of Circular A-4, from 2003, states the following: "For regulatory analysis, you should provide estimates of net benefits using both 3 percent and 7 percent."[53] That language is clear. So too is language that appears in a later section of the proposed updated Circular that discusses regulations involving a "substantial incidence on capital." There, the Circular states—albeit in a long, complex sentence—that "OMB recommends consideration of a lower value of 1.0 … and a high value of 1.2" (p. 79). And in the Preamble to the proposed updated Circular too, OMB states clearly that 1.7 percent is "the proposed value of the social rate of time preference for use in near-term analyses" (p. 29). But nowhere in the proposed updated Circular itself do I find OMB stating anything quite so clearly about recommending that agencies use a 1.7 percent rate.

Admittedly, the Circular does state that a consideration of the 30-year average yield on Treasury notes "produces a real 10-year rate of 1.7 percent, and corresponds to a social rate of time preference of 1.7 percent" (p. 76). And this statement appears within a section of the updated Circular labeled "*a* default approach" (p. 75, emphasis added). But is this *the recommended* default approach? The Circular states that, "[f]or simplicity, transparency, and tractability, OMB is setting one default rate for social rate of time preference for all effects" within a 30-year time frame. Thus, it would seem reasonable to infer that OMB intends to propose 1.7 percent as the new discount rate agencies should use.[54] Yet I cannot find in the proposed updated Circular where it actually says what the Preamble says, namely that 1.7 percent is indeed being proposed as the recommended default rate that agencies should use.

The proposed updated Circular's section on discounting contains a host of other passages that imply almost anything but the existence of "one default rate" being recommended. The entire discussion of discount rates is prefaced in the updated Circular with a statement that "[s]everal reasonable approaches to discounting are presented in this section" (p. 75). After explaining the basis for the 1.7 percent rate, the next section begins by noting that "[t]here are other appropriate approaches to discounting" (p. 76). This section states that agencies "may choose to adopt … the Ramsey approach" (p. 76). The Circular indicates that an agency seeking to use the Ramsey approach "*or other alternative approaches to discounting*" should simply consult with OMB (p. 77, emphasis added). The Circular implies that it is possible to "extend the Ramsey framework" and take into account other issues, such as the introduction of risk, as

[53] 2003 Circular A-4, p. 34

[54] The Administrator of the Office of Information and Regulatory Affairs has announced, for example, that the proposed Circular A-4 "revision updates the discount rate that translates future costs and benefits into present-day values." Richard L. Revesz, Strengthening Our Regulatory System for the 21st Century (April 06, 2023), https://www.whitehouse.gov/omb/briefing-room/2023/04/06/strengthening-our-regulatory-system-for-the-21st-century/. Notably, this statement refers to a revision to the "discount rate" (singular) rather than the formerly recommended discount rates (plural).

well as to "use preference specifications with additional parameters" (p. 77). And if that were not enough, the Circular says that "[t]he discounting considerations reviewed in this section are not exhaustive" (p. 78). Needless to say, the Circular seems, by its own terms, to belie the notion that "simplicity, transparency, and tractability" can be found in a single discount rate, whether one set at 1.7 percent or any other level.

If agencies will be permitted to use any "reasonable approach," then at least the updated Circular should state that plainly. Of course, in going through the exercise of recalculating a 30-year average of Treasury notes, it would appear that OMB does intend to propose that agencies generally use a discount rate of 1.7 percent as the recommended default rate. If that is indeed its intended approach, then at a minimum the final update should make that point clear to the reader.

ii. *Encourage more information*. All this said, my second comment with respect to discounting would be to resist the idea of recommending that agencies use just a *single* discount rate in regulatory analysis. The implication from having the 1.7 percent rate is *the* default rate would convey a false sense of precision and certainty about discounting. As OMB has properly acknowledged, a number of "appropriate" and "reasonable" approaches exist. Moreover, all the various issues and assumptions about discounting for which the Preamble has solicited public comment itself suggests that the selection of discount rate entails making a number of assumptions or choices. As I am not aware that the economics literature has settled on any single number or even one consensus approach,[55] using just one discount rate as the default would imply a greater degree of definitiveness than exists in the field.

The instinct reflected in OMB's proposed update is certainly a sound one: namely, to search for the most credible basis of discount rates in light of accumulated evidence since 2003, and then to provide standardization across government analyses. Still, even if OMB settles upon what it thinks is a single best estimate of the discount rate to be used as a default for 30-year estimates, it would do well to recommend agencies provide some sensitivity analysis around that rate. For example, even if OMB should retain 1.7 percent as its estimate of a social time preference, it would still be reasonable to instruct agencies to conduct discounting by using several rates around this estimate, such as 1.5 percent, 2.0 percent, and 2.5 percent. A clear statement to this effect would enhance the usefulness of Circular A-4. After all, the 2003 Circular A-4 recommendation for both 3 percent and 7 percent contained a virtue that extended beyond just the assumptions and data underlying those two percentages. That virtue rested in the information value provided by estimating and reporting present value using two discount rates—namely, an indication of the robustness of estimated net benefits. Providing some sensitivity analysis with respect to discount rates would also be consistent with the lack of a firm consensus in the literature on the appropriate discount rate. Given that the point of regulatory analysis is to inform, using more than a single discount rate would provide more complete information to both decision-makers and the public.[56]

[55] *See, e.g.*, Jindrich Matousek, Tomas Havranek & Zuzana Irsova, "Individual Discount Rates: A Meta-Analysis of Experimental Evidence," 25 *Experimental Economics* 318–358 (2022) (noting that "results vary widely" across studies of individual discount rates); Council of Economic Advisors, Discounting for Public Policy: Theory and Recent Evidence on the Merits of Updating the Discount Rate (January 2017) (noting "active debate in the economics literature" over certain aspects of discounting).

[56] To maintain comparability with past regulatory analyses, a case could be made that OMB ought to continue to recommend agencies use a discount rate of 3 percent as among its recommended rates, even if it also recommends use of rates in the range of, say, 1.5 percent and 2.0 percent.

B. Distributional analysis

I applaud OMB for expanding Circular A-4's treatment of distributional analysis. Notwithstanding Executive Order 12,866's statement of regulatory philosophy and principles of regulation that call for agencies to consider "distributive impacts" and "equity," the distribution of regulatory impacts has been insufficiently attended to in regulatory analyses over the decades. Granted, distributional analysis can be difficult to conduct in a rigorous manner, but it never helped that the 2003 version of Circular A-4 contained only *two paragraphs* addressing distributional analysis. This is a topic on which OMB is well justified expanding its discussion in the proposed update.

i. Improve Clarity. To make the section on distributional analysis communicate more effectively, four aspects of it could be made clearer.

First, the subsection labeled "When to Perform Distributional Analysis" could actually say when distributional analysis should be conducted. Right now, the subsection offers some considerations, to be sure. But it misses an opportunity to encourage agency analysts *always* to be as attentive as possible to how costs and benefits are distributed, an approach that would seem entirely consistent with the placement of distributive impacts and equity in Executive Order 12,866—not to mention in Executive Orders 13,563 and 14,094. It is possible, in other words, for OMB to say more definitively in the updated Circular that *any time agencies are conducting a benefit-cost analysis they should accompany that analysis with as clear a statement as possible, consistent with the law, about the expected distribution of benefits and costs*.

The lack of a clear directive of this kind from the proposed update to Circular A-4 is striking given that the 2003 version of Circular A-4 stated quite clearly, even emphatically, that an agency's "regulatory analysis should provide a separate description of distributional effects."[57] I can only surmise that OMB inadvertently deleted this clear directive in proposing its update.

The Preamble to the proposed update indicates that the update is "intended to assist agencies in expanding estimation of disparate effects" (p. 11). With this as the intent, deleting a clear directive that agencies should describe the distribution of regulatory impacts hardly moves in the right direction. Granted, as the Preamble notes, evidence indicates that agencies have seldom provided the "separate description" called for by the 2003 version of Circular A-4. But that is no reason to backtrack on the normative force conveyed in Circular A-4. The proposed update should communicate at least as much direction as in 2003—and then seek to demonstrate to agencies that OMB really means it this time. Instead, the way that the proposed update's section on "When to Perform Distributional Analysis" is written, OMB is taking a step backwards.

Second, the proposed update somewhat confusingly states that "the benefits and costs of a regulation may also be distributed unevenly over time" (p. 61). The statement itself is irrefutable, of course. But mere differences in the temporal distribution of benefits and costs are typically addressed through discounting.[58] The only way to convert benefits or costs into present value terms is to begin with an understanding of how those costs and benefits will be distributed over time. In this section on distributional analysis, the updated Circular A-4 should clarify that the point of conducting a distributional analysis is different than just taking account of how regulatory impacts are distributed over

[57] 2003 Circular A-4, p. 14.

[58] Much the same that is said here about discounting also applies to the use of QALYs, which the proposed update would endorse (pp. 7-8). Using a QALY can take into account how impacts are distributed across age groups. If QALYs are used, then agencies must know something about the distribution across age groups and they can and should specify what they know and not obscure those differences by only reporting measures of QALYs.

time. The point is to determine whether any temporal differences are themselves distributed evenly or unevenly across different segments of society. The update comes close to this with its example of lead remediation (p. 61), but it never quite says that agencies should try to identify *who* exactly will bear the immediate costs versus *who* will receive the ongoing, long-term benefits. This basic difference between distributional analysis and discounting could be made more clearly.

Third, it is not clear why the proposed update states that the results of a distributional analysis should only be summarized and transparently described only "*when distributional effects are relevant to the agency's decision*" (p. 64). If an agency analyst has produced "results" from a distributional analysis, these results should surely *always* be summarized and described transparently. The language about only doing so when "relevant" unnecessarily obscures the guidance that Circular A-4 can provide to agencies. As already noted, the section on when to perform a distributional analysis is itself far from clear; however, if an agency nevertheless does prepare such an analysis, there is no reason why OMB should be advising agencies to withhold that analysis if they do not think the results of the analysis are "relevant." Agencies should disclose the analysis because, even if *they* do not think it is relevant, the public still deserves to know—and some others in government or in the public might well have a different view on its relevancy. Given that the purpose of regulatory analysis is to "inform policymakers, other government stakeholders, and the public" (p. 2), the results of *any* distributional analysis should be disclosed.

Finally, although the proposed update helpfully states that distributional analysis can be either quantitative or qualitative (pp. 61, 64), by using the term "distributional *analysis*" OMB may inadvertently discourage agencies from trying *always* to do what it can to identify and disclose distributional information on different regulatory alternatives under consideration. Just as the Circular distinguishes between different types of overall regulatory analyses—e.g., benefit-cost analysis, cost-effectiveness analysis, and outcomes (pp. 4-9)—OMB could consider making a sharper distinction between different types of distributional "analyses." It may be useful, for example, to encourage agencies at a minimum to seek to provide what might be called a "distributional specification" or "statement of the distribution of regulatory impacts." A distributional specification or statement would provide a descriptive account of what is known about the characteristics of the expected first-order recipients of regulatory benefits and first-order bearers of regulatory costs. With a regulatory proposal on aviation safety, for example, the agency analyst could provide demographic and income characteristics of members of the flying public (presumably the principal first-order beneficiaries) as well as a basic description of the number and size of firms in the regulated airline industry (the first-order cost-bearers). (I deliberately emphasize "first-order" here because tracing out further the incidence of regulatory benefits and costs will in many if not most cases be highly uncertain.[59])

Admittedly, a distributional statement of the kind I have described may well be what the drafters of the proposed updated Circular have in mind when they refer to a "qualitative" distributional analysis. Even if so, using the term "analysis" may mislead the typical agency analyst into thinking that agencies must do much more than simply identifying what is known about the different segments of society or the economy that will likely be affected by a new regulation. To be clear, doing more than just specifying a distribution (or providing a statement) would almost always be laudable. But if we take as a starting point that agencies are presently doing too little by way of articulating the distribution of impacts, then proposing

[59] *See* Brian F. Mannix, "Employment and Human Welfare: Why Does Benefit-Cost Analysis Seem Blind to Job Impacts?," in Cary Coglianese, Adam Finkel, and Christopher Carrigan, eds., *Does Regulation Kill Jobs?* 190-206 (2013).

that each overall regulatory impact analysis contain, at a minimum, a distributional specification or statement would be a meaningful step in the right direction.

It may be useful in this regard for OMB to do more to emphasize that agencies already are expected to provide certain kinds of distributional statements. They produce statements accompanying regulatory decisions that speak to certain elements of distribution, such as impacts on small entities as required under the Regulatory Flexibility Act, health and safety impacts on children as called for under Executive Order 13,045, and environmental impacts on minority and low-income individuals as directed by Executive Orders 12,898 and 14,096. Moreover, no agency can complete a credible benefit-cost analysis without some understanding about who is likely, at least in the first instance, to receive benefits and bear costs under the regulatory alternatives being analyzed. A default expectation that, at a minimum, each regulatory impact analysis must be accompanied by a clearly delineated distributional statement would not be asking agencies to do the impossible. Moreover, such as statement, if consistently reinforced in practice by OMB, would do a lot to move forward in giving greater attention to the consideration of distributional concerns in the regulatory process. As currently drafted, the proposed update reads as if agencies could continue business as usual if they do not deem doing anything is not "practical" or "appropriate" (p. 62).

ii. Encourage more information. The section on weighting benefits and costs is consistent with the principle of encouraging agencies to provide more information. For that reason, I am supportive of Circular A-4 signaling to agencies that weighting might sometimes be pursued as a supplement to conventional estimation techniques. I am concerned, however, with the unduly permissive way that this section is drafted and what that may mean for how it will be implemented. Specifically, the second paragraph in this section (p. 65) begins by stating unqualifiedly that agencies "may choose to conduct a benefit-cost analysis that applies weights." This paragraph also states that agencies that choose to use weighting "may treat it as your primary estimate of net benefits" (p. 65). Only at the very end of this paragraph does the proposed update indicate that agencies choosing to apply distributional weighting "should also present" traditional estimates.

On revision, I would recommend that OMB reverse the emphasis in this section by making clearer that weighting can sometimes supplement traditional ways of estimating benefits and costs, but only when doing so would provide decision-makers and the public with reliable information. Any use of weighting presupposes that (a) the agency can understand well the incidence of benefits and costs in a reliable manner, and (b) the agency has a sound basis for the weights to apply given what it anticipates the incidence to be.

On this second point, the proposed update takes a position similar to that which it seems to take with respect to a discount rate: It declares 1.4 to be a "reasonable estimate of the income elasticity of marginal utility" (pp. 65-66). For much the same reason noted above with discount rates, the selection of a single income elasticity rate probably creates a false sense of precision and certitude about an analytic approach that remains in its infancy. A better approach, at present at least, would be to suggest that agencies assess the sensitivity of the results of any weighting.

With respect to the first point—understanding the incidence and distribution of impacts—the proposed update's silence is glaring. This necessary precondition for weighting is critical to add to this part of the updated Circular if OMB is to retain its recommendation about weighting. As a practical matter, meeting this precondition is likely to be the biggest limiting factor for the use of weighting. Agencies, after all, have relatively little experience making estimates of the distribution of regulatory impacts in the first place. Even if they are able in some rulemakings to identify reliably the income characteristics of the

beneficiaries of regulation, the income characteristics of the cost-bearers will be fraught with additional difficulties. This is because even when the first-order cost-bearers can be identified (as they usually can be), it is far from clear whether these costs are subsumed by the firm's owners or shareholders, passed along to consumers, or borne by workers in terms of lower wages or reduced employment. Even if an analyst could reliably determine where the ultimate incidence of costs lies—a determination which economic research to date cannot generally support—there would still be additional analytic challenges in determining the income distribution that exists among shareholders, customers, or even different classes of workers.

The current version of the proposed update thus takes an overly optimist posture toward the use of weighting in benefit-cost analysis. It is true that, in principle, a well-conducted weighted benefit-cost analysis could provide additional information to decision-makers and the public. In practice, though, if OMB were to take the kind of permissive approach to weighting as implied by the current version of the updated Circular, it would risk having agencies provide decision-makers and the public with *less reliable* information.

Instead of the current permissive approach in the proposed update, weighting should be recommended only in those (likely limited) circumstances where the agency has a reliable basis for understanding the distribution of both benefits and costs. OMB should be concerned that what the late economist Ned Gramlich, in his book *A Guide to Benefit-Cost Analysis*, wrote about incorporating employment effects into benefit-cost analysis could come to apply to distributional weighting. He said that "the whole jobs issue is a potential alibi for large-scale fudging of numbers."[60] One could read the proposed update to license agencies (unintentionally) to adjust for the elasticity of marginal utilities if it can help them achieve a more desired outcome than an "unweighted" estimate of net benefits. I am sure that would be a mistaken reading, but OMB would do well to make clearer that even though additional information is always to be encouraged (and weighting could provide additional information), agencies must still ensure that the information it provides has a reliable basis.

In the end, I recommend that OMB downplay weighting as an option until agencies have progressed in their ability to meet the underlying preconditions need for weighting to be credible. The Circular should present a more cautious treatment of weighting that allows agencies to conduct such an exercise as a supplement only when it can be assured that doing so will provide additional reliable and meaningful information. Instead of emphasizing weighting of impacts, OMB should do much more than the current version of the proposed update does to encourage agencies to start paying attention to the distribution of regulatory impacts whenever they can. When it comes to distributional analysis, before permissively allowing agencies to run, OMB should do more to get them all to start walking.

C. Scope of analysis

The proposed update would expand the discussion in the 2003 Circular A-4 on the geographic and temporal scope of analysis. The 2003 Circular provided three sentences on the scope of analysis, while the proposed update's treatment spans nearly three pages. I have no substantive changes to suggest to this new section, but I would offer brief observations on the themes of clarity and information availability.

i. Improve Clarity. Although I have no qualms with the substance of the additional content in the proposed update, it does tend overall to obscure the basic obligation of the agency analyst to consider all effects of a new regulation. This was actually clearer in the 2003 version of the Circular which directed agencies to "focus on benefits and costs that accrue to citizens and residents of the United States" but then also

[60] Edward Gramlich, *A Guide to Benefit-Cost Analysis* 227 (2d ed. 1990).

unequivocally stated that, for any regulation "likely to have effects beyond the borders of the United States, these effects should be reported"[61]—without stating any restriction on whether these transborder effects accrued to citizens or non-citizens. On its face, the basic upshot of the 2003 Circular seemed clear: agencies should assess all regulatory effects, even those "beyond the borders," at the same time that the focus should be on impacts on U.S. citizens and residents.

Granted, this relatively clear language did not keep the geographic scope of some regulatory analyses from garnering controversy over the years. Nevertheless, the language in the proposed update seems perhaps inadvertently more equivocal. On the one hand, the focus on the effects on U.S. citizens and residents only should apply "[i]n many circumstances" and when "feasible and appropriate" (p. 9). On the other hand, effects beyond the borders should be considered only when they affect U.S. citizens and residents as well as "[i]n certain contexts" where it is "particularly appropriate" (p. 9). As much as I realize the intent of this new content is to clarify—see the Preamble—I cannot help but wonder if it might be better to reinsert the old language and then use the additional language from the proposed update as elaboration. In other words, start with the general principle that, while the primary emphasis should be on effects to U.S. citizens and residents, OMB has for twenty years recommended that regulatory effects that extend beyond the borders should be included in agencies' regulatory analyses. The proposed update then could clarify that part of the reason to assess effects no matter where they fall geographically is that even transborder effects still affect U.S. citizens and residents, for all the reasons stated in the proposed update. Then the rest of what has been added might be clearer as elaboration rather than equivocation.

ii. Encourage more information. The 2003 update encouraged agencies to report separately the impacts of regulations falling beyond the borders. The proposed update largely does the same in directing agencies to provide "supplementary analysis" (pp. 9, 10) of impacts on noncitizens. This strikes me as exactly the right approach, entirely consistent with agencies' obligation to provide more information, rather than less. By including, but separating out, the impacts on noncitizens, decision-makers and the public will learn more than if certain impacts went unanalyzed or were lumped in with aggregate estimates.

What I really like about this part of the scope of analysis are the passages that stress that such additional information should only be provided when it can be reliably estimated. For example, the proposed update states that supplemental information should be provided "unless you determine that … effects cannot be separated in a practical and reasonably accurate manner, or that the separate presentation of such effects would likely be misleading or confusing…" (p. 10). Although this qualifying language appears in a sentence related to analyses with a principal emphasis on "the global effects of the regulation," it really should apply across the board, whenever agencies have an opportunity to provide supplementary analysis. (This is precisely the kind of language that is missing from the distributional analysis section on weighting benefits and costs.) Additional similar qualifying language in this section on scope of analysis should definitely be retained in the final update:

> You should be consistent in your treatment of noncitizens residing abroad in your benefit and cost estimates. If you include some effects experienced by such noncitizens in your primary analysis, consistency generally requires also including countervailing effects on similar noncitizens in your primary analysis. For example, if benefits that are experienced by noncitizens residing abroad are included in your analysis, compliance costs borne by noncitizens residing abroad should generally be included in your analysis as well, and vice versa. Whatever decisions you make regarding the inclusion and exclusion of effects in your analysis, the basis for those decisions should be transparent and clear, and should focus on capturing the significant effects of a

[61] 2003 Circular A-4, p. 14.

> regulation. Similarly, you should be transparent about any data limitations or other sources of uncertainty regarding who will experience regulatory impacts.
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> ***
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> You should recognize that regulatory effects on firms, nongovernmental organizations, or other similar entities ultimately accrue to those entities' individual consumers, owners of assets or liabilities, workers, program beneficiaries, and so forth, and those individuals may comprise a mix of U.S. citizens and residents. You should consider the principles above in determining how to appropriately include or exclude such effects. When it is too difficult in practice to separate such regulatory impacts—for example effects on the foreign versus U.S. owners, customers, or employees of regulated firms—you should be consistent and transparent in whether and how important impacts to noncitizens residing abroad are included in your analysis. As noted previously, if benefits that are experienced by such noncitizens are included in your analysis, consistency generally requires that the costs to similar noncitizens be included as well, and vice versa (pp. 10-11).

And in a footnote within the preceding quoted paragraph, the proposed update properly states:

> Unless it can be demonstrated using appropriate empirical evidence that regulatory costs imposed on foreign manufacturers or other producers will not be passed through to U.S. citizens or residents, a reasonable estimate of the portion of the costs that are passed through should be included in a primary regulatory analysis that focuses exclusively on effects that are experienced by U.S. citizens and residents. You should transparently present the total costs imposed abroad to clarify your estimate of the share of those costs that are passed through. Similarly, such an analysis should not exclude benefits to U.S. persons merely because they flow through foreign channels, but rather provide a reasonable estimate of the benefits that are passed through (p. 11, n.18).

Cautionary language comparable to these passages is what I find missing from the section on weighting benefits and costs. It is for that reason that, in the preceding section of these peer review comments, I described the treatment of such weighted as unduly "permissive."

In any event, separating out the anticipated domestic and global effects of regulations can provide decision-makers and the public with additional information, and thus should continue to be encouraged by OMB. But the cautionary and qualifying language I have identified above is important to be retained because the farther out the geographic scope of an analysis, the greater the uncertainty that may arise in estimating impacts. To conclude, agencies should be admonished, exactly as they are in the proposed update, to be sure that they only provide concrete quantified estimates of geographically extended impacts—or impacts disaggregated by citizen versus noncitizen—when they can be reliably estimated.[62]

D. Development of analytic baselines

The 2003 Circular contained a single page of text devoted to the analytic baseline for regulatory analysis. The proposed update triples the discussion. By and large, these additions are clear and helpful. I offer comments and suggestions as follows.

i. Improve Clarity. I have four relatively minor suggestions about how to improve the clarity of this section. First, I suggest noting that the approach to the analytic baseline outlined in the Circular is

[62] This is not to deny that agencies can *qualitatively* describe such extended impacts even if they cannot quantitatively estimate them.

commonly referred to as "counterfactual" analysis in the literature. Given that analysts are likely to encounter the "counterfactual" terminology elsewhere, it would be helpful to add at least a parenthetical in the text or a statement in a footnote to draw attention to the fact that when others speak of estimating counterfactuals, this is the same as the "no-action baseline" language used in the Circular.

Second, the "pre-statutory" and "post-statutory" baseline terminology from the 2003 Circular is simply confusing, as OMB acknowledges in footnote 23 in its proposed update (p. 13). Instead of continuing to use that terminology, OMB should instead use the "without-statute" and "with-statute" terms that it states in the footnote is the more precise terminology. Then add a footnote explaining that "without-statute" and "with-statute" corresponds to the "pre-statutory" and "post-statutory" language in the 2003 Circular.

Third, the following sentence is either unclear or incorrect: "An agency's regulation should generally be assessed in a manner that compares against a state of the world that conforms to any relevant previously issued regulations" (p. 13). The baseline should be to the world as it would exist without the regulation under consideration—and if that world is one in which other previously relevant regulations are not followed, then agencies should not assume a counterfactual world that "conforms" to those regulations. At a minimum, this bullet point needs clarification if it is trying to say something different. But I suspect that what it needs is some qualification that cautions agency analysts against simply assuming that the counterfactual baseline is one in which other regulations are complied with fully. Available research on compliance strongly suggests the unreasonableness of such an assumption.[63]

Finally, in the second sentence of the third bullet point (p. 14), the insertion of the word "probably" before "can be used" would make the sentence clearer (especially in light of the immediately following sentence). The revised second sentence would then read: "In these cases, estimates from the earlier regulation's regulatory analysis are presumably readily available and, especially if the previous regulation is very recent, *probably* can be used to characterize that primary baseline in assessment of the new action."

ii. Encourage more information. The discussion of the use of multiple baselines and sensitivity analysis is consistent with the theme of encouraging agencies to produce analyses that provide more information to decision-makers and the public. The cautionary text in this part of the updated Circular—such as about consistency in the use of baselines—is also important. Agencies must ensure that any additional information provided by a multi-baseline assessment is meaningful and reliable.

E. Unquantified impacts

Executive Order 12,866 acknowledged that "some costs and benefits are difficult to quantify." As a result, the original version of Circular A-4 from 2003 contained two short subsections on what agencies should do when benefits or costs are difficult to monetize or quantify. The proposed update to Circular A-4 would meld, amend, and substantially expand these two sections into one longer section entitled, "Methods for Treating Non-Monetized Benefits, Costs, and Transfers." This reorganization makes sense, although in Part III of these peer review comments, in responding to Question 5 posed in the "Charge to Peer Reviewers," I will have more to say about the overall placement of discussion about unquantified impacts in the Circular.

i. Improve Clarity. This new section on dealing with unmonetized and unquantified benefits and costs is helpful. Its discussion of the reasons why regulatory impacts might be difficult to quantify or monetize is

[63] Cary Coglianese, "Building Better Compliance," 100 *Texas Law Review Online* 192-214 (2022), https://papers.ssrn.com/sol3/papers.cfm?abstract_id=4190579.

clear, and its advice on how to handle such situations is generally sound. The section could be strengthened by addressing three opportunities for increased clarity.

First, the discussion on page 44 of the difference between unmonetized/unquantified impacts and uncertain impacts is aiming in the right direction. But its discussion of what counts as an "uncertain" impact misses the mark and is not as clear as it should be. When the updated Circular says that impacts "that are difficult to quantify … differ from those that are uncertain," this is only true for some kinds of uncertain impacts. In fact, the Circular misleadingly defines "uncertain effects" on page 44 as those impacts that can be stated in probabilistic terms—that is, in terms of risk (probability times magnitude). Because risk can be measured and quantified, risky impacts are not the same as unquantified impacts—that is why the Circular is seeking to say they "differ." The problem is that some uncertain impacts *will be the same* as unquantified impacts—specifically those impacts that are uncertain in the Knightian sense. As this confusion seems to permeate other discussions of uncertainty in the proposed update, I will address it further in the next section of this Part addressing uncertainty.

Second, at the top of page 45, the proposed update encourages analysts, "[i]f [they] are not able to quantify certain effects of a regulation, [to] present any relevant quantitative or qualitative information that would inform an understanding of [any unquantified] effects (including their magnitude and probability)." Again, the sentiment here is the right one—and it is consistent with the second theme in these peer review comments, namely that OMB should encourage agencies to provide more information to decision-makers and the public. The problem, though, is twofold: (a) If the analyst is not able to quantify effects, then it is not immediately self-evident why the analyst would be able to present "quantitative …information … including their magnitude and probability." If the analyst has quantitative information, especially on magnitude and probability, then the simple premise of this sentence (i.e., of being unable to quantify certain effects) would not seem to hold. To improve clarity, consider removing "quantitative or qualitative" in front of "information" in this sentence. (b) It would be useful to clarify here what counts as "*relevant* information." Presumably that means information about effects that are more than just speculative. It may be useful here either to cross-reference or reiterate the point made on page 28 that regulatory analyses do not need to include impacts that are only highly speculative.

Third, the necessity or even value of footnote 78 on page 45 is far from clear. Yes, costs should be considered as opportunity costs, not necessarily as budgetary or accounting costs. But the underlying message here is far from distinctive to challenges of quantification. The example is also far from optimal to illustrate the difficulties of monetizing or quantifying costs because it focuses on estimating cost-savings, which could potentially be seen as a benefit of a regulation instead of a reduction of costs. There is an inherent need to be careful about how one characterizes cost-savings in benefit-cost analyses, lest double-counting occur. If an example is needed on page 45—though I do not think one is—it would be better to use one that more cleanly centers on the difficulties in estimating costs. Barring that, I would recommend deleting footnote 78.

ii. Encourage more information. This section is a model of what it means for OMB to encourage agencies to provide more information to decision-makers and the public. Rather than ignoring unmonetized or unquantified impacts, this section of the proposed update encourages agencies to provide as much information about these impacts as possible (p. 45). The section contains a useful discussion of break-even analysis and efforts to gauge the order of magnitude of unquantified impacts. The recommended summary table of unquantified or unmonetized impacts is also a good one too.

My main recommendation here would be add language to the Circular strongly encouraging agencies to refer to these unmonetized or unquantified impacts within or at least very near the same summary tables

that list monetized or quantified impacts. Under the proposed Circular as currently drafted, agency analysts could still prepare analyses that give primacy to monetized impacts in their presentation of their results, relegating the recommended discussion and summary table of unmonetized or unquantified impacts to an appendix. Burying the consideration of unmonetized or unquantified impacts in a report would be both unfortunate and inconsistent with what I take to be the intent of this section, which is to ensure that agency decision-makers and members of the public are fully informed. If the information recommended in this section is presented to agency decision-makers in a readily accessible location in a regulatory analysis report, agency decision-makers should then have a better ability to take unmonetized or unquantified impacts into account when providing the "reasoned determination that the benefits of the intended regulation justify its costs," as called for by Executive Order 12,866.

F. Uncertainty

Uncertainty will be ever-present in regulatory analysis and regulatory decision-making. It is for that reason that Circular A-4 not only contains a section on uncertainty but addresses it in multiple ways throughout the document. One way to address uncertainty has been evident throughout these peer review comments, which is simply to conduct analyses using multiple reasonable discount rates, using different assumptions about distribution, providing multiple baselines, and so forth. The section on uncertainty in the proposed update is consistent with this general approach to the treatment of uncertainty and I am generally supportive of recommendations.

i. Improve Clarity. The proposed update could benefit from greater clarity around the use of terms such as "risk" and "uncertainty." As indicated in the immediately preceding section, the proposed update's discussion of unquantified impacts seems to take what many readers would identify as "risk" and equate it entirely with "uncertainty": "Uncertain effects are those that may or may not come to pass or that have uncertain magnitudes, but where some aspects of the underlying probability of occurring or of potential outcomes are known" (p. 44). But then in footnote 117 on page 67, the proposed update says that "'uncertainty' refers to a more fundamental lack of knowledge"—a definition that, by the way, would be consistent with impacts that are difficult to quantify, notwithstanding the proposed Circular's unequivocal statement on page 44 that uncertain impacts "differ" from unquantified ones.

Granted, the confusing usage throughout the proposed update to Circular A-4 is not unique to this document. Numerous taxonomies of uncertainty prevail in the literature, so I can hardly expect Circular A-4 to use uncertainty-related terminology that will immediately resonate with all readers. As one recent study of uncertainty across various academic disciplines has noted, there exists a "range of epistemic issues represented under the banner of uncertainty" which has likely contributed in the academic literature to an "inconsistency of treatments of uncertainty"—and "this inconsistency may hamper communications efforts with peers, policymakers and other stakeholders."[64]

Nevertheless, precisely because inconsistent and imprecise usage can hamper communication, OMB would do well to try harder to define and consistently use terms such as "risk" and "uncertainty" throughout Circular A-4. On pages 48 to 51 of the proposed update, for example, the Circular uses the word "risks" repeatedly—even though it does so in a sense that would meet the definition of "uncertain effects" provided on page 44 and parts of Section 11 because the outcomes are merely probabilistic. The proposed update returns on pages 71 to 73 to a discussion of risk—in the context of risk aversion—but here it does so under a section labeled "Economic Values of *Uncertain* Outcomes." The proposed update

[64] Luke D. Bevan, "The Ambiguities of Uncertainty: A Review of Uncertainty Frameworks Relevant to the Assessment of Environmental Change," 137 *Futures* 102919 (2022).

is to some degree to be commended for being at least somewhat transparent about its spongy use of uncertainty. It states in footnote 117 that it is using "variability" and "uncertainty" interchangeably. And footnote 118 not unhelpfully discusses various ways that uncertainty can arise—but then this footnote never really integrates the distinctions it makes within the discussion contained in the text.

All in all, I fear that, without greater effort to define and clarify "uncertainty" itself, many readers of the Circular will be at least somewhat hampered in their ability to internalize and apply the content of Section 11 (and other parts of the Circular where risk and uncertainty are discussed). The Circular could better meet its stated goal of "assist[ing] analysts" (p. 2) by doing more to tighten up its definition (or definitions) of uncertainty and making sure uncertainty-related terms are used more consistently throughout the document.

ii. Encourage more information. The proposed update sensibly recognizes that risk aversion may sometimes be appropriate to assume when conducting a regulatory analysis. It also sensibly provides considerations for determining when risk neutrality may be the more suitable assumption. What I did not see in this section, though, is a recommendation that it may also be appropriate for agency analysts to compare the results they obtain under risk aversion with results that would apply under risk neutrality—and vice versa. I suspect that in many cases it will be informative to the decision-maker, and to the public, to understand whether or how much much the rankings of different regulatory alternatives hinge on assumptions made about risk tolerances.

III: Additional Questions and Comments

The preceding Part responded the "Charge to Peer Reviewers" by providing answers to Questions 6 and 4, respectively. It did so for each of the six "notable topics" that had been identified for comments in the Charge. Some of the discussion of these topics in Part II may also have spoken to some of the other questions in the Charge. In this present Part, though, I expressly address the remaining questions in the Charge. Doing so allows me to offer other comments and suggestions—and with respect to other topics—that stood out to me on my reading of the proposed update to Circular A-4.

A. Questions 1 and 2: Support for Assumptions and Recommendations

The first two questions in the Charge contain a substantial overlap. Question 1 asks "whether the recommendations in the guidance are supported by the leading theoretical and empirical peer-reviewed academic literature in economics or other relevant disciplines." Question 2 asks much the same with respect to the "assumptions" that are contained in the proposed update to Circular A-4. The following provides comments responsive to these questions on two passages in, respectively, Section 5 of the proposed update ("Identifying the Need for Federal Regulatory Action") and Section 6 ("Alternative Regulatory Approaches").

On page 15, the proposed updated Circular states that "addressing behavioral biases" represents a "*common* need[] for regulation." Such biases may indeed create a need for regulation in some circumstances—presumably often because such biases contribute to the market failure of information asymmetries, as noted in the proposed update (although perhaps also for other reasons). Still, the academic literature on behaviorally informed regulation remains relatively new. I am not aware of any research that would provide a basis for stating how "common" it is for behavioral biases to provide a justification for regulation. I would suggest deleting the word "common" and rewording the sentence.

On page 25, the proposed updated Circular moves in a positive direction by qualifying a statement from the original 2003 version of the Circular about performance standards. Instead of stating that performance

standards "are generally superior" to other regulatory designs,[65] the proposed update now says that "[w]hen outcomes are straightforward to measure, performance standards often are superior" to other regulatory designs (p. 25). It would be more accurate to replace "often are" with "may be." Unlike in 2003, the literature now contains research showing distinct limitations to performance standards—including how they can sometimes produce problematic results even when outcomes are ostensibly straightforward to measure.[66]

More importantly, the point of regulatory analysis—indeed the point of the rest of Circular A-4—is to provide information about whether, in particular context, a given regulatory design is superior to its alternatives. It has always seemed discordant that Circular A-4 has offered generalizations about particular types of regulatory designs when the point of doing analysis is to compare alternatives when applied to specific regulatory problems in specific settings. In this regard, a National Academy of Sciences, Engineering, and Medicine report issued in 2018 identifies a range of contextual considerations that may contribute to some regulatory designs as being more appropriate than others[67]—even though that report is no substitute for a context-specific regulatory analysis.

That same NASEM report—as well as other research—also shows that another kind of "alternative" regulation never mentioned in the proposed update to Circular A-4, an alternative called "macro-means" regulation in the NASEM report or "management-based" regulation elsewhere, can actually "specify[] … means" (p. 25) but still allow flexibility to regulated entities and may exhibit much the same virtues often attributed to performance standards.[68] Given that this type of means-based regulation can exhibit many of the virtues of performance standards, it is hard to see why performance standards are still singled out in Circular A-4 for distinction—or at least why management-based regulation is not also mentioned.

But OMB should know that, at a minimum, no research literature supports a claim about how "often" performance standards may be superior to other standards. It is not helpful to make such a sweeping statement about performance standards or any other particular regulatory strategy or design. Again, the point of regulatory analysis, conducted in accordance with Circular A-4, is to inform the selection of alternatives.

For much the same reason, the proposed update's statement that "performance standards often provide greater incentives for innovation" (p. 25) is unsupported. Again, no research contains support for any frequentist claims about performance standards' incentives relative to other regulatory designs. More importantly, the mere specification of a regulation "in terms of outcomes rather than … the means to

[65] 2003 Circular A-4, p. 8.
[66] Cary Coglianese & Jennifer Nash, "The Law of the Test: Performance-Based Regulation and Diesel Emissions Control," 34 *Yale Journal on Regulation* 33-90 (2017), https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2888990; Cary Coglianese, "The Limits of Performance-Based Regulation," 50 *University of Michigan Journal of Law Reform* 525-563 (2017), https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3014768.
[67] National Academies of Sciences, Engineering, and Medicine (NASEM), Designing Safety Regulations for High-Hazard Industries (2018) (chapter 4), https://nap.nationalacademies.org/catalog/24907/designing-safety-regulations-for-high-hazard-industries.
[68] NASEM, *supra* note 27 (chapters 2 and 5); Cary Coglianese & Shana Starobin,,"Management-Based Regulation," in Kenneth R. Richards and Josephine van Zeben, eds., *Policy Instruments in Environmental Law* 292-307 (Edward Elgar, 2020), https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3715057; Cary Coglianese, "Management-Based Regulation: Implications for Public Policy," in Gregory Bounds and Nikolai Malyshev, eds., *Risk and Regulatory Policy: Improving the Governance of Risk* (OECD Publishing, 2010); Cary Coglianese & David Lazer, "Management-Based Regulation: Prescribing Private Management to Achieve Public Goals," *Law & Society Review* 37:691-730 (2003), https://papers.ssrn.com/sol3/papers.cfm?abstract_id=297162.

those ends" does not "provide" an incentive to firms (p. 25). All an outcome-specified regulation does is give firms flexibility to innovate if they should otherwise have a desire to do so.[69] As I have noted elsewhere:

> [a]lthough the innovation possibilities of performance standards mark one of their chief theoretical advantages, it is important to recognize that performance standards do not by themselves actually encourage innovation. That is, there is nothing in the specification of a required end-state that for that reason provides any new incentives for innovation. The incentives for innovation exist outside of the regulation, in the overall competitive business environment that drives regulated firms to look for new, less costly ways to achieve regulatory goals. While performance standards facilitate such innovation, since the regulatory scheme gives firms flexibility, the performance standards alone do not actually drive the innovation. It is somewhat of a misconception to think that performance standards will induce innovation (as opposed merely to *allow for* innovation).[70]

In addition, innovation is not always positive when it comes to performance standards. Innovation has sometimes taken the form of regulated entities finding new, less costly ways of achieving their goals that violate the underlying "spirit" or purpose of the regulation, even though they may still remain in compliance with the letter of the law.[71]

B. Question 3: Potential Challenges for Implementation

The proposed update to Circular A-4 properly recognizes and provides accommodation for the challenges that can accompany regulatory analysis in practice. The proposed update's treatment of unquantified impacts, for example, demonstrates OMB's recognition of the difficulties of conducting timely and useful regulatory analyses. In other ways, the proposed update emphasizes feasibility throughout its text, frequently reminding the analyst that the guidance contained in the Circular is intended to be general and even often aspirational. The proposed Circular provides numerous reminders that in specific circumstances the appropriate analytic approach might need to depart from the ideal.

Perhaps the one aspect of the Circular, though, could be said to be less-than-sensitive to real-world challenges: that is in the structure, length, and presentation of the Circular itself. As I noted at the outset, the proposed updated Circular is nearly twice as long as the original Circular, with more than six times the number of footnotes. At times, the increased discussion and additional footnotes are needed and helpful. But the size and complexity of the proposed update does inevitably suggest "potential challenges" to the reader in terms of digesting what it recommends.[72]

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[69] Some exceptions here might be said to prove the point. Outcome-based regulations can provide incentives for innovation when they either have variable consequences associated with them—such as emissions taxes—or when they allow for the possibility of variations in outcome levels—such as with cap-and-trade regulations. But the incentives in these cases come not from the mere specification of a rule in terms of an outcome, as stated in the proposed updated Circular. That is, the incentives are not from the mere fact that the regulation's obligation is stated in terms of an outcome. A uniform performance standard backed up by a conventional penalty will not on its own provide any incentives for innovation; at most, it will allow for such innovation.

[70] Coglianese, "Limits of Performance Standards," *supra* note 26, at 542.

[71] *Id*; Coglianese & Nash, "The Law of the Test," *supra* note 26.

[72] To be fair, Circular A-4 is far from alone in increasing its length over time. The 1996 edition of Eugene Bardach's book, *The Eight-Step Path of Policy Analysis*, spanned 126 pages. The 2019 edition, by contrast, had grown to 216 pages. Sometimes important and complex subject matter necessitates length. Even this peer review report is itself lengthy! I am only trying to encourage OMB to do as much as it can to make Circular A-4 as easily digestible as it can.

Upon revising the draft update, might OMB take upon itself the challenge to do what it surely encourages agencies to do when they craft new regulations? Can OMB find ways to simplify and clarify? Can it seek to make edits that will make the document clearer and more consistent, even if it is not necessarily written entirely in "plain" language? Can OMB try to identify additional ways of streamlining so that it can communicate with its audience even more effectively?

In asking these questions, I do not mean to imply that the current draft is incomprehensible. I only mean to point out that, just as any document on regulatory analysis might, the proposed updated Circular is likely to present some potential challenge to some of its readers. Yet because of the important role that the Circular plays in helping agencies produce regulatory analyses, I hope to encourage OMB to take still further efforts to improve the accessibility of the document for a wide audience across the entire federal government.

C. Question 5: Encouraging Accounting for Non-Monetized and Non-Quantified Effects

Question 5 in the Peer Reviewer's Charge asks for suggestions of "best practices [that] might be identified in the guidance to encourage accounting for non-monetized (possibly also non-quantified) effects." I would suggest simply doing more in the Circular to encourage agencies to think about the full range of impacts of any new regulations.

As noted in Part I of this report, the current draft of Circular A-4 leaps right into the valuation of benefits and costs without first encouraging agencies to identify all the likely impacts, positive and negative, from a new regulation. Granted, it may seem like this should already be obvious. But if OMB assumes it will be obvious, it will miss an opportunity to do more to encourage accounting of non-monetized or non-quantified effects. To encourage accounting for these effects, OMB needs first to encourage analysts to look for these effects in the first place. The first step in any benefit-cost analysis should be for the agency to identify *all the anticipated consequences* of a new regulation—and then it can go about determining which of these effects can be quantified and monetized.

The current draft of the updated Circular does not provide an extended discussion of unquantified and unmonetized impacts until the 9th subsection of its 7th section—nearly halfway into the report. The final version of the updated Circular would do well to add a brief section or subsection before introducing benefit-cost analysis that instructs analysts to start off by identifying *all* the likely consequences of their rules before beginning any benefit-cost analysis. My suggestion would be to add a paragraph to this effect at the very beginning of Section 2 (p. 4) and then again returning to the point at the very beginning of Section 7. The discussion at the start of Section 7 could then be accompanied with a preview what will follow in that section: first, how to treat impacts that can be quantified and monetized (benefit-cost analysis), and second, how to treat impacts that cannot be either quantified or monetized.

D. Question 7: Data Set Recommendations

I like that OMB is asking for suggestions about data sets that might be "broadly useful" as well as for advice about how it might include this information in Circular A-4. Although I do not have immediate suggestions about specific data sets at the present time, it is clear to me that OMB is well-situated to serve as a kind of clearinghouse of not only good sources of data but all sorts of good ideas about how agencies can more easily and effectively produce high-quality regulatory analysis. At the same time that I would encourage OMB to find ways to build such a clearinghouse, I would discourage OMB from including lists of data sets in Circular A-4 for at least three reasons.

First, as already noted, Circular A-4 is already a long document. Second, Circular A-4 is unlikely to be updated with anything close to the frequency that a repository or clearinghouse of data sets should be.

Circular A-4 to help agencies improve the quality of the data. Specifically, to recap two suggestions I have already offered, OMB would do well to:

- Emphasize the importance of reliable, high-quality evidence early in the report, such as in a statement of principles for regulatory analysis and in discussing the need to identify and quantify impacts even before turning to the valuation of benefits and costs.
- Remind analysts of the value that retrospective impact evaluations of regulations can provide in informing prospective benefit-cost analyses.

Because careful, causally oriented retrospective evaluation can be valuable for regulatory learning, I would urge OMB to consider creating not merely an online repository of data sets but also to consider building an online repository of retrospective studies of regulations. The Education Department has created a "What Works" clearinghouse of educational evaluation research. The field of regulation could benefit from something comparable.

In thinking about retrospective studies that might be "broadly useful" to encourage or to share, OMB might find it helpful to consider, as I have noted elsewhere, three types of situations where retrospective studies can be of particular value: (1) "close calls"—where initial, prospective benefit-cost analyses anticipated only small net benefits; (2) "high uncertainty rules"—where the prospective analysis contained a high degree of uncertainty and thus where subsequently there could be much to learn; and (3) "common issues"—where rules have similar features, regulatory designs, or common assumptions, thus making the gathering retrospective data on one rule potentially informative for other rules.[73]

E. Additional recommendations

As peer reviewers, we were also asked if we had any other recommendations to offer to OMB. I will share two recommendations about the proposed update's discussion of compliance on pages 53-55. This discussion, I should say, is quite valuable. If the benefits of a regulation depend, say, on ongoing and consistent behavior by regulated entities—such as performing regular oversight or maintenance—it is not unreasonable to question whether compliance will be maintained over time. I read this part of the Circular to encourage agencies to consider how slippage in compliance may affect reasonable expectations of regulatory impacts. At a minimum, as the proposed update to the Circular makes clear, agency analysts should not blithely assume full compliance when conducting regulatory analyses. The proposed update's treatment of compliance gives agency analysts helpful guidance on making their assumptions about compliance transparent and, when appropriate, testing the extent to which these assumptions affect analytic results.

Two additional opportunities come to mind for improving the discussion of compliance on pages 53-55. First, agencies could be encouraged here to do more to consider alternatives that would make compliance more likely. The proposed update does state that "it is generally helpful to specifically address the manner and method of enforcement" (p. 53). A cross-reference here to the section on enforcement methods on page 24 would be one positive addition. So too would be a statement that encourages agency analysts, rule-writers, and enforcement personnel to consult with each other to identify alternatives that could maximize compliance.[74] And so too would it be helpful to encourage analysts to consider conducting, as appropriate, break-even analyses with respect to compliance.

[73] Cary Coglianese, "Moving Forward with Regulatory Lookback," 30 *Yale Journal on Regulation* (online) 57-66 (2013), https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3015481.
[74] Cynthia Giles, Next Generation Compliance: Environmental Regulation for the Modern Era (2022).

Second, OMB would do well to alert agency analysts to the possibility that *full legal compliance* can be maintained even though behavioral responses *do not align with* the regulation under analysis. How could that be? Many agencies have legal authorization to waive rules or otherwise grant exemptions. When waivers or exemptions are granted, regulated entities can remain in full compliance with the law, even though their behavior does not accord with the expectations that otherwise might form the basis of a regulatory impact analysis. The discussion of page 53-55, focused as it is on "compliance," can lead analysts to miss the possibility that agency officials can and do grant waivers and exemptions—and that analyses should give due consideration to how that possibility might shape results. The updated Circular A-4 would do well to include at least a sentence or two in this section indicating that agency analysts should consider the implications of waivers and exemptions in much the same way, and for similar reasons, that this section properly urges analysts to consider the implications of less than full compliance.[75]

Conclusion

I appreciate the approach OMB is taking to update Circular A-4 by proceeding thoughtfully and with the benefit of public and expert input into its revisions. The passage of twenty years' time is more than enough to justify revisiting the Circular and updating it. By updating Circular A-4, OMB can better assist agency personnel in the production of regulatory analyses that meaningfully inform decision-makers and the public.

[75] For a discussion of the value of regulatory analysts taking into account "obligation alleviation"—i.e., waivers, exemptions, exceptions, and the like—see Cary Coglianese, Gabriel Scheffler, & Daniel E. Walters, "Unrules," 73 *Stanford Law Review* 885, 944-947 (2021), https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3701841.

Individual Peer Reviewer Comments: Joseph Cordes

My comments are presented as follows. First, I provide general comments about several broad topics in the revised circular that, in my opinion, warrant further attention and/or modification in the final version. I then respond to the specific questions that have been listed both in the peer reviewer charge and peer reviewer comment form. I conclude with some broad themes to consider in the final version.

1. Choice of the Social Discount Rate

The proposed revisions to Circular A-4 appropriately devote considerable attention to updating the guidance concerning the discount rate to be used in benefit-cost analysis as applied to government regulations. On balance, the 2023 Circular A-4 covers the main points of the literature on choosing the "correct" social discount rate. The following points should, however, be noted.

(1) The specific recommendation to use a default real after-tax discount rate of 1.7% should be reconsidered on several grounds. First, given the uncertainties involved in choosing the discount rate to pick a single value of 1.7% introduces an element of false precision. At the very least, an approximation of 2% (perhaps with some higher alternatives) would seem more defensible. Second, the time frame used to construct the proposed default real social discount rate encompasses a period during which the risk-free Treasury rate was kept intentionally low by quantitative easing and other expansive monetary policy. Thus, while there is a case for proposing a default real discount rate lower than the 2003 Circular A-4 default rate of 7%, 1.7% (or even 2%) may be lower than the longer-run discount rate. Something like a default discount rate of 3% with a lower value of 2% and an upper value of 4% or 5% may be more defensible.

(2) The possible role of the Ramsey approach to discounting is unclear. Are agencies being encouraged to use the Ramsey approach as an alternative to the default based on the risk-free real Treasury rate? Moreover, the actual value of the Ramsey rate depends entirely on assumptions made about its components. Depending on these assumptions it is possible to arrive at a Ramsey rate that is greater than the proposed default rate of 1.7%. For example, the UK government, which has adopted the Ramsey approach recommends use of a 3.5% real discount rate based on the assumptions of a 1.5% pure rate of time preference; a value of the marginal consumption elasticity of 1.0, and a long-run growth rate of 2.0%.

(3) The revised draft of Circular A-4 is correct in noting that when capital market distortions such as taxes, drive a wedge between the real return to capital and the individual discount rate, the conceptually correct approach for discounting is the so-called shadow price of capital approach. The challenge is the practical and consistent implementation of this method. The revised Circular A-4 presents an example based on the RFF Working Paper by Newell, Brest, and Pizer that could be used as a template by agencies. To the extent that OIRA wishes to encourage agencies to consider using the shadow-price approach, it would be useful to provide somewhat more detailed examples of how to implement the shadow price approach, if not in the circular itself, then in a web link. An approach consistent with the shadow price of capital framework can also be found in Mannix (OMB-2022-0014-3906).

(4) Finally, the proposed revision of Circular A-4 presents the case for possible applying a schedule of declining discount rates for policies (mainly environmental) with inter-general benefits. There is some support for this in the peer-reviewed literature cited in the revised Circular A-4. A concern, however, is that the precise level and "shape" of the declining discount rate schedule is

likely to be quite sensitive to specific assumptions made about the underlying distribution of "uncertain" discount rates. Indeed, the specific schedule of declining discount rates that is presented in the preamble is offered with relatively little justification.

2. Distributional Effects in Regulatory Impact Analysis

Compared with the 2003 Version of Circular A-4, the proposed 2023 revision devotes considerable attention to incorporating distributional effects of regulation into regulatory impact analysis. Identifying and, where possible, estimating the distributional effects of proposed government regulations is clearly desirable. The question is how best to do so.

The critical first step in any analysis of distributional effects is a determination of the incidence of aggregate benefit and aggregate costs of regulation. Namely, how are both the projected benefits and the projected costs of regulation distributed among the relevant groups affected by the regulation? The word "relevant" is underscored because although a typical assumption may be that what matter is distribution by income group, this need not necessarily be the case, depending on the regulation under consideration. For example, in some cases, the relevant distributional effects may be geographical. Agencies would benefit from more guidance on this matter. Such guidance need not be incorporated in Circular A-4 itself, but perhaps could be provided in a link to a supplementary website focusing on "how to incorporate distributional effects."

There are formidable conceptual and empirical challenges to identifying and estimating distributional effects. Simply determining who benefits and who bears the cost requires determining what public finance economists refer to as the economic incidence of regulatory benefits and regulatory costs. This may or may not correspond to what might be described as the initial impact of the regulation. Consider the case of a regulation that requires producers to reduce carbon emissions. The costs of complying with such regulations may be paid by producers, but may be shifted backward to workers through lower wages and forward to consumers in the form of higher prices.

Additional guidance to agencies on the basics of incidence analysis may be useful, indeed required, to facilitate some consistency in how distributional effects are analyzed. A possible model may be to adapt the manner in which economic incidence analysis of taxes is undertaken by the U.S. Treasury and the Congressional Budget Office to determining the economic incidence of regulation. Indeed it may be helpful to develop guidelines for undertaking distributional transfer analysis, analogous to benefit transfer analysis often used in environmental benefit-cost analysis.

Once the incidence of regulatory benefits and costs have been identified and estimate, the issue is that of how best to incorporate distribution into regulatory impact analysis. Although the proposed Circular A-4 revision recognizes that there various ways of taking distribution into account, its quasi-endorsement of "distributionally weighted" benefit-cost analysis is problematic in several ways.

(1) The acknowledged purpose of benefit cost analysis is to assess whether a particular policy change, such as a government regulation, enhances economic efficiency. While, from a welfare-analytic perspective, government regulations should be both economically efficient, and have desirable (or at least acceptable) distributional outcomes, the two objectives are distinct. The public interest is best served by presenting separate impacts of regulation on efficiency and equity rather than by attempting to combine the effects in a single weighted benefit-cost measure.
(2) The conceptual premise behind the suggested method of constructing distributional weights is relatively weak. As several public commenters – see Banzaf (OMB-2022-0014-0158} Sullivan

(OMB-2022-0014-0029), Kenkel (OMB-2022-0014-3910) and Fraas(OMB-2022-0014-3917) -- have noted, the common argument that it is reasonable to assume that the marginal utility of an additional $! of income may decline with income for a single individual is based more subjective views of what seems reasonable, rather than on empirical evidence; and moreover does not necessarily apply across individuals.

The preferable approach would be to incorporate distributional effects in a regulatory impact analysis in much the same way as distributional effects are presented separately from efficiency effects in the analysis of tax policy. Namely show how the benefits and costs are distributed among the relevant groups *in addition to and separately from presenting any estimates of the policy's impact on economic efficiency*. The inherently subjective weighting of these separate effects is best left to decision-makers and the political process.

3. Geographical Scope

Guidance in the 2003 version of Circular A-4 states that the "….analysis should focus on benefits and costs that accrue to citizens and residents of the United States." In the case of a regulation that "is likely to have effects beyond the borders of the United States, these effects should be reported separately." Thus, while the inclusion of benefits and costs beyond the borders of the United States in regulatory impact analyses was not expressly prohibited in the 2003 version of Circular A-4, the inclusion of benefits and costs experienced by non-U.S. citizens is circumscribed.

The greater willingness to consider global benefits and costs that is found in the 2023 proposed revisions to Circular A-4 reflects a legitimate debate about how to treat "global social benefits and/or costs" particularly in the case of environmental problems whose scope is global rather than national – e.g. Smith (OMB-2022-0014-0079). One way of framing the issue in a manner that is entirely consistent with established benefit-cost principles is as follows. If one accepts the premise that the relevant social benefits should be based on the willingness to pay for environmental improvement of U.S. citizens, the question can be reframed as follows: (1) to what extent do U.S. citizens have a positive willingness to pay for environmental benefits that accrue to citizens in other countries, and if so, (2) How should this willingness to pay be estimated?

Scholarly research suggests that the answer to the first question is "yes," while the answer to the second question may be that $1 of environmental benefit accruing to citizens of other countries would be valued at less than $1 of benefit accruing to U.S. citizens. This suggests that a conservative approach to incorporating global benefits and costs would be: (a) to include global benefits and costs separately, along with purely domestic benefits and costs, as recommended in the 2003 version Circular A-4, and (b) present a range of values for such global benefits, treating the full magnitude of global benefits and costs as "upper bound" estimates, and applying an appropriate discount to such values to represent the willingness to pay of American citizens. The revised draft is generally consistent with this approach, however the brief reference to situations where "such effects cannot be separated in a practical and reasonably accurate manner, or that the separate presentation of such effects would likely be misleading or confusing in light of the factors detailed above" is likely to confuse agencies and lead to inconsistencies across analyses.

4. Incorporating Insights from Behavioral Economics

The revised circular includes a discussion of the possible role of behavioral economics in regulatory impact analysis. The suggestion to draw upon behavioral economic insights such as through the use of nudges to implement regulations is useful. A potential caveat is that a recent survey of empirical studies

(Mertens, et, al. 2021. "The effectiveness of nudging: A meta-analysis of choice architecture interventions across behavioral domains" Proceedings of the National Academy of Sciences) finds that nudges have small to modest effects on outcomes.

Caution, however, should be exercised in broadening the list of possible justifications for regulation to include "behavioral biases." As Geyer and Viscusi (Journal of Benefit Cost Analysis, 2016) note:

> The evidence of systematic irrational behavior creates a conflict between two core principles of benefit-cost analysis (BCA): the Kaldor–Hicks principle and the principle of consumer sovereignty. The Kaldor–Hicks principle instructs the analyst to attempt to identify the outcome that maximizes the net benefits to the people subject to the policy options, while the principle of consumer sovereignty instructs the analyst to respect the choices that the people would make in determining what is best for themselves. If consumers are believed to be acting irrationally, then an analyst must choose between incorporating the benefits of a policy that addresses the self-harm done by an individual and respecting consumer sovereignty and thus ignoring such benefits, leading to a violation of the Kaldor–Hicks principle.

To the extent that behavioral biases are offered as a justification for government intervention, and are used as the basis for estimating presumed social benefits of intervention, agencies should be strongly encouraged to adopt something like the Geyer-Viscusi "behavioral transfer" test. Moreover, presentation of estimated benefits in a regulatory impact analysis should separate those benefits arising from correcting "traditional" market failures from market those that are attributable to behavioral biases.

5. Discussion of Uncertainty

Proposed revisions devote more attention to uncertainty than does the 2003 version. At time, however, the discussion of uncertainty seems to conflate two distinct aspects of when uncertainty is relevant. One important issue is how to best account for the unavoidable uncertainties encountered in estimating regulatory impacts. The revisions do provide a brief discussion of what is commonly called sensitivity analysis At minimum undertaking even a simple incremental sensitivity analysis should be required as a strongly recommended best practice in regulatory impact analysis. More sophisticated forms of sensitive analysis based on Monte Carlo simulations are increasingly accessible in excel-based programs such as Crystal Ball, and agencies should be encouraged to adopt these technologies.

The other dimension of uncertainty discussed in the revision pertains to what assumptions are appropriate about how individuals and businesses incorporate uncertainty into their decision. It is not always clear, however, about how different assumptions about uncertainty – e.g. risk neutrality vs, risk aversion – should be incorporated in regulatory impact analyses.

Specific Questions

1. Please comment on whether the recommendations in the guidance are supported by the leading theoretical and empirical peer-reviewed academic literature in economics or other relevant disciplines, and if not, please provide alternative recommendations that would be (and citations to support them).

   As someone who has taught benefit-cost analysis to hundreds of Master's and Doctoral students for the past 20+ years, I would give the revised version of Circular A-4 high marks for its coverage of the relevant literature.

2. Where the guidance reflects assumptions, are they supported by the theoretical and empirical peer-reviewed academic literature in economics, or other relevant disciplines? If unsupported assumptions are identified, are there alternatives you would recommend? Please provide supporting references for both parts of the response—concerns about assumptions, if any, and suggested alternatives.

Several key regulatory analysis inputs discussed in the draft are particularly dependent on underlying assumptions, and the final circular would benefit from more clarity on how different assumptions would affect estimated benefits and costs.

As noted above in general comment #2, although several citations are provided to support the case for cresting and using distributional weights, there is considerable disagreement, creating skepticism, among many economists about both the conceptual and the empirical basis for using such weights in benefit-cost analysis.

3. Does the guidance appropriately recognize and account for potential challenges for implementation (e.g., technical feasibility or constraints on data availability or other resources)?

The revised version of Circular A-4 lays out a fairly challenging agenda for undertaking regulatory impact analysis, including the implementation of distributional analysis, and possible use of the shadow price of capital approach to discounting. The draft revisions do not offer guidance that is detailed enough need to ensure that regulatory analysis is undertaken in a consistent and transparent manner across agencies of the federal government. One option would be to provide such guidance in an expanded version of Circular A-4, but this may not be the best alternative. An alternative would be to create supplemental websites that would be linked within A-4 to provide: (a) "best practice" templates for how to present results of regulatory analyses; (b) guidance for how to develop and present estimates of the distributional effects of regulations; and (c) particular good illustrations of regulatory analyses that embody best practices. An advantage of providing such information via websites is that advances in data availability, as well as empirical approaches to regulatory analysis could be regularly updated for the benefit of the federal regulatory community.

4. Do you have any other suggestions for improving the completeness, objectivity, and/or transparency of agency regulatory analyses? If so, how might these be incorporated into guidance?

OMB/OIRA might want to consider funding some workshops on the implementation of the revisions discussed both in Circular A-4 and Circular A-94.

5. What practices might be identified in the guidance to encourage accounting for non-monetized (possibly also non-quantified) effects?

The discussion of this topic in the 2023 revision is fairly thorough. I have two suggestions. First, it would be very useful either in the circular, or a supplemental website to encourage agencies to follow a structure set of steps in undertaking a benefit-cost analysis. A particularly useful list of such steps can be found in Boardman, et. al. *Cost-Benefit Analysis: Concepts and Practice*. One feature of such a list is that it makes clear that in conceptualizing a benefit cost analysis, *all* possible benefits and costs – *intangible as well as tangible* – should be identified and discussed. Second, it might be useful to provide some specific illustrations of common approaches for incorporating nonmonetized effects into benefit-cost analysis – e.g. cases in which including an

otherwise nonmonetized benefit or cost would strengthen the findings; cases in which break-even analysis may provide insight into "how large" a nonmonetized effect would need to be in order to affect the outcome.

6. Do you have suggestions that would improve the clarity and logical presentation of the guidance and/or ease execution of analyses?

I believe a number of my comments above offer suggestions. There is only so much guidance that can be offered in a written document such as Circular A-4. The overall quality and consistency of regulatory impact analyses would be improved by the development of supplemental materials and cases on a separate website, along with the offering of periodic workshops on how to do good and transparent regulatory analysis.

7. Should the guidance include suggestions of broadly useful data sets? If so, which data sets, and how should this information be presented in the guidance? How should the guidance reflect best practices related to data quality (including timeliness of data)?

Absolutely! An obvious starting point would be https://data.gov/, but some guidance as to which of the many data sets available on this website are likely to be the most useful for different types of regulatory analysis would be important to provide. This hearkens back to comments made above about the desirability of investing public resources in better educating agencies about how to undertake good regulatory analysis.

8. Do you have any additional recommendations for ensuring that the guidance and associated methodologies are supported by the theoretical and empirical peer-reviewed academic literature in economics, or other relevant disciplines? If so, please provide them here.

I have two additional comments. (1) I am not an expert in the economics of anti-trust, and I am aware that anti-competitive behavior by firms is a form of private market failure. Traditionally, this form of market failure has been dealt with by economic regulation undertaken by independent agencies such as the FTC, and by the anti-trust division of the Justice Department. In contrast, much of the original impetus for OIRA-style regulatory review came in response to the growth of what has been termed social regulation. While the effects of social regulation on market power should certainly be considered, it is not clear whether the revised circular is suggesting that the scope of OIRA regulatory review should be broadened to focus on market power as a source of market failure. In my opinion, moving in this direction would dilute the already-scarce staff resources needed to review social regulations. (2) Circular A-4 is intended to provide broad guidance about regulatory impact analysis generally certainly including, but not limited to environmental regulations. But, as several public commenters have noted, there appears to an emphasis on revising and improving environmental regulations. Somewhat more attention in the document should be given to other regulations, such as in the areas of product safety, occupational safety, etc.

Some Concluding Reactions

Several broad themes emerge from my review.

- Regulatory impact analysis should be transparent to policy officials who will base decisions on it and the public. There are several areas where the 2023 draft unintentionally supports approaches that may reduce that transparency. One key point that is made in the draft is that disaggregation,

and clear presentation of the empirical inputs into an estimate conveys important information that collapsing information into a single number (e.g., distributional weights assigned to benefits or costs or exclusive use of global benefits) obfuscates.

- The 2023 draft is arguably too complex or sophisticated at points to be accessible by regulatory analysts, policy makers, and the public. Simple, clear guidance (supported by templates, web-based tools, and examples available separately, as suggested above) could yield better analyses in most cases.
- The draft provides agencies considerable flexibility in some areas—especially on discounting, accounting for how regulatory benefits and costs are distributed, and identifying the problem to be solved. While some flexibility may be appropriate to address different situations, consistency across agencies will be important if the federal government is to ensure its regulatory policies are targeted at the most pressing problems and cost-effective in addressing them. Not only would it be chaotic if every agency approached regulatory impact analysis differently, but the information value of the analysis would also suffer.
- Although it is beyond the scope of this peer review, it would be useful to make sure that principles and approaches for doing benefit-cost analysis that are presented in Circular A-4 are consistent with those discussed in Circular A-94.

Individual Peer Reviewer Comments: Scott Farrow

Introduction: My understanding of principles and purpose underlying the A-4 guidance

Analytical level and audience: Guidance is for an acceptable lower bound of RIA quality done by advanced practitioners. The academic doing frontier research is not your audience nor are they economic neophytes. The target analytical level is a minimum acceptable level for regulations submitted to OIRA, with perhaps aspirational quality levels identified for some items.

Be brief, be consistent, be neutral.

Be brief. Extensive discussion as written lets in ambiguity or a sense of trying to convince the audience.

Be consistent. Inconsistency across documents (for instance with A-94 discount guidance) creates confusion. Inconsistency within the document (e.g. in regard to the use or non-use of the Ramsey formula) creates the appearance of biased selection.

Be neutral. You are reinforcing professional standards for practitioners. Selectiveness could briefly distort decisions. Selectiveness can lead to a backlash—as this document is doing with the prior Administration's efforts to restrict analysis to primary effects.

If in doubt, be professionally conservative but zero is not necessarily conservative.

There are grey areas in the standard practice of professionals, among them the specific value of some parameters such as "the" discount rate and "the" elasticity of the marginal utility of income. The challenge is to identify a value, or guidance, that improves upon zero or an existing default. (Farrow, 2012). Agencies are always free to go beyond the guidance.

Farrow, S., "A Missing Error Term in Benefit-Cost Analysis," *Environmental Science and Technology*, 46(5):2523-2528, 2012.

Topics identified in charge to reviewers:

1. distributional analysis;
2. discount rate;
3. scope of analysis, including geographic scope;
4. development of analytic baselines;
5. unquantified impacts; and
6. uncertainty.
7. Other

Comments are organized by topic, with a general summary of each followed by charge questions.

A.1 Distributional analysis: General summary of comments and recommendations

1. Background points:

1.1 Choosing a value for the elasticity of the marginal utility of income has analytical implications if the Ramsey rule is considered for the social discount rate--as it is currently discussed in the discounting text (Gollier, 2013; Acland and Greenberg, 2023). The income elasticity would also be a new application in regulatory practice and subject to concerns about applying across individuals. In contrast, the existing policy decision of a constant VSL implies that a weighting decision has already been made and hence breaks no new policy ground if VSL elasticity weights are applied (Viscusi and Kniesner, 2023; Farrow,

2021). Whatever value is chosen for the weighting parameter, having an identified parameter for weighting in a sensitivity analysis would, in my view, be useful.

1.2 Transfers only net to zero generally under $\varepsilon = 0$. Transfers can have differential impacts under a different assumption for ε. **Note**: Many regulations that are currently excluded as "transfer rules" could (should) come under OIRA review once distributional effects are expected as part of a regulatory analysis.

1.3. As income is often a common denominator among distributional categories (e.g. see CEQ, 2022), a "chain rule" type of estimation is possible as illustrated in Viscusi and Kniesner (2023).

1.4 Distribution and cost: Suppose Cost in a regulation is paid by the Federal government or there is a change in government revenues. Regarding distribution, OMB might consider identifying the income quintile of the dollar averaged taxpayer for distributional analysis. For example, it is not inconceivable that the average dollar of taxes comes from the Xth (for example, say 4th) quintile in which case down-weighting might occur in a weighted distributional analysis. [I note the issue of Cost of Public Funds (with $\varepsilon=0$) in A-4 and A-94 seem to be treated differently in each draft, see also Boardman, et al., 2020.]

2. Recommendations

2.1 Reconsider the document wide implications (such as discounting) of using a weighting parameter based on the elasticity of the marginal utility of income, or alternatively consider weights based on the income elasticity of the VSL as already being in regular and policy approved use.

2.2 Continue the assumption for the base case that the elasticity of the marginal utility of income (ε) is zero for continuity and its implication for transfer rules. In other words, distributional weighting should NOT be a primary analysis.

2.3 If use of the elasticity of the marginal utility of income is retained as the weighting approach, then transfers should be a sub-section in the larger distributional analysis.

2.4 Distributional impact analysis via the income channel should be expected as an important sensitivity analysis if distributional impacts are shown to exist. This can be done with a type of chain rule of causation as demonstrated in Viscusi and Kniesner (2023). Ideally using income net of transfers but if that is not possible, use another income measure.

2.5 Recommend calculation of a break-even ε: if such elasticity can be computed it could be compared to a rough lower bound of $\varepsilon_{vsl}=.5$ implied by current policy choices of a policy constant VSL; and the $\varepsilon_{Y}=1.4$ as exists in the draft guidelines.

A.2 Specific charge questions: distribution

1. Please comment on whether the recommendations in the guidance are supported by the leading theoretical and empirical peer-reviewed academic literature in economics or other relevant disciplines, and if not, please provide alternative recommendations that would be (and citations to support them).

The distributional weight of 1.4 based on the elasticity of the marginal utility of income is not supported in the A-4 draft but stated as "OMB has determined". While this could be ok as the preamble discusses it, but the support in the preamble depends on a very extended footnote (footnote 27) discussing various estimates. This suggests to me that the value and use of the parameter is not yet standard (i.e. a lower bound of quality for which OIRA is providing guidance).

Further, implications of elasticity of the marginal utility of income and Ramsey formula are investigated along with a meta analysis of the relevant elasticity literature in

Acland, Daniel and Greenberg, David H., The elasticity of marginal utility of income for distributional weighting and social discounting: a meta-analysis (June 18, 2023). Journal of Benefit-Cost Analysis, Available at SSRN: https://ssrn.com/abstract=4483436

Potential use of elasticity of VSL weighting:

a) Kniesner, T., & Viscusi, W. (2023). Promoting Equity through Equitable Risk Tradeoffs. *Journal of Benefit-Cost Analysis, 14*(1), 8-34. doi:10.1017/bca.2023.4

b) Farrow, R. Scott, 2021 On Balance: When All Lives Matter Equally: Equity Weights for BCA by Combining the Economics of VSL and US Policy (memberclicks.net)

Marginal excess burden of taxation: Boardman, A., Greenberg, D., Vining, A., & Weimer, D. (2020). Efficiency without Apology: Consideration of the Marginal Excess Tax Burden and Distributional Impacts in Benefit–Cost Analysis. *Journal of Benefit-Cost Analysis, 11*(3), 457-478. doi:10.1017/bca.2020.18

CEQ environmental justice area definitions: Council on Environmental Quality (CEQ), 2022. Climate and Economic Justice Screening Tool, 1.0. Available at: About - Climate & Economic Justice Screening Tool (geoplatform.gov)

2. Where the guidance reflects assumptions, are they supported by the theoretical and empirical peer-reviewed academic literature in economics, or other relevant disciplines? If unsupported assumptions are identified, are there alternatives you would recommend? Please provide supporting references for both parts of the response—concerns about assumptions, if any, and suggested alternatives.

   Is elasticity of zero supported in the empirical literature? Not to my knowledge. It has been (and remains) a useful anchoring point because it is explainable as a default parameter. (Farrow and Rose (2018)…Section 2, consumer welfare metrics and aggregation).

   Farrow, S. and A. Rose, "Welfare Economics: Bridging the Partial and General Equilibrium Gap", *Journal of Benefit-Cost Analysis*, Spring, 2018.

3. Does the guidance appropriately recognize and account for potential challenges for implementation (e.g., technical feasibility or constraints on data availability or other resources)?

Distributional analysis based on sorting by income before transfers and taxes ignores the existing redistribution by governments. While gross income could be informative, CBO publishes a regular report with net of transfer income by quintile: example for 2019 is The Distribution of Household Income, 2019 | Congressional Budget Office (cbo.gov) .

4. Do you have any other suggestions for improving the completeness, objectivity, and/or transparency of agency regulatory analyses? If so, how might these be incorporated into guidance?

   No comment

5. What practices might be identified in the guidance to encourage accounting for non-monetized (possibly also non-quantified) effects?

Currently appropriate for distributional effects, though long.

6. Do you have suggestions that would improve the clarity and logical presentation of the guidance and/or ease execution of analyses?

   Particularly if the final draft maintains use of the Marginal Elasticity of Income, transfers should be a subset of the distributional section, with income elasticity equal to zero for standard zero net value transfers. Then the second section can discuss relaxing this assumption in ways that OIRA ultimately chooses.

7. Should the guidance include suggestions of broadly useful data sets? If so, which data sets, and how should this information be presented in the guidance? How should the guidance reflect best practices related to data quality (including timeliness of data)?

   In general no, though for distribution the annual CBO report on income net of transfers may be useful in a footnote as a type and source of net income information.

8. Do you have any additional recommendations for ensuring that the guidance and associated methodologies are supported by the theoretical and empirical peer-reviewed academic literature in economics, or other relevant disciplines? If so, please provide them here.

From the summary above: Recommendations

1. Reconsider the document wide implications (such as discounting) of using a weighting parameter based on the elasticity of the marginal utility of income, or alternatively consider weights based on the income elasticity of the VSL.
2. Continue the base case assumption that the elasticity of the marginal utility of income (ε) is zero for continuity and its implication for transfer rules. In other words, distributional weighting should NOT be a primary analysis.
3. If use of the elasticity of the marginal utility of income is retained as the weighting approach, then transfers should be a sub-section in the larger distributional analysis.
4. Distributional impact analysis via the income channel should be expected as an important sensitivity analysis if distributional impacts are shown to exist. This can be done with a type of chain rule of causation as demonstrated in Viscusi and Kniesner (2023). Ideally using income net of transfers but if that is not possible, use another income measure.
5. Recommend calculation of a break-even ε: if such can be computed it could be compared to a lower bound of ε_{vsl}=.5 implied by current policy choices of a policy constant VSL; and the ε_Y =1.4 as exists in the draft guidelines.

B.1 Discount rate: General summary of comments and recommendations

1. Background points
   a. I find the discount literature a morass of competing approaches. Some of these approaches alter other aspects of the analysis, such as using a pure consumption rate after converting to consumption units by applying a shadow price for capital. In my view this reduces transparency, communicability to decision-makers, and introduces uncertain parameters without a clear gain in accuracy.

   b. Draft use of more recent 10-year Treasury rate is a move toward a prescriptive policy parameter instead of a descriptive (positive) parameter. Recent decades highlight the role of Treasury intervention to alter dramatically the 10-year bond rate, whether driving it effectively to zero or recent changes that sharply increased the rate.

   c. OIRA/OMB should balance multiple issues to define "the" discount rate, which will never be exactly true. Gollier (2013) and Li and Pizer (2021) clearly illustrate the role of the term structure of discount rates; even potentially negative (which would cause no end of consternation) while risk adds further complications.

2. Observation: Li and Pizer (2021) build on a historical literature of a weighted average of consumption and investment return, as well as the legacy OMB interest rates of 3% and 7% (real). Implicit in their Figure 2, based on equation 16, are calculations that suggest the mean (using an uninformed prior) of the dynamic consumption and private capital rates quickly converges to essentially 3 percent (the consumption rate)--much earlier than the long term on which they focus. In fact, for either shadow price of capital (v, based on OMB's ratio or a Ramsey estimate), the average discount rate rounds to 3 % for a project term starting at 10 years or less (see attached table…if OIRA investigates this the table should be checked for replication).

3. Recommendations:

   a. That the default recommendation for any length of project is 3% real, justified as expected value with uninformed prior of existing term structure bounds over relevant forecast periods.

   b. Encourage sensitivity testing at such other discount rates as analyst can justify.

4. Reasoning:

   a. Maintains prior 3 and 7 % as underpinnings but explicitly weights them considering term structure.

   b. A consistent way to set the default discount rate based on expected value.

   c. Discounting can be done in a way familiar to practitioners.

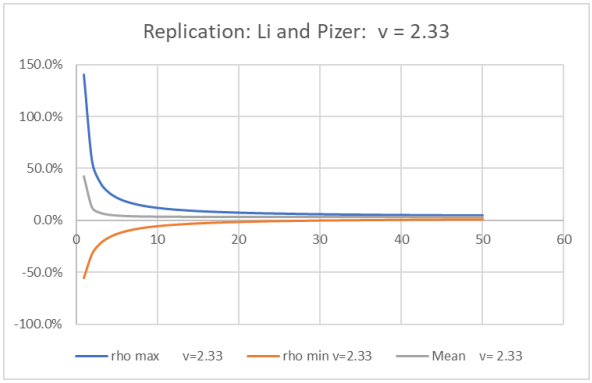
   d. Avoids guidance on issues such as shadow price of capital to convert to consumption units, and risk of project (embedded in private sector rate of return).

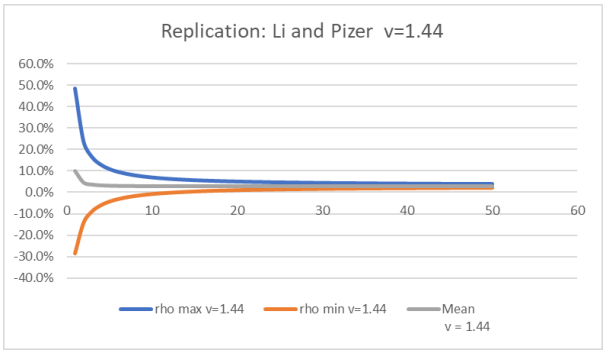
5. Long term discounting

   The draft section does not reach a conclusion and so the guidance is unclear. The recommendation above would effectively use the consumption rate as the default long-term rate in any event.

6. Replication of data behind Figure 2: Li and Pizer, 2021.

Replicating Fig 2: Li and Pizer			rc	3%	v	2.33
Using Eqn. 16				v=1.44 values pasted as numbers		
t	rho max v=2.33	rho min v=2.33	Mean v= 2.33	rho max v=1.44	rho min v=1.44	Mean v = 1.44
1	140.0%	-55.8%	42.1%	48.3%	-28.5%	9.9%
2	57.2%	-32.5%	12.4%	23.6%	-14.2%	4.7%
3	36.5%	-22.3%	7.1%	16.3%	-8.8%	3.8%
4	27.3%	-16.6%	5.3%	12.8%	-6.0%	3.4%
5	22.0%	-13.0%	4.5%	10.8%	-4.2%	3.3%
6	18.6%	-10.5%	4.0%	9.5%	-3.1%	3.2%
7	16.2%	-8.7%	3.8%	8.5%	-2.2%	3.1%
8	14.5%	-7.3%	3.6%	7.8%	-1.6%	3.1%
9	13.1%	-6.2%	3.5%	7.3%	-1.1%	3.1%
10	12.1%	-5.4%	3.4%	6.8%	-0.7%	3.1%
11	11.2%	-4.6%	3.3%	6.5%	-0.4%	3.1%
12	10.5%	-4.0%	3.3%	6.2%	-0.1%	3.0%
13	9.9%	-3.5%	3.2%	5.9%	0.2%	3.0%
14	9.4%	-3.0%	3.2%	5.7%	0.4%	3.0%
15	9.0%	-2.6%	3.2%	5.5%	0.5%	3.0%
16	8.6%	-2.3%	3.1%	5.4%	0.7%	3.0%
17	8.3%	-2.0%	3.1%	5.2%	0.8%	3.0%
18	8.0%	-1.7%	3.1%	5.1%	0.9%	3.0%
19	7.7%	-1.5%	3.1%	5.0%	1.0%	3.0%
20	7.4%	-1.3%	3.1%	4.9%	1.1%	3.0%
21	7.2%	-1.1%	3.1%	4.8%	1.2%	3.0%
22	7.0%	-0.9%	3.1%	4.7%	1.3%	3.0%
23	6.9%	-0.7%	3.1%	4.6%	1.4%	3.0%
24	6.7%	-0.6%	3.1%	4.6%	1.4%	3.0%
25	6.5%	-0.4%	3.1%	4.5%	1.5%	3.0%
26	6.4%	-0.3%	3.1%	4.5%	1.6%	3.0%
27	6.3%	-0.2%	3.1%	4.4%	1.6%	3.0%
28	6.2%	-0.1%	3.0%	4.4%	1.7%	3.0%
29	6.0%	0.0%	3.0%	4.3%	1.7%	3.0%
30	5.9%	0.1%	3.0%	4.3%	1.8%	3.0%
31	5.8%	0.2%	3.0%	4.2%	1.8%	3.0%
32	5.8%	0.3%	3.0%	4.2%	1.8%	3.0%
33	5.7%	0.4%	3.0%	4.1%	1.9%	3.0%
34	5.6%	0.5%	3.0%	4.1%	1.9%	3.0%
35	5.5%	0.5%	3.0%	4.1%	1.9%	3.0%
36	5.4%	0.6%	3.0%	4.0%	2.0%	3.0%
37	5.4%	0.7%	3.0%	4.0%	2.0%	3.0%
38	5.3%	0.7%	3.0%	4.0%	2.0%	3.0%
39	5.3%	0.8%	3.0%	4.0%	2.0%	3.0%
40	5.2%	0.8%	3.0%	3.9%	2.1%	3.0%
41	5.1%	0.9%	3.0%	3.9%	2.1%	3.0%
42	5.1%	0.9%	3.0%	3.9%	2.1%	3.0%
43	5.0%	1.0%	3.0%	3.9%	2.1%	3.0%
44	5.0%	1.0%	3.0%	3.9%	2.1%	3.0%
45	5.0%	1.1%	3.0%	3.8%	2.2%	3.0%
46	4.9%	1.1%	3.0%	3.8%	2.2%	3.0%
47	4.9%	1.2%	3.0%	3.8%	2.2%	3.0%
48	4.8%	1.2%	3.0%	3.8%	2.2%	3.0%
49	4.8%	1.2%	3.0%	3.8%	2.2%	3.0%
50	4.8%	1.3%	3.0%	3.8%	2.3%	3.0%





B.2 Specific charge questions: Discounting

1. Please comment on whether the recommendations in the guidance are supported by the leading theoretical and empirical peer-reviewed academic literature in economics or other relevant disciplines, and if not, please provide alternative recommendations that would be (and citations to support them).

   Li and Pizer (2021) is cited but I feel a useful implication may have been missed as noted in the recommendation. Various pieces by Gollier are cited, mainly about discounting for climate change, but in my view Gollier (2013) has a better integration, including the use of the Ramsey formula (with higher discount rates) prior to concerns about risk which are later incorporated as well.

   Gollier, Christian. *Pricing the Planet's Future: The Economics of Discounting in an Uncertain World*, Princeton: Princeton University Press, 2013. https://doi.org/10.1515/9781400845408

2. Where the guidance reflects assumptions, are they supported by the theoretical and empirical peer-reviewed academic literature in economics, or other relevant disciplines? If unsupported assumptions are identified, are there alternatives you would recommend? Please provide supporting references for both parts of the response—concerns about assumptions, if any, and suggested alternatives.

   The choice of 10-year bonds has always been, in my mind, a convenient compromise. Its continued use in the face of dramatic interventions does not seem well supported in the literature. I suggest the alternative discussed above of not changing the bounds in Li and Pizer but using an expected value based on an uninformed prior of the bounds for typical duration. The mean is implied, in my view, in the Li and Pizer (2021) article.

3. Does the guidance appropriately recognize and account for potential challenges for implementation (e.g., technical feasibility or constraints on data availability or other resources)?

   I do not think the current discount rate guidance accounts for potential challenges to implementation by suggesting the consumption rate of interest following adjustments using the shadow price of capital. While the latter certainly exists in the literature, it adds complexity to each agency's analysis. The same discount rate, consumption rate of interest, could be used by considering it the uninformed prior (average) of the existing bounds. (see discussion above). This would maintain current methodologies for discounting without adjustment for shadow prices (which agencies would be free to do in going beyond the minimum guidance provided in A-4.)

4. Do you have any other suggestions for improving the completeness, objectivity, and/or transparency of agency regulatory analyses? If so, how might these be incorporated into guidance?

   From above:

   Recommendations:

   a. That the default recommendation for any length of project is 3% real, justified as expected value with uninformed prior of existing term structure bounds over relevant forecast periods.
   b. Encourage sensitivity testing at such other values as analysts can justify.

5. What practices might be identified in the guidance to encourage accounting for non-monetized (possibly also non-quantified) effects?

   Not applicable.

6. Do you have suggestions that would improve the clarity and logical presentation of the guidance and/or ease execution of analyses?

   See recommendation in 4 above.

7. Should the guidance include suggestions of broadly useful data sets? If so, which data sets, and how should this information be presented in the guidance? How should the guidance reflect best practices related to data quality (including timeliness of data)?

   In general no.

8. Do you have any additional recommendations for ensuring that the guidance and associated methodologies are supported by the theoretical and empirical peer-reviewed academic literature in economics, or other relevant disciplines? If so, please provide them here.

   Not on this topic.

C.1 Scope of the analysis: General summary of comments and recommendations

1. Standing (Whittington and MacRae, 1990; Farrow, 2023): The existing discussion begins with Geographic scope and proceeds to temporal. Geography and time are not the most obvious elements of standing that previously in A-4 was based on a legal definition of standing, citizens and legal residents. You may or may not have a way to push the concept of standing to foreigners (there is always the potential for evidence that US citizens have a valuation for foreign impacts); geography (in US, outside US, etc), time (discounting gives standing to impacts on people in outyears), and there may be other legal dimensions to the definition of standing such as existing US law or US international treaties. All the dimensions follow from having to justify standing for a particular analysis (Farrow, 2023) but this guidance should provide the required minimum.
2. International scope: A particular regulation, say affecting climate change, might have a US legal basis (in treaties, which gives standing to others), or perhaps a US empathy basis (we are willing to pay to reduce not only our own impacts but others, Farrow, 2023 for VSL for "foreigners".). I don't find the existing "strategic interest" discussion very compelling unless an existing US legal justification exists although standing, as a policy determined issue, could be based on decision-maker interest.
    a. If both domestic and international impacts are assessed, they should be presented both separately and together so as not to obscure results likely informative to decision-makers in an aggregate. In some ways, this is a distributional analysis, with the dimension being US or foreign as the distributional impact.
3. Legal scope: Consideration should be given to the legal scope of standing as this was the previous basis for scope to include "citizens and residents". Legal linkage may occur through US law or international treaties. For instance, where regulations are legally linked, the impacts of such linkage should be explored. As stated in a recent EPA SAB report (EPA, 2021) "A "linkage" in rules exists when changes in one regulation automatically induces changes in the normal

operation and implementation of other regulatory requirements. The linkage may be present in legislation, regulation or guidance. Where rules are linked by law, regulation or guidance, an RIA should include significant effects (benefits and costs) from changes in the normal operation of linked local, state, federal and international regulatory programs. Those impacts may seem indirect, but they may be as certain to occur as some of the direct compliance costs of a regulatory change. “

4. **Recommendation:** Start the section with a short discussion of standing in benefit-cost analysis and then proceed to guidance on your appropriate sections such as: legal, geographic, temporal.

C.2 Scope of the Analysis: Specific charge questions

1. Please comment on whether the recommendations in the guidance are supported by the leading theoretical and empirical peer-reviewed academic literature in economics or other relevant disciplines, and if not, please provide alternative recommendations that would be (and citations to support them).

   Citations on standing from above:

   Whittington, D. and D. MacRae, Jr., 1990. Judgments about Who Has Standing in Cost-Benefit Analysis, *Journal of Policy Analysis and Management* , 9(4):536-547.

   Farrow, S. (2023). The Net Benefits and Residual Cost from U.S. Border Management of the Initially Inadmissible. *Journal of Benefit-Cost Analysis, 14*(1), 163-189. doi:10.1017/bca.2023.2

   Citation on legal linkage across regulations:

   EPA Scientific Advisory Board, Report SAB-2021-002, SAB Peer Review of the EPA's Revised Guidelines for Preparing Economic Analysis (PDF)

2. Where the guidance reflects assumptions, are they supported by the theoretical and empirical peer-reviewed academic literature in economics, or other relevant disciplines? If unsupported assumptions are identified, are there alternatives you would recommend? Please provide supporting references for both parts of the response—concerns about assumptions, if any, and suggested alternatives.

   Standing is generally viewed as a policy choice (see Whittington and Macrae) on scope of analysis but one should be able to justify the assumption based on law, analytical capability or decision-maker interest.

3. Does the guidance appropriately recognize and account for potential challenges for implementation (e.g., technical feasibility or constraints on data availability or other resources)?

   Reasonably, noting that international impacts inevitably add complexity and should only occur where the extra cost has the potential to change a decision.

4. Do you have any other suggestions for improving the completeness, objectivity, and/or transparency of agency regulatory analyses? If so, how might these be incorporated into guidance?

   From above:

Recommendation: Start the section with a short discussion of standing in benefit-cost analysis and then proceed to guidance on your appropriate sections such as: legal, geographic, temporal.

5. What practices might be identified in the guidance to encourage accounting for non-monetized (possibly also non-quantified) effects?

   Not applicable.

6. Do you have suggestions that would improve the clarity and logical presentation of the guidance and/or ease execution of analyses?

   See recommendation in 4 above and discussion regarding role of standing.

7. Should the guidance include suggestions of broadly useful data sets? If so, which data sets, and how should this information be presented in the guidance? How should the guidance reflect best practices related to data quality (including timeliness of data)?

   In general no.

8. Do you have any additional recommendations for ensuring that the guidance and associated methodologies are supported by the theoretical and empirical peer-reviewed academic literature in economics, or other relevant disciplines? If so, please provide them here.

   Not on this topic.

D.1 Analytic baseline: general summary and recommendations

1. Compliance is called out as a bullet in this section (p. 12, line 495) but the only mention is the last of a paragraph on p. 13 (line 533). Seems to need at least its own short paragraph even if reader is referred to a later section (section number would also be useful in reference to section 8b, page 53. Analyzing compliance is useful not only for net benefit estimation, but also opens another alternative policy channel of communication and enforcement to affect net benefits.
2. Identification of legal linkages in standing should also be a part of the baseline. See comment on legal scope in section C (scope).
3. **Recommendation:** Include some discussion of compliance in this section as it sets up a further dimension of regulatory implementation--those actions that might affect compliance.
4. **Recommendation:** Include a discussion of legally linked regulations as potentially part of the baseline.

D.2 Charge Questions:

1. Please comment on whether the recommendations in the guidance are supported by the leading theoretical and empirical peer-reviewed academic literature in economics or other relevant disciplines, and if not, please provide alternative recommendations that would be (and citations to support them).

   No comment

2. Where the guidance reflects assumptions, are they supported by the theoretical and empirical peer-reviewed academic literature in economics, or other relevant disciplines? If unsupported assumptions are identified, are there alternatives you would recommend? Please provide

supporting references for both parts of the response—concerns about assumptions, if any, and suggested alternatives.

No comment

3. Does the guidance appropriately recognize and account for potential challenges for implementation (e.g., technical feasibility or constraints on data availability or other resources)?

   Line 516: while this paragraph has a good discussion of potential future regulations, what is missing to me is that some existing legally linked regulations may change effect and have impacts with the date of implementation of the initiating regulation. For instance, regulations defining maximum water contaminant levels may have immediate effect on clean-up levels under CERCLA via Applicable and Relevant or Appropriate Requirements.

4. Do you have any other suggestions for improving the completeness, objectivity, and/or transparency of agency regulatory analyses? If so, how might these be incorporated into guidance?

   From above:

   Recommendation: Include a discussion of legally linked regulations as potentially part of the baseline.

5. What practices might be identified in the guidance to encourage accounting for non-monetized (possibly also non-quantified) effects?

   Not applicable.

6. Do you have suggestions that would improve the clarity and logical presentation of the guidance and/or ease execution of analyses?

   From above:

   Recommendation: Include some discussion of compliance in this section as it sets up a further dimension of regulatory implementation--those actions that might affect compliance.

7. Should the guidance include suggestions of broadly useful data sets? If so, which data sets, and how should this information be presented in the guidance? How should the guidance reflect best practices related to data quality (including timeliness of data)?

   In general no.

8. Do you have any additional recommendations for ensuring that the guidance and associated methodologies are supported by the theoretical and empirical peer-reviewed academic literature in economics, or other relevant disciplines? If so, please provide them here.

   Not on this topic.

E. Uncertainty:

Major observations: No comments other than the section is long and the distinction could be made earlier about parameter uncertainty in modeling compared with risk based, behavioral valuations with uncertainty.

F.1 Ancillary/Secondary/General equilibrium impacts section 8h (about p. 40-43)

General summary and recommendations

1. I am supportive of using general equilibrium models when warranted (Farrow and Rose, 2018), but the section as written starts out too basic and ends up with too much detail.
2. A major change in this draft is the movement from considering ancillary benefits or costs (that I always interpreted as more a multi-market or external effect) to a multi-page discussion of potential general equilibrium analysis. At the same time, I don't find much definitive guidance. The explicit assumption in the companion Draft A-94 on Multipliers assumes full employment in which secondary effects of expanded economic activity is assumed to be a transfer with zero effect (when epsilon =0). See A-94 (1982 and current draft). OMB should be consistent.
3. I would be surprised if OMB would countenance an assumption of less than full employment over an extended period of time although briefer periods of time or regulations designed to address negative shocks may warrant such an assumption.
4. **Recommendation:** Clarify assumption about macro employment in CGE modeling, which could refer to OMB's forecasts in the budget for out years.

   Farrow, S. and A. Rose, "Welfare Economics: Bridging the Partial and General Equilibrium Gap", *Journal of Benefit-Cost Analysis*, Spring, 2018.

F.2. Charge question 6

Do you have suggestions that would improve the clarity and logical presentation of the guidance and/or ease execution of analyses?

Recommendation: Clarify assumption about macro employment in CGE modeling, which could refer to OMB's forecasts in the budget for out years.

G. Unquantified benefits. No comment except that it is long.

Individual Peer Reviewer Comments: Kenneth Gillingham

Please provide your responses to the charge questions below (see separate "Circular A-4 Peer Review Charge" document).

1. Please comment on whether the recommendations in the guidance are supported by the leading theoretical and empirical peer-reviewed academic literature in economics or other relevant disciplines, and if not, please provide alternative recommendations that would be (and citations to support them).

This is the most important question, so I will tackle it in more depth than most of the others. I will divide up my discussion by each of the categories mentioned in the "Charge to Peer Reviewers" document. I want to note upfront that the proposed guidance already has an enormous number of references and in general I do not necessarily believe that more references are needed. What is most important is the weight of the intellectual arguments on each guidance point (backed up by the literature of course). Simply adding more references does not necessarily make the foundation for guidance stronger. I will focus my comments on the discount rates and distributional analysis but will at least briefly discuss each category.

(1) discount rate

In general, I believe that the literature strongly supports updating the discount rate(s) used for regulatory analysis. The last update was 30 years ago and markets have unquestionably changed. There is much written about the decline in the real interest rate over the past decades. The macroeconomic literature is very clear that the decline is not a very recent phenomenon or entirely due to the actions of the Federal Reserve (there were some confused comments on this point). Some of the literature on this is already referenced in the proposed guidance, but there are numerous other papers (including this one by Maury Obstfeld: https://static1.squarespace.com/static/5d0ed7795d764000017ccc00/t/64708cccca9c416a53fcb089/1685097682218/Natural+Rates+of+Interest.pdf).

When considering the intertemporal tradeoffs quantified by the discount rate used for regulation, the economic literature is very clear that it is the *social* discount rate that is the relevant rate. This is the rate that quantifies the resource allocation tradeoff between now and the future. The literature is broad, but I fully agree with the proposed guidance in using a "positive" discount rate that uses revealed rates of interest in society to quantify the opportunity cost to society of resource use today to allow for resource use in the future. I believe that this is the most solidly grounded strain of literature and is the most relevant for the proposed guidance.

The literature is also clear that the starting point consumption rate of discount – the rate the individuals trade off the present and future – should be a risk-free rate. The closest proxy to a perfect risk-free rate is widely understood in the economics literature to be the rate on U.S. Treasuries. This strongly supports the proposed guidance in using the rate on U.S. Treasuries. Conceptually, it is also clear that the appropriate rate to use would adjust for inflation. The proposed guidance uses TIPS after 2003 when they first became available. While it would be ideal to use TIPS beforehand, the approach to adjust for inflation prior to 2003 and then move to TIPS post-2003 is a reasonable analytic compromise and I believe to be the right approach.

The result when using 10-year Treasuries with a 30 year time window is 1.7%, and is even lower if TIPS are not used. However, it is higher using 30-year Treasuries, and also is different depending on the exact 30-year time frame being used. This 1.7% rate is the core rate the guidance. I believe that the literature supports this basic recommendation to use an updated version of the rate on Treasuries as the

consumption rate, as it appropriately captures the downward trending long-run interest rates that we observe in the market. I am less comfortable with the precision of 1.7%. This feels to me to be arguably false precision. I recognize that even a small difference can make a difference in the net benefits of a policy that has long-run payoffs, but I am concerned that it conveys precision that just is not there. I will come back to this shortly with a recommendation, but first would like to address two other issues that are closely related.

The first issue is that of risk. This is an extremely complicated and difficult issue. In principle, each project (i.e., regulation) has its own risk profile and correlation between the payoffs of the project and economic growth. It is sometimes assumed that the payoffs of a given project are perfectly positively correlated with economic growth because when economic growth is high the payoffs are likely to be higher (because there is more economic activity to lose). When the correlation is positive, economic theory is clear that the discount rate used for the project should be higher. The intuition for this is that the payoffs will happen at a time with higher incomes and thus, due to the diminishing marginal utility of income, the payoffs will be less valuable in utility terms. In contrast, when the correlation between the project payoffs and economic growth is negative (i.e., the payoffs will be highest when economic growth is the lowest), then the discount rate used for the project should be lower for the analogous reason. The proposed guidance covers these basic concepts well.

It is challenging to quantify whether the correlation is positive or negative for any given project, let alone for all projects in the economy. For example, for projects that provide an insurance value and could reduce the probability of catastrophes, such as regulations to mitigate climate change, there is a literature arguing that the evidence supports a negative correlation (see work on the "climate beta" by Christian Gollier and others, mostly already cited in the proposed guidance). But there is also some literature suggesting that there could be a positive correlation in the context of climate change mitigation (already accurately cited in the proposed guidance). Thus, there seems to be no clear consensus in the literature even for climate change which is the topic where this correlation has been studied the most. Going beyond climate change, the issue becomes even more difficult. My best assessment is that for many standard regulations, the correlation is likely to be at least weakly positive, but it may be zero. This could suggest slightly increasing the discount rate to account for risk, a point I will come back to.

The proposed guidance provides agencies the option to use a discounting schedule based on the Ramsey formula, especially for regulations that will have effects long into the future. The economic literature widely uses the Ramsey formula to understand long-run discounting. The proposed guidance suggests that the Ramsey formula relies on a set of assumptions, but this is actually not quite right. The original Ramsey paper developed the formula based on a set of relatively strong assumptions, but they have been relaxed in the literature since then. Some commenters who are not familiar with the literature seem to have missed this or were led astray by a footnote in the proposed guidance. You do not need specific forms of the utility function or the lack of distortions in the economy to generate the Ramsey formula. You do need the pure rate of time preference and the rate of economic growth to be sufficiently small. Stepping back, the weight of evidence in the literature strongly indicates that using a Ramsey formula for regulations with long-run payoffs is solidly grounded. Stochastic versions of the Ramsey formula are especially useful for accounting for risk and uncertainty in the long run. The proposed guidance approach follows the literature and is a sensible alternative approach. It can generate a declining term structure of discount rates, which is well supported in the latest economic literature (the references are already in the proposed guidance).

The first issue mentioned above is risk, as I just discussed. The second issue is how to account for regulatory action that reduces investment in capital (rather than consumption). In the previous guidance

document, a proxy was used for the rate of return on capital, based on the rate of return on equities (which is about 7%), was recommended as a second discount rate in addition to the rate on Treasuries. All regulatory analysis used both rates. The logic for the two rates is that it is unclear whether regulation that has upfront costs will reduce consumption or investment in capital today. In theory, if there are no distortions in the economy, then the risk-adjusted rate of return on capital should equal the consumption rate. In the proposed guidance, the 7% rate is discarded and deemed generally inappropriate for a social rate of discount. The argument given is that it involves a potentially very different degree of risk and is thus inappropriately handling risk by combining the issue of capital with the issue of risk. I agree with this assessment and I believe it is supported by the literature.

Instead, the proposed rule suggests using a shadow price of capital approach to address the issue of capital. Theoretically, this is a very appealing approach and it is used in regulatory analysis in other countries in the world. The approach calculates the total present discounted value of consumption displaced by a unit of public investment and uses this sum to value private investment displaced. A key point is that the approach converts all quantities to consumption equivalents based on the shadow price of capital. Calculating the shadow price of capital is a bit complicated because it requires forecasting the extent to which displaced investment reduces future investment and consumption. In a closed economy, this approach can adjust the benefits and costs in a way that effectively leads to a higher discount rate that accounts for the displacement of investment in capital. Conceptually, I believe that the shadow price of capital approach is strongly grounded in the literature. The key challenge is determining the appropriate shadow price of capital to use, which I will return to in my response to question #2.

One point about making an adjustment for deferred investment in capital is that is presumes that society would be on an optimal path of investment in capital and consumption over time after the adjustment. For a variety of reasons this may or may not be the case. For example, market power might lead to deviation from the optimum in the investment in capital. There are multiple other distortions in the economy that may not be correctly accounted for in calculating the shadow price of capital. This is an area at the frontier of our knowledge, but the basic point here is that it is not always clear what the adjustment for deferred investment in capital is, even with reasonable data to develop a shadow price of capital. Depending on the distortions, it may not even be necessary to make an adjustment for deferred investment in capital, even in a (partly) closed economy.

One of the major challenges in thinking through social discounting is the equity premium puzzle, which is the name given for the historically higher rate of return on equity (a proxy for capital) over Treasury bills than might be expected based on the risk of the two types of securities. One explanation for this seemingly excessive return includes the possibility of catastrophes or other systematic risks that are priced into the market for capital (see work by Barro). The equity premium puzzle has been a challenge to economists for decades now and while there are multiple explanations, it has not yet been fully resolved. It suggests that there might be another intangible factor when thinking about the discount rate appropriate for regulations that reduce investment in capital. I will be upfront in saying that I do not have a complete solution for accounting for the equity premium puzzle. It has been used as an argument for a second rate besides the consumption rate that is higher. Using such an inflated second rate would be equivalent to using a higher shadow price of capital in the calculation of the certainty equivalents in the shadow price of capital approach.

One other point that has come up in the comments is that the rate of return of Treasuries comes about from equilibrium of supply and demand for a market-traded asset, but that most individuals in the United States do not own or trade Treasuries. This is especially true for lower income households, who have been shown in the literature to use a higher private implicit discount rate. The argument is then that the if we

care about a social discount rate that aggregates preferences, it is important to consider the preferences of the poor, and thus a higher discount rate should be used. I see only modest merit in this argument because Treasuries are very widely traded (including by some low-income households) and for the equilibrium rate of return to be the appropriate value to use for social discounting, it need not account for all preferences. In other words, the preferences of low-income households are already largely priced in through equilibrium in the market given that they have the opportunity to buy Treasuries. One would have to believe that they are an entirely different market that never buys Treasuries, but this is empirically not true. At most, I could see accounting for higher private discount rates for lower income households as an argument for very slightly increasing the discount rate, but in general, I do not think this should change the basic recommendations.

With all of this background, I come to my recommendation. **I recommend retaining the structure of the proposed guidance, as it is well-grounded in the literature, and not going back to the old structure of 3% and 7%. I am not entirely comfortable with the false precision of 1.7%, and while I see reasons for the possibility of an even lower rate, there are more reasons for slightly higher rate, including risk and low-income households not being part of the Treasury market. Thus, I recommend using a rate of 2% for the social discount rate (i.e., the consumption rate). Further, I support the use of an analysis based on the shadow price of capital to account for investment. This could also partly help to reflect the equity premium puzzle, although I do not recommend simply taking the delta between Treasuries and equities from the equity premium puzzle and applying it for the shadow price of capital adjustment, as that would imply using a rate with an incorrect risk profile for regulatory activity.**

(2) distributional analysis

The recommendations for distributional analysis contain two components. The first is to calculate the benefits and costs of the regulation for different subpopulations. This guidance follows the standard in the academic literature and is very clear. **I strongly support this discussion of calculating the benefits and costs for different subpopulations and recommend very few changes to this discussion, if any.**

The second is to provide agencies the option to perform an equity-weighted benefit-cost analysis. The concept that individuals, on average, display a diminishing marginal utility of income is extremely strongly grounded in the literature. I don't see a need to cite any more references here, because the bottom line is that scholars routinely find evidence that individuals and households value a dollar more when they are low income than when they are high income. There should be no debate about this, despite what I noticed in some comments on the docket. Debating diminishing marginal utility of income is deeply misinformed.

Equity-weighted benefit-cost analysis has become more common in the literature in recent years, but there are still only a relatively small number of papers using this approach. In many respects, it simply operationalizes the diminishing marginal utility of income in the benefit-cost analysis. In concept, it is moving the benefit-cost analysis closer to an analysis based on maximizing a social welfare function that includes a diminishing marginal utility of income. There is a massive literature in economics that use social welfare functions that include a diminishing marginal utility of income, so this basic concept is extremely well grounded.

There are some potential critiques to equity-weighted benefit-cost analysis that I believe are worth discussing. One critique is that it is impossible to know what the social welfare function for society is. However, the standard benefit-cost analysis based on Potential Pareto Improvements and economic efficiency is implicitly making an assumption about the social welfare function. Whether the assumption

is made implicitly or explicitly, there is always an underlying assumption being made (much has been written about this in the economic, philosophy, and law literatures, including work by Paul Kelleher and Matthew Adler). So, I do not find this critique to be well grounded based on economic theory. I view equity weighting as one way to get closer to a more sensible social welfare function that more closely matches both economic theory and reality by accounting for the diminishing marginal utility of income.

A second critique is that the actual details of equity-weighting can greatly influence the results of an equity-weighted benefit-cost analysis and that the economic literature is still developing in fleshing out the implications of the details. This is a somewhat fair critique, in that most papers in the economics literature that calculate benefits and costs of regulations do not use equity-weighting, and the literature using this approach is not as well established. But it is very important to note that the basic concept behind the approach is extremely well established and the use of the concept is becoming more established in recent years.

A third critique is that when there are benefits/costs from regulation due to reduced mortality, the use of a single value of statistical life (VSL) for everyone in the United States already is implicitly putting extra weight on effects impacting lower income households. The decision to use a single VSL in regulatory analysis in the United States is an ethical decision and I will not comment on this decision, as it is a deep and complicated topic with difficult tradeoffs. But the worry is that there would be some "double-weighting" of benefits/costs if there is equity weighting and a single VSL is used to monetize mortality benefits/costs. I recommend addressing this possibility directly in the guidance by making sure that double weighting does not occur. One way to do this could be to not equity weight the mortality effects of regulation, as they are already implicitly equity weighted. From an intellectual perspective, this would not be ideal, as it could imply a different effective equity weight on mortality damages than on everything else. But that's already how U.S. regulatory analysis works, and this change would only lessen the inconsistency, so it could be a pragmatic

In my deliberations before writing this review, I spent a great deal of time weighing what the economic literature says and these critiques. The actual methodology for calculating equity-weighted benefit-cost analysis in the proposed guidance is supported by the literature. There may be other ways to perform the analysis, but the proposed approach is reasonable and I believe that it would be difficult to find a much-preferable approach.

Thus, on balance, **I strongly recommend that equity-weighting is permitted as an option for regulatory analysis using the methodology in the proposed guidance, but that due to the relatively early stage of the literature that implements the concept, the equity-weighted analysis should not be the primary analysis, but rather could be presented accompanying a more standard analysis**. I believe that it provides very useful information on the consequences of the regulation for social welfare and should be permitted as part of a careful regulatory analysis.

(3) scope of analysis, including geographic scope

The recommendations in the proposed guidance on the scope of analysis are clear and are supported by the leading peer-reviewed literature. One example of this is the National Academies report on "Valuing Climate Damages," which clarifies that a global scope of the analysis is appropriate for the calculation of the social cost of carbon dioxide. The arguments given are widely accepted by most leading economists. Specifically, when the effects of the regulation have a global scope, the correct analysis considers this global scope. The logic in the National Academies report can extend to other regulation that have global ramifications. The proposed guidance provides the correct set of reasons for this argument.

Some commenters and economists have argued that only domestic effects should be considered, but in general this is not supported by leading economists (the references I would add on this are already in the proposed guidance). The justification for only using domestic effects is that it is a U.S. regulatory analysis, so only the United States should be considered. But even if the purview is restricted to only the United States, the best economic evidence indicates that a global perspective is still warranted due to reciprocity; best responses of other countries to the United State's actions; effects on Americans overseas, and indirect effects back on the United States through trade, innovation, and migration.

Some commenters and economists have also argued that it is reasonable to present effects from a global analysis, but that the domestic effects should be reported separately. This may be possible in some contexts, but in other contexts, it would be extraordinarily difficult, if not impossible, to disentangle the true value for the domestic effects. To the extent that the domestic effects really can be disentangled, I am comfortable with this suggestion. That said, I strongly believe that requiring agencies to make a simple calculation for the domestic effects that ignores reciprocity, best responses, Americans overseas, and indirect effects has the potential to lead to a misleading calculation that does not actually capture the effects on the United States. **Thus, I strongly recommend retaining the approach in the proposed guidance that allows agencies to present a global estimate when it can make a reasonable case that a purely-domestic estimate is infeasible.**

(4) development of analytic baselines

I do not believe that there is a great deal of literature on the development of analytic baselines. The only work I am aware of is a paper by another one of the expert review committee members, Prof. Joe Aldy. Thus, I defer to Prof. Aldy on the exact details on how the approach relates to the literature.

But the exact details are less important. What is most important is that my overall assessment of the guidance on the development of analytic baselines is that if follows the literature. The guidance appears to follow a philosophy that is standard in the literature: that regulatory analyses should be performed with a baseline that is as realistic as possible. This should include all regulations or policies that are currently on the books and can include regulations or policies that can reasonably be expected to be in place in the future. I recognize that this may be difficult in some cases because not every target that a politician proclaims is likely to be come to fruition.

Thus, I would recommend that if agencies make a case to include regulations or policies that are not yet implemented in the analytic baseline in the primary analysis, they should also always present the results from an analysis that only includes regulations and policies that have been implemented as a secondary analysis. I would also recommend that agencies should confer with OIRA if they plan on including regulations and policies that have not yet been implemented. But in principle, the recommendation is theoretically sound, as it is just aiming to increase the realism of the baseline.

I have a similar view about allowing agencies to model incomplete compliance when the evidence is strong and clear. The goal of the baseline in regulatory analysis is to be as realistic as possible, and if the evidence is strong, then I think agencies should model incomplete compliance. However, I recognize that most cases in the United States, full compliance should be expected. Accordingly, **my primary recommendation on this is that I believe that there should be language to indicate that agencies should assume full compliance unless they provide evidence indicating that full compliance is unlikely.** This is true for other regulations and policies being modeled in the analytic baseline and also may be true in the regulation scenarios. Addressing this recommendation could be achieved with a single sentence.

(5) unquantified impacts

I felt that the discussion of unquantified impacts is broadly aligned with the leading literature. Frankly, there is not a great deal of literature on unquantified impacts, likely because they are so difficult to quantify. I strongly support the guidance allowing for unquantified impacts to be mentioned but do have a recommendation that I will detail in my response to question #5 below.

(6) uncertainty

The discussion of uncertainty was very solid and the guidance is sensible and based on the literature. One aspect that is common in the economics literature is to run Monte Carlo sensitivity analyses based on distributional assumptions. This is mentioned very briefly as an option for more complex rules. I support this but believe that there should be supportive documentation with examples for the agencies.

2. Where the guidance reflects assumptions, are they supported by the theoretical and empirical peer-reviewed academic literature in economics, or other relevant disciplines? If unsupported assumptions are identified, are there alternatives you would recommend? Please provide supporting references for both parts of the response—concerns about assumptions, if any, and suggested alternatives.

(1) discount rate

In general, the assumptions about the discount rate are well-supported by the theoretical and empirical peer-reviewed literature. As mentioned above, I believe the assumptions leading to 1.7% imply a false precision and I suggest that the balance of evidence suggests rounding upward to 2%.

The assumptions going into the shadow price of capital approach are the ones that are the most difficult to justify. I believe that the proposed guidance does an excellent job reviewing the evidence. Yet, it was clear that that there is substantial uncertainty around the key parameters used to calculate the certainty equivalents and a case could easily be made for higher (or in some cases lower) values of the shadow price of capital than 1.2. The lower bound of 1.0 (i.e., simply using the consumption rate) is very sensible, as it also accords with an open economy. But **I recommend using a somewhat higher bound on the shadow price of capital than 1.2 to reflect uncertainty in the other direction**. I could see a reasonable argument for 1.4. This would shift the higher second effective discount rate up a bit further. The goal here is to accurately characterize the opportunity cost if investment in capital is decreased.

(2) distributional analysis

I do not believe there are any notable assumptions relating to the discussion of performing a standard distributional analysis.

There are assumptions inherent in performing an equity-weighted analysis. I believe that the assumptions that are underlying the methodology for performing equity-weighted analysis are sound and justified by the literature. I believe that one could quibble and use other assumptions, so I support a sensitivity analysis on the assumptions. But I don't have strong views on better assumptions.

(3) scope of analysis, including geographic scope

I have no concerns about the assumptions made in the proposed guidance on the scope of the analysis. I would recommend referencing the following paper in JAERE by Matt Kotchen: https://resources.environment.yale.edu/kotchen/pubs/whichscc.pdf

This paper emphasizes that at least in the context of the social cost of carbon dioxide, the assumption of a global estimate is relatively close to the U.S. domestic estimate that accounts for best responses from

other countries, and that a country's "optimal" preferred social cost of carbon dioxide can be less or more than the global number. This is an example of a case where simply using the global estimate is the analytically preferable approach that comes closer to accurately representing the true characterization of the effects on the United States.

(4) development of analytic baselines

I have no concerns about the assumptions made regarding the development of analytic baselines.

(5) unquantified impacts

I was comfortable with the assumptions made about unquantified impacts, but have more to say on unquantified impacts in question #5 below.

(6) uncertainty

I found the discussion of uncertainty to be based on reasonable assumptions. I do not recommend any changes to the assumptions.

3. Does the guidance appropriately recognize and account for potential challenges for implementation (e.g., technical feasibility or constraints on data availability or other resources)?

I believe that this is a very important question and one for which I have several thoughts, divided up again by category:

(1) discount rate

Implementation of a social discount rate of 1.7% (or my recommended social discount rate of 2%) is transparent and straightforward. There should be no implementation challenges.

Implementing the shadow price of capital approach is somewhat more complicated, but not too difficult. Indeed, it is already performed my multiple other countries and thus should be operationalizable. **I strongly recommend providing supporting documentation with worked examples.** An imperfect alternative that is transparent and straightforward could be to recommend another discount rate that matches with a shadow price of capital approach for a typical regulation. This would be far easier to implement but is not as intellectually grounded or theoretically appealing.

Using the Ramsey formula is more complicated and **I believe that the guidance should be clear that agencies should confer with OIRA on the use of the Ramsey formula**. **I also recommend making it clear that the Ramsey formula will likely only be used in a small number of rules where the long-term payoffs are especially relevant**.

(2) distributional analysis

In the calculation of the benefits and costs to different populations, I thought that the proposed guidance did a reasonable job in providing implementable information. The proposed guidance could have said that agencies should present distributional analyses for certain stratifications of the population, such as by income or other groups. I believe that this would be too prescriptive and that providing agencies the flexibility to determine the most appropriate groups (within the confines of the law) can lead to better and more insightful analyses. **I would recommend providing supplementary documents that lay out how distributional analyses can be performed and provide some examples. But I do not believe the proposed guidance should be changed on this topic.**

I thought that the discussion of equity-weighted benefit-cost analysis did provide an operationalizable methodology. **However, I very strongly recommend supplementary documentation that provides worked examples and makes the set of calculations more transparent.** The proposed guidance is reasonable on this point, but not comprehensive, and could lead agencies to be confused about how to implement the equity-weighted benefit-cost analysis, since there are details that would need to be clarified, such as the concern about valuing mortality damages with a single VSL leading to double weighting.

(3) scope of analysis, including geographic scope

I believe that the guidance appropriately recognizes and accounts for potential challenges for implementation by recommending that in certain cases, the scope of the analysis can be expanded beyond the borders of the United States. This reflects the challenge in some contexts of correctly accounting for the effects on the United States from activities that happen elsewhere in the world. This assumption simplifies the analysis in these contexts. I also support the general guidance to restrict the scope of the analysis to the domestic scope in most circumstances, which also eases implementation. **I recommend no changes.**

(4) development of analytic baselines

There could be some real challenges to following the guidance in the development of analytic baselines, especially if they include regulations or policies that are not yet implemented or assume imperfect compliance. As stated above, I believe that the guidance is intellectually sound and in the right direction, and I think it is important to allow agencies to have the flexibility to account for other regulations or policies and imperfect compliance when the evidence strongly supports these.

However, I worry about implementation, and thus **my recommendation above is to make sure that the standard guidance is for an analytic baseline including only regulations and policies that have already been implemented and assuming full compliance.** This would ease implementation challenges but permit agencies to make modifications where the evidence is strong.

(5) unquantified impacts

I found the proposed guidance to be a clear that agencies are recommended to discuss unquantified impacts and I feel that this is intellectually sound. As I discuss below in the response to question #5, I believe that there are ways to quantify many seemingly unquantifiable impacts, but my recommendation is not to change the basic guidance (besides strongly encouraging agencies to attempt to quantify impacts) because of the difficulty of implementing some of these approaches.

(6) uncertainty

The treatment of uncertainty is one of the places in the guidance document where implementation of some of the recommendations may be more difficult. In particular, there is a last paragraph in the section on the treatment of uncertainty that indicates that another approach for dealing with uncertainty is to convert uncertain outcomes into certainty equivalents. This paragraph seems tacked on to the discussion and leaves many implementation questions unanswered. Intellectually, one could use certainty equivalents for a benefit-cost analysis under uncertainty, but it is rare in the existing literature to do so, and the single paragraph provides very little concrete information on operationalizing the recommendation.

Thus, **I strongly recommend allowing for the use of certainty equivalents in the treatment of uncertainty but clarifying that such analyses should be performed upon consultation with OIRA**

and in most cases should be secondary analyses. In addition, I strongly recommend supplementary documentation with examples worked out for how an analysis using certainty equivalents could be carried out properly.

4. Do you have any other suggestions for improving the completeness, objectivity, and/or transparency of agency regulatory analyses? If so, how might these be incorporated into guidance?

The proposed guidance is clear, objective, and transparent in informing agency regulatory analysis. I do not see a need to divide my answer to this question into the categories used above.

One area that I believe is worthy of some modified or additional discussion is in the new consideration given to behavioral biases. First, as a scholar in this area, I believe that new discussion is well grounded in the literature. I also think that following the line of reasoning on behavioral biases laid out in the proposed guidance will be immensely helpful for agency regulatory analysis that rely (implicitly or explicitly) on behavioral biases to justify core aspects of the analyses. Many past regulatory analyses are unclear about what behavioral bias is justifying the core of the analysis, and this is an area ripe for improvement, especially with the advances in the literature on behavioral economics over the past two decades.

Second, I believe that there is an important distinction that is missing from the discussion. Not all behavioral biases are market failures that can be corrected with regulatory action. For a behavioral bias to be a market failure that is a justification for regulation, it is widely understood in the economics literature that there must be a situation where the "decision utility" (i.e., the utility at the time the individual is making a decision) is different than the "experienced utility" (i.e., the utility at the later time when the benefits of the decision are being realized). Sometimes this difference is described as "ex ante" utility and "ex post" utility. Some regulatory analyses implicitly have this distinction in mind by accounting for benefits that occur at a later time than the decision being affected by the regulation occurs. There is strong economic evidence from numerous papers that deviations between the decision utility and experienced utility appear to occur due to behavioral biases. The behavioral biases that could lead to such a deviation are carefully documented in the proposed guidance. However, not all of the behavioral bias discussed in the proposed guidance are necessarily leading to a market failure.

I recommend distinguishing between behavioral biases that clearly lead to a deviation between decision utility and experienced utility, such as inattention, and those that may not, such as biased beliefs (which may continue to be biased ex post, thus leading to no deviation of decision and experienced utility). Regulatory analysis should focus on identifying the behavioral bias and the nature of the behavioral bias. In my assessment, most behavioral biases documented in the behavioral economics literature tend to lead to a deviation between decision and experienced utility, but it is crucial that the distinction is made and that it is not just assumed that there is a market failure every time there is a documented behavioral bias. I suggest that the guidance recommends that the agencies make sure to cite the literature and provide a clear explanation for why the behavioral bias is a market failure.

5. What practices might be identified in the guidance to encourage accounting for non-monetized (possibly also non-quantified) effects?

For this question, I again did not divide up the answer by the categories, but instead will summarize my thoughts on non-monetized and possibly non-quantified effects. I should first note that this is an area that others on the expert review committee are more deeply steeped in than me.

My bottom-line assessment is that the guidance does an excellent job in discussing non-monetized and non-quantified effects. These effects are very tricky and some are impossible to quantify, let alone monetize. The guidance clarifies that these effects can be accounted for in the regulatory analysis through

discussions of the issues. In general, this follows my experience with how the agencies currently handle non-monetized and non-quantified effects.

My biggest recommendation relating to non-monetized and non-quantified effects is to very strongly encourage the agencies to at least attempt to monetize (or at least quantify) the effects. There is a full discussion in the guidance on both revealed preference and stated preference estimates. While revealed preference estimates should be preferred in most cases, as the guidance notes, stated preference estimates can be used in many cases to quantify and/or monetize many effects that otherwise might not be possible to monetize. In some cases it is possible to develop monetized estimates, even for categories of effects that may seem difficult at first blush. And monetization is crucial for to higher-quality analyses in the long run, as it allows for apples-to-apples comparisons.

6. Do you have suggestions that would improve the clarity and logical presentation of the guidance and/or ease execution of analyses?

The proposed guidance is very clearly written and sensibly organized. However, one of my broader concerns about the proposed guidance is that it is somewhat long and at the same time does not provide the necessary information to operationalize some of the guidance in agency analyses. To be more specific, there are several aspects in the proposed guidance that recommend new methodologies or considerably changed methodologies. Some of these are substantially more complicated than in the previous guidance, such as the use of the shadow price of capital approach or distributionally-weighted benefit-cost analysis. In these situations, I think it is essential that the guidance provides very clear implementation information to the agencies. What would be especially helpful would be examples of the recommended guidance implemented in a sound manner. Every regulation is of course different, but having worked examples will provide much clearer guidance to the agencies and will likely result in higher quality regulatory analysis.

I do not believe this additional information providing clear implementation examples should be included in the proposed guidance. Rather I recommend including it in supplementary documents. The guidance is long enough as it is.

7. Should the guidance include suggestions of broadly useful data sets? If so, which data sets, and how should this information be presented in the guidance? How should the guidance reflect best practices related to data quality (including timeliness of data)?

The goal of Circular A-4 is to provide a steady document that stands the test of time. The last revision was performed 30 years ago. Ideally, the next revision will also be 20-30 years from now. I see some value in having links to broadly useful data sets provided in a single location to simplify agency analyses, but I worry that what is a broadly useful data set today will be supplanted by new and different data sets in the future. The past decade has seen a massive improvement in the availability and reliability of data that are relevant to regulatory analyses, and I anticipate that this revolution in data access and quality will continue. Moreover, while there are some broadly useful data sets, most analyses are going to require specific data sets for the context at hand. The specialists within the agencies may be some of the most likely to know about these data sets. This may render a list of useful data sets to be only marginally useful for most regulatory analyses.

Thus, I recommend that the guidance does not include suggestions of broadly useful data sets. I am supportive of a supplementary document that contains links to repositories with data sets that are likely to be broadly useful. This supplementary document should then be regularly updated as new data sets become available. As for which data sets to include, I would recommend performing a review of recent regulations and academic articles related to these regulations to find data that appear to come up again and again (or should have come up again and again). Unfortunately, under the timeline of this review, I

am unable to provide this review and the data sets that immediately come to mind are all obvious federal government sources (BLS, BEA, EIA, etc.).

I am supportive of the guidance recommending the use of high quality and timely data. In some sense, this appears to already be in the guidance in the discussions of data transparency. I do not think it is obvious how to provide more direct guidance because each regulation may have its own data availability opportunities and challenges. Timely data is very important for regulatory analysis and agencies should be expected to use the most recent data available at the time the analysis is being performed. **I recommend this guidance should be very explicit in the guidance that recent and high-quality data should be used whenever possible.**

8. Do you have any additional recommendations for ensuring that the guidance and associated methodologies are supported by the theoretical and empirical peer-reviewed academic literature in economics, or other relevant disciplines? If so, please provide them here.

I have one further recommendation, which relates to the basic parity that WTP and WTA seem to be on in the proposed guidance. The economics literature is very clear – for reasons described in the proposed guidance – that WTP is a much-preferred measure to WTA. Very little work is done in economics using WTA as the measure, and when WTA is used, it is only because there is no feasible way to calculate WTP.

Thus, I strongly recommend elevating WTP over WTA as the preferred measure for use in regulatory analysis, with WTA being acceptable only if it is infeasible to use a WTP estimate. This aligns with the previous Circular A-4 guidance and it seems that somehow this point was lost. It would only require a sentence early on in the discussion of WTP and WTA to remedy this concern.

In addition, please feel free to provide a general summary of your comments and recommendations.

My general summary of my comments and recommendations is that the proposed guidance is a major step forward. I strongly support the spirit of the major changes and for most of them have only minor recommendations and suggestions for improvement. The most important area that I believe needs more thought is the discussion of social discounting and risk. While I agree with the approach used to derive the social discount rate, I worry about false precision in recommending the use of a 1.7% rate and I suggest using a 2% rate, as I discuss above. I also have further suggestions for bolstering the intellectual argument provided on this point and further thoughts on the shadow price of capital approach.

Separately I have a strong recommendation that the guidance be supported by accompanying documents that provide worked out examples to clarify how to operationalize some of the guidance. Several of the new methodologies in the proposed guidance are theoretically sound and supported by the literature but will be new to the agencies. And the current guidance document is insufficient to provide a clear roadmap for implementation. The proposed guidance in some cases is quite specific and in other cases is more general. The proposed guidance could probably be shortened by moving some of the specifics to accompanying documents. This would also have the advantage allowing the accompanying documents to be updated more regularly. I believe that one of the most important objectives in this revision should be to develop a guidance document that will stand the test of time the way the previous guidance document did. Ideally, the next update should be 30 years from now.

Kenneth Gillingham, Professor of Economics, Yale University

July 24, 2023

Individual Peer Reviewer Comments: William Pizer

Please provide your responses to the charge questions below (see separate "Circular A-4 Peer Review Charge" document).

1. Please comment on whether the recommendations in the guidance are supported by the leading theoretical and empirical peer-reviewed academic literature in economics or other relevant disciplines, and if not, please provide alternative recommendations that would be (and citations to support them).
2. Where the guidance reflects assumptions, are they supported by the theoretical and empirical peer-reviewed academic literature in economics, or other relevant disciplines? If unsupported assumptions are identified, are there alternatives you would recommend? Please provide supporting references for both parts of the response—concerns about assumptions, if any, and suggested alternatives.

A large part of my comments here are focused on the discounting recommendation in the proposed revisions. These recommendations can be broken down into five main points: the change in the consumption rate, the shift to a shadow price of capital approach, use of a default risk premium versus certainty equivalents to address risk, the option to use a Ramsey discounting approach, and options for a declining discount rate over long horizons. I then turn to other topics in the proposed revisions.

The first three topics fit together as they collectively replace the current discounting approach that recommends 3 and 7 percent. Existing A-4 guidelines from 2003 indicate that 3 percent is meant to reflect a consumption rate of interest that "the average saver uses to discount future consumption", while 7 percent is meant to reflect the "average before-tax rate of return to private capital." *The change from 3 to 1.7 percent as a consumption rate.*

In general, there is compelling evidence that the risk-free interest rate has declined (Bauer and Rudebusch 2021; Barrage and Nordhaus 2023). The change from 3 to 1.7 percent arises from a simple application of the existing methodology applied in 2003 to new data in 2022. **For several reasons, however, OMB should instead consider a change from 3 to 2 percent for the (risk-free) consumption rate.**

Note the existing, specific methodology and its reapplication reflect an assumption about how to estimate the risk-free interest rate faced by consumers. This includes choices about the use of Treasuries, the maturity of the Treasuries, and the averaging term. The existing A-4 guidance does not cite any literature reflecting this methodology, although the idea of focusing on Treasuries (and perhaps high-grade private bonds) seems well established (Newell and Pizer 2003).

My suggestion follows from several lines of thought. First, applying the same procedure to 30-year bonds yields a number slightly above 2 percent, rather than below 2 percent (Morgenstern et al. 2023). There is no reason for the term structure of rates to be flat, but arguably any approximation error matters more at longer horizons due to the effects of compounding. Suppose one approximates a longterm 30-year rate of 2 percent with a shorter-term, 10-year rate of 1.7 percent. That error in the discounted value at 30 years is twice the error in discounted value when one approximates the 10-year rate of 1.7 percent with the 30-year rate of 2 percent. 1.017^(-30)-1.02^(-30) = 2 x (1.017)^(-10)(1.02)^(-10)). This argues for leaning towards longer horizon bond rates as the basis for the consumption rate.

Second, rates on high grade, non-Treasury bonds have fallen but not by as much as Treasuries (Barrage and Nordhaus 2023). Other comments have suggested Treasuries might generally have been distorted by monetary policy (Art Fraas et al. 2023). This may argue for a decline, but a smaller one, closer to 1 percent (from 3 to 2 percent) based on trends discussed in Barrage and Nordhaus.

Third, there is a desire for long-term stability in CBA. For example, Appendix D to Circular A-94 is updated every 5 years; Circular A-4 itself has been updated every 10-20 years. This implies that we would not want to change the discount rate every time this calculation yields a different answer. Keeping the discount rate as a whole number (or perhaps intervals of 0.5%) suggests that it will only change when there is substantial evidence to do so.

Finally (and related to the third point), the use of 1.7 percent suggests a precision in the estimate that is unlikely to exist. Treasury rates are, at best, a proxy for the underlying consumption discount rate. Both the current A-4 and proposed updated guidance even describe the real rate of interest on government debt as a "fair approximation."

In summary, the argument that Treasury securities reflect a risk-free return is generally established in the literature, although there has been concern about the influence of monetary policy. There is strong evidence for a decline. But the precise decline to 1.7 percent is perhaps too large and inappropriately precise.

Shift to a shadow price of capital approach to capital impacts

The proposed revisions would eliminate the investment return of 7 percent as one of the two discount rates and replace it with a shadow price of capital approach. This is a justified change in the guidelines based on the economic literature.

The current A-4 guidelines recognize the shadow price of capital (SPC) approach as "analytically preferred." More recent work (Li and Pizer 2021), building on results going back to Bradford (1975) highlight the stark errors that arise from using a pre-tax investment rate of return in the presence of tax distortions. A disruption in the capital stock will almost certainly have a different temporal pattern of consumption effects than the regulatory action being contemplated. This is ignored by the opportunity cost of capital argument that justifies using an investment rate of return.

A separate issue is the SPC value. A formula based on Equation (19) in Li and Pizer (2021) is relatively uncontroversial, with parameters describing aggregate savings, depreciation, and the discount/interest rates for investment and consumption. Application of this formula requires assumptions.

Newell et al. (2023) propose applying that formula with the investment rate defined as a consumption rate grossed up by taxes, yielding estimates between 1.1 and 1.2. The proposed A-4 takes that approach, indicating 1.2 as the default value. **Given other comments below about the default discount rate based on risk, the proposed SPC value of 1.2 based on this approach is appropriate and wellgrounded in the literature, as is the proposed A-4 implementation through sensitivity analysis.**

The preamble requests comments on an alternative application with observed market rates (which was done in Li and Pizer, yielding 1.4). Based on Newell et al., this would result in an SPC of 1.6 (using 2 and 7 percent as the consumption and investment rates). The application of the SPC with observed market rates is incorrect because it is conflating a risk premium with a tax distortion. The calculation of the shadow price in Li and Pizer is based on the idea that taxes create a wedge between the consumption and investment rates. The consumption rate reflects actual preferences, but the government's tax collection is still part of the benefit flow leading to a shadow price > 1. That is, there is a tax distortion in the economy that gives a dollar of capital a higher welfare value than consumption.

If higher returns reflect risk correlated with consumption, however, the underlying consumption rate should also be higher. There is not a corresponding tax (or other) distortion in the economy. While one could construct the shadow price based on a higher investment rate arising from risk, it would not reflect

consumer preferences for the risky cash flow arising from the investment return. I would note that the proposed revisions incorrectly refer to risk premia as a "distortion" (page 78). While the size of the equity premium remains a puzzle in economic theory, that is not the same as a distortion. This brings me to my third related topic.

Default risk premium versus certainty equivalents to address risk and discounting

The proposed guidelines suggest that uncertain costs and benefits should be converted to certainty equivalents for the purpose of discounting, and discounted at the risk-free rate. While theoretically correct, as noted in Joskow et al. (2023), focusing on the certainty equivalent calculation diverges from standard practice (Lucas 2014; Cherbonnier and Gollier 2022). Standard practice is to adjust the discount rate to reflect risk. Adjusting the risk-free rate is also the approach proposed in revisions to Circular A-94. A third point is that certainty equivalents are a relatively difficult task to propose for all cost-benefit impacts as the default (as I note in my response to question #3 below).

As a default, Circular A-4 discounting guidelines should instead adopt the proposed A-94 approach, which is a default premium of about 1 percent. Coupled with the above suggestion of a 2 percent riskfree rate, it suggests a default, risk-adjusted discount rate of 3 percent. This would address the above concerns about matching practice, making A-94 and A-4 internally consistent, and being more practical for agencies.

As noted in Morgenstern et al. (2023), it would also be appropriate to conduct sensitivity analysis around the default discount rate. Based on this attention to the risk premium, the two sensitivity cases could focus on 2 percent as the fully risk-free rate, and 4.5 percent as the case with the full risk premium (corresponding to a "beta" of 1). This range is now consistent with the risk premium in the A94 proposed revision. The 2.5 percent risk premium is also in line the methodology used by the French Government (Ni and Maurice 2021). They suggest a premium of 2 percent through 2070 and 3 percent after 2070, or an average of 2.5 percent. Finally, a 4.5 percent rate is consistent with a pre-tax return of 7 percent based on a 35 percent tax rate. 7 percent is a typical estimate of the real pre-tax return averaged across various investments (Barrage and Nordhaus 2023).

Alongside this default guidance, OMB could suggest agencies consider alternatives that (a) use a specific, evidence-based risk premium, as described in section 9.d of the proposed A-94 revisions, or (b) explicitly model the relationship between a particular cost or benefit and the discount factor based on stochastic growth and the Ramsey discount rate (see below), calibrating the Ramsey parameters to match the risk-free rate. Note that option (b) is the approach recommended by NASEM (2017) for the SCC, and is analytically the same as converting to certainty equivalents and discounting at the risk-free rate, also as noted below.

Option to use a Ramsey discounting approach

Over longer time horizons, long-term uncertainty can have dramatic effects on the level of economic well-being (Müller, Stock, and Watson 2020; Rennert et al. 2021). Over 100 years, a 90% confidence interval includes a factor of 10 or more in per capita income. This dramatically skews the value of future outcomes tied to economic well-being (such as mortality valuation) so that expected values are much, much higher than median values.

At the same time, it is uncontroversial in the economics literature that marginal utility declines with increased consumption and future high-dollar consequences matter less in future high-income scenarios. As pointed out by NASEM (2017), this requires tying uncertain future outcomes to uncertain marginal utility; their recommended approach is what they call "Ramsey-like" discounting. This is mathematically

equivalent to a certainty equivalent approach to discounting at the risk-free rate, as currently proposed in the A-4 revisions. E.g.,

$$EE[ee^{-(\rho\rho+\eta\eta\eta\eta_{tt})tt}(xx_{tt}(\eta\eta_{tt}))] = EE[ee^{-rr_{tt}tt}] \cdot EE\left[\frac{EE[ee^{-\eta\eta\eta\eta_{tt}(\eta\eta_{tt})tt}xx_{tt}(\eta\eta_{tt})]}{EE[ee^{-\eta\eta\eta\eta_{tt}(\eta\eta_{tt})tt}]xx_{tt}(\eta\eta_{tt})}\right]$$

where $rr_{\eta\eta} = \rho\rho + \eta\eta\eta\eta_{\eta\eta}$ is the stochastic Ramsey discount rate for time t, $\eta\eta_{\eta\eta}$ is a stochastic growth rate from period 0 to period t (e.g., the time average of the annual rates in a particular stochastic path), and a particular benefit or cost at time t, $xx_{\eta\eta}$, explicitly depends on $\eta\eta_{\eta\eta}$. The left side reflects expected discounted net benefits based on an explicit model of the correlation between $xx_{\eta\eta}$ and Ramsey discount factor $ee^{-rr_{\eta\eta}tt}$ through the parameter g_t (Equation (2) in Rennert` et al (2021)). The right side re-arranges into the risk-free discount factor, $EE[ee^{-rr_{\eta\eta}tt}]$, and the certainty-equivalent of benefit or cost $xx_{\eta\eta}$.

For CBA where significant consequences extend beyond 50 years, the use of a Ramsey discounting approach coupled with benefits driven by a stochastic growth model is strongly supported by the economics literature (Rennert et al. 2021; NASEM 2017).

For consistency across the above-suggested alternatives, the Ramsey discounting parameters would need to match the default risk-free rate. This Ramsey approach would replace any risk adjustment.

A note about the Ramsey approach versus the risk premium approach

As is well known, risk premia observed in the market cannot be explained by standard utility models (see relevant discussion and references in Barrage and Nordhaus 2023). In experiments conducted by Brian Prest while I was writing this review, the stochastic growth rates in the RFF-SPs (Rennert et al. 2021) generate a roughly 0.3 percent near-term (over a period of 5-10 years) risk premium using η = 1.24 (also Rennert et al. 2021) for an investment return perfectly correlated to aggregate income. This puts the Ramsey discounting alternative at odds with the other approaches using a 2.5 aggregate risk premium.

I acknowledge this limitation but believe it is the best choice at this time. As NASEM (2017) highlighted, it is essential to make some adjustment to discount factors when modeling uncertainty in economic growth over long time horizons. This applies to climate change damages from greenhouse gas emissions and perhaps other applications. Further research could explore other approaches that might better harmonize these alternatives. For example, including a more explicit modeling of non-Gaussian distributions for economic growth can generate higher risk premia in a traditional model (Quinet 2013).

Option for a declining discount rate over long horizons

There is considerable evidence that the term structure of discount rates declines over time based on persistent uncertainty (Weitzman 2001; Newell and Pizer 2003; Bauer and Rudebusch 2021). This is also true when uncertainty arises in a Ramsey discounting context from uncertain and persistent future growth (Gollier 2014). However, the focus of this literature has been the appropriate discount rate *for certain or certain-equivalent outcomes*. Work based on actual valuation of outcomes has emphasized the need to simultaneously tackle the potential correlation with economic growth (NASEM 2017; Gollier 2014). It points to a rising term structure depending on persistent uncertainty about long-term economic growth.

For this reason, it seems unwise to include an option for a declining rate, distinct from the option to use a Ramsey discounting approach that would allow any trend to arise endogenously.

Distributional analysis and weighting

Traditional cost benefit analysis focuses on the Kaldor-Hicks notion of social welfare, where costs and benefits are combined, dollar-for-dollar into a net-benefit estimate (Boardman et al. 2005). The underlying notion is that when net-benefits calculated this way are positive, the change in individual well-being is such that winners *could* compensate losers to make everyone better off. In practice, the winners do not typically compensate losers. Therefore, decisionmakers care about the distribution of outcomes across different groups defined by various demographics.

The existing A-4 guidance indicates that analyses "should provide a separate description of distributional effects". However, in reality few RIAs provide such analysis (see, for example, Robinson, Hammitt, and J. Zeckhauser 2016; Revesz and Yi 2022). The preamble document notes all of this in its discussion of the topic, and the proposed revised guidance provides additional emphasis on describing distributional effects.

The proposed revisions also provides an option for agencies to weight costs and benefits based on the idea of declining marginal utility, primarily based on economic status. Agencies can then choose to use the weighted cost benefit analysis as the primary estimate of net benefits.

An emphasis on distributional weighting, and particularly the idea that it would be the primary estimate, is problematic.

I mention four problems here; see also Morgenstern et al. (2023). The first is that it implies distributional concerns don't just matter, but they easily dominate the analysis. Computing net benefits this way presumes that the very best (highest net benefit) distribution places all costs on the richest person and gives all benefits to the poorest person. Consider the following table of household income by quintile (Tax Policy Center 2023), implied weights based on the proposed A-4 guidance, and average weighted effects for three policies with different average household effects across quintiles:

	Lowest	Second	Third	Fourth	Highest	Weighted average
Mean income	$14,859	$41,025	$70,879	$115,462	$269,356	
Implied weight	8.9	2.2	1	0.51	0.15	
Policy I	10	10	10	10	10	25.4
Policy II	50	0	0	0	0	89.1
Policy III	0	0	0	0	50	1.5
Policy IV	25	25	0	0	0	55.3

Here all four policies have the same unweighted average ($10) and total ($50) benefits across society. But Policy I spreads the effects evenly across all quintiles while Policies II and III concentrate them in the poorest and richest households, respectively. Policy IV spreads the benefits evenly between the lowest two quintiles. Policy II, which benefits the poorest, has the highest weighted average, while policy III,

which benefits the rich, has the lowest. The range of weighted benefits goes from $1.5 to $89.1—demonstrating how distributional effects can easily dominate what might be other (total benefit) differences among policies.

Note, in particular, that we could lower the lowest quintile benefits in Policy II to $50 \times 55.3 \div 89.1 = \$31$ and Policy II would still be "just as good" as policy IV based on equity weighting. This is the case even though total benefits are one-third smaller and policy IV shares the benefits across still-relatively-poor households. In this way, cost-benefit analysis tends to become dominated by distributional concerns that favor giving all the benefits to the poorest while implying very specific trade-offs. Spreading the benefits from the lowest to second lowest quintile equates to a one-third reduction in welfare.

This highlights a second problem: the normative and subjective nature of this approach. It presumes a particular distribution of costs and benefits is best—namely those that tend to equalize income. It is important that recognizing declining marginal utility of income is not the same as deciding that maximizing (arithmetic) average utility is the societal goal. Indeed, much of social choice theory focuses on the puzzle of how to establish any basis for ranking, let alone establishing cardinal metrics (Mueller 2003). For example, in taxation there is a notion of equal sacrifice (Sidgwick 1883; Mill 1871). Indeed, one of the sources of estimate of the elasticity of marginal utility is an approach that assumes society chooses income tax rates so that individuals make an "equal absolute sacrifice of satisfaction" (Evans 2005). Justice 40 is a based on a similar notion that a minimum benefit that should accrue to disadvantaged communities (USG 2022). Notably it does not suggest that the increasing direction of all net benefits to the very poorest is desired.

A third concern, aside from the issues related to whether equity weighting would rank policies in the way that society would desire, is the difficulty interpreting the weighted average. In the above example, Policy II exceeds Policy IV by an average of $33.8 per household (or a total welfare given by $33.8 times 125 million households). Policy 1 exceeds policy III by $23.9 per household. It is not clear how to interpret these numbers or to compare them.

A final observation is that the calculation of weighted net benefits will necessarily depend on the granularity of the calculations. The weighting function is highly non-linear and convex in income. Thus average values increase as quintiles become deciles, etc. (Morgenstern et al. 2023).

An emphasis on distributional outcomes is important. For transparency, OMB could be stronger in its recommendations in this space; namely, that agencies could be required to either provide distributional analysis or document the process leading to the determination it is not necessary (see comments on question #4 below). While the idea of distributional weights has a long history in economic thought and public choice theory, however, it does not seem well supported for an expanded role in government regulatory analysis at this time. Expanded reporting in this area and additional research could be done with an eye to future updates (see comments on question #8 below).

Distributional issues and the VSL / willingness-to-pay measures

Willingness-to-pay (WTP) values for various outcomes will typically be lower for poorer households (Acland and Greenberg 2022). To the extent that CBA uses average valuations for non-market goods that do not distinguish by sub-group, this is equivalent to weighting valuations that do vary based on income (Morgenstern et al. 2023). **Thus, one way to address some distributional concerns without the complication of equity weights is to simply not vary WTP measures by sub-group in the first place.** Most notably OMB guidance already does this for the value of statistical life (VSL) across sub-groups in

the US. This same approach could be used for other non-market goods, which could be recommended in place of distributional weights.

Note it would be particularly bad to apply distributional weights if WTP was already the same across subgroups (Morgenstern et al. 2023).

None of the concerns noted above with regard to distributional above apply to this approach of using average WTP values where possible.

Scope of analysis, including geographic scope

The proposed guidance on scope represents a significant change from the current A-4. In particular, the current A-4 indicates a focus on US citizens and residents, with any effects beyond the borders reported separately. The proposed guidance says such a focus is appropriate in many circumstances. Then, "when feasible and appropriate, all such important effects should be included, regardless of whether they result directly from a regulation's domestic applicability, or indirectly from a regulation's impact on foreign entities."

In general, an increased focus on primary effects beyond US borders is supported by the literature (Pizer et al. 2014; NASEM 2017; Kotchen 2018). This includes a primary focus on global estimates for global externalities that are the subject of international negotiations and agreements. This is based on several arguments: international agreements may have committed the US and partners to a global perspective; strategically, even without a global agreement, US action may leverage foreign action; and international trade effects may imply that foreign impacts directly bear on US residents.

Nonetheless, it is compelling to see estimates of the direct effects on US citizens and residents in regulatory analysis. Even when the global estimates are appropriate as a primary focus, US law generally concerns outcomes for US citizens and residents (Rowell 2015). Indirect effects may be tricky to follow.

It could be clearer that the primary analysis should be domestic except where the appropriate conditions are met (see below #6). Also, the guidance could suggest that an analysis of primary effects on US citizens and residents is always desirable as at least a supplemental analysis (see below #4).

Intersection of scope and equity

There is an extremely important intersection between the guidance on scope of analysis and distributional issues. The above discussion generally disfavored distributional weights but encouraged using a single, average WTP across sub-groups to address equity concerns. This discussion must be revisited in cases where the scope of analysis is broadened beyond US citizens and residents.

In particular, the arguments for equity principles have a very different starting point when applied beyond US citizens and residents. The threshold question is *whether* impacts beyond US citizens and residents should be considered. It is then a separate and additional question whether (a) such impacts should be weighted to suggest that dollar transfers from rich to poor countries are welfare improving (because poorer countries have higher marginal utility of dollars); and/or (b) it is desirable on equity grounds to use the same willingness to pay in poorer countries for non-market goods—avoided mortality, environmental amenities, etc. To this point, there is no clear argument for such equity concerns based on the reasons for including primary effects beyond US borders noted above or noted in the proposed A-4 guidance.

For this reason, any primary effects outside US borders should be measured based on the recipients willingness to pay.

Uncertainty and risk distinct from discounting.

Issues of risk and discounting were discussed above.

The importance of addressing uncertainty, particularly through sensitivity analysis of key uncertain variables or through probabilistic analysis, remains largely unchanged and highly relevant / important.

However, the proposed revisions (pages 71-73) lean more towards an assumption of risk aversion and provide a much greater focus on the idea of computing certainty equivalents. While conceptually correct, most government cost-benefit guidance has focused on risk-neutrality as the default (Boardman et al. 2005; Stokey and Zeckhauser 1978). The typical exception is when risks are not shared evenly across large populations. Or, when there is a large, undiversifiable societal risk. **It would therefore seem that for most cost-benefit analysis, an assumption of risk neutrality (distinct from risk and discounting) would remain a reasonable choice.**

I would note that uncertainty about policy outcomes themselves is distinct from issues surrounding the measurement of willingness to pay for individual risk reductions as the outcome (as relates to mortality or other harms). Such valuations implicitly demand attention to individual risk preferences.

3. Does the guidance appropriately recognize and account for potential challenges for implementation (e.g., technical feasibility or constraints on data availability or other resources)?

Discounting and risk

It is uncontroversial that consumers (and society) demand a higher rate of return for risky investments, public and private, that are correlated with other outcomes—either market or consumption (the CAPM and C-CAPM models, respectively). The guidance defaults to an approach that discounts at the risk-free rate and handles uncertainty through the calculation of certainty equivalents values for costs and benefits. As noted above, there is a functional equivalence between Ramsey discounting and the certainty-equivalent approach with the risk-free rate.

As a practical matter, it seems a significant burden for agencies to perform a certainty-equivalent calculation for all costs and benefits; the likely default would be to use an expected value or best (median) estimate). A best-guess approach cannot capture any potential correlation with market risk or growth. An expected value approach without stochastic growth modeling (or market analysis) would similarly miss any correlation. Meanwhile, evidence suggests that different types of projects deserve different rates based such correlation (Gollier, Ploeg, and Zheng 2022).

As noted above for questions #1/#2, it seems advisable to use a default approach regarding market risk as recommended in the proposed Circular A-94 revision based on a default risk premium. This could be replaced by either a Ramsey discounting approach or a specific risk premium.

Uncertainty distinct from discounting

As noted above, the guidance leans more towards an assumption of risk aversion and measurement of certainty equivalents. As a practical matter, such calculations require considerably more time and resources (and information) than simple sensitivity analysis around key variables. For this reason, the guidance should be clearer when those calculations are warranted. For example, when a relatively small population is facing uncertain outcomes from the policy or other cases that OMB identifies.

4. Do you have any other suggestions for improving the completeness, objectivity, and/or transparency of agency regulatory analyses? If so, how might these be incorporated into guidance?

Distributional analysis

Regarding distributional analysis, the proposed revisions continue to leave it to agencies to determine when distributional analysis is needed, as well as to which groups should be considered when such an analysis is performed.

In the interest of transparency, OMB could require all analyses to include a section on distributional effects. When agencies determine such an analysis is not necessary, this section could document their process for making that determination including what groups were considered.

Scope of analysis

In cases where the primary focus is global effects of regulation, the guidance indicates "…it is generally appropriate to produce a separate supplementary analysis of the effects experienced by U.S. citizens and residents, unless you determine that such effects cannot be separated in a practical and reasonably accurate manner, or that the separate presentation of such effects would likely be misleading or confusing in light of the factors detailed above." It seems like there are always rough approximations to apportioning global impacts (e.g., by share of GDP) given benefits have to be added up in the first place. It is also not clear how the presentation would be misleading or confusing.

5. What practices might be identified in the guidance to encourage accounting for non-monetized (possibly also non-quantified) effects?

   I do not have specific comments on this question.

6. Do you have suggestions that would improve the clarity and logical presentation of the guidance and/or ease execution of analyses?

Shadow price of capital

I would note that the discounting section on "effects on capital" (and guidance for the shadow price approach) could be a distinct top-level section. Discussion of the shadow price has been included in the discounting section in the past because equity-based discount rates were part of the default discounting approach. However, application of the shadow price is now functionally distinct and not really connected to any of the discounting discussion.

General exposition

In a more general way, my main presentational concern is that the proposed revisions, much more than the previous guidance, mixes guidance with justification and narrative, making the actual default guidance and alternatives harder to tease out. For example, the discounting section (where I have spent considerable time and focus) includes five sub-headings (rationale, discounting in general, effects on capital, long-term discounting, relationship with risk, non-monetized benefits and costs).

I would advise re-organizing with either (a) a shorter document that contains specific guidance coupled with annexes that provide evidence and narrative, or (b) a shorter guidance header in each section followed by the same evidence and narrative section. The shorter guidance would include specific instructions for the default assumption / methodology, followed by clear explanation of alternative methods.

For example, in the discounting section the above suggestions for specific guidance might look like:

Guidance on discounting.

Default approach: Discount at 3 percent with sensitivity based on 2 and 4.5 percent.

Alternative: Use a risk-free rate of 2 percent coupled with a specific beta reflecting the correlation of a specific benefit or cost with the aggregate economy.

Alternative: Use a Ramsey discounting and a stochastic growth model, calibrated to a risk-free rate of 2 percent, to capture the implicit risk premium. This is functionally equivalent to using the term-structure of the risk-free rate coupled with a certainty equivalent calculation that allows for stochastic growth and uses the same Ramsey risk aversion parameter.

This would then be followed by a longer discussion.

Scope of analysis

The language in the proposed revisions states "In many circumstances, your primary analysis should focus on the effects of a regulation that are experienced by citizens and residents of the United States (which will often be the primary effects of the regulation)." Then later "In certain contexts, it may be particularly appropriate to include effects experienced by noncitizens residing abroad in your primary analysis." I believe it would be clearer, and in keeping with intention, to indicate that the default focus is primary effects on US citizens and residents.

7. Should the guidance include suggestions of broadly useful data sets? If so, which data sets, and how should this information be presented in the guidance? How should the guidance reflect best practices related to data quality (including timeliness of data)?

   Given the evolving landscape of available data, and the desire for the guidance to be durable, I am not inclined to suggest inclusion of any particular data set. There is existing government (OMB) guidance on information quality (OMB 2023); any specific data quality guidance could be included there.

8. Do you have any additional recommendations for ensuring that the guidance and associated methodologies are supported by the theoretical and empirical peer-reviewed academic literature in economics, or other relevant disciplines? If so, please provide them here.

NASEM (2017) recommended a regularized, five year cycle for updating the social cost of carbon through a cycle of research, interagency process, and external review. To date, Circular A-4 has been updated every decade or two, but without any clear process. Based on the arguments for the recommended SCC process, it could make sense for OMB to propose a similar, perhaps longer cycle for A-4—perhaps every 10 years. In particular, the current A-4 revision might lay out a timeline for the next revision as well as identify research that could occur in intervening years. Research topics might include reviews of various agency CBAs, in order to understand how well the current guidance is and can be implemented, as well as specific topics where further empirical or theoretical work would be helpful. For example, distributional weighting and risk premium with Ramsey discounting have both been identified in my comments.

In addition, please feel free to provide a general summary of your comments and recommendations.

There were three main substantive comments.

1. The proposed discounting guidance in Circular A-4 and Circular A-94 needs to be harmonized. In particular, there could be default assumption about the discounting risk premium with sensitivity analysis reflecting higher and lower risk premia. Based on suggested rounding and the A-94 risk premium, this would be a central value of 3 percent, with sensitivity of 2 and 4.5 percent. As alternatives, agencies could provide a more specific estimate of the risk premium for particular costs

and benefits *or* could explicitly model uncertainty around economic growth and discounting through a Ramsey model, calibrated to a 2 percent risk free rate.

2. While an expanded presentation of distributional analysis is warranted, it seems premature to emphasize the use of distributional weights and, especially, to suggest that such weighted CBA could be a primary analysis. For non-market goods, use of national valuation averages could address some of the equity issues that motivate weighting without the same concerns.

3. The primary scope analysis could be global when such scope is motivated by one of several reasons. However, valuation of impacts outside the U.S. should be based on the willingness-topay by those foreign countries.

References

Acland, Daniel, and David H. Greenberg. 2022. "Principles and Practices For Distributional Weighting: A New Approach." SSRN Scholarly Paper. Rochester, NY. https://doi.org/10.2139/ssrn.4067472.

Art Fraas, John D. Graham, Kerry Krutilla, Randall Lutter, Jason F. Shogren, and Linda Thurnstrom. 2023. "Comments on Proposed Revisions to Circular A-4, Regulatory Analysis." https://www.regulations.gov/comment/OMB-2022-0014-3917.

Barrage, Lint, and William Nordhaus. 2023. "Background Note on Rates of Return and Discounting." available at the website https://bit.ly/3TwJ5nO in the folder, "DICE Folders".

Bauer, Michael D., and Glenn D. Rudebusch. 2021. "The Rising Cost of Climate Change: Evidence from the Bond Market." *The Review of Economics and Statistics*, September, 1–45.

Boardman, Anthony E., David H. Greenberg, Aidan R. Vining, and David L. Weimer. 2005. *Cost Benefit Analysis: Concepts and Practice*. 3rd edition. Upper Saddle River, N.J: Prentice Hall.

Bradford, David F. 1975. "Constraints on Government Investment Opportunities and the Choice of Discount Rate." *American Economic Review* 65 (5): 887–99.

Cherbonnier, Frédéric, and Christian Gollier. 2022. "Risk-Adjusted Social Discount Rates." *The Energy Journal* 43 (4). https://doi.org/10.5547/01956574.43.4.fche.

Evans, David J. 2005. "The Elasticity of Marginal Utility of Consumption: Estimates for 20 OECD Countries*." Fiscal Studies 26 (2): 197–224. https://doi.org/10.1111/j.1475-5890.2005.00010.x.

Gollier, Christian. 2014. "Discounting and Growth." *American Economic Review* 104 (5): 534–37. https://doi.org/10.1257/aer.104.5.534.

Gollier, Christian, Frederick van der Ploeg, and Jiakun Zheng. 2022. "The Discounting Premium Puzzle: Survey Evidence from Professional Economists." Working Paper 1345. Economics Series Working Papers. Toulouse School of Economics. https://ideas.repec.org//p/oxf/wpaper/976.html.

Joskow, Paul, Christopher Knittel, Deborah Lucas, Gilbert Metcalf, John Parsons, Robert Pindyck, and Richard Schmalensee. 2023. "Comments on Draft Revisions to OMB Circulars A-4 and A-94 -." Research Commentary 2023–04. MIT CEEPR. https://ceepr.mit.edu/workingpaper/researchcommentary-comments-on-draft-revisions-to-omb-circulars-a-4-and-a-94/.

Kotchen, Matthew J. 2018. "Which Social Cost of Carbon? A Theoretical Perspective." *Journal of the Association of Environmental and Resource Economists* 5 (3): 673–94. https://doi.org/10.1086/697241.

Li, Qingran, and William A. Pizer. 2021. "Use of the Consumption Discount Rate for Public Policy over the Distant Future." *Journal of Environmental Economics and Management* 107 (May): 102428. https://doi.org/10.1016/j.jeem.2021.102428.

Lucas, Deborah. 2014. "Rebutting Arrow and Lind: Why Governments Should Use Market Rates for Discounting." *Journal of Natural Resources Policy Research* 6 (1): 85–91. https://doi.org/10.1080/19390459.2013.874106.

Mill, John Stuart. 1871. *Utilitarianism*. Longmans, Green, Reader, and Dyer.

Morgenstern, Richard, Richard Newell, William Pizer, and Brian Prest. 2023. "Comments to OMB on the Proposed Revisions to Circular A-4." Resources for the Future. 2023.

https://www.rff.org/publications/testimony-and-public-comments/comments-on-theproposed-revisions-to-circular-a-4/.

Mueller, Dennis C. 2003. *Public Choice III*. 3 edition. Cambridge ; New York: Cambridge University Press.

Müller, Ulrich K., James H. Stock, and Mark W. Watson. 2020. "An Econometric Model of International Growth Dynamics for Long-Horizon Forecasting." *The Review of Economics and Statistics*, October, 1–47.

NASEM. 2017. *Valuing Climate Damages: Updating Estimation of the Social Cost of Carbon Dioxide*. https://doi.org/10.17226/24651.

Newell, Richard G., and William A. Pizer. 2003. "Discounting the Distant Future: How Much Do Uncertain Rates Increase Valuations?" *Journal of Environmental Economics and Management* 46 (1): 52– 71. https://doi.org/10.1016/S0095-0696(02)00031-1.

Newell, Richard G., William A. Pizer, and Brian C. Prest. 2023. "The Shadow Price of Capital: Accounting for Capital Displacement in Benefit–Cost Analysis." 23–07. Resources For the Future. https://www.rff.org/publications/working-papers/the-shadow-price-of-capital-accounting-forcapital-displacement-in-benefitcost-analysis/.

Ni, Jincheng, and Joël Maurice. 2021. "RÉVISION DU TAUX D'ACTUALISATION." France Stratégie/Direction générale du Trésor.

OMB. 2023. "Information Policy." The White House. 2023. https://www.whitehouse.gov/omb/information-regulatory-affairs/information-policy/.

Pizer, W., M. Adler, J. Aldy, D. Anthoff, M. Cropper, K. Gillingham, M. Greenstone, et al. 2014. "Using and Improving the Social Cost of Carbon." *Science* 346 (6214): 1189–90. https://doi.org/10.1126/science.1259774.

Quinet, Émile. 2013. "L'évaluation Socioéconomique Des Investissements Publics." France Stratégie, Direction générale du Trésor. https://www.researchgate.net/publication/278629800_L'evaluation_socioeconomique_des_investissements_publics.

Rennert, Kevin, Brian C. Prest, William A. Pizer, Richard G. Newell, David Anthoff, Cora Kingdon, Lisa Rennels, et al. 2021. "The Social Cost of Carbon: Advances in Long-Term Probabilistic Projections of Population, GDP, Emissions, and Discount Rates." *Brookings Papers on Economic Activity* Fall 2021. https://www.brookings.edu/bpea-articles/the-social-cost-of-carbon/.

Revesz, Richard L., and Samantha P. Yi. 2022. "Distributional Consequences and Regulatory Analysis." *Environmental Law* 52 (1): 53–98.

Robinson, Lisa A., James K. Hammitt, and Richard J. Zeckhauser. 2016. "Attention to Distribution in U.S. Regulatory Analyses." *Review of Environmental Economics and Policy* 10 (2): 308– 28. https://doi.org/10.1093/reep/rew011.

Rowell, Arden. 2015. "Foreign Impacts and Climate Change." *Harvard Environmental Law Review* 39 (371). https://harvardelr.com/2015/07/12/foreign-impacts-and-climate-change/.

Sidgwick, Henry. 1883. *The Principles of Political Economy*. Cambridge Library Collection - Philosophy. Cambridge: Cambridge University Press. https://doi.org/10.1017/CBO9781139095358.

Stokey, Edith, and Richard Zeckhauser. 1978. *A Primer for Policy Analysis*. W. W. Norton.

Tax Policy Center. 2023. "Household Income Quintiles." Tax Policy Center. March 16, 2023. https://www.taxpolicycenter.org/statistics/household-income-quintiles.

US Government, The White House. 2022. "Justice40 Initiative | Environmental Justice." The White House. 2022. https://www.whitehouse.gov/environmentaljustice/justice40/.

Weitzman, Martin L. 2001. "Gamma Discounting." *American Economic Review* 91 (1): 260–71. https://doi.org/10.1257/aer.91.1.260.

Individual Peer Reviewer Comments: Christina Romer

OVERVIEW

The proposed revision of OMB Circular A-4 is an ambitious and welcome step. It seeks to bring the latest evidence into the conduct of regulatory analysis by U.S. government agencies. The revised guidance is exceptionally well researched and documented, and provides numerous examples that both readers and analysts will find helpful. The new guidelines should help to improve and standardize regulatory analysis throughout the federal government.

I am by training and experience a macroeconomist and economic historian. As such, I feel most able to comment on the aspects of the revised circular that touch on macroeconomic issues and assumptions. Having served as chair of the Council of Economic Advisers, I also have experience guiding and evaluating regulatory analysis. This experience makes me acutely away of some of the potential practical problems implementing procedures that are conceptually sound but somewhat abstract. As both a researcher and a policymaker, I am also a strong proponent of increased transparency in all government analyses.

In this review, I focus on four key topics: the appropriate discount rate, the treatment of uncertainty, implementation challenges, and transparency. The first two are topics singled out in the Charge to Peer Reviewers. My discussion of these two topics involves answers to review questions 1, 2, 3, and 4 (though in ways that are difficult to separate). My discussion of implementation challenges involves answers to questions 3, 6, and 7. My discussion of transparency answers question 4 of the charge.

DISCOUNT RATE

Because the costs and benefits of a regulation occur over many years, any cost benefit analysis needs a way of taking into account time preference. The revised circular proposes that regulatory analysis use a single estimate of the long-term real risk-free interest rate for discounting. The circular calculates this rate by averaging the real return on ten-year U.S. government bonds over the thirty years from 1993 to 2022. This average is based on Treasury Inflation-Protected Securities (TIPS) from 2003 to 2022, and ex post real yields for the ten years prior to 2003 (when ten-year TIPS are not available). The resulting proposed discount rate is 1.7%. This number replaces the 3% and 7% rates that were called for in the 2003 version of the circular.

Cyclical Factors. There are a number of reasons why the 1.7% rate may be somewhat too low. One that is mentioned in many of the public comments is that monetary policy has been highly expansionary for much of the past fifteen years. It is perhaps more accurate to emphasize that the U.S. economy has experienced two highly contractionary events—the 2008 financial crisis and the 2020 Covid-19 pandemic—that depressed real output and employment. The Federal Reserve responded appropriately with countercyclical reductions in the federal funds rate and with long-term government bond purchases (quantitative easing). As a consequence, interest rates on long-term government bonds have been very low for a number of years.

A key reason for looking at a 30-year average is the hope that business cycle fluctuations and the related countercyclical monetary actions will balance out, and one will be left with an estimate of the risk-free rate uncontaminated by cyclical movements.[76] However, in the case of the period 1993-2022, it seems likely that we may have a skewed sample. The period before 2008 was particularly stable, with low

[76] This point is made carefully in the public comment by James Stock (OMB-2022-0014-0081).

inflation and modest interest rate movements.[77] There were no periods of extreme monetary tightening and high interest rates to reduce inflation that were common in the pre-1990 period.[78] This very stable period was then followed by a severe recession in 2008-09 and a sustained period of very slow recovery and high unemployment—both of which necessitated very low interest rates for a prolonged period to stabilize the economy. Then, just as the U.S. economy was finally returning the full employment, the Covid pandemic hit, sending the economy into a tailspin and leading the Federal Reserve to quickly bring interest rates down to the near-zero lower bound. As a consequence, the period 1993-2022 is dominated by recession and low interest rates in a way that one hopes (and I expect) will not become the norm. Indeed, the experience of inflation and rapidly rising interest rates in 2022 and 2023 suggest a recent reversal of that pattern.

The skewness of the most recent 30 years might suggest extending the averaging window to 35 or 40 years. The goal of the longer sample is to more evenly balance boom and recession years. The likely impact of this change would be on the order of an increase in the estimated real riskfree rate of ½ to 1 percentage point.

Importantly, it is widely accepted that some of the decline in real interest rates over the past 15 years is, in fact, secular rather than cyclical. Rising inequality, slowing technological change, and other factors appear to have lowered the equilibrium real interest rate noticeably in the past two decades.[79] Therefore, even a cyclically-balanced sample is likely to show a lower average real Treasury rate than was calculated in the previous version of the circular. Nevertheless, a longer sample is appropriate for ensuring that the average only reflects the non-cyclical downward trend, not the cyclical movements.

Bias in the CPI. A second factor to consider in estimating the real interest rate is likely bias in the Consumer Price Index (CPI), which is used explicitly in calculating real rates before 2003, and is the measure of inflation protected against in TIPS. The 1996 Boskin Commission report identified various reasons, such as unmeasured quality improvements and the ability of consumers to alter their consumption bundle in response to relative price changes, that the change in the CPI overstates actual inflation.[80] Their estimate at the time was that that "true" inflation was likely roughly 1.1 percentage point lower than measured by the CPI.

If inflation is indeed overstated, then the calculated ex post and TIPS real interest rates are understated. Importantly, the CPI has been revised substantially since 1996, and so the likely overstatement in inflation has surely declined over time. Thus, this consideration likely suggests only a modestly higher estimate of the real risk-free rate.[81]

Liquidity Services. A third consideration is the unique liquidity services provided by U.S. government bonds (particularly the non-TIPS bonds used in the average before 2003). As discussed in the public comment by Joshua Rauh, government bonds can pay a lower interest rate because they are so liquid.[82]

[77] There is a large literature in macroeconomics about the so-called "Great Moderation" in economic fluctuations and Federal Reserve monetary policy starting in the mid-1980s. See, for example, McConnell and Perez-Quiros (2000) and Stock and Watson (2003).
[78] See Romer and Romer (2023) for a discussion of these episodes of monetary contraction.
[79] See, for example, Laubauch and Williams (2003), Bauer and Rudebusch (2016) and Del Negro, Giannone, Giannoni, and Tambalotti (2017).
[80] Advisory Commission to Study the Consumer Price Index (1996).
[81] The public comment by Michael Boskin (OMB-2022-0014-0009) suggests data that could be used to help figure out the size of the appropriate adjustment.
[82] Joshua Rauh (OMB-2022-0014-0119).

Given that the benefit and cost streams related to government regulations are highly illiquid, it makes sense to use the risk-free rate on a less liquid and tradeable asset. Rauh cites a paper by Amihud et al. (2015) that suggests a spread of 0.45 to 0.82 percentage points between the most and least liquid assets.

Recommendation. These considerations lead me to believe that a real risk-free discount rate in the range of 2 to 3 percent would be more accurate and in line with the academic literature than the proposed 1.7%. A further benefit of using a round number or a range is that it makes clear that the number used is not precise, and is subject to nontrivial error and evolution over time.

TREATMENT OF RISK AND UNCERTAINTY

The discussion above focuses on an appropriate measure of the real, risk-free social discount rate. A related crucial issue is the treatment of risk and uncertainty about future costs and benefits. The revised circular calls for analysts to calculate the certainty equivalents of the stream of future costs and benefits, and then discount them using the real risk-free rate. I am concerned that this approach may be overly difficult for a number of reasons. It may also lead to substantial understatements of the importance of risk.[83]

Background. For simplicity, consider a regulation that has benefits only in a single year in the future. Suppose those benefits are uncertain, and that each possible realization of the benefits can be assigned a real monetary value. In general, the amount that households today value these potential future benefits differs from the expected real monetary value of the benefits discounted to today using the riskless real interest rate because of risk aversion. Households are generally not indifferent about whether good outcomes occur in a good state of the world (when marginal utility is likely to be low), or a bad state of the world (when marginal utility is likely to be high).

Conceptually, there are two ways to adjust the discounted expected value to obtain a more accurate estimate of the value to households today of the uncertain future benefits. One is to replace the expected real monetary value of the uncertain future benefits with a number that reflects how much households would on average value those benefits in the year they occur in terms of the contribution to the households' utility, and then discount that using the riskless real interest rate. The draft circular calls this the "certainty equivalence" approach. The other approach is to compute the expected real monetary value of the benefits, but to discount it to today using an interest rate that differs from the riskless real interest rate. This approach can be called the "risk-adjusted discount rate" approach. Importantly, both the risk-adjusted discount rate approach and the certainty equivalence approach are attempting to compute the same object (the value to households today of the uncertain future benefits), so the only grounds for choosing one over the other are practical rather than conceptual.

With either approach, the size, and potentially the direction, of the adjustment (relative to the expected real monetary value of the benefits discounted using the riskless real interest rate) depends on the nature of the risk. Consider a regulation whose real benefits in monetary terms are on average higher when incomes are lower. Such a regulation, in effect, provides households with some insurance against poor outcomes, and so has a value to households greater than if there were no uncertainty about the benefits. As a result, with the certainty equivalence approach, the expected real monetary value of the benefits would be replaced by a larger number. With the riskadjusted discount rate approach, the riskless real interest rate would be replaced by a lower number.

[83] Portions of the discussion in this section are closely related to concerns raised by William Nordhaus (OMB-2022-0014-0089) and Joshua Rauh (OMB-2022-0014-0119) in their public comments on the draft circular.

An important case where this could arise involves regulations related to climate change. The effects of regulations to reduce or mitigate climate change may be on average larger in cases where climate change would otherwise be larger, which might be cases where average real incomes are lower. That is, regulations to mitigate climate change may provide insurance, and so the certainty equivalent value of benefits would be higher (or the appropriate risk-adjusted discount rate would be lower).

For most regulations, however, the risk is likely to positively, rather than negatively, correlated with income. Pollution is likely to be higher (and so the benefits of mitigation regulations are larger) when output and income are higher. The benefits of financial regulation are likely to be higher when people have more wealth, which is likely when economic growth is higher. Because the marginal utility of a given dollar benefit is lower when income is higher, the fact that the dollar benefits of regulations are typically greater when income is higher means that the average impact of regulations on utility is likely to be lower than it would be if individuals received the expected monetary benefit for sure. As a result, in most cases, the expected real monetary value of the benefits would be replaced by a lower number when the certainty equivalence approach is used, and the riskless real interest rate would be replaced by a higher number when the risk-adjusted discount rate approach is used.

The same is generally true of regulations whose benefits are not pecuniary (such as improved health and life expectancy or habitat and species preservation), even if the benefits measured in nonpecuniary terms are not on average larger when average incomes are higher. Consider, for example, a regulation whose benefits take the form of improved health and life expectancy. One would expect the real monetary value households place on those outcomes to be greater when real incomes are greater: when real incomes in the economy are higher, people are willing to spend more to obtain improved health and life expectancy. Indeed, there is strong evidence that as average real incomes in the economy grow over time, the real value households attach to greater life expectancy rises more than proportionally with real income.[84] The fact that the real monetary value individuals attach to nonpecuniary benefits is generally greater when real incomes are higher (and so marginal utility is lower) means that the impact on utility of regulations having nonpecuniary benefits is likely to be lower than it would be if individuals received the expected monetary benefit for sure.

Difficulties with the Implementation of the Certainty Equivalence Approach. Either approach to accounting for risk involves the necessity of calculating a stream of expected values of costs and benefits over time. This is inherently difficult because researchers need to estimate the range of possible outcomes and the probability of each. In both approaches, analysts also need to gather evidence on the correlation between the distribution of outcomes and the state of the economy. As a result, no matter how it is done, accounting for uncertainty will be time consuming and analytically challenging. But it is likely that the certainty equivalence approach is going to be substantially more difficult.[85]

The additional information that is needed to calculate the certainty equivalence well involves not just how the net benefits are likely to vary with average real incomes in the economy, but also with any other factors likely to affect how much households value the benefits in different circumstances. In addition, one would have to account for the likely increase in uncertainty as the horizon considered grows, which requires all the information needed to compute the certainty equivalents on a year-by-year basis. Although using the risk-adjusted discount rate approach would ideally also involve the same information, it appears

[84] See, for example, Hall and Jones (2007).

[85] The public comment by Arthur Fraas, John D. Graham, Kerry Krutilla, Randall Lutter, Jason F. Shogren, and Linda Thunström (OMB-2022-0014-3917) discusses a number of practical difficulties related to using the certainty equivalence approach.

to be much more amenable to finding a reasonable short-cut. All one needs to evaluate a project is a figure for how much to adjust the riskless real interest rate. This adjustment to the discount rate adjusts the expected values discounted at the riskless real interest rate, and makes the adjustments larger at longer horizons.

An important piece of evidence that the certainty equivalence approach is hard to use is that it is not how businesses generally decide whether to undertake investment projects. A corporation considering an investment project that involves upfront costs and uncertain future payoffs faces a problem similar to an agency deciding whether to issue a regulation that involves near-term costs and uncertain future benefits. Thus, it could use either a certainty equivalence approach or a risk-adjusted discount rate approach. In practice, corporations overwhelmingly use a riskadjusted discount rate approach: a typical corporate investment decision is based on whether the expected rate of return exceeds a threshold chosen by the firm—known as the "hurdle rate" or "discount rate." This procedure is equivalent to basing the decision on whether the stream of expected net payoffs discounted at the hurdle rate is positive.[86]

The fact that private firms generally do not use the certainty equivalence approach creates a second problem with using it: there is not a broad established body of knowledge and best practices about how to use it. This not only makes the approach more costly to use, but it also gives agencies considerable discretion in how to implement it. Consistent with this observation, the draft circular suggests several quite different possible techniques for implementation: direct evidence of households' willingness to pay, stated willingness to pay, and calculations using an assumed utility function for a typical household. These techniques are likely to yield very different estimates in many cases. In contrast, because private firms overwhelmingly rely on a risk-adjusted discount rate approach, one can use their experiences and practices as a starting point for thinking about how to apply that approach to regulations.

A final problem with the certainty equivalence approach concerns its conceptual underpinnings. Logically, the most appealing way to implement the approach is to weight various possible realizations of the real monetary benefits at a given horizon according to how much households value additional income when that realization occurs. That is, one would estimate how marginal utility varies with income, and then value the benefits of a regulation based on the product of the real monetary benefits and the marginal utility of income for the different possible realizations of the benefits. (This is the "assumed utility function" technique mentioned above.) The logical appeal of this technique is compelling, and the draft circular's efforts to rely on it are understandable and admirable.

This technique, however, leads to estimates of the cost of risk (and hence of the needed adjustments from expected monetary values to certainty equivalent values) that are *vastly* smaller than what is implied by individual behavior and market outcomes. At the individual level, aversion to small-stakes risks exceeds what is implied by this technique by amounts that are absolutely enormous.[87] Probably more importantly, this technique predicts a gap between the average return on the stock market and the return on a riskless asset—the "equity premium"—that is more than a factor of ten lower than what we observe.[88] Thus, using what seems to be the most logical way of implementing the certainty equivalence approach leads to an assessment of the importance of risk that is completely at odds with what we observe in other situations. And, as the draft circular notes, the other possible techniques, in addition to being less appealing conceptually, suffer from significant difficulties in practice.

[86] See Gormsen and Huber (2023) and the many refereed papers cited there, such as Trahan and Gitman (1995).
[87] For individuals' attitudes toward small risks, see Rabin (2000).
[88] The seminal reference on the equity premium is Mehra and Prescott (1985); for an updated analysis, see Mehra (2007).

One can make a reasonable case that the very high price that individuals and the market as a whole attach to many risks is in part the result of behavioral biases. But these phenomena are deeply entrenched, and there is little evidence that they can be eliminated by "nudges." Nor has it been firmly established that they are in fact largely due to behavioral biases (rather than, for example, complicated features of individuals' underlying preferences). Thus, standard arguments that it may sometimes be appropriate to depart from fully following the evidence from individual behavior and market outcomes because they might not reflect complete optimization would not warrant a wholesale replacement of individuals' and markets' valuations of risks with policymakers' judgments.

Recommendations. This discussion leads to two recommendations: to use the riskadjusted discount rate approach rather than the certainty equivalence approach, and to provide stronger guidance to agencies about the baseline implementation of that approach. Concretely, the circular should provide a "default" risk-adjusted discount rate to be used, with agencies having leeway to use a different discount rate if the analysis indicates it is warranted by the risk profile of the net benefits of the regulation being considered (which could point to a rate either lower or higher than the default rate).

The arguments for the risk-adjusted discount rate approach rather than the certainty equivalence approach follow straightforwardly from the preceding discussion: it is easier to implement, there is a broader body of knowledge and practice to draw on, and it automatically makes larger adjustments at longer horizons.

The arguments for specifying a default risk-adjusted discount rate are that all analyses would start from the same baseline and so would be more comparable, and that it would limit undesirable discretion by allowing for departures only when analysis indicated that it was warranted.

The argument that there should be leeway to use a discount rate different from the baseline one also follows straightforwardly from the earlier discussion (and is implied by the discussion in the draft circular as well): the appropriate adjustment to the riskless real interest rate depends on the riskiness of the net benefits and on how correlated they are with economic outcomes. For example, a lower adjustment should be made for a regulation with an insurance element than for one whose payoffs are likely to be much greater in situations where everything is going well. Consistent with the earlier discussion, because regulations involving climate change are an important example of regulations that might have a significant insurance element, the appropriate adjustment to the riskless real interest rate for such regulations may be smaller than the adjustment best suited to constructing the baseline discount rate.

A final issue is how large the adjustment from the riskless real interest rate to the default risk-adjusted discount rate should be. This is obviously a difficult question, but here are three broad thoughts. First, as noted above, there are strong reasons to think that for most regulations, uncertainty reduces the amount that households value the benefits relative to the case where they would receive the expected monetary benefits for sure. Thus, the default risk-adjusted discount rate should almost certainly be greater than the riskless real interest rate.[89] Second, the upward adjustment should almost certainly be much less than the average premium on equities relative to riskless assets (which is about six percentage points). The return on equities reflects residual claims on corporate profits; as a result, at both short and long horizons, there is much more uncertainty about equity returns than about real GDP or average real consumption per person, which are much more closely related to the real monetary benefits of regulation than are equity

[89] Note that using the discount rate approach with a discount rate above the riskless real interest rate does not mean that the estimated benefits of regulation will be less than under the certainty equivalence approach proposed in the draft circular. Both approaches attempt to estimate the same quantity—how much households today value the uncertain stream of future net benefits from a regulation—and both generally make downward adjustments relative to finding the expected real monetary benefits and discounting them at the riskless real interest rate.

returns. Third, since the equity premium is arguably the best guide we have to how society values some aspect of overall risk, it is likely that the most appropriate adjustment is in the same general ballpark as the equity premium after a (likely substantial) downward correction to reflect the lower volatility of the outcomes relevant to the real monetary benefits of regulations relative to the volatility of equity returns.

Taken together, these observations suggest that the upward adjustment to the riskless real interest rate to obtain the default risk-adjusted discount rate should be more than trivial but nonetheless moderate. Very tentatively, the adjustment should perhaps be between roughly onehalf and two percentage points. But this is obviously highly speculative; much more analysis would be needed to obtain the precise number to be used.

IMPLEMENTATION CHALLENGES

Question 3 of the Charge to Peer Reviewers asks if the revisions proposed in Circular A-4 take adequate account of implementation challenges. Although the circular is careful to mention resource constraints, I do worry that implementation of some of the proposed changes will be quite difficult. Take, for example, the development of an appropriate analytical baseline. It makes complete sense to consider the possible changes in technology, economic growth, and the impact of related government regulations in setting the baseline against which the costs and benefits of the new regulation are to be measured. However, the research, knowledge, and data necessary to calculate this baseline are likely to be very large. One has to ask whether the improved analytical baseline would itself pass a cost benefit test.

Likewise, the proposal to deal with uncertainty by calculating the certainty equivalent stream of costs and benefits, and then discounting them by the risk-free real social discount rate is methodologically sound, but difficult in practice. Analysts are asked to estimate the distribution of outcomes along numerous dimensions, and then convert these to certainty equivalents using revealed preferences or other direct evidence, or using an analytical model. As discussed above, this seems exceedingly difficult and resource intensive.

Not only are some of the proposed methods complex and time-consuming, I worry that they give analysts excessive discretion. The more steps in a procedure, the easier it is to have bias creep in—either accidentally or deliberately. It becomes harder for others to follow the regulatory analysis and to figure out which assumptions or estimates are most central to the analysis. As discussed above, in the case of dealing with uncertainty and risk, this is one reason that OIRA may wish to return to the use of a discount rate that includes a risk premium as a simpler approach.

A suggestion that was made by another peer reviewer that I thought was very sensible is for OIRA to provide supplemental information online for those doing the cost benefit analysis. Indeed, one could imagine simplifying and shortening the revised circular and putting more detailed analysis in supplements or online appendices. The circular is currently written at a somewhat awkward level—perhaps too detailed and technical for less-expert readers, but too basic and general for highly trained professional analysts. Supplements showing realistic complicated examples in detail would be very valuable to those actually doing the cost benefit analysis.

Question 7 of the Charge to Peer Reviewers asks if the circular should list broadly useful data sets. An online resource would likely be the most sensible place to suggest data sets that could be helpful in parts of the regulatory analysis. Such a list does not belong in the circular itself because it would quickly become out of date. But a running list that is updated frequently would surely be very helpful to analysts.

ENSURING TRANSPARENCY

Question 4 of the Charge to Peer Reviewers asks for suggestions to improve the transparency of regulatory analysis. The revised circular makes many suggestions along this dimension that are excellent. OMB and OIRA continue to be an incredible force for good in encouraging and enforcing greater transparency in government regulatory analysis. Most of my suggestions seek to emphasize guidance already in the revised circular.

The most important suggestion is related to my concerns about the appropriate discount rate and the treatment of uncertainty and risk discussed above. It is essential that year-by-year values of the real monetized costs and benefits be reported so that it is easy for others to try alternative discount rates. This would ensure that the issue of appropriate discounting is kept separate from the stream of estimated costs and benefits.

Since there is bound to be uncertainty about the costs and benefits, it will be necessary to present the range of possible effects, along with the estimated probabilities. It would be valuable to present these distributions in their raw form, before they are converted to certainty equivalents using an analytical model. This would allow other scholars to have the option of weighting the outcomes by the probabilities and then discounting by a risk-adjusted discount rate. Similarly, if the suggestion that certainty equivalents be replaced by the more conventional risk-adjusted discounting is adopted, agencies should provide evidence on the likely covariance of costs and benefits with income. This step would be particularly important when an agency wishes to argue for a risk-adjusted discount rate that is larger or smaller than the default value.

The proposed revisions encouraging distributional analysis also raise important issues for transparency. In cases where analysts present an income-weighted cost benefit analysis, the guidance wisely asks for the unweighted (or, more appropriately, as the guidance points out, conventionally weighted) estimates. I think it is valuable to go even further in showing the steps of the analysis. In particular, agencies should report the costs and benefits by income (or other) group. This would enable others to see exactly what is being estimated or assumed about the distribution of costs and benefits before any estimates of the marginal utility of income are added to the analysis.

The guidance in the revised circular is somewhat vague about what groups should be used for the distributional analysis. As such, it leaves agencies a great deal of discretion in the focus of the distributional analysis. One category that is mentioned only briefly is age. While I understand that agencies need to be cautious in explicitly weighting different age groups in their cost benefit analyses, presenting the costs and benefits by age could be very useful for policymakers and the public. Regulations that provide large net benefits to the young in terms of health and education are crucial for economic growth. Thus, understanding the age distribution of regulatory effects could provide useful information about possible long-run consequences and possible spillovers of regulations.

CONCLUDING REMARKS

The proposed revisions to Circular A-4 have much to recommend them. Improving the analytical baseline, considering distributional consequences more rigorously, and updating the discount rate estimates to incorporate more recent data are all good ideas. OIRA has also provided a wealth of information about the relevant literature on these and many other topics.

If my only option were to say yes or no to the entire package of revisions, I would say yes— but it would be a close call. My concerns about the discount rate proposed and the pitfalls of trying to use the certainty equivalence approach are substantial and likely consequential in practice. In this review I have suggested some modest-to-moderate further revisions that I feel would increase the accuracy and reduce the

difficulty of the required regulatory analysis. I would therefore encourage OIRA to revise the circular further before final implementation.

REFERENCES

Advisory Commission to Study the Consumer Price Index. 1996. *Toward A More Accurate Measure of the Cost of Living*. Final Report to the Senate Finance Committee.

Amihud, Yakov, Allaudeen Hameed, Wenjin Kang, and Huiping Zhang. 2015. "The Illiquidity Premium: International Evidence." *Journal of Financial Economics* 117(2): 350–68.

Bauer, Michael D., and Glenn D. Rudebusch. 2016. "Monetary Policy Expectations at the Zero Lower Bound." *Journal of Money, Credit and Banking* 48(7): 1439–65.

Del Negro, Marco, Domenico Giannone, Marc P. Giannoni, and Andrea Tambalotti. 2017. "Safety, Liquidity, and the Natural Rate of Interest." *Brookings Papers on Economic Activity* (Spring): 235–94.

Gorsmen, Niels Joachim, and Kilian Huber. 2023. "The Cross-Section of the Perceived Cost of Capital." Unpublished paper.

Hall, Robert E., and Charles I. Jones. 2007. "The Value of Life and the Rise in Health Spending." *Quarterly Journal of Economics* 122(1): 39–72.

Laubach, Thomas, and John C. Williams. 2003. "Measuring the Natural Rate of Interest." *Review of Economics and Statistics* 85(4): 1063–70.

McConnell, Margaret, and Gabriel Perez-Quiros. 2000. "Output Fluctuations in the United States: What Has Changed since the Early 1980s?" *American Economic Review* 90(5): 1464–76.

Mehra, Rajnish. 2007. "The Equity Premium Puzzle: A Review." *Foundations and Trends in Finance* 2(1): 1–81.

Mehra, Rajnish, and Edward C. Prescott. 1985 "The Equity Premium: A Puzzle," *Journal of Monetary Economics* 15(2): 145–61.

Rabin, Matthew. 2000. "Risk Aversion and Expected-Utility Theory: A Calibration Theorem." *Econometrica* 68(5): 1281–92.

Romer, Christina D., and David H. Romer. 2023. "Presidential Address: Does Monetary Policy Matter? The Narrative Approach after 35 Years." *American Economic Review* 113(6): 1395– 423)

Stock, James H., and Mark W. Watson. 2003. "Has the Business Cycle Changed and Why?" In *NBER Macroeconomics Annual 2002*, ed. Mark Gertler and Kenneth Rogoff, 159–218. Cambridge, MA: MIT Press.

Trahan, Emery A., and Lawrence J. Gitman. 1995. "Bridging the Theory-Practice Gap in Corporate Finance: A Survey of Chief Financial Officers." *Quarterly Review of Economics and Finance* 35(1): 73–87.

Individual Peer Reviewer Comments: W. Kip Viscusi

Please provide your responses to the charge questions below (see separate "Circular A-4 Peer Review Charge" document).

1. Please comment on whether the recommendations in the guidance are supported by the leading theoretical and empirical peer-reviewed academic literature in economics or other relevant disciplines, and if not, please provide alternative recommendations that would be (and citations to support them).

Discount rate

The proposed social rate of time preference of 1.7% on p. 76, line 3525, reflects more fine tuning than is warranted. For that rate, I would suggest 2% rather than 1.7%. Regardless of what number OMB selects as the focal rate, it is essential to provide a strong economic justification for that number to avoid RIAs being overturned by the courts because of their choice of the discount rate. I review these cases relating to how agency discount rates have fared in the courts in my peer reviewed article, "The Social Rate of Discount: Legal and Philosophical Underpinnings," *Annual Review of Financial Economics*, 2023 (in press), also available as SSRN Working Paper 4083202. Simply citing OMB guidance is not sufficient for agencies unless there is compelling economic evidence in support of the selected rate. This issue is likely to be particularly prominent for analyses that adopt long-term rates different than the base social rate of discount.

I believe that OMB should continue to advocate reporting of benefits and costs using multiple discount rates. I advocate 3% as an additional discount rate of interest for two reasons. First, if the current low interest rates are the result of a Federal Reserve policy that will not continue, the 3% rate will be more appropriate than 2%. Second, use of a 3% rate is consistent with past A-4 guidance, and consequently it will make possible a comparison of RIA results with policies analyzed using the previous version of A-4. Note too that 3% is in line with the 30 year average of the 10-year real Treasury interest rate, 1985-2014, as indicated on page 20 of the Preamble document. Due to the long future time horizon of policy analyses such as those pertaining to climate change, interest rate performance during such recent periods is not irrelevant. Given the effect of Federal Reserve policies in depressing interest rates in recent decades, which is a monetary policy that is unlikely to continue indefinitely, a 3% rate remains a reasonable rate.

There also is support in various submissions for reporting results using multiple discount rates. The public submissions by Susan Dudley, OMB-2022-0014-0129, and Art Fraas et al., OMB-2022-0014-3917, include two previous OIRA administrators in Republican administrations, Susan Dudley and John Graham. The longevity of the revised A-4 document will be enhanced if administrations with a different perspective will be able to use the RIA results. Dudley does not advocate a specific alternative discount rate but suggests that agencies present results using multiple discount rates. See Susan Dudley, Public Submission, pp. 12-13. Fraas et al. advocate 3% and 5% as the two discount rates. See Fraas, et al., Public Submission, p. 3. Their submission provides details regarding their rationale for this approach and extensive references. The pertinent factors include the influence of the Federal Reserve Bank policies on market rates of interest as well as references suggesting that these policies are not likely to continue over the long-term.

Distributional Analysis

In my view, this section should be substantially reworked, strengthening the guidance for providing distributional impact information, but with much of the discussion of weighting eliminated. In particular, I would eliminate the section -- e. Weights and Benefit-Cost Analysis that begins on p. 65.

The most promising component of this section is the advocacy that RIAs report distributional effects of their policies. This is a very worthwhile advance. However, the draft A-4 provides agencies with too much leeway regarding the dimensions on which to report the distributional effects. As Kniesner and I document in Thomas J. Kniesner and W. Kip Viscusi, "Promoting Equity through Equitable Risk Tradeoffs," *Journal of Benefit-Cost Analysis,* 2023, 14(1), pp. 8-34, in their implementation of the Biden Administration's Justice40 equity effort, agencies have used a myriad of different profiles to determine who is disadvantaged. These dimensions include rural residence, being over age 65, living near a highway, and demographic characteristics such as being Black or Hispanic. Consistent with our JBCA article, I propose that OIRA establish standardized income-based categories for reporting distributional effects so that the effects across agencies can be compared. Thus, my proposal is that OMB specify a specific, standardized set of income-based categories, which would be concrete implementation of the government's identification of categories for the distributional effects on p. 62, line 2872, and the importance of having consistency in these analyses, as noted on p. 62, line 2879. Such a structure will facilitate comparisons of distributional effects across different agencies. Of course, agencies could supplement these distributional breakdowns with other breakdowns of distributional effects. For example, Hamilton and I found that analysis of risk levels by minority status was also useful in our analysis of over 200 Superfund sites in James T. Hamilton and W. Kip Viscusi, *Calculating Risks? The Spatial and Political Dimensions of Hazardous Waste Policies* (Cambridge: MIT Press, 1999).

The discussion of distributional weights ignores the substantial implicit redistribution that takes place by using average VSL levels and average unit benefit levels rather than population-specific values. This notion is implicit in the discussion on p. 66, line 3044, but not examined in detail. My 2023 JBCA paper with Kniesner (Thomas J. Kniesner and W. Kip Viscusi, "Promoting Equity through Equitable Risk Tradeoffs," Journal of Benefit-Cost Analysis, 2023, 14(1), pp. 8-34) documents the extent to which there is redistribution as a result of using average population-wide values for the VSL. The magnitude of the discrepancy is greater with large income elasticities of the VSL. Using a VSL income elasticity of 1.0, which agencies such as DOT now use, the article reports that the ratio of the average VSL to the VSL for the target population is 1.9 for the 10th percentile of the worker distribution, 1.4 for the 25th percentile of the worker income distribution, 1.2 for the median Black worker, and 1.3 for the median Hispanic worker. In effect, these disadvantaged groups already receive a premium as a result of using average benefit values for that group. The income elasticity discussion of distributional weights in Table 1 of the Preamble is based on three papers that I coauthored. The Preamble uses these results as part of its advocacy for distributional weights. However, the main implication of this research has the opposite message, which is that there is substantial redistribution that is already taking place by using an average VSL for all. In effect, the baseline for conceptualizing what redistribution is needed to achieve equity would be quite different if the population-specific estimates of the VSL were used rather than the population average. Similar concerns are raised by Scott Farrow, Society for Benefit-Cost Analysis blog, "On Balance: When All Lives Matter Equally: Equity Weights for BCA by Combining the Economics of VSL and US Policy," March 16, 2021.

The draft document proposes an explicit distributional weighting scheme for which there is no consensus in the economics literature or as a policy matter. A principal underlying assumption pertains to the diminishing marginal utility of income. For any individual, there is generally diminishing marginal utility of income. However, empirical evidence making comparisons across different individuals is less clear since individual utility functions are only estimated up to a positive linear transformation, such as a + bu(x). See my articles: W. Kip Viscusi and William Evans, "Utility Functions that Depend on Health Status: Estimates and Economic Implications," *American Economic Review,* 1990, 80(3), pp. 353-374, and W. Kip Viscusi, "Utility Functions for Mild and Severe Health Risks," *Journal of Risk and*

Uncertainty, 2019, 58(2/3), pp. 143-166, among others. More generally, see John Pratt, Howard Raiffa, and Robert Schlaifer, *Introduction to Statistical Decision Theory* (Cambridge: MIT Press, 2001).

In justifying distributional weights, the Preamble, p. 14, line 615, alludes to the role of happiness surveys. However, self-reported happiness measures are inconsistent with the lifetime trajectory of the VSL. In particular, the happiness measure trajectory over the life cycle is opposite that of the VLS. Happiness scores over the lifetime display a U shape whereas the VSL has an inverted-U shaped relation. There are other reasons why happiness scores should not supplant market-based WTP measures of mortality risk reduction values. See W. Kip Viscusi, "Wellbeing Measures of Mortality Risks: Life-Cycle Contradictions and Ordinal Index Challenges," *Behavioural Public Policy*, 2020, 4(2), 245-253.

Scope of the Analysis Including Geographic Scope

The discussion of intertemporal scope issues was on point.

However, I disagree with the discussion of geographic scope. Agencies should be required to report the benefits to the United States, including benefits to U.S. citizens and military who are abroad. The benefits to the U.S. should serve as the primary analysis rather than possibly using global benefits as indicated on p. 10, line 393. Instead of saying that it is "generally appropriate" to present impacts on the U.S., I believe that it is always appropriate. This information is important for three reasons. First, statutory guidance frequently specifies that the objective of the statute is to provide benefits to the "Nation," not the world. While there has been an effort to emphasize benefits to the world with respect to climate change policies, the objective of U.S. policies is not to promote worldwide social welfare but to reflect the preferences of the citizenry. Second, knowing the benefits to the U.S. is essential to better understand the equity implications for the U.S. The concerns with respect to equity expressed in Biden's executive order cannot be addressed without this knowledge. Third, in its 2022 analysis of the SCC, EPA uses the U.S. VSL to value the U.S. mortality costs but an income-adjusted value for other countries. In the absence of information that distinguishes the U.S. from the rest of the world, it is impossible for independent analysts to assess the global mortality costs based on different benefit transfer assumptions.

When appropriate, as in the case of global warming policies, I also support the reporting of the global benefits. This information is valuable for two principal reasons. First, the global benefit value is what is pertinent to determining the economically efficient global climate change policy. See W. Kip Viscusi, "The Social Rate of Discount: Legal and Philosophical Underpinnings," *Annual Review of Financial Economics*, 2023 (in press), also available as SSRN Working Paper 4083202. Knowing this value enables the U.S. and other countries to set globally efficient targets for climate change policies. Second, even from the standing of the domestic benefits, the value of any reciprocity resulting from other countries undertaking effective climate change policies because of U.S. actions is a domestic benefit that should be recognized. In addition, if there is altruism among U.S. citizens for the well-being of those in other countries, that altruism also should be recognized as a U.S. benefit. My article with Ted Gayer (Ted Gayer and W. Kip Viscusi, "Determining the Proper Scope of Climate Change Policy Benefits in U.S. Regulatory Analyses: Domestic Versus Global Approaches," *Review of Environmental Economics and Policy*, 2016, 10(2), pp. 245-263) recognizes each of these influences. However, ultimately the benefit number that should be used for the SCC should be conceptualized as the benefits that can be traced to the benefit derived by the U.S. either directly or indirectly.

Development of Analytic Baselines

My main suggestion is that the status quo serve as the baseline unless the RIA provides empirical evidence, specific evidence of future policy changes, or other regulatory guidance that provide a credible

basis to assume a different temporal pattern for benefits and costs. Perhaps the proposed A-4 could strengthen the role of empirical evidence noted on p. 13, line 551. Our research on EPA analyses of Superfund sites (see James T. Hamilton and W. Kip Viscusi, *Calculating Risks? The Spatial and Political Dimensions of Hazardous Waste Policies* (Cambridge: MIT Press, 1999) found that EPA often asserted hypothetical changes in land use that affected assessed benefits even though there was no sound empirical basis for this assessment. In effect, I am proposing stronger language in A-4.

Unquantified Impacts

This section seemed fine and is of potentially broad significance. For example, many non-monetized effects involve health impacts for which it is difficult to assign quantitative measures of the impact, such as the number of people exposed to exposure levels above the reference safe dose.

Uncertainty

This section included a surprising reference to non-expected utility frameworks. Expected utility theory is generally accepted as the normative reference point. Departures from this theory are sometimes labelled as a form of irrationality and often serve as an indicator of potential market failure. To adopt this approach to dealing with uncertainty is inconsistent with A-4's treatment of behavioral market failures.

Risk neutrality is desirable when the losses are spread broadly across the population. When individuals incur substantial losses, their personal risk aversion does come into play and is a legitimate concern when monetizing benefits for financial losses.

It is important for OMB to emphasize that risk assessments should be guided by the mean risk levels, not the upper bound of the risk. There could be elaboration of this issue around p. 69, line 3218. Any presentation of confidence intervals in regulatory analyses that reports the upper bound of the risk should also report the counterpart lower bound value. This procedure is not the norm in analyses by agencies such as EPA and FDA, but should be. See James T. Hamilton and W. Kip Viscusi, *Calculating Risks?: The Spatial and Political Dimensions of Hazardous Waste Policy* (Cambridge: MIT Press, 1999); W. Kip Viscusi, James T. Hamilton, and P. Christen Dockins, "Conservative Versus Mean Risk Assessments: Implications for Superfund Policies," *Journal of Environmental Economics and Management*, 1997, 34(3), pp. 187-206; and W. Kip Viscusi, Joel Huber, and Jason Bell, "Responsible Precautions for Uncertain Environmental Risks," *Journal of Benefit-Cost Analysis*, 2019, 10(2), pp. 296-315.

Behavioral Economics and Nudges

The proposed A-4 and the Preamble recognize behavioral biases as a form of market failure, and also suggest that nudges can serve as an effective policy instrument. Each of these aspects of the document requires that the underlying behavioral economics rationale is sound.

Consider first the role of behavioral economics factors generally. The existence of behavioral biases in narrowly defined experimental contexts should not serve as a sufficient rationale for government regulation. A case in point is that of the EPA-DOT fuel economy standards analyzed in Ted Gayer and W. Kip Viscusi, "Overriding Consumer Preferences with Energy Regulations," *Journal of Regulatory Economics*, 2013, 43(3), pp. 248-264. The RIA was based on the assertion that consumers completely ignore the long-term fuel economy gains and that government regulation was required to address this problem. While it is not impossible that there is some market shortcoming, the extent and prevalence of the intertemporal irrationality was simply asserted, not documented.

To address this problem of not properly documenting the behavioral failure, Ted Gayer and I have proposed that OIRA adopt a behavioral transfer test to serve much the same function for behavioral economics findings as does the more conventional benefit transfer test. The criteria we recommend for the behavioral transfer test include the following:

> -Does the evidence reflect the stakes, characteristics of decision makers, opportunities for learning, and frequency of decisions comparable to the market context of interest?
>
> -Is the sample in the study reflective of the beliefs and preferences of the policy's target population group?
>
> -Do respondents in the study understand what is being valued?
>
> -Is there sufficient evidence of consistency of responses and attention to the experimental task to make us confident of the findings?
>
> -Are the decisions comparable to market-based decisions with respect to the commodity in terms of the financial stakes and consumer attributes?
>
> -Was the experiment incentivized and published in a peer review outlet?

For additional support and elaboration of these issues, see W. Kip Viscusi and Ted Gayer, "Rational Benefit Assessment for an Irrational World: Toward a Behavioral Transfer Test," *Journal of Benefit-Cost Analysis*, 2016, 7(1): 69-91. Also see Ted Gayer, Public Submission, OMB-2022-0014-0127. Similar concerns along with appropriate citations are raised in Susan Dudley, Public Submission, OMB-2022-0014-0129. The proposed A-4 alludes to the importance of recognizing behavioral distortions (p. 15, line 654), behavioral biases (p. 15, line 662 and section iv on pages 18-19). The behavioral transfer tests that Gayer and I propose are applicable to all such matters.

The evidence in support of nudge policies is often similar in that it may be based on experimental contexts and small samples. Behavioral transfer tests are also applicable to studies of nudges. Among the most prominent nudge policies are informational policies, such as hazard warnings. These and other types of nudges are potentially effective policy instruments. Often the choice is between nudges and policies involving financial incentives. Proper comparison of the performance of nudges and financial incentives requires that payments in the form of transfers, which typically constitute the main cost of financial incentive policies, be treated appropriately consistent with the guidance in the earlier A-4. Previous comparisons in the literature other than in my work have not recognized the proper treatment of transfers. See W. Kip Viscusi, "Efficiency Criteria for Nudges and Norms," *Public Choice*, 2022, 191 (3-4), pp. 465-482, and W. Kip Viscusi, "Nudges Versus Financial Incentives," in Cass R. Sunstein and Lucia A. Reich, editors, *Research Handbook on Nudges and Society* (Cheltenham, U.K.: Elgar Publishing, 2023 in press), also available as SSRN Working Paper 4422704. Together these articles provide a comprehensive review of the most prominent nudge and financial incentive policies in four policy areas of interest.

Fatality Risks and the Value of a Statistical Life

Equitable Risk Tradeoffs. In a series of publications, I have advocated a concept of promoting risk equity through the use of the same VSL across the population despite evidence heterogeneity of the VSL. See W. Kip Viscusi, "Risk Equity," *Journal of Legal Studies*, 2000, 29(2), Part 2, pp. 843-871; W. Kip Viscusi, *Pricing Lives: Guideposts for a Safer Society* (Princeton: Princeton University Press, 2018); and Thomas J. Kniesner and W. Kip Viscusi, "Promoting Equity through Equitable Risk Tradeoffs," *Journal of Benefit-Cost Analysis*, 2023, 14(1), pp. 8-34. From an equity standpoint, doing so treats all lives equally

irrespective of income, minority status, or age. The proposed guidance is consistent with this approach but does not require it. On page 51, line 2348, the proposed guidance establishes a floor on the VSL for children, for whom a lower VSL is not permitted, but does not prevent agencies from adopting a child premium, as some agencies may do in order to justify their regulation. See the critique of CPSC's proposed doubling of the VSL for children in Thomas J. Kniesner and W. Kip Viscusi, "Is a Child's Life Twice as Valuable as an Adult's?" *Regulation*, Summer 2023, pp. 11-12.

The proposed A-4 does not endorse the use of QALYs for valuing mortality risks but does support the use of QALYs for nonfatal risks in many places, including caveats regarding QALYs. The revised A-4 should disavow the use of QALYs even more. The underlying assumption of QALYs is that the number of life years is the driving concern, where these years become quality-adjusted. This focus on counting the number of life years is inconsistent with the application of the VSL by agencies, which do not scale the VSL in terms of the number of remaining life years but instead generally use a standard VSL across the population. For nonfatal risks, OMB should continue to rely on WTP measures.

For fatal risks for which evidence based on occupational hazards is appropriate from a benefit transfer standpoint, agencies should use revealed preference data based on labor market studies. The applicability of general VSL estimates to traumatic risks such as those in transportation contexts is documented in W. Kip Viscusi and Elissa Philip Gentry, "The Value of a Statistical Life for Transportation Regulations: A Test of the Benefits Transfer Methodology," *Journal of Risk and Uncertainty*, 2015, 51(1), 53-77. The discussion in the proposed A-4 of benefit transfer methods on p. 37, line 1670, is directly pertinent since in the case of transportation accidents it is feasible to establish the comparability of the VSL of transportation-related fatalities and the VSL from occupational risks more generally.

The best evidence based on labor market studies uses the BLS Census of Fatal Occupational Injuries (CFOI) mortality data. To the best of my knowledge, DOT is the only agency that relies exclusively on CFOI-based labor market studies of the VSL. They all should do so. Earlier mortality risk measures entail much greater measurement error. Moreover, the studies based in these earlier risk variables have been shown to be subject to substantial publication selection effects, possibly overstating the VSL by 70-80%. Estimates based on the CFOI measures are less susceptible to such biases. There are additional publication selection biases that arise from using the "best estimate" from different studies rather than all estimates. See W. Kip Viscusi, "Best Estimate Selection Bias in the Value of a Statistical Life," *Journal of Benefit-Cost Analysis*, 2018, 9(2), pp. 205-246; W. Kip Viscusi, "The Role of Publication Selection Bias in Estimates of the Value of a Statistical Live," *American Journal of Health Economics*, 2015, 1(1), 27-52; and W. Kip Viscusi, *Pricing Lives: Guideposts for a Safer Society* (Princeton: Princeton University Press, 2018).

Evidence from stated preference studies with respect to mortality risk valuation is subject to rampant publication selection effects and do not provide a sound basis for benefit assessment. See Clayton J. Masterman and W. Kip Viscusi, "Publication Selection Biases in Stated Preference Estimates of the Value of a Statistical Life," *Journal of Benefit-Cost Analysis*, 2020, 11(3), pp. 357-379.

For very short life extensions, agencies can use the value of a statistical life year (VSLY). The underlying theory for this measure first appeared in Michael J. Moore and W. Kip Viscusi, "The Quantity-Adjusted Value of Life," *Economic Inquiry*, 1988, 26(3), pp. 369-388. The best measures of the VSLY are in Joseph E. Aldy and W. Kip Viscusi, "Adjusting the Value of a Statistical Life for Age and Cohort Effects," *Review of Economics and Statistics*, 2008, 90(3), pp. 573-581. Note that we find that the VSLY varies over the life cycle, which I have also found in subsequent studies. The result is inconsistent with a constant QALY. Also note that the proposed A-4 document's discussion regarding the heterogeneity of the

VSL on p. 50, including FN 85, is very dated, as it is based on a 2003 article by John Graham. My 2008 RESTAT article with Aldy finds that there is a pronounced inverted-U shaped pattern to the VSL, which I have found in other articles as well.

One benefit area for which I believe stated preference studies are desirable is for valuing illnesses that might not be comparable to traumatic injuries in terms of their morbidity effects. However, all such stated preference evidence should meet the criteria specified by OMB for such studies and also include a detailed description of the health impacts involved. For example, many studies simply elicit a WTP for cancer risks generally, but the morbidity effects are not identical for all cancers. See W. Kip Viscusi, Joel Huber, and Jason Bell, "Assessing Whether There Is a Cancer Premium for the Value of a Statistical Life," *Health Economics*, 2014, 23(4), 384-396, in which we find a 20% premium for bladder cancer, but we find a larger premium for blood cancer in Wesley A. Magat, W. Kip Viscusi, and Joel Huber, "A Reference Lottery Metric for Valuing Health," *Management Science,* 1996, 42(8), pp. 1118-1130.

Due to increases in income levels over time, agencies have been updating the VSL for income using a positive income elasticity, often about 1.0. Estimates of the income elasticity of the VSL vary and are in the range of 0.6 in W. Kip Viscusi and Joseph E. Aldy, "The Value of a Statistical Life: A Critical Review of Market Estimates throughout the World," *Journal of Risk and Uncertainty*, 2003, 27(1), pp. 5-76; 0.25 to 0.63 in Hristos Doucouliagos, T.D. Stanley, and W. Kip Viscusi, "Publication Selection and the Income Elasticity of the Value of a Statistical Life," *Journal of Health Economics*, 2014, 33, pp. 67-75; 1.4 in Thomas J. Kniesner, W. Kip Viscusi, and James P. Ziliak, "Policy Relevant Heterogeneity in the Value of Statistical Life: New Evidence from Panel Data Quantile Regressions," *Journal of Risk and Uncertainty,* 2010, 40(1), pp. 15-31; a U.S. Income Elasticity of 0.5 in W. Kip Viscusi and Clayton J. Masterman, "Income Elasticities and Global Values of a Statistical Life," *Journal of Benefit-Cost Analysis*, 2017, 8(2), pp. 226-250; and 0.55 for affluent nations in Clayton J. Masterman and W. Kip Viscusi, "The Income Elasticity of Global Values of a Statistical Life: Stated Preference Evidence," *Journal of Benefit-Cost Analysis*, 2018, 9(3), pp. 407-434. An income elasticity of 1.0 makes explaining income elasticity updates very straightforward. I have used that number in a couple of articles, and agencies often use that value as well. However, for purposes of an RIA, a lower income elasticity for the U.S. may have a stronger empirical justification.

WTA and WTP

The proposed guidance frequently suggests that policy analyses can use either WTP or WTA measures. This type of comment appears repeatedly as WTP and WTA are treated as being equally valid. See, for example, p. 28, line 1257 and line 1262, which oddly refers to WTA and WTP as "similar." While they are similar theoretically, they are often quite different empirically, as is noted on p. 29, line 1280. Empirical estimates of the WTA estimates are inconsistent with any effort to reconcile the WTA premium with rational economic behavior or attempts to explain the WTA-WTP discrepancy based on influences such as income effects. OIRA should insist on the use of WTP values unless agencies can document the validity of WTA measures. See W. Kip Viscusi, Joel Huber, and Jason Bell, "Reference-Dependent Valuations of Risk: Why Willingness-to-Accept Exceeds Willingness-to-Pay," *Journal of Risk and Uncertainty*, 2012, 44(1), 19-44; W. Kip Viscusi, "Reference-Dependence Effects in Benefit Assessment: Beyond the WTA-WTP Dichotomy and WTA-WTP Ratios," *Journal of Benefit-Cost Analysis*, 2015, 6(1), 187-206; and W. Kip Viscusi, *Pricing Lives: Guideposts for a Safer Society* (Princeton: Princeton University Press, 2018).

2. Where the guidance reflects assumptions, are they supported by the theoretical and empirical peer-reviewed academic literature in economics, or other relevant disciplines? If unsupported assumptions are identified, are there alternatives you would recommend? Please provide

supporting references for both parts of the response—concerns about assumptions, if any, and suggested alternatives.

Discount Rate

As noted above, basing the future discount rate on the recent period assumes that the monetary policies of the Federal Reserve will continue in a similar manner in the future, which many economists do not believe is will be the case. See the references in the public submission by Art Fraas et al., OMB-2022-0014-3917.

Distributional Analysis

My discussion in the Distributional Analysis heading for Question 1 identified two main areas where the assumptions were not warranted. The proposed A-4 imposes a particular social welfare function incorporating distributional weights that is not consistent with standard WTP measures. There is not widespread support for this arbitrary social welfare function. Moreover, it neglects the extent of redistribution that will already occur based on the application of average WTP values for all those affected by a policy. I provided the reference to my 2023 JBCA article with Kniesner on that issue. The other area of disagreement with the assumptions in this section was the claim that happiness scores are a useful measure of benefit values. I provided my article reference above.

Scope of the Analysis

The discussion of the geographic scope of the analysis in the proposed A-4 ignored the statutory guidance with respect to whether benefits to the Nation are consequential. I propose that domestic benefits should always be presented even if global benefits are calculated. Doing so is also essential to understanding the domestic distributional impact of policies.

Fatality Risks and the Value of a Statistical Life

The proposed A-4 guidance illustrated the use of VLSY, indicating on p. 50, line 2288, that for someone with a 40-year remaining life expectancy that the calculated VSL would equal 40 x VSLY. While the logic is correct, someone with a 40-year life expectancy would be in their 40's around the peak of their lifetime VSL trajectory so that there is no need to resort to the use of VSLY in this instance. A typical mean age in a VSL study is about 40. For example, the mean age is 41 in Thomas J. Kniesner, W. Kip Viscusi, Christopher Woock, and James P. Ziliak, "The Value of Statistical Life: Evidence from Panel Data," *Review of Economics and Statistics*, 2012, 94(1), pp. 74-87.

3. Does the guidance appropriately recognize and account for potential challenges for implementation (e.g., technical feasibility or constraints on data availability or other resources)?

Distributional Analysis

By failing to establish OMB guidance for the categories for which information regarding distributional impacts is required, OMB may be in a position where it is difficult to make distributional judgments across policies. With respect to implementation, let me also emphasize that OMB should not readily accept any claims that it is not feasible to do a distributional analysis. Officials at EPA and in various D.C. organizations told us that analyzing distributional effects of Superfund sites was not feasible, but we did it for over 200 sites using information at the block group level, which is more refined than the analyses being undertaken under Justice40. See James T. Hamilton and W. Kip Viscusi, *Calculating Risks? The Spatial and Political Dimensions of Hazardous Waste Policies* (Cambridge: MIT Press, 1999).

4. Do you have any other suggestions for improving the completeness, objectivity, and/or transparency of agency regulatory analyses? If so, how might these be incorporated into guidance?

Scope of the Analysis

The most important suggestion for improving the completeness and transparency of the analysis is to report domestic impacts as well as global impacts for policies with international impacts, such as climate change policies.

Uncertainty

The most important way to improve objectivity in the analysis is to use mean risk estimates, and to report lower bounds in any situation in which upper bounds are also reported.

5. What practices might be identified in the guidance to encourage accounting for non-monetized (possibly also non-quantified) effects?

This section of the guidance was very good as written.

6. Do you have suggestions that would improve the clarity and logical presentation of the guidance and/or ease execution of analyses?

The guidance was clear and presented logically. However, the guidance document is very long, in part because there is a detailed effort to justify all the components of the guidance. Substantial trimming of the background discussion would make the document more accessible.

7. Should the guidance include suggestions of broadly useful data sets? If so, which data sets, and how should this information be presented in the guidance? How should the guidance reflect best practices related to data quality (including timeliness of data)?

The guidance is likely to serve as a reference for RIAs for many years. During that time, data set availability will change, as will best practices. Should OMB be motivated to provide such information, this can be done apart from this guidance document.

8. Do you have any additional recommendations for ensuring that the guidance and associated methodologies are supported by the theoretical and empirical peer-reviewed academic literature in economics, or other relevant disciplines? If so, please provide them here.

In my responses to question 1, I provided comments on the main areas of OMB interest as well as topics that were not explicitly indicated as matters for which comments were requested, such as behavioral economics and nudges, fatality risks and the value of a statistical life, and the use of WTP and WTA values.

In addition, please feel free to provide a general summary of your comments and recommendations.

The final comment I made in the group meeting is that the guidance document should reflect mainstream economic analysis and be able to serve as a guidance document in future administrations. Many of the proposed revisions are excellent. I believe that the document will have a longer useful life if the following changes are made.

Discount Rate

Agencies should show multiple discount rates. In addition to the administration's proposal, which I would change to 2%, I would also recommend that agencies provide results based on a 3% rate. Some other groups advocate also showing results using higher discount rates, such as 5%.

Distributional Analysis

The proposed presentation of distributional impacts is likely to a long-term improvement in policy analyses, particularly if done correctly. My proposal that OMB and agencies be cognizant of the implicit distributional consequences of applying uniform unit benefit measures to all should be incorporated in any subsequent welfare analysis. The proposed social welfare function weights in A-4 are arbitrary, are not generally accepted, and will undermine the constructive progress that the proposed A-4 will be able to achieve with respect to distributional impacts.

Geographic Scope

Economic analysts and presidential administrations differ in the weight that they would place on domestic and global impacts. Requiring agencies to present both sets of information in situations in which global benefits are consequential will enable administrators to weight these impacts in their preferred manner.

Uncertainty

Reporting mean risk assessments and symmetric presentation of upper and lower bounds of the risk will lead to the greatest expected health improvements from government policies.

Behavioral Economics and Nudges

Adopting the behavioral transfer tests as suggested by Ted Gayer and me will restrict the introduction of behavioral economics concerns to the situations where they are most appropriate.

Fatality Risks and the Value of a Statistical Life

Agency estimates of the VSL and the VSLY should be based on revealed preference data from the labor market using mortality risk data from the BLS Census of Fatal Occupational Injuries. There is no need to augment this information with stated preference evidence except for health impacts for which there is no comparable labor market data and for which morbidity effects are greater than for traumatic accidents, as in the case of cancer.

Throughout their analyses, agencies should rely on WTP measures, not WTA. Restricting the focus to WTP also will eliminate the applicability of QALYs.

Final Comment

Overall, the proposed A-4 document is very well done and reflects a tremendous amount of work, as well as a careful examination of the pertinent issues.