OMB Circular No. A-4: Explanation and Response to Public Input

November 9, 2023

1.   Introduction

Analyzing the benefits and costs of regulatory alternatives helps policymakers arrive at sound regulatory decisions. It also helps the public and other branches of government understand the effects of those decisions. Careful analysis can facilitate the development of well-designed regulations and thereby increase net benefits for society as a whole. To help support the development of better analysis, the Office of Management and Budget (OMB) has provided guidance to agencies since the 1980s on how to conduct regulatory analysis. The previous OMB guidelines were issued in 2003 as OMB Circular No. A-4 (often referred to as simply Circular A-4).[1]

In order to encourage continued improvements in the quality of the regulatory analyses prepared by agencies, and pursuant to Executive Order 14094 of April 6, 2023 (Modernizing Regulatory Review) and the Presidential Memorandum of January 20, 2021 (Modernizing Regulatory Review), OMB, through the Office of Information and Regulatory Affairs (OIRA) has revised these guidelines. Through revised guidelines, OMB seeks to ensure that analytic guidance reflects new developments in economic and other scientific understanding.

OMB published proposed revisions to Circular A-4 on April 6, 2023.[2] Alongside the revisions, OMB also published a document titled "Preamble: Proposed OMB Circular No. A-4, 'Regulatory Analysis,'" (hereinafter, Preamble) that elaborated on "[s]ome of the motivations for the more important proposed revisions, and some considerations that OMB would like to highlight given the request for public comment."[3] OMB solicited public comments on the proposed revisions for a 60-day period,[4] which was extended for an additional 14 days.[5] In total, OMB received 4,498 public comment submissions in response to the proposed revisions. Simultaneously, an independent and external contractor selected nine peer reviewers and organized a peer review of the proposed revisions to the Circular, following a public nominations period.[6] In drafting both the proposed and final revised guidelines, OMB consulted with the Council of Economic Advisers as well as relevant agencies and Executive Office of the President components.

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[1] Office of Management & Budget, *Circular No. A-4, Regulatory Analysis* (Sept. 17, 2003), *https://www.whitehouse.gov/wp-content/uploads/legacy_drupal_files/omb/circulars/A4/a-4.pdf* [hereinafter Circular A-4 (2003)].

[2] Office of Management & Budget, *Draft for Public Review: Circular No. A-4, Regulatory Analysis* (Apr. 6, 2023), *https://www.whitehouse.gov/wp-content/uploads/2023/04/DraftCircularA-4.pdf* [hereinafter Draft Circular A-4].

[3] Office of Management & Budget, *Preamble: Proposed OMB Circular No. A-4, "Regulatory Analysis"* (Apr. 6, 2023) *https://www.whitehouse.gov/wp-content/uploads/2023/04/DraftCircularA-4Preamble.pdf* [hereinafter Preamble].

[4] Office of Management & Budget, *Request for Comments on Proposed OMB Circular No. A-4, "Regulatory Analysis,"* 88 Fed. Reg. 20,915 (Apr. 7, 2023).

[5] Office of Management & Budget, *Proposed OMB Circular No. A-4 Modernization-Extension of Public Comment Period*, 88 Fed. Reg. 37,289 (June 7, 2023).

[6] Office of Management & Budget, *Request for Nominations of Experts to Peer-Review Draft Guidance on Conducting Analysis of Federal Regulations*, 88 Fed. Reg. 20,912 (Apr. 7, 2023).

This document provides explanations of OMB's decisions that are reflected in the revisions to Circular A-4,[7] as well as responses to public comments[8] and peer reviewers' reports on the draft revisions.[9] As such, it supersedes the Preamble as OMB's primary explanation of its revisions to Circular A-4 (though there are some questions posed in the Preamble that relate to issues not discussed in this document). For convenience, it refers to input from both public commenters and peer reviewers as "comments"—and refers to the authors of both forms of input as "commenters"—throughout the document.

OMB believes that the benefits of revising Circular A-4 are substantial. Improvements to guidance on the analytical assessment of regulatory benefits and costs will facilitate better decision-making in the policymaking process. OMB expects that improved analysis will lead to better policy that improves societal well-being. More narrowly, clarifying guidance in the Circular is likely to also reduce confusion and allow for the more effective use of agency and OIRA resources. While there are costs associated with the drafting of, and transition to, new guidance, OMB believes that the aggregate benefits of these proposed revisions are likely to well exceed those costs.

OMB's assessment that the benefits of revising Circular A-4 exceed the costs is buttressed by the views of commenters. While expert commenters raised concerns with distinct aspects of OMB's proposed revisions, a great number of holistic assessments were positive:

- "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."[10]
- "[T]he proposed revisions bring the Circular A-4 guidance more in line with the teachings and research of modern economics and represent a valuable revision to A-4."[11]
- "[T]his is a quality guidance document that generally reflects well the state of knowledge in the academic literature."[12]
- "Overall, I find the proposed revisions to be excellent, based upon sound science and economics."[13]
- "I would give the revised version of Circular A-4 high marks for its coverage of the relevant literature."[14]

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[7] Office of Management & Budget, *Circular No. A-4, Regulatory Analysis* (Nov. 9, 2023), *https://www.whitehouse.gov/wp-content/uploads/2023/11/CircularA-4.pdf* [hereinafter Circular A-4 (2023)].

[8] "Circular A-4 Modernization Updates," Office of Management & Budget, *https://www.regulations.gov/docket/OMB-2022-0014/comments*. Citations to public comments in this document will reference the identity and docket number of the public comment, which can be retrieved at the previous URL.

[9] Office of Management & Budget, *Individual Peer Reviewer Comments on Proposed OMB Circular No. A-4, "Regulatory Analysis"* (Aug. 3, 2023), *https://www.whitehouse.gov/wp-content/uploads/2023/08/A4-Peer-Reviewer-Comments_508c-Final.pdf*. Citations to public comments in this document will reference the identity of the peer reviewer, which can be retrieved at the previous URL.

[10] Peer Review Report of W. Kip Viscusi.

[11] David Autor et al., OMB-2022-0014-0021 (focusing on revisions to discount rates, distributional effects, and risk aversion).

[12] Peer Review Report of Joseph E. Aldy.

[13] Robert N. Stavins, OMB-2022-0014-0002.

[14] Peer Review Report of Joseph Cordes.

- "I welcome the proposed revisions to Circular A-4. In general, I believe the update will help bring economic analysis within the United States Government more in line with best practices of the profession."[15]
- "Circulars A-4 and A-94 are out of date and that the proposed updates would bring the federal government's benefit-cost methodology closer to the current, best available economic research and theory… . These … improvements will lead to sounder economic analysis and, ultimately, better policymaking to serve the public interest."[16]
- "I find that most of the proposed revisions align with developments in the economics literature since the guidelines were last issued in 2003."[17]
- "I strongly endorse the proposed revisions and find them to be consistent with the sound use of economics to support regulatory analysis and inform decisions. The proposed update to Circular A-4 harmonizes Federal guidelines for regulatory analysis with contemporary economic knowledge and best practices, as reflected in the progression of the scientific literature since (and prior to) 2003, the publication date of the current version of the Circular. By promoting the use of valid and reliable methods to estimate economic benefits and costs for regulatory analysis, the proposed revisions will enhance Federal decision-making to support societal well-being."[18]
- "The revised guidance is exceptionally well researched and documented…. The new guidance should help to improve and standardize regulatory analysis throughout the federal government."[19]
- "The proposed revisions to A-4 follow in the tradition of analytical integrity imbedded in the original Circular. In part, this is because of the revisions' commitment to updating methods and decision-making approaches to align with best practices as they have evolved over the twenty years since A-4 was first issued."[20]
- "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."[21]

2. **Scope of Analysis**

   a. Spatial Scope of Analysis

   As the Preamble explained (footnote added in braces):

   The material in Circular A-4 [(2003)] on the appropriate scope of analysis merits potential revisions for several reasons. First, Circular A-4 [(2003)]'s language in the section "*Scope of Analysis*" is potentially unclear. For example, it contrasts "benefits and costs that accrue to citizens and residents" with "effects beyond the borders of the United States," even though at any given point in time some

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[15] Matthew Kotchen, OMB-2022-0014-0114.
[16] 102 Economists, OMB-2022-0014-3924.
[17] Ted Gayer, OMB-2022-0014-0127.
[18] Robert Johnson, OMB-2022-0014-0118.
[19] Peer Review Report of Christina D. Romer.
[20] Arden Rowell, OMB-2022-0014-3923.
[21] Peer Review Report of Kenneth Gillingham.

citizens and residents of the United States are not within the borders of the United States, and effects occurring beyond the border of the United States can result in benefits or costs that accrue to U.S. citizens (whether or not they reside abroad) and residents. Second, there has long been a practice of accounting for certain benefits and costs accruing to noncitizens residing abroad in regulatory analyses without accounting for other benefits or costs accruing to noncitizens residing abroad. {*See, e.g.*, Office of Management and Budget and the Secretariat General of the European Commission, *Review of the Application of EU and US Regulatory Impact Assessment Guidelines on the Analysis of Impacts on International Trade and Investment: Final Report and Conclusions* (2008).} The result has been analyses that often have inconsistent scope with respect to different categories of benefits or costs, without adequate explanation of why the scope of analysis was varying across these categories. Third, both the reality of— and, in some cases, agencies' knowledge of—the ways that the global economy, ecosystems, and other important vectors of regulatory impacts are intertwined and interconnected have greatly expanded over the last two decades. This has led to new ways of thinking about the appropriate way to focus the scope of regulatory analyses.[22]

In addition, "the importance of international regulatory cooperation has grown since Circular A-4 [(2003)] was originally issued, and E.O. 13609 had not yet been issued when the Circular was written."[23]

The Preamble also summarized the changes made in the proposed revisions to Circular A-4:

The proposed revisions to Circular A-4 in the "Scope of Analysis" section would make several changes that respond to issues raised regarding the 2003 Circular, elaborated upon in the discussion below. The revised "Scope of Analysis" section notes that primary analyses of regulations can often continue to focus on effects experienced by citizens and residents of the United States. But it also notes that U.S. citizens and residents are frequently affected by a regulation indirectly, through that regulation's effects on noncitizens residing abroad, and clarifies that such effects may be important for analysts to estimate. The section also clarifies situations in which including effects experienced by noncitizens residing abroad in a primary analysis may be particularly appropriate.[24]

As noted in the proposed revisions,

Such contexts include, for example, when:
- assessing effects on noncitizens residing abroad provides a useful proxy for effects on U.S. citizens and residents that are difficult to otherwise estimate;

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[22] Preamble at 2.
[23] *Ibid*.
[24] *Ibid*.

- assessing effects on noncitizens residing abroad provides a useful proxy for effects on U.S. national interests that are not otherwise fully captured by effects experienced by particular U.S. citizens and residents (e.g., national security interests, diplomatic interests, etc.);
- regulating an externality on the basis of its global effects supports a cooperative international approach to the regulation of the externality by potentially inducing other countries to follow suit or maintain existing efforts; or
- international or domestic legal obligations require or support a global calculation of regulatory effects.[25]

The Preamble summarized the remaining portions of the section:

> It emphasizes the importance of consistency in the scope of analysis used to analyze benefits and costs. It also provides additional guidance about analysis in the context of regulations that implicate international regulatory cooperation and adds discussion of Executive Order 13609 of May 1, 2012 (Promoting International Regulatory Cooperation) (E.O. 13609).[26]

OMB solicited comment on all aspects of the proposed revisions to this section.

Some commenters were broadly supportive of this approach.[27] One commenter offered that "[t]he recommendations in the proposed guidance on the scope of analysis are clear and are supported by the leading peer-reviewed literature."[28] A number of commenters specifically emphasized their support for revisions that noted the potential importance of considering the global effects of regulations in the context of regulation of an externality with global effects.[29] A number of these commenters supported that "strategic reciprocity or other policy changes from actors abroad" will effect U.S. citizens and residents,[30] and noted that regulating externalities at the globally efficient level could have "predictable tit-for-tat responses" or "support the affected countries moving from an autarchic to a cooperative policy stance."[31]

Some commenters, in registering their support for the revisions to this section, emphasized that because the world has become increasingly interconnected over the last twenty years, there will be more cases when analyzing effects initially imposed on foreign noncitizens

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[25] Draft Circular A-4 at 9-10.

[26] Preamble at 2.

[27] *See, e.g.*, Peer Review Report of Kenneth Gillingham; Peer Review Report of Joseph E. Aldy; Peer Review Report of William Pizer; Peer Review Report of Robert S. Farrow.

[28] Peer Review Report of Kenneth Gillingham.

[29] *See, e.g.*, Robert N. Stavins, OMB-2022-0014-0002; Richard Morgenstern et al., OMB-2022-0014-0031; James Stock, OMB-2022-0014-0081; Eli Fenichel, OMB-2022-0014-0084; Paul Joskow et al., OMB-2022-0014-0096; Marvin Phaup, OMB-2022-0014-0058; Attorneys General of New York et al., OMB-2022-0014-0169; Legal Priorities Project, OMB-2022-0014-3914; R. Daniel Bressler, OMB-2022-0014-3915; 102 Economists, OMB-2022-0014-3924.

[30] Draft Circular A-4 at 9.

[31] James Stock, OMB-2022-0014-0081. *See also* Peer Review Report of Kenneth Gillingham; Robert N. Stavins, OMB-2022-0014-0002; Richard Morgenstern et al., OMB-2022-0014-0031.

are a useful proxy for effects that redound to U.S. citizens and residents.[32] As a result—as one such commenter put it—Circular A-4 "should scope the geographic interactions broadly even if narrowly considering the benefits and costs to U.S. citizens and residents."[33] Certain commenters felt that these revisions were "generally reasonable."[34]

> One commenter was more critical:
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> In some cases, such as immigration and trade regulations, this exercise may be relatively more feasible if, for example, a US regulation prompts a predictable response such as a retaliatory tariff or quota. In other cases, tying regulatory changes to foreign reciprocity appears extremely speculative and inappropriate for inclusion into agency analysis.[35]

OMB believes there are a range of circumstances in which analysis capturing potential iterated actions or reciprocity effects is appropriate for inclusion in regulatory analysis. OMB's determination is that reciprocity-related evidence must be examined on a context-specific basis.

Another commenter argued that agencies should "credit only reductions associated with binding agreements, not goals or pledges."[36] OMB believes that the legal form of international policy agreements—whether binding agreements, goals or pledges, or the absence of any agreement— is not the sole factor to consider regarding the likely actions of other governments. In a regulatory analysis, the same standards of evidence and estimation procedures should apply to the likely path of foreign government programs and policies as, for example, state government programs and policies. Still another commenter argued that "such complex domino effects are rare" and that "given the well-known incentive to free ride," other countries may not follow-suit or maintain their existing efforts to regulate the externality.[37] Without opining on the relative frequency of reciprocity and "tit-for-tat" repeated game effects versus free-riding—a topic beyond the scope of the Circular—OMB agrees that agencies should assess whether, in the particular context being analyzed, reciprocity or free-riding (or neither) is likely to occur.

Certain commenters called for analysis of the global effects of a regulation to be required in all cases, but also required to be the supplementary analysis (and never the primary analysis).[38] Other commenters stated that an analysis of a regulation's effects on noncitizens living abroad was useful in the contexts that OMB identified, but likewise stated that such analysis should be supplementary, and that producing such estimates should be optional.[39] In the judgment of OMB, there may be cases—such as when a regulation has de minimis effects on

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[32] *See, e.g.*, Washington Department of Fish and Wildlife et al., OMB-2022-0014-0047; Eli Fenichel, OMB-2022-0014-0084; Legal Priorities Project, OMB-2022-0014-3914.

[33] Eli Fenichel, OMB-2022-0014-0084.

[34] Susan Dudley, OMB-2022-0014-0129. *See also, e.g.*, Arthur Fraas et al., OMB-2022-0014-3917.

[35] American Petroleum Institute et al., OMB-2022-0014-0168.

[36] Arthur Fraas et al., OMB-2022-0014-3917.

[37] 29 Business Community Organizations, OMB-2022-0014-3918.

[38] *See, e.g.*, Alliance for Automotive Innovation, OMB-2022-0014-0067; Western Energy Alliance, OMB-2022-0014-0155.

[39] Peer Review Report of W. Kip Viscusi; Peer Review Report of Glenn C. Blomquist; Timothy Fitzgerald, OMB-2022-0014-0117; H. Spencer Banzhaf, OMB-2022-0014-0158.

noncitizens living abroad—where the benefits of producing a global-effects analysis would not justify the costs of its production. Accordingly, OMB disagrees with the first set of commenters that it would be appropriate to always produce such analyses. In addition, regarding both sets of commenters, OMB maintains—for the reasons articulated in the proposed revisions to the Circular and the Preamble, summarized above—that there are circumstances where it may be particularly appropriate to include effects experienced by noncitizens residing abroad in a primary analysis. Accordingly, OMB does not believe that a one-size-fits-all policy on which analyses are primary or supplementary would be appropriate for this topic.

Some commenters argued that OMB should delete the clause beginning with "unless" in this sentence of the proposed revisions to Circular A-4:

> When your primary analysis focuses on the global effects of the regulation, 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.[40]

One commenter argued that "[a]pproximations of U.S. impacts are always feasible (e.g., based on the U.S. share of GDP and/or global population and other standard metrics)."[41] A number of commenters urged that OMB require the production of an analysis of regulatory effects on U.S. citizens and residents.[42] However, one commenter argued that in some "contexts, it would be extraordinarily difficult, if not impossible, to disentangle the true value for the domestic effects" and recommended "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."[43] Another commenter supported the inclusion of this passage as well.[44] OMB agrees, and notes that there are circumstances where the use of such approximations—as in the U.S. share of GDP or global population—while feasible, would not be reasonably accurate; or, conversely, where the production of reasonably accurate estimates would be so burdensome as to not be justifiable. Similarly, OMB notes that there may be circumstances in which the effects of a regulation on noncitizens living abroad redound to the U.S.—e.g., due to effects on U.S. national interests—and, accordingly, the separate presentation of such effects are likely to be misleading or confusing. Accordingly, OMB believes that it is important to note these limitations on the production of such estimates at this time. OMB has made an edit to the phrase in the final text of the Circular for clarity.

Certain commenters felt that the proposed revisions to this section of the Circular identified too many potential circumstances in which considering regulatory effects experienced

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[40] Draft Circular A-4 at 10.
[41] Alliance for Automotive Innovation, OMB-2022-0014-0067. *See also* Peer Review Report of William Pizer.
[42] *See, e.g.*, Peer Review Report of W. Kip Viscusi; The Buckeye Institute, OMB-2022-0014-0107; Attorney General of Virginia et al., OMB-2022-0014-0125; Susan Dudley, OMB-2022-0014-0129; American Petroleum Institute et al., OMB-2022-0014-0168; American Chemistry Council, OMB-2022-0014-3909; Arthur Fraas et al., OMB-2022-0014-3917; 29 Business Community Organizations, OMB-2022-0014-3918.
[43] Peer Review Report of Kenneth Gillingham.
[44] Peer Review Report of Cary Coglianese.

by noncitizens residing abroad in a primary analysis may be particularly appropriate. Their reasoning generally emphasized legal or practical justifications for their conclusions.

Among such commenters who rested their arguments on legal grounds, several cited concerns about the bounds of agencies' relevant statutory authorities.[45] Other commenters aired constitutional concerns about producing such analyses.[46] Conversely, some commenters referred to the proposed revision's guidance as consistent with agencies' legal obligations.[47] OMB notes that legal limits on the factors that agencies may consider in setting regulatory standards (to the extent they apply) may be distinct from possible limits (if any such limits exist) on the scope of regulatory analyses that agencies produce to comply with Executive Order 12866 and to transparently disclose regulatory effects. To the extent that law might limit the scope of regulatory analyses produced for the purpose of agency compliance with Executive Order 12866 in particular instances, any such limits are best addressed on a case-by-case basis rather than through revisions to Circular A-4. Among the commenters raising legal concerns, views regarding the legally permissible contexts for such analysis varied. For example, one commenter argued that such legally permissible contexts are "generally limited to diplomatic, military, intelligence, and international trade activities in which the concerns of foreign government reciprocity and retaliation against Americans are present."[48] OMB does not think there is a strong evidential basis for the claim that only such activities implicate foreign government reciprocity, retaliation, or related concerns. Nor does OMB believe that such concerns exhaust the reasons why an agency has good reason to produce analyses that account for regulatory effects on noncitizens residing abroad, as noted previously.

Commenters making practical arguments usually centered on the claim that those outside of the U.S. do not bear—or bear almost none of—the costs of Federal regulatory actions.[49] OMB notes that this is not true, for the simple reason that whether a regulation's effects abroad are benefits or costs depends on the effect of the regulatory action. For example, a regulatory action that decreases emissions of a global pollutant provides a great deal of benefits to individuals beyond the borders of the United States, but a regulatory action that increases emissions of a global pollutant imposes a great deal of costs to individuals beyond the borders of the United States. For example, another commenter pointed out that costs of regulatory action can fall outside the country because "production does not solely occur inside the United States,"[50] and indeed, longstanding practice, including in the context of the estimation of costs of regulations with effects on trade or investment that impact noncitizens living abroad, reflects the global

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[45] *See, e.g.*, National Rural Electric Cooperative Association, OMB-2022-0014-0068; The Buckeye Institute, OMB-2022-0014-0107; Attorney General of Virginia et al., OMB-2022-0014-0125; American Petroleum Institute et al., OMB-2022-0014-0168; Institute for Energy Research, OMB-2022-0014-3913; 29 Business Community Organizations, OMB-2022-0014-3918.
[46] *See, e.g.*, National Federation of Independent Business, OMB-2022-0014-0004; Attorney General of Virginia et al., OMB-2022-0014-0125.
[47] Center for Climate and Energy Solutions et al., OMB-2022-0014-0162; Attorneys General of New York et al., OMB-2022-0014-0169.
[48] National Federation of Independent Business, OMB-2022-0014-0004.
[49] *See, e.g.*, National Rural Electric Cooperative Association, OMB-2022-0014-0068; V. Kerry Smith, OMB-2022-0014-0079; The Buckeye Institute, OMB-2022-0014-0107; Attorney General of Virginia et al., OMB-2022-0014-0125.
[50] Anonymous Commenter, OMB-2022-0014-0041.

nature of production that has the potential to be affected by Federal regulations.[51] Similarly, costs falling on U.S. firms are partially borne by noncitizens residing abroad who have partial equity ownership of those firms (e.g., as stockholders). In addition, as the proposed revisions to the Circular explained, there are many circumstances in which estimates of regulatory effects on noncitizens living abroad provide a useful proxy for the regulatory effects on U.S. citizens and residents—for example, in the international trade context, OMB has long adopted a global estimate of regulatory costs—support a cooperative international approach to the regulation of a global externality, or both. OMB believes that the use of such proxies may be appropriate in other cases as well, depending on the evidence base and regulatory context.

One commenter argued that "it is not appropriate for domestic regulatory agencies to regulate based on 'international … legal obligations.' If Congress has agreed to a treaty, then it is a domestic legal obligation, not an international one. If it has not, it is neither."[52] First, OMB reiterates that its guidance applies to regulatory analysis conducted under Executive Order 12866, and that law does not generally limit the scope of such regulatory analyses; to the extent law limits the production of such regulatory analyses, it is best addressed on a case-by-case basis rather than through revisions to Circular A-4. Second, OMB notes that such legal obligations can be created through other means, such as executive agreements.[53]

b. *Temporal Scope of Analysis*

The Preamble also discussed the section's material on the temporal scope of analysis, which "clarifies that the temporal scope of analyses should be long enough to encompass all of the important effects that are likely to result from the regulation."[54] This material also now incorporates a discussion of the appropriate temporal scope of analysis that previously appeared in the section "*Discount Rates*." Collectively, the updated section expands on similar material that previously appeared in the Circular.[55]

Some commenters supported the new material (both in this section, and as elaborated in "*Discount Rates*").[56] However, one group of commenters wrote that:

> the draft directs agencies that they "should not, for example, select an ending point after which the relative size of benefits or costs is likely to change in a way that could change the sign of the estimated net benefits, change the relative ranking of regulatory alternatives, or otherwise have effects relevant to the public

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[51] *See, e.g.*, Office of Management & Budget and the Secretariat General of the European Commission, *Review of the Application of EU and US Regulatory Impact Assessment Guidelines on the Analysis of Impacts on International Trade and Investment: Final Report and Conclusions* (2008), *https://georgewbush-whitehouse.archives.gov/omb/inforeg/reports/sg-omb_final.pdf*.

[52] Institute for Energy Research, OMB-2022-0014-3913.

[53] *See, e.g.*, Am. Ins. Ass'n v. Garamendi, 539 U.S. 396, 415 (2003); Dames & Moore v. Regan, 453 U.S. 654, 680 (1981); Wilson v. Girard, 354 U.S. 524, 526-30 (1957); United States v. Pink, 315 U.S. 203, 229 (1942); United States v. Belmont, 301 U.S. 324, 330 (1937); United States v. Curtiss-Wright Export Corp., 299 U.S. 304, 318 (1936); B. Altman & Co. v. United States, 224 U.S. 583, 601 (1912).

[54] Preamble at 2.

[55] Circular A-4 (2003) at 15.

[56] *See, e.g.*, Peer Review Report of W. Kip Viscusi; Eli Fenichel, OMB-2022-0014-0084; Legal Priorities Project, OMB-2022-0014-3914; R. Daniel Bressler, OMB-2022-0014-3915.

or policymakers." … This seems to provide little guidance in practice, allowing instead for a malleable standard that can achieve any desired results. … OMB should substantially revise the draft to clarify the limitations on agencies' abilities to predict regulatory effects centuries in the future.[57]

OMB respectfully disagrees and believes that by clarifying that the sign of net benefits and the relative ranking of regulatory alternatives' net benefits are key metrics to consider, it has provided clear and operationalizable guidance to agencies on the appropriate temporal scope of analysis. It also believes that it would be inappropriate to set artificial limits on agencies' ability to produce analyses that account for regulatory effects far in the future, where the available evidence enables agencies to produce such estimates.

One group of commenters argued for OMB to provide substantially more guidance to agencies, such as advising that "OMB should recommend that agencies address whether the analysis is sensitive to the choice of analytical timeframe."[58] As noted previously, OMB has provided such guidance. OMB has incorporated discussion that was previously provided in "*Discount Rates*" into "*Scope of Analysis*" for greater clarity.

3. Developing an Analytic Baseline

a. *Emphasizing that Baselines are Forecasts*

As described in the Preamble (footnote added in braces):

Proposed revisions to Circular A-4 would clarify that an appropriate standard (i.e., no-action) baseline is not a description of the status quo; it is a forecast of the way the world would look absent the regulatory action being assessed. That means that it should account for expected changes to current conditions over time. Circular A-4 [(2003)] notes that "[i]t may be reasonable to forecast that the world absent the regulation will resemble the present." {Circular A-4 (2003) at 15.} However, the circumstances in which this is a reasonable assumption may be somewhat narrow, and this comment therefore merits augmentation so as to provide useful guidance to agencies. The proposed revisions to Circular A-4 in this section would emphasize that baselines should be grounded in sound theoretical and empirical evidence about not only current conditions, but also ongoing and anticipated future trends in the areas of interest.

OMB solicited comments on these changes.

Many commenters were supportive of this change.[59] One commenter argued 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

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[57] Attorney General of Virginia et al., OMB-2022-0014-0125.
[58] Center for Climate and Energy Solutions et al., OMB-2022-0014-0162.
[59] *See, e.g.*, Eli Fenichel, OMB-2022-0014-0084; H. Spencer Banzhaf, OMB-2022-0014-0158; Legal Priorities Project, OMB-2022-0014-3914.

different temporal pattern for benefits and costs."[60] However, OMB believes that the guidance in the proposed revisions that the baseline "be grounded in sound theories and empirical evidence about current conditions and ongoing and anticipated future trends in the areas of interest"[61] appropriately focuses analysis on the best forecast of the world absent the regulatory action.

One commenter suggested that the term "dynamic baseline" be substituted for "analytic baseline," arguing that term "does not convey the main point of the guidance that baseline conditions without the proposed regulation need to be forecast into the future."[62] OMB has retained the term "analytic baselines," as the term "dynamic baseline" might erroneously imply that the baseline is never static, and the term "analytic baseline" helps to emphasize that the baseline is the starting point for the analysis.

The proposed revisions to Circular A-4 also provided additional detail on how to integrate government action into the baseline (footnote added in braces):

> the baseline should attempt to reflect relevant final rules (especially if their requirements are being modified by the regulation under consideration) and proposed rules or other previously announced policy changes that the agency is reasonably certain will be finalized before the rule under consideration. {The effects of regulatory and other policy changes induced by the regulation under consideration should generally be attributed to the future actions themselves. Please consult with OMB for more specific guidance in particular cases.} Agencies are encouraged to consider the likely path of future government programs and policies when relevant and appropriate, either reflecting them in the primary or in a supplemental baseline (in either approach, carefully describe the ways in which the future government programs or policies may affect your analysis).[63]

One commenter argued that "allowing agencies to speculate on the likely path of future programs and policies is, generally, inappropriate for an analytical baseline and detracts from the usefulness of regulatory analysis as it may mask a regulatory action's impacts."[64] Another commenter argued against accounting for government programs and policies not yet enacted, as doing so would make "the baseline more subjective, volatile, and unpredictable."[65] However, one commenter argued 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."[66]

After considering these commenters' concerns, OMB has decided to retain this text (with some clarifying and flow-improving revisions to the footnote) in the final version of the revised

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[60] Peer Review Report of W. Kip Viscusi.
[61] Draft Circular A-4 at 12.
[62] Dale Whittington, OMB-2022-0014-0080.
[63] Draft Circular A-4 at 13.
[64] American Petroleum Institute et al., OMB-2022-0014-0168.
[65] Arthur Fraas et al., OMB-2022-0014-3917.
[66] Peer Review Report of Kenneth Gillingham. *See also* Peer Review Report of Joseph E. Aldy.

Circular. In the proposed revisions, quoted above, OMB noted that for Federal regulatory actions the effects of future regulatory actions should generally be attributed to those actions themselves; to incorporate such effects in the baselines of analyses currently being conducted would fail to provide policymakers and the public with a clear guide to the welfare effects of regulatory alternatives. However, it is often the case that the future behavior of other government actors is relevant to the appropriate assessment of a Federal regulatory action's effects. As the proposed revisions noted, a baseline should be "an analytically reasonable forecast of the way the world would look absent the regulatory action being assessed, including any expected changes to current conditions over time."[67] Just as it is not generally appropriate to "forecast that the world absent the regulation will resemble the present," it is not always appropriate to forecast that there will be no changes in government policy in the future. As a result, there will be circumstances where it may be important—either in a primary, or at a minimum in a supplemental baseline— for an agency to consider the likely path of government policies. Such predictions should be supported with reasonable evidence, and the effects of any future policies *induced* by the federal action under consideration should not be incorporated into the baseline for analysis of the federal action under consideration.

b. Pre-Statutory Baselines

Under Circular A-4 (2003), as noted in the Preamble, pre-statutory baselines were used for all primary analyses "of the effects of the first regulation that implements a statutory requirement"[68]:

> The proposed revision to Circular A-4 [states] that, "[i]n general, an agency's first regulatory action implementing a new statutory authority should be … assessed against a pre-statutory baseline"; but if "substantial portions of a regulation … simply restate statutory requirements that are self-implementing even in the absence of the regulatory action or over which an agency clearly has little (or no) regulatory discretion," agencies "may use a post-statutory baseline in" their analysis, in order to focus analytic efforts "on the discretionary elements of the action and potential alternatives."[69]

OMB solicited comment on this change.

Some commenters were critical of the change on pre-statutory baselines. A commenter argued that "Even in cases where agencies argue they have no discretion, the RIA framework and interagency peer review provide information and incentives to identify and consider other alternatives that are consistent with statutory mandates."[70]

One commenter argued that their use should be required, because "Congress may be surprised to learn what the likely benefits and costs of the mandated rulemaking are likely to be" and the "agency's benefit-cost analysis may help persuade Congress, prior to implementation of

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[67] Draft Circular A-4 at 12.
[68] Preamble at 3.
[69] *Id.* at 4.
[70] Susan Dudley, OMB-2022-0014-0129.

the rule, to revise or repeal an inefficient rule."[71] Similarly, another commenter argued that "the audience for [regulatory impact analyses] is broader than the agency; Congress, the courts, and the public benefit from a transparent examination of the benefits and costs of regulations, whether they stem from direct statutory directives or discretionary actions. Such information can lead Congress to make legislative changes."[72] Other commenters raised similar concerns.[73]

However, another commenter argued that it is important to "[d]istinguish impacts directly influenced by the regulatory decision from impacts influenced by [c]ongressional or other action," because "[i]ncluding impacts driven by ... statutory requirements could lead to misleading conclusions about the impacts of a regulatory agency's decision. Given that the primary goal of the analysis is to inform that decision," accounting for the effects of the regulatory decision is important.[74]

One commenter noted that "pre-statutory" and "post-statutory" were unclear and confusing terms, and urged that they be replaced with "without-statute" and "with-statute" (respectively).[75] OMB agrees that this is a worthwhile clarificatory change.

While OMB agrees that the critical commenters have identified potential drawbacks to the use of with-statute baselines in regulatory analyses, producing analyses using without-statute baselines can also be burdensome for agencies, particularly in cases where the effect of the statute is unclear but the marginal effect of regulatory alternatives beyond the statute is clear. In addition, since an agency lacks discretion, an analysis using without-statute baselines will not produce results that will inform policymakers or the public about the options actually available to the agency. However, there may be many cases where the effects of the statute are easy to estimate, or an analysis that includes a without-statute baseline will be particularly informative. As a result, OMB expects that agencies will continue to produce analyses with without-statute baselines—even when the agency lacks discretion—in some cases. In weighing the benefits of such analysis against its costs, and the appropriate role of executive agencies in evaluating the merits of legislative choices, agencies may decide to consult with OMB on whether such analysis would be worthwhile in cases where the agency lacks discretion. As an example, EPA's "*Phasedown of Hydrofluorocarbons: Allowance Allocation Methodology for 2024 and Later Years*" utilized a without-statute baseline, which exemplified an assessment of a combination of statutory directive and the agency's discretion.[76] Relatedly, in light of commenters' concerns that "little … discretion" was ambiguous,[77] OMB has clarified the text to emphasize that this only applies when an agency has "essentially no regulatory discretion."[78] In all cases other than the

[71] Alliance for Automotive Innovation, OMB-2022-0014-0067.
[72] Susan Dudley, OMB-2022-0014-0129.
[73] Western Energy Alliance, OMB-2022-0014-0155; American Petroleum Institute et al., OMB-2022-0014-0168; Arthur Fraas et al., OMB-2022-0014-3917; 29 Business Community Organizations, OMB-2022-0014-3918; Kristin E. Hickman, OMB-2022-0014-3920.
[74] Lisa Robinson, OMB-2022-0014-3921.
[75] Peer Review Report of Cary Coglianese.
[76] Environmental Protection Agency, *Phasedown of Hydrofluorocarbons: Allowance Allocation Methodology for 2024 and Later Years*, 88 Fed. Reg. 46836 (July 20, 2023).
[77] *See, e.g.*, 29 Business Community Organizations, OMB-2022-0014-3918.
[78] Circular A-4 (2023) at 12.

rare instances when an agency has essentially no discretion, agencies should analyze regulations using a without-statute baseline.

A commenter also argued that OIRA has a statutory obligation under the Regulatory Right-to-Know Act[79] to force agencies to conduct analysis using pre-statutory baselines in order "to report to Congress each year the costs and benefits of federal regulation, whether those rules are embedded in statute or flow from agency discretion."[80] OMB disagrees with this commenter that the Act implicitly codifies the use of a pre-statutory baseline (now primarily known as a without-statute baseline). However, longstanding practice—as demonstrated by OMB's Reports to Congress submitted in accordance with the Regulatory Right-to-Know Act[81] and other public statements—has involved dovetailing of concepts and interpretations across Circular A-4,[82] statutory requirements, and Executive Order requirements. As such, there may be circumstances in which OMB inquires about comparisons of regulatory effects against without-statute baselines. The Regulatory Right-to-Know Act, as codified, does not expressly refer to the concept of baselines, and does not require a specific approach with respect to baselines or even reference the assessment of statutory effects.

c. The Use of Multiple Baselines

As noted in the Preamble, the proposed revisions included "more robust discussion of instances in which comparisons of regulatory effects against multiple baselines may be appropriate."[83]

Some commenters raised concerns about the requirement to consider multiple baselines. For example, one commenter noted that "a reasonable interpretation of the guidance" requires agencies "to include costs that have already been incurred" in some baselines.[84] The proposed revisions specifically noted the importance of including already-incurred costs when a clarification, delay, revision, or reversal of a policy is assessed against a baseline "where the recently finalized regulation is issued as originally stated."[85] The reason is that "estimates from the earlier regulation's regulatory analysis are presumably readily available and, especially if the previous regulation is very recent, can be used to characterize that primary baseline in assessment of the new action."[86] Nevertheless, "analysts are encouraged to update this analysis with an assessment that reflects newly available data or meaningful updates or changes in circumstances that affect the baseline."[87] The intervening costs that have been incurred are one particularly important change in circumstances that could affect the baseline, and therefore OMB notes that "among the factors needing careful accounting are costs associated with past

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[79] Codified at 31 U.S.C. § 1105 note.
[80] Alliance for Automotive Innovation, OMB-2022-0014-0067.
[81] "Reports," Office of Management & Budget, Office of Information & Regulatory Affairs, *https://www.whitehouse.gov/omb/information-regulatory-affairs/reports/*.
[82] OMB was directed to produce the Circular by the Regulatory Right-to-Know Act itself.
[83] Preamble at 4.
[84] Dale Whittington, OMB-2022-0014-0080.
[85] Draft Circular A-4 at 14.
[86] *Ibid*.
[87] *Ibid*.

compliance activity that have already been incurred."[88] OMB emphasizes that this inquiry is potentially distinct from a retrospective analysis of the effects of the policy; often, such policies have not yet taken effect, so such an analysis would not even be possible.

Another commenter argued that while "there is value in analyzing and estimating the costs and benefits of agency policies that are not rulemakings, … [i]ncluding this additional information in the regulatory analysis may cause confusion about what information should be considered by the decisionmaker when deciding whether and how to regulate."[89] This commenter also raised legal concerns about the use of such baselines, and noted that "requiring additional analysis to produce information that presumably cannot be used for decision-making stresses limited available analytic resources."[90] OMB is sensitive to these concerns. However, it believes that the cases where it calls attention to the benefits of analysis with multiple baselines justify the additional analytic resources, do not pose legal concerns, and are unlikely to cause confusion. For example, assessing a regulation both against a baseline that accounts for previously issued regulations and a baseline that conforms to both previously issued regulations and sub-regulatory actions (such as guidance) ensures that policymakers and the public consider both the marginal effect of a regulation relative to binding rules, and relative to non-binding guidance that could be more easily rescinded. A similar result applies to the discussion of interim final rules. The use of two baselines allows policymakers and the public to consider the effect of final rules relative to both the interim final rule and the prevailing circumstances prior to the interim final rule. If two (or more) baselines are not analyzed, an agency may not have an occasion to produce any analysis consistent with the directive in Section 6(a)(3)(C) of Executive Order 12866; the urgency motivating the interim final rule may not have allowed for analysis consistent with Section 6(a)(3)(C) before publication, and only examining a baseline relative to the interim final rule would potentially cause the final rule to not be covered by Section 3(f)(1) of Executive Order 12866 (as amended).

4.   Identifying the Potential Needs for Federal Regulatory Action

a. Identifying Needs Generally

As discussed in the Preamble, the proposed revisions to Circular A-4 made two categories of revisions to the section previously titled "*The Need for Federal Regulatory Action.*"

> First, the proposed revisions would amend discussion in Circular A-4 [(2003)] to clarify that analysis of a regulation's anticipated effects can reveal that what was previously assumed to be a need for regulation is not present, or identify additional needs for regulation not previously considered. Proposed revisions would clarify that consideration of the need for federal regulatory action and development of the regulatory analysis is an iterative process. Further, proposed revisions would emphasize that statements about a need for federal regulatory action should generally be supported by evidence in the regulatory analysis. Proposed revisions would also clarify that even when a regulation is

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[88] *Ibid*.
[89] Jennifer Baxter, OMB-2022-0014-3912.
[90] *Ibid*.

implementing or interpreting a statutory requirement, an agency should conduct reasonable inquiries to identify other needs for federal regulatory action.

Second, proposed revisions to this section would elaborate and expand upon the existing discussions of market failures and other distortions. As noted in the proposed revisions to Circular A-4, modeling such distortions is often a standard starting point for conducting analyses of regulatory interventions. Proposed revisions would add additional material on the connection between the concept of externalities and common pool resources, club goods, and public goods, as well as the concept of network benefits. Proposed revisions would expand the material on market power to provide further information regarding the sources and effects of market power. Proposed revisions would clarify material in Circular A-4 [(2003)] focusing on asymmetric and imperfect information and distinguish it from behavioral biases; proposed revisions would break out material on behavioral biases into its own section and discuss it separately. And proposed revisions would emphasize improving government operations and service delivery, promoting distributional fairness and equity, and protecting civil rights and civil liberties or advancing democratic values as potential needs for federal regulation by breaking each out into a separate section as well. Proposed revisions to this section would more generally aim to emphasize the critical relationship between identifying market failure—or other distortions—and producing a rigorous regulatory analysis.[91]

Because a number of commenters addressed behavioral biases in a manner that was distinct from their discussion of other topics in this section, OMB has separated that discussion into the next sub-section of this document. A number of commenters also addressed the section "*Showing Whether Regulation at the Federal Level Is the Best Way to Solve the Problem*," which OMB also discusses in a separate sub-section.

A number of commenters were supportive of these revisions, including its expanded material on network effects, market power, improving government services, promoting distributional fairness, and protecting civil rights and civil liberties or advancing democratic values.[92] One commenter urged OMB to provide further guidance on how regulators should

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[91] Preamble at 5-6.

[92] *See, e.g.*, Peer Review Report of Joseph E. Aldy; Eli Fenichel, OMB-2022-0014-0084; Peter Shane, OMB-2022-0014-0086; Paul Joskow et al., OMB-2022-0014-0096; Dr. Josh Bivens and Dr. Heidi Shierholz, OMB-2022-0014-0142; American Economic Liberties Project, OMB-2022-0014-0144; Gopi Goda, OMB-2022-0014-0147; Commissioner Rebecca Kelly Slaughter, OMB-2022-0014-0052. OMB added material on how "[f]irms may be able to exercise greater market power on those who are in more disadvantaged or vulnerable communities or groups" (citing Caitlin Knowles Myers et al., "Retail Redlining: Are Gasoline Prices Higher in Poor and Minority Neighborhoods?," *Economic Inquiry* 49, no. 3 (2011): 795-809; Jennifer L. Doleac and Luke C.D. Stein, "The Visible Hand: Race and Online Market Outcomes," *The Economic Journal* 123, no. 572 (2013): F469-F492). OMB also added material on how "absent government regulation, imperfect or asymmetric information continues to substantially affect important sectors of the economy, such as the agricultural, insurance, consumer credit, healthcare, and real estate markets" (citing Liran Einav, Amy Finkelstein, and Paul Schrimpf, "Optimal Mandates and the Welfare Cost of Asymmetric Information: Evidence from the U.K. Annuity Market," *Econometrica* 78, no. 3 (2010): 1031-92; Liran Einav, Mark Jenkins, and Jonathan Levin, "Contract Pricing in Consumer Credit Markets,"

consider market power and competition when designing and analyzing regulations.[93] OMB has done so in separate guidance.[94] Another commenter argued that

> Federal agencies should consider and address whether their analysis of a regulation's anticipated effects reveals that "what was previously assumed to be a need for regulation is *not* present." (emphasis added). [Quoting Preamble at 5-6] This provision appropriately recognizes that rigorous economic analysis, without prejudgment, will from time to time, and perhaps often, lead to the conclusion that a proposed new rule is unnecessary or ill-advised. We recommend that this provision be explicitly incorporated into the Proposal.[95]

OMB notes that the proposed revisions to the Circular already clarified this point: "It is important to analyze any potential need before determining that it is present and relevant in your particular regulatory context."[96] OMB has attempted to further clarify this point by adding "potential" before "need" throughout this section of the Circular in the final version.

Some commenters were critical of the discussion of distributional fairness and equity, civil rights and civil liberties, or advancing democratic values as potential needs for federal regulatory action.[97] One commenter argued that "promoting distributional fairness and advancing equity" should be struck because they are vague.[98] Another wrote:

> By adding new, non-economic-based justifications for regulatory intervention, including behavioral biases, distributional fairness, equity, civil rights/liberties, and democratic values, the revised Circular A-4 represents a major departure from this tradition [of justifying regulations only using market-based justifications]. In so doing, it opens the door to additional values-based rationales for regulation down the road. If regulators can justify new interventions merely by invoking an amorphous concept such as "democratic values," one can easily envision their citing morality, happiness, or any number of other subjective, values-based justifications for intervention at some future point.[99]

OMB notes that these "new" justifications are *not* newly introduced justifications for federal regulatory action. Circular A-4 (2003) stated that "redistribut[ing] resources," "prohibit[ing] discrimination," "protect[ing] privacy, permit[ting] more personal freedom[,] or promot[ing] other democratic aspirations" are other "justifications for regulations in addition to correcting

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Econometrica 80, no. 4 (July 2012): 1387-1432; Pablo Kurlat and Johannes Stroebel, "Testing for Information Asymmetries in Real Estate Markets," *Review of Financial Studies* 28, no. 8 (2015): 2429-61).

[93] American Economic Liberties Project, OMB-2022-0014-0144.

[94] Office of Management & Budget, *Guidance on Accounting for Competition Effects When Developing and Analyzing Regulatory Actions* (Oct. 2023), *https://www.whitehouse.gov/wp-content/uploads/2023/10/RegulatoryCompetitionGuidance.pdf*.

[95] Joint Financial Services Industry Associations, OMB-2022-0014-1567.

[96] Draft Circular A-4 at 15.

[97] *See, e.g.*, National Federation of Independent Business, OMB-2022-0014-0004; Virginia Office of Regulatory Management, OMB-2022-0014-0036; Attorney General of Virginia et al., OMB-2022-0014-0125.

[98] National Federation of Independent Businesses, OMB-2022-0014-0004.

[99] Virginia Office of Regulatory Management, OMB-2022-0014-0036.

market failures."[100] OMB also notes that Executive Order 12866 directs that net benefits include consideration of "potential economic, environmental, public health and safety, and other advantages; distributive impacts; and equity"[101] and that Executive Order 13563 directs agencies to consider "values that are difficult or impossible to quantify, including equity, human dignity, fairness, and distributive impacts."[102] OMB believes that it is appropriate to retain discussion of these as potential needs for federal regulatory action.

b. *Identifying Behavioral Biases*

Many commenters were supportive of the inclusion of behavioral biases as a potential need for federal regulation in the proposed revisions.[103] One commenter specifically noted that behavioral biases are "a justification both for regulatory intervention and for using dollar valuations that are not equal to observed willingness to pay or willingness to accept."[104] Conversely, some commenters argued against justifying either a need for federal regulatory action on the basis of behavioral biases or accounting for behavioral biases in the valuations of benefits and costs.[105] One such commenter argued that if agencies can alter estimates of benefits and costs "based on asserted biases, little remains of objective analysis of effects."[106]

Certain commenters emphasized that agencies should be careful to use high-quality evidence when justifying the presence of behavioral biases.[107] One commenter noted in particular that "[t]he mere fact that a bias can be shown in experimental settings is not enough to justify either intervention or adjustment, because the market itself includes checks on the impact of biases."[108] OMB believes that the proposed revisions largely addressed this point in an adequate manner, stating (footnote added in braces):

> You should carefully consider the degree to which the evidence available to you
> indicates that behavior reflects rational preferences and the degree to which it
> indicates that such behavior is the product of a behavioral bias. {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,
> no. 2 (2011).} When you have gathered evidence that the latter is the case—for
> example, studies demonstrating private undervaluation or overvaluation of

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[100] Circular A-4 (2003) at 5.

[101] Executive Order 12866 of September 30, 1993 (Regulatory Planning and Review), 58 Fed. Reg. 51,735 (Oct. 4, 1993).

[102] Executive Order 13563 of January 18, 2011 (Improving Regulation and Regulatory Review), 76 Fed. Reg. 3821(Jan. 21, 2011).

[103] *See, e.g.*, Peer Review Report of Kenneth Gillingham; Zachary Steigerwald Schnall, OMB-2022-0014-0028; Daniel Acland, OMB-2022-0014-0078; Gopi Goda, OMB-2022-0014-0147.

[104] Daniel Acland, OMB-2022-0014-0078.

[105] *See, e.g.*, Howard Beales, OMB-2022-0014-0087; Attorney General of Virginia et al., OMB-2022-0014-0125; American Petroleum Institute et al., OMB-2022-0014-0168; National Association of Home Builders, OMB-2022-0014-3901; Don Kenkel, OMB-2022-0014-3910; 29 Business Community Organizations, OMB-2022-0014-3918.

[106] Howard Beales, OMB-2022-0014-0087.

[107] Peer Review Report of W. Kip Viscusi; Peer Review Report of Joseph Cordes; Daniel Acland, OMB-2022-0014-0078; Ted Gayer, OMB-2022-0014-0127; Susan Dudley, OMB-2022-0014-0129.

[108] Howard Beales, OMB-2022-0014-0087.

relevant consumer products—that evidence will likely provide a key input in your quantification of regulatory benefits.[109]

OMB has further clarified in the final version of Circular A-4 that such a behavioral bias should be one "observed in, or applicable to, the specific regulatory context."[110] The existence of behavioral bias would not be supported, for example, unless high-quality evidence documents that it appears in consequential settings. These are the same standards that OMB recommends agencies employ when assessing any evidence that underlies a regulatory analysis.

A number of commenters noted that just as regulated parties can exhibit behavioral biases, government regulators can as well.[111] OMB agrees that all people can exhibit behavioral biases, and if such a phenomenon causes government to fail to maximize social welfare, that would represent an example of failure of public institutions (a concept that Circular A-4 addresses).

Some commenters noted that regulations that address behavioral biases may impose costs that should be considered as well. For example, one commenter wrote that "though regulation may indeed correct for certain alleged flaws in human decision-making, such as the tendency of consumers to prefer junk food over healthy alternatives, it is far from clear that the benefits of paternalistic government intervention exceed the considerable costs to individual autonomy."[112] Another commenter argued that "to cite behavioral biases as the reason for regulation" implements a "paternalistic vision of the state" that "is in deep tension with the fundamental principles of self-government."[113] OMB believes that such costs could appropriately be discussed in a regulatory analysis where evidence exists that they are present, potentially as non-monetized costs of the regulation.

> c. *Showing Whether Regulation at the Federal Level Is the Best Way to Solve the Problem*

The proposed revisions made relative minor elaborations to the material in the section "*Showing Whether Regulation at the Federal Level Is the Best Way to Solve the Problem.*" Some commenters were supportive of these revisions.[114]

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[109] Draft Circular A-4 at 19.

[110] Circular A-4 (2023) at 18.

[111] *See, e.g.*, Virginia Office of Regulatory Management, OMB-2022-0014-0036; Alliance for Automotive Innovation, OMB-2022-0014-0067; Ted Gayer, OMB-2022-0014-0127; Susan Dudley, OMB-2022-0014-0129; Institute for Energy Research, OMB-2022-0014-3913.

[112] Virginia Office of Regulatory Management, OMB-2022-0014-0036.

[113] 29 Business Community Organizations, OMB-2022-0014-3918 (citing Alexis de Tocqueville, *Democracy in America*, trans. and ed. Harvey C. Mansfield and Delba Winthrop (Chicago: The University of Chicago Press, 2000), 663).

[114] *See, e.g.*, Peter Shane, OMB-2022-0014-0086; H. Spencer Banzhaf, OMB-2022-0014-0158.

Other commenters were critical of the proposed revisions.[115] On one hand, one group of commenters argued that the section "still contains problematic language that has the effect of reinforcing the notion that federal regulation is a disfavored way of addressing our social problems. That is an ideological point of view, and it has no place in a document intended to provide neutral guidance to agencies."[116] On the other hand, another group of commenters argued that the proposed revisions "fail to account for … the substantial advantages of tailoring regulations to serve the needs and interests of local populations rather than imposing national solutions from Washington."[117] Another commenter similarly argued that Circular A-4 "should emphasize the learning value of deferring to States to address problems that do not create interstate commerce issues" and that "[i]nstead of allowing agencies to assert that other levels of government are 'failing to appropriately address a problem,' the draft should encourage the natural experiments that are essential to evaluating how well regulatory programs meet stated goals.[118]

Regarding the first set of comments described above, OMB disagrees that the section presumes that federal regulations is either favored or disfavored relative to other policy tools. The proposed revisions merely emphasized that "[i]t can be informative to consider other means of addressing the need for regulatory action you have identified in addition to, or instead of, Federal regulation."[119] Regarding the latter comments described above, OMB notes that the proposed revisions specifically stated:

> More localized problems, including those that are common to many areas, may be better addressed locally …. If preferences differ by region, those differences can be reflected in varying State, local, territorial, and Tribal regulatory policies. Moreover, States, localities, territories, and Tribal lands can serve as a testing ground for experimentation with alternative regulatory policies. One State can learn from another's experience while local jurisdictions may compete with each other to establish the best regulatory policies.[120]

OMB also notes that advising agencies to consider whether the benefits of State regulation outweigh the costs of a fragmented regulatory system is not new to the proposed revisions. Circular A-4 (2003) noted as well that "The local benefits of State regulation may not justify the national costs of a fragmented regulatory system. For example, the increased compliance costs for firms to meet different State and local regulations may exceed any advantages associated with the diversity of State and local regulation."[121]

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[115] *See, e.g.*, Virginia Office of Regulatory Management, OMB-2022-0014-0036; Attorney General of Virginia et al., OMB-2022-0014-0125; Susan Dudley, OMB-2022-0014-0129; Sidney A. Shapiro, Amy Sinden, and James Goodwin, OMB-2022-0014-0151.
[116] Sidney A. Shapiro, Amy Sinden, and James Goodwin, OMB-2022-0014-0151.
[117] Attorney General of Virginia et al., OMB-2022-0014-0125.
[118] Susan Dudley, OMB-2022-0014-0129.
[119] Draft Circular A-4 at 20.
[120] *Id*. at 21.
[121] Circular A-4 (2003) at 6.

5.   Alternative Regulatory Approaches

Some commenters praised many of the proposed revisions to the section on "*Alternative Regulatory Approaches*."[122]

One group of commenters raised concerns that the discussion of performance standards overclaimed and did not sufficiently emphasize compliance considerations relevant to the choice between design standards and performance standards.[123] OMB has addressed these concerns in the final version of Circular A-4, and also supplemented the language on methods to enhance compliance.

One commenter argued that the final version of Circular A-4 should strike language suggesting that "the fixed costs of regulation, which in empirical terms have fallen on smaller firms, might be an unfair burden to place on the larger firms that benefit from those regulations by putting smaller competitors at a disadvantage."[124] OMB continues to believe, however, that as stated in the proposed revisions

> it is not necessarily efficient to place a heavier burden on one segment of a regulated industry solely because it can better afford the higher cost. This has the potential to load costs on the most productive firms, costs that may be disproportionate to the marginal harms those firms' actions cause.[125]

Accordingly, OMB is not modifying this text in the final version of Circular A-4.

Some commenters noted the importance of agencies designing their regulations to facilitate the collection of data that can inform their future evaluations of regulatory costs and benefits.[126] In response to those comments, OMB has reorganized and enhanced some previously drafted language to clarify that agencies may have various tools to promote data collection and learning by variation, such as pilot programs.

6.   Developing Benefit and Cost Estimates

As noted in the Preamble:

> Many updates are proposed to the material in the "*Developing Benefit and Cost Estimates*" section, including regarding revealed preference methods, stated preference methods, benefit-transfer methods, general equilibrium analysis, and how to account for non-monetized effects. These proposed revisions largely elaborate on material that was previously present in Circular A-4 [(2003)], with

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[122] *See, e.g.*, Ganesh Sitaraman and Shelley Welton, OMB-2022-0014-0141.

[123] Ganesh Sitaraman and Shelley Welton, OMB-2022-0014-0141. *See also* Sidney A. Shapiro, Amy Sinden, and James Goodwin, OMB-2022-0014-0151.

[124] American Economic Liberties Project, OMB-2022-0014-0144. *See also* Sidney A. Shapiro, Amy Sinden, and James Goodwin, OMB-2022-0014-0151.

[125] Draft Circular A-4 at 24.

[126] *See, e.g.*, Peer Review Report of Joseph E. Aldy.

reference to more recent methods and findings in the academic literature, and make other incremental improvements. In addition, a terminological change from discussion of "ancillary benefits and countervailing risks" to "additional benefits and costs" has been proposed to clarify that categories of effects such as "ancillary" or "indirect" are not meaningfully different for analytical purposes from categories of effects that are "primary" or "direct."[127]

OMB solicited comment and feedback on all of these proposed revisions. OMB also requested comment on "generalizing guidance" that is "related to econometrics and other applied statistics" topics "and collecting relevant content in one section."[128]

a. The Key Concepts Needed to Estimate Benefits and Costs

Many commenters supported the additional material provided in the proposed revisions on the concepts of willingness-to-pay (WTP) and willingness-to-accept (WTA) values.[129] However, some argued that OMB should advise agencies to use WTP rather than WTA values because they are more often available or can have smaller bias.[130] One commenter argued that "[e]mpirical estimates of … WTA … 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."[131]

The proposed revisions to Circular A-4 already noted that "[i]n practice, the evidence available for your regulatory analysis may constrain your choice of WTP and WTA measures."[132] However, OMB disagrees with commenters that this systematically favors WTP measures over WTA measures, because the measures simply "differ in who starts with the good or service."[133] For example, the proposed revisions to the Circular noted that "estimates of VSL" are generally "from studies on wage compensation for occupational hazards"[134]; these are WTA measures, because the individual starts with the right to take on additional mortality risk in exchange for higher wages. OMB believes that providing guidance to agencies that WTP estimates should be generally preferred to WTA estimates (or vice versa) would be inappropriate: instead, they should use their "professional judgment to determine the most appropriate use of the available evidence. This may include using WTP or WTA data as a proxy for the other measure, in a situation in which the other measure might be preferable."[135] Such situations would include where the WTA premium over WTP estimates cannot be explained as the result of rational economic behavior.

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[127] Preamble at 7.
[128] *Id*. at 9.
[129] *See, e.g.*, Alliance for Automotive Innovation, OMB-2022-0014-0067.
[130] *See, e.g.*, Peer Review Report of W. Kip Viscusi; Alliance for Automotive Innovation, OMB-2022-0014-0067. *See also* Peer Review Report of Kenneth Gillingham.
[131] Peer Review Report of W. Kip Viscusi.
[132] Draft Circular A-4 at 29.
[133] *Ibid*.
[134] *Id.* at 49.
[135] *Id.* at 29.

b. *Revealed Preference and Stated Preference Methods*

Several commenters were supportive of the updated material on revealed and stated preference methods in the proposed revisions.[136] One commenter argued that, "[c]ompared to the 2003 version of Circular A-4, the proposed revisions provide a more balanced and credible perspective on the appropriate use of stated preference methods" that is "consistent with the contemporary economic literature."[137]

c. *Benefit-Transfer Methods*

Several commenters were supportive of the updated material on benefit-transfer methods in the proposed revisions.[138]

d. *Additional Benefits and Costs*

Some commenters were supportive of OMB's approach.[139] One commenter offered qualified support, noting that "in principle, BCA should include all the significant consequences of a policy decision, whether they are direct or indirect, intended or unintended, beneficial or harmful."[140] However, this commenter also argued that "[regulatory impact analyses] should clearly distinguish additional benefits or costs from impacts related to the main purpose of the regulation."[141] Certain other commenters echoed this argument, for "transparency" and to "cause an agency to pursue regulatory alternatives … that are more appropriate given their regulatory purview."[142]

For expository purposes, OMB used the term "the main purpose of the regulation" in the proposed revisions to Circular A-4 to help explain that agencies should consider benefits and costs *in addition* to those they are likely to be focused on (that is, those that are "the main purpose of the regulation").[143] However, OMB does not believe that agency analysts should be advised to assess which purposes of a regulation are the main purposes. A regulation may have many purposes; agency policymakers may be motivated by distinct purposes, none of which are primary or "main" purposes; or the purposes may have unclear relationships to the benefits and costs of the regulation. In addition, an agency analyst may be unaware of which purposes are the main ones, and views about which purposes are primary may change as regulatory alternatives are developed and analyzed. OMB agrees about the importance of transparency, and believes that this is best accomplished by clearly listing categories of benefits and costs. Readers of regulatory analyses can use such categories to further categorize which regulatory effects they deem to be consistent with the main purpose of the regulation or additional to those effects. OMB does not believe that it would be appropriate for analysts to be thrust into difficult

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[136] *See, e.g.*, Peer Review Report of Glenn C. Blomquist; Eli Fenichel, OMB-2022-0014-0084; Robert Johnston, OMB-2022-0014-0118; Catherine L. Kling, OMB-2022-0014-0761.

[137] Robert Johnston, OMB-2022-0014-0118.

[138] *See, e.g.*, Eli Fenichel, OMB-2022-0014-0084; Robert Johnston, OMB-2022-0014-0118.

[139] *See, e.g.*, Jonathan B. Wiener, OMB-2022-0014-3919; American Lung Association, OMB-2022-0014-0749.

[140] Susan Dudley, OMB-2022-0014-0129.

[141] *Ibid.*

[142] American Petroleum Institute et al., OMB-2022-0014-0168.

[143] Draft Circular A-4 at 39.

determinations of what regulatory effects are consistent with the purposes of the regulation, and which are not.

Some commenters urged that OMB use the term "ancillary benefits and costs" rather than "additional benefits and costs" in the final version of the Circular.[144] This was generally bundled with an argument that "agencies must separately identify the regulatory benefits that they believe are most relevant to congressional purposes," whatever term is used to identify those benefits.[145]

> Where the lion's share of benefits of a proposed rulemaking are primary benefits, that is a good indication that the agency is seeking to remedy the same problem that Congress had in mind when enacting the statute under which the agency proposes to act and therefore is seeking to carry out congressional direction. On the other hand, when ancillary benefits predominate, that suggests the proposed regulation represents a focus on a mission other than the one Congress has provided. Without separate identification of ancillary benefits, Congress, the people, and the agencies will face difficulty in understanding whether agency action is mainly trained on congressional, or agency, objectives.[146]

OMB's response to these comments is similar to its response about identifying regulatory benefits and costs that are consistent with the main purpose of the regulation, but stronger. While an agency has some capacity to determine its own purposes—though see above—OMB would place agency analysts in an improper role if it advised analysts to determine which regulatory benefits and costs Congress had in mind when enacting the relevant authorizing statute(s). OMB reiterates that, as one commenter put it, "BCA should include all the significant consequences of a policy decision, whether they are direct or indirect."[147] OMB also believes that transparency is best achieved by having agencies list categories of benefits and costs, which readers of regulatory analyses can use to engage in such categorization themselves.

e. *Methods for Treating Non-Monetized Benefits and Costs*

A number of commenters were supportive of the material in the proposed revisions on how analysis can treat non-monetized benefits and costs.[148] One group of commenters recommended that OMB urge "agencies to identify and discuss important non-quantified effects of the regulation whenever an agency presents quantified costs or benefits."[149] The proposed

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[144] *See, e.g.*, Paul Ray, OMB-2022-0014-0104; Western Energy Alliance, OMB-2022-0014-0155; Daren Bakst, OMB-2022-0014-3907; 29 Business Community Organizations, OMB-2022-0014-3918.

[145] Paul Ray, OMB-2022-0014-0104. *See also, e.g.*, Daren Bakst, OMB-2022-0014-3907; 29 Business Community Organizations, OMB-2022-0014-3918.

[146] Paul Ray, OMB-2022-0014-0104. *See also, e.g.*, Daren Bakst, OMB-2022-0014-3907; 29 Business Community Organizations, OMB-2022-0014-3918.

[147] Susan Dudley, OMB-2022-0014-0129.

[148] *See, e.g.*, Peer Review Report of Cary Coglianese; Peer Review Report of Joseph E. Aldy; Peer Review Report of W. Kip Viscusi; Peer Review Report of Kenneth Gillingham; Daniel Acland, OMB-2022-0014-0078; Eli Fenichel, OMB-2022-0014-0084; Southern Environmental Law Center, OMB-2022-0014-0106; Dr. Josh Bivens and Dr. Heidi Shierholz, OMB-2022-0014-0142; Environmental Defense Fund, OMB-2022-0014-0154; Center for Climate and Energy Solutions et al., OMB-2022-0014-0162; R. Daniel Bressler, OMB-2022-0014-3915; Catherine L. Kling, OMB-2022-0014-0761.

[149] Attorneys General of New York et al., OMB-2022-0014-0169.

revisions noted that agency analysts "should include a summary table that lists all the unquantified or non-monetized benefits, costs, and transfers, and when feasible and appropriate highlight (e.g., with categories or rank ordering) those that you believe are most important (e.g., by highlighting factors such as the degree of certainty, expected magnitude such as the number of individuals affected, and reversibility of effects)."[150] However, this group of commenters argued that "a table not take the place of a narrative discussion of the most important non-quantified effects."[151] OMB has emphasized the need for a "description of the meaningful unquantified and non-monetized effects" alongside any table in the final version of Circular A-4.[152]

> Another group of commenters similarly argued that

> where the monetized benefit figure does not in fact reflect all benefits of the rule, OMB should require the regulatory analysis to explicitly and prominently so state, including in any tables that compare the cost and benefit figures. Among other things, this should include a prominent warning label at the beginning of the analysis and in public summaries thereof stating the dollar figure shown for benefits does not fully account for all of the rule's benefits and therefore the reader cannot determine a net cost or benefit of the rule by comparing the monetized values.[153]

While OMB does not believe that such a warning label is necessary, it does encourage agencies to clearly communicate—whether in tables or textual summaries—when the monetized net benefits estimate does not account for all of a rule's important benefits or costs.

f. Monetizing Health and Safety Benefits and Costs

As noted in the Preamble, few changes were made to the section "*Monetizing Health and Safety Benefits and Costs.*"

> One part of this section that was largely left unchanged in the proposed revisions is the material on monetizing health and safety benefits and costs (including the subsections on nonfatal risks, fatality risks, and risks to children). As the proposed revised version of the Circular notes, that material is essentially unchanged, with the exception of relatively minor edits, including correcting outdated language, providing a missing citation to an already-referenced source, and updating to reflect current agency estimates of value of statistical life (VSL) ….

> While recognizing that potential modifications to material on monetizing health and safety benefits and costs and health and safety metrics could be advantageous,

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[150] Draft Circular A-4 at 45.
[151] Attorneys General of New York et al., OMB-2022-0014-0169.
[152] Circular A-4 (2023) at 46.
[153] Earthjustice and Sierra Club, OMB-2022-0014-3908.

OMB believes that continued reliance on this material is generally appropriate at this time.[154]

OMB specifically requested "comment on whether there are any areas where well-supported and longstanding agency practice is not reflected in this section of the Circular."[155]

A number of commenters criticized the inconsistency that emerged between the proposed revision's changes to material on the use of revealed preference and stated preference methods generally, and material left unchanged in this section.[156] OMB agrees with these commenters, and has deleted the conflicting (and redundant) material in the final version of Circular A-4.

Several commenters criticized the discussion of the relationship between age and mortality valuation, and the use of value of a statistical life year (VSLY) measures.[157] Certain commenters offered criticism of the Circular's discussion of valuing child mortality, particularly in light of active debate in the academic literature on the question.[158] A number of commenters urged OMB to add recent references and advances on a number of the topics covered.[159] Other commenters offered additional criticism of this material.[160]

One commenter specifically noted that "it seems sensible to defer making specific suggestions on valuing risks to health and longevity, given the complexity of the issues" and ongoing debate and advances in the academic literature.[161] OMB agrees with this commenter, not only on the topic of longevity, but more generally. Several of the topics covered in the proposed revisions to the Circular—such as discussions of the current state of the academic literature of VSL, context-specific versus general VSL estimation, the relationship between longevity and mortality risk valuation, and the valuation of health and safety harms to children—are, as the proposed revisions to the Circular stated, "an evolving area in both results and methodology."[162] OMB also notes that agencies have occasionally expressed different views regarding VSL methodologies in these contexts.[163] Given the ongoing and unsettled nature of empirical and methodological issues in the economic literature—and the limited value a summary of that

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[154] Preamble at 7.

[155] *Ibid.*

[156] *See, e.g.*, Zachary Steigerwald Schnall, OMB-2022-0014-0028; Catherine L. Kling, OMB-2022-0014-0761.

[157] *See, e.g.*, Peer Review Report of Joseph E. Aldy; Sidney A. Shapiro, Amy Sinden, and James Goodwin, OMB-2022-0014-0151; Catherine L. Kling, OMB-2022-0014-0761.

[158] *See, e.g.*, Peer Review Report of W. Kip Viscusi; Zachary Steigerwald Schnall, OMB-2022-0014-0028; Sidney A. Shapiro, Amy Sinden, and James Goodwin, OMB-2022-0014-0151; Lisa Robinson, OMB-2022-0014-3921.

[159] Peer Review Report of W. Kip Viscusi; Peer Review Report of Joseph E. Aldy; Peer Review Report of Glenn C. Blomquist; Lisa Robinson, OMB-2022-0014-3921; Catherine L. Kling, OMB-2022-0014-0761.

[160] *See, e.g.*, Eli Fenichel, OMB-2022-0014-0084; James Broughel, OMB-2022-0014-0095; Sidney A. Shapiro, Amy Sinden, and James Goodwin, OMB-2022-0014-0151; Adam Finkel, OMB-2022-0014-0156.

[161] Lisa Robinson, OMB-2022-0014-3921.

[162] Draft Circular A-4 at 50.

[163] *Compare, e.g.*, Department of Health and Human Services, *Guidelines for Regulatory Impact Analysis* (2016) (using both revealed preference and stated preference evidence to estimate VSL) and Department of Transportation, *Treatment of the Value of Preventing Fatalities and Injuries in Preparing Economic Analyses* (2021) (using only revealed preference hedonic wage studies to estimate VSL). *See also, e.g.*, Consumer Product Safety Commission, Notice of Availability: Proposed Draft Guidance for Estimating Value per Statistical Life, 88 Fed. Reg. 17,826 (Mar. 24, 2023) (in which the Consumer Product Safety Commission proposed the use of a higher VSL for children).

literature would have for agencies—OMB has decided to remove much of the content in this section in the final version of the Circular, but looks forward to working with agencies in the context of specific analyses that examine these issues in light of the evolving literature.

One topic in the proposed revisions to Circular A-4 that received specific attention from commenters was the guidance that "it is appropriate to use a value for mortality risk reductions (sometimes referred to as the value of a statistical life, or VSL) that does not depend on the income of the sub-population to which the mortality risk reduction benefits accrue."[164] Some commenters were harshly critical of this guidance, on the basis that it conflicts with Kaldor-Hicks efficiency measurement.[165] Other commenters supported this approach, with some citing scholarship on the concept of mortality risk equity.[166] OMB believes that the latter commenters presented more persuasive argument, given the particular conceptual difficulties that arise when those who bear the benefits and costs of a regulation are not coterminous and the tight relationship of the income elasticity of VSL and the absolute value of the income elasticity of marginal utility. OMB also notes that this is consistent with consistent agency practice stretching back prior to the 2003 version of Circular A-4.

g. Other Topics

One group of commenters supported the new material in the proposed revisions about the potential role of general equilibrium modeling in benefit-cost analysis.[167]

One group of commenters urged OMB to recommend that agencies adjust non-market environmental goods over time at a default rate reflecting the income elasticity of the WTP for non-market environmental goods and the limited substitutability of non-market goods and market goods.[168] OMB views the comment to be thoughtful and well-supported. However, the enormous variety of non-market environmental goods reduces the usefulness of default recommendations. Accordingly, while OMB believes that agencies should project estimates of the value of non-market environmental goods that account for the income elasticity of the WTP for non-market environmental goods and the limited substitutability of non-market goods and market goods, OMB does not believe that it would be appropriate at this time to provide in Circular A-4 a default estimate of the rate at which non-market environmental goods' value increases.

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[164] Draft Circular A-4 at 66.

[165] Catherine L. Kling, OMB-2022-0014-0761.

[166] Peer Review Report of W. Kip Viscusi (citing W. Kip Viscusi, "Risk Equity," *Journal of Legal Studies* 29, no. 2(2000): 843-871; W. Kip Viscusi, *Pricing Lives: Guideposts for a Safer Society* (Princeton: Princeton University Press, 2018); Thomas J. Kniesner and W. Kip Viscusi, "Promoting Equity through Equitable Risk Tradeoffs," *Journal of Benefit-Cost Analysis* 14, no. 1 (2023): 8-34; Peer Review Report of William Pizer.

[167] Paul Joskow et al., OMB-2022-0014-0096.

[168] Mortiz A. Drupp et al., OMB-2022-0014-0130.

7.   Other Key Considerations

a. *Accounting for Compliance and Take-up*

Commenters varied in their views of the proposed revisions guidance on accounting for compliance. Some commenters were positive on the guidance to consider whether there will be under-compliance, over-compliance, or full compliance with a regulation.[169] One group of commenters called for OMB to expand its discussion of the benefits of continuous monitoring approaches for compliance.[170] One commenter argued for the importance of disaggregating the impacts driven by anticipatory compliance from other impacts of the regulation.[171]

One commenter argued that any assumption other than full compliance would be "problematic" because "[a]gency policymakers, Congress, and the public deserve information on the full expected costs and benefits of agency-made law" and presenting analysis with only "partial compliance costs … obfuscates the diminishing marginal returns of the rule."[172] Another commenter similarly argued that analysis of full compliance should be required because the "American public and Congress have a right to know the anticipated economic effects of federal regulations as they are promulgated, and not as compliance officers might wish they were written," but that analysis of different compliance levels could be useful as supplementary analyses.[173] However, another commenter urged that analysis in which agencies "assume full compliance with a regulation" has "encouraged regulations that were more highly 'optimized' on paper, but had lower compliance and so worse outcomes in the real world."[174] And one commenter argued that the goal of the "regulatory analysis is to be as realistic as possible, and if the evidence is strong, then I think agencies should model incomplete compliance."[175]

A number of commenters recommended that OMB expand its discussion to account for Giles (2022) or more deeply link the discussion of compliance to the discussion of designing regulatory alternatives.[176] In response to these comments, OMB has included citations to Giles (2022) and clarified that there are multiple options for designing rules to promote compliance.

More specifically, OMB noted that effects of the type also associated with under-compliance also occur when "agencies grant regulated parties waivers or exemptions to regulatory requirements" that reduce the extent of new actions that are legally required.[177] OMB also clarified that agencies should "examine risks of non-compliance" in their regulatory analysis, when relevant.[178] OMB also provided guidance that it "may be helpful to specifically

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[169] *See e.g.*, Ganesh Sitaraman and Shelley Welton, OMB-2022-0014-0141; Earthjustice and Sierra Club, OMB-2022-0014-3908; Rebecca Dell, OMB-2022-0014-0736.
[170] Earthjustice and Sierra Club, OMB-2022-0014-3908.
[171] Lisa Robinson, OMB-2022-0014-3921.
[172] Susan Dudley, OMB-2022-0014-0129.
[173] Arthur Fraas et al., OMB-2022-0014-3917.
[174] Rebecca Dell, OMB-2022-0014-0736. *See also* Peer Review Report of Joseph E. Aldy.
[175] Peer Review Report of Kenneth Gillingham.
[176] *See e.g.*, Ganesh Sitaraman and Shelley Welton, OMB-2022-0014-0141; Lisa Robinson, OMB-2022-0014-3291; Earthjustice and Sierra Club, OMB-2022-0014-3908; Rebecca Dell, OMB-2022-0014-0736.
[177] Circular A-4 (2023) at 53, n.99.
[178] *Id.* at 53.

address the manner and method of compliance communications and enforcement, the resources needed—and availability of those resources—for those approaches."[179] Finally, OMB noted that it "may be helpful to consider the distributional effects of uneven compliance."[180]

b. Accounting for Business Cycle Dynamics in the Estimation of Benefits and Costs

Commenters were generally supportive of the additional material in the proposed revisions on accounting for business cycle dynamics in the estimation of regulation's benefits and costs.[181]

8. Transfers

a. The Approach to Transfers Generally

As noted in the Preamble, Circular A-4 (2003) gave limited attention to the category of transfers.[182] The proposed revisions to the Circular drew upon the 2011 guidance documents titled "Regulatory Impact Analysis: A Primer"[183] and "Regulatory Impact Analysis: Frequently Asked Questions (FAQs),"[184] which had provided further guidance on achieving a society-wide perspective in net benefits presentation—a topic that has often taken the form of distinguishing between transfers and either benefits or costs. The proposed revisions to Circular A-4 took two approaches to the summary accounting of transfers—one carrying forth the longstanding practice of presenting transfers as a separate category of regulatory effects than benefits or costs (except in the historically rare instances in which behavioral responses, and their benefit and cost consequences, have been estimated) and the other clarifying "that agencies can alternatively eschew the use of the category of transfers, and treat transfers instead as offsetting benefits and costs (which leaves estimates of net benefits unchanged). This approach may be of particular use when producing a distributional analysis."[185] OMB solicited comments on both approaches and on the transfers guidance more generally.

A number of commenters critiqued the text of the proposed revisions to the Circular on this issue. For example, one commenter criticized the Circular's language that suggests asking: "Are effects naturally dollar-denominated? If not, the impacts in question are unlikely to be transfers."[186] The commentor asked, "So this is saying that if something is 'naturally dollar-

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[179] *Ibid.*
[180] *Ibid.*
[181] *See, e.g.*, Dr. Josh Bivens and Dr. Heidi Shierholz, OMB-2022-0014-0142.
[182] Preamble at 9.
[183] Office of Information & Regulatory Affairs, *Regulatory Impact Analysis: A Primer* (Aug. 15, 2011), *https://www.reginfo.gov/public/jsp/Utilities/circular-a-4_regulatory-impact-analysis-a-primer.pdf*.
[184] Office of Information & Regulatory Affairs, *Regulatory Impact Analysis: Frequently Asked Questions (FAQs)* (Feb. 7, 2011), *https://www.whitehouse.gov/wp-content/uploads/legacy_drupal_files/omb/assets/OMB/circulars/a004/a-4_FAQ.pdf*.
[185] Preamble at 10. Note that this approach is of particular use when producing a distributional analysis because the welfare effects of a regulation may depend on the distribution of any transfer. An analysis that accounts for the differing welfare effects of regulatory benefits or costs on individuals of different incomes (qualitatively or quantitatively) may result in transfers altering the estimate of net benefits. See the section "Distributional Effects."
[186] Draft Circular A-4 at 59.

denominated,' like the purchase of a Coca-Cola, then it is likely to be a transfer?"[187] The commenter "[r]ecommended deleting" the statement in Circular A-4.[188] OMB notes that Coca-Cola is a tangible object, with dollar-denominated transactions secondary. Another commenter offered a list of hypotheticals in which regulations cause what appears to be "a gain for one group and an equal-dollar-value loss for another group"[189] but that are not, in the commenter's view, naturally classified as transfers.[190]

Another comment noted support for the proposed revisions to Circular A-4's discussion of how transfers often cause behavioral changes that lead to benefits or costs.[191]

One commenter noted that the use of transfers as a category poses a "challenge," namely, "that they may be used to wave away benefits or costs to certain groups relative to others."[192] Another comment disagreed, arguing that the category of transfers should be used, but limited to "financial exchanges" (i.e., "financial receipts and payments").[193] One group of commenters were supportive of the discussion of both approaches to transfers.[194] Another commenter was opposed to the option to restrict categories of effects to benefits and costs on the grounds that this would produce inconsistencies among agencies taking opposite approaches, and because this would make the regulations' costs rise (although net benefits would be unchanged, as benefits would rise by an equal amount if an effect were truly a transfer).[195]

After considering the various public comments, OMB has decided to retain both accounting approaches. OMB believes that this allows agencies appropriate flexibility by enabling them to use the accounting approach that best fits their particular regulatory context and analysis, without being unduly constraining.

b. The Marginal Cost of Public Funds

As noted in the Preamble, the proposed revisions also included "discussion of why agencies should not use the marginal cost of public funds (MCPF) when analyzing changes in government revenues and expenditures caused by regulations."[196]

> The marginal cost of public funds (which is closely related to the marginal excess tax burden (METB)) is not discussed in specific terms in Circular A-4 [(2003)]. OMB Circular No. A-94— OMB's guidance on benefit-cost analysis of federal programs, as published in 1992—directs that analysis of certain public investments should include a supplementary analysis with METB. {OMB, Circular A-94, Guidelines and Discount Rates for Benefit-Cost Analysis of

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[187] Dale Pekar, OMB-2022-0014-0016.
[188] *Ibid*.
[189] Draft Circular A-4 at 57.
[190] Anonymous Commenter, OMB-2022-0014-0041.
[191] National Health Law Program et al., OMB-2022-0014-0159.
[192] Eli Fenichel, OMB-2022-0014-0084.
[193] Arthur Fraas et al., OMB-2022-0014-3917.
[194] Paul Joskow et al., OMB-2022-0014-0096.
[195] RISE Stronger, OMB-2022-0014-3925.
[196] Preamble at 10.

Federal Programs 13 (Oct. 29, 1992), https://www.whitehouse.gov/wp-content/uploads/legacy_drupal_files/omb/circulars/A94/a094.pdf.} However, there are noteworthy practical and theoretical challenges with performing sufficiently thorough regulatory assessments to apply the METB or MCPF in an analysis, as discussed in the proposed revisions to Circular A-4.[197]

More specifically, the proposed revisions to Circular A-4 noted that the MCPF, as "an estimate of the distortionary cost of taxation" is underspecified because the "benefits and costs of behavioral responses to taxation will vary with the form of taxation enacted; for example, taxation of a negative externality may produce behavioral responses with substantial net social benefits" (citing Amy Finkelstein and Nathaniel Hendren, "Welfare Analysis Meets Causal Inference," *Journal of Economic Perspectives* 34, no. 4 (2020): 155-156).[198] In addition, given that Congress—not agencies—make the ultimate decision about whether to address changes in budget outlays or receipts through tax changes, spending changes, or changes in the level of debt, "applying a marginal cost of public funds in the primary analysis may inappropriately express false certainty about the attribution" of the regulatory action to the future change in tax rates.[199] The proposed revisions also noted that "[a]nother challenge in using a marginal cost of public funds is that estimates of the distortionary costs of taxation often ignore distributional considerations" (citing Bas Jacobs, "The Marginal Cost of Public Funds Is One at the Optimal Tax System," *International Tax and Public Finance* 25 (2018): 883-912).[200]

The Preamble noted that in addition to "welcoming comments on any relevant scholarly literature or practitioner experience, we request updates that have become available since OMB last sought feedback on this conceptual area in late 2019 and early 2020" on this question.[201]

One commenter supported OMB's approach, arguing that "[t]he effect of current spending on future taxation is too uncertain to consider when considering the costs of regulations. Furthermore, even if taxation did increase in the future as a result of increased spending now, the distributional benefits of such taxation might offset its distortionary costs."[202] Another commenter disagreed, arguing in particular that "[c]hanges in government expenditures associated with regulations might become more important as agencies" pair regulatory compliance with funding changes; for example, if EPA were "coordinating a new regulation on [per- and polyfluoroalkyl substances (PFAS)] that can contaminate drinking water with funds to communities that would have difficulty complying," it would make sense to account how communities would fund compliance activities.[203]

OMB notes, however, that even in this commenter's PFAS example, it is not clear how agencies would estimate the method that communities would use to fund compliance activities. They could broadly raise income, property, or sales taxes; create or increase a Pigouvian tax; cut spending; divert resources from savings; etc. This indeterminacy is one of the reasons that OMB

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[197] *Ibid.* (footnote added in braces).
[198] Draft Circular A-4 at 60-61.
[199] *Ibid.*
[200] *Id.* at 61.
[201] Preamble at 10 ("This docket's URL is *https://www.regulations.gov/document/OMB-2017-0002-0055*.").
[202] National Health Law Program et al., OMB-2022-0014-0159.
[203] Peer Review Report of Glenn C. Blomquist.

counsels against adoption of a MCPF. OMB also echoes its other concerns with the use of the MCPF, stated previously. Accordingly, OMB has retained its approach in this section.

9. Distributional Effects

a. Expanded Guidance on Producing Distributional Analyses

Distributional analyses can be critical to understanding the effects of a regulation, as noted in the Preamble:

> If it were possible to redistribute income from the winners to the losers using a costless, non-distortionary tax and transfer scheme, everyone could potentially be made better off (or no worse off) by a regulation for which there is a positive total net willingness to pay. However, this theoretical possibility is not likely to be realized or even approximated. As such, analyzing the full welfare effects of regulations requires analyzing the incidence, or distribution, of their effects.

The Preamble noted that policymakers may be interested in distributional analyses for a variety of other reasons, including to determine how lower income or other underserved communities will be affected.[204] And the Preamble noted that Executive Order 12866 directs "agencies to consider distributive impacts when deciding among alternatives," but that most analyses do not include such considerations.[205] Executive Order 14094 further states that "[r]egulatory analysis, as practicable and appropriate, shall recognize distributive impacts and equity, to the extent permitted by law."[206]

Because of the potential importance of distributional analysis, the proposed revisions to Circular A-4 provided "expanded guidance on distributional analysis" that was "intended to assist agencies in expanding estimation of disparate effects of rules on individual groups."[207] OMB specifically sought comment on this expanded guidance, and whether OMB should identify agencies with data sources that may be useful for agencies interested in performing a distributional analysis.[208]

Commenters expressed a range of views on OMB's expanded guidance on distributional analysis. Almost all commenters agreed that distributional analyses of regulations are important to produce in many cases and relevant for policymakers and others to consider.[209] Several commenters emphasized the importance of updating and expanding guidance on distributional analysis, stating that "[a]n emphasis on distributional outcomes is important,"[210] that

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[204] Preamble at 11.
[205] *Ibid.*
[206] Executive Order 14094 of April 6, 2023 (Modernizing Regulatory Review), 88 Fed. Reg. 21,879 (Apr. 11, 2011).
[207] Preamble at 11.
[208] *Id*. at 16.
[209] *See, e.g.*, International Foundation for Valuing Impacts, OMB-2022-0014-0020; Commissioner Rebecca Kelly Slaughter, OMB-2022-0014-0052; James Rising, OMB-2022-0014-0057; Business Roundtable, OMB-2022-0014-0062; Howard Beales, OMB-2022-0014-0087; Susan Dudley, OMB-2022-0014-0129; 29 Business Community Organizations, OMB-2022-0014-3918.
[210] Peer Review Report of William Pizer.

"considering distributional consequences more rigorously" is a good idea,[211] that "[i]dentifying and, where possible, estimating the distributional effects of proposed government regulations is clearly desirable,"[212] that "the advocacy that [regulatory impact analyses] report distributional effects of their policies…is a very worthwhile advance,"[213] and that they " strongly support this discussion of calculating the benefits and costs for different subpopulations."[214] One commenter pointed out that expanded guidance can help promote the use of 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.[215]

Certain commenters supported distributional analysis and recommended stronger requirements that "[d]istributional analysis should be part of any complete benefit-cost analysis"[216] (see "*Whether to Require Distributional Analyses*" below). Additional commenters also supported the inclusion of the proposed revisions' expanded guidance to agencies regarding how to produce distributional analyses.[217] Other commenters argued for yet further expanded guidance on producing distributional analyses.[218] OMB believes at this time that the expanded guidance provided in the Circular covers relevant basics useful for all agencies, while recognizing that agencies may find additional resources useful when developing certain regulatory analyses.

Some commenters argued that Circular A-4 should advise agencies to use the most granular information about benefits and costs as is feasible.[219] While OMB agrees that there are many benefits to using the most granular information available, OMB's determination is that such blanket guidance would be inadvisable. Agencies may decide that the use of less granular data is best for a host of potential reasons; for example, because of a belief that the less granular data is higher quality or more reliable, because the less granular data can be used consistently across benefit and cost categories in a way that increases the reliability of the net benefits estimate, or to ensure comparability to benefit and cost estimates developed in analyses of other regulations. To be sure, in many cases, the accuracy that more granular data provide will make their use preferable. But no one-size-fits-all answer is advisable, given the myriad concerns agencies must balance. OMB has instead taken two steps to clarify this point. First, it has maintained the material in the proposed revisions about unit of analysis and granularity: "When choosing the unit of analysis, you should consider whether the unit of analysis could obscure the relevant distributional effects. For example, if a regulation affects only individuals in the lowest

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[211] Peer Review Report of Christina D. Romer.
[212] Peer Review Report of Joseph Cordes.
[213] Peer Review Report of W. Kip Viscusi.
[214] Peer Review Report of Kenneth Gillingham.
[215] Peer Review Report of Cary Coglianese.
[216] Peer Review Report of Glenn C. Blomquist.
[217] *See, e.g.*, Susan Dudley, OMB-2022-0014-0129. David Autor et al., OMB-2022-0014-0021.
[218] *See, e.g.*, Robert N. Stavins, OMB-2022-0014-0002; Environmental Defense Fund, OMB-2022-0014-0154; Lisa Robinson, OMB-2022-0014-3921.
[219] *See, e.g.*, Environmental Defense Fund, OMB-2022-0014-0154; Center for Climate and Energy Solutions et al., OMB-2022-0014-0162.

decile of income, summarizing by quartile will make the average size of such effects appear smaller."[220] Second, it has clarified—in the context of income weighting—that "analyses applying weights of this type to benefits and costs that are estimated with more granularity will, holding all else equal, be more informative than if benefits and costs are estimated with less granularity."[221]

Certain commenters emphasized the specific need for more distributional analysis of baseline cumulative exposure to various health risks to more accurately estimate regulatory benefits and costs.[222] OMB highlighted this issue in the proposed revisions to Circular A-4, writing that "because of differences in cumulative exposures and underlying health risk factors, reducing the emissions of harmful pollution may benefit certain exposed populations more than others."[223] OMB agrees with commenters that this is likely to be a particularly useful area for agencies to focus on when producing distributional analyses.

b. *Whether to Require Distributional Analyses*

In drafting the proposed revisions to Circular A-4, OMB

considered whether the Circular should call for agencies to generally produce distributional analyses in regulatory impact analyses for certain types of rules. After consideration, we have proposed revisions that do not adopt this approach. Regardless of the type of rule, not all rules of a given type will necessarily have important distributional effects, distributional analysis can be a complex undertaking (especially when the expected incidence of benefits and costs is fully analyzed), and agencies' resources for conducting economic analyses of regulatory actions are scarce. For this reason, we have proposed revisions that emphasize agency discretion to perform preliminary screening of rules to determine which are most likely to have significant differentiated effects on particular demographic groups and to analyze important distributional effects in those cases.[224]

OMB also

considered whether Circular A-4 should specify which demographic or other groups should be analyzed when agencies conduct distributional analysis. Such a specification would ensure greater uniformity in agencies' analysis and allow comparisons across rules. However, Circular A-4 applies across a large number of different agencies that analyze rules addressing a wide variety of issues and the

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[220] Draft Circular A-4 at 62.
[221] Circular A-4 (2023) at 66.
[222] *See, e.g.*, Environmental Protection Network, OMB-2022-0014-0043; Center for Climate and Energy Solutions et al., OMB-2022-0014-0162 (citing Elisheba Spiller, Jeremy Proville, Ananya Roy, and Nicholas Z. Muller, "Mortality Risk from $PM_{2.5}$: A Comparison of Modeling Approaches to Identify Disparities across Racial/Ethnic Groups in Policy Outcomes" *Environmental Health Perspectives* 129, no. 12 (2021): 127004-1 to 127004-12); Arden Rowell, OMB-2022-0014-3923.
[223] Draft Circular A-4 at 61.
[224] Preamble at 11-12.

important distributional effects and concerns are likely to differ across rules. Therefore, the proposed revisions would include a list of possible groups to examine, but would not strictly call for the analysis of particular groups across all rules, nor is the list exhaustive of groups that may be affected by rules. That said, to the extent possible given available evidence, we tentatively conclude that it is nevertheless generally advisable for agencies to maintain consistency when identifying groups of interest across their regulations—particularly for regulations addressing similar concerns—or else explain their rationale for not doing so.[225]

OMB expressly solicited comment on these approaches.

Certain commenters felt that OMB should define a category of regulatory actions for which distributional analysis is mandatory.[226] Commenters presenting such views differed as to what category that should be. A commenter proposed 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."[227] One commenter argued that "proposed regulations that affect a large group of people with a wide distribution of income over a long period of time should be mandated to conduct distributional analysis. This will likely include any policies or investments with climate environmental, or health impacts."[228] Another commenter argued for mandating distributional analysis of any regulation that "disproportionately benefits low-income, vulnerable, minority, and underserved populations."[229] Still another commenter recommended that analyses "include a discussion of the determinants of how the net impacts of a regulation are distributed across income groups."[230] One commenter argued that the

> guidance should include instructions to analyze, at a minimum: 1) the businesses being regulated in cases where the benefits of the regulation are assumed to be broad based and accrue to entities outside the regulated community; 2) businesses by size category, where data are available, with an emphasis on smaller businesses; and 3) consumers of the regulated products by income group, with an emphasis on the lower quartile or quintile of the income distribution, depending on data availability.[231]

One commenter argued that "OMB makes a good case for" agency discretion in the determination of whether to produce a distributional analysis, "insofar as appropriate analyses will depend critically on the policy context, which differ across agencies."[232] However, to reduce

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[225] *Id*. at 12.

[226] *See, e.g.*, Peer Review Report of W. Kip Viscusi; Daniel Axelrad et al., OMB-2022-0014-0045; Environmental Defense Fund, OMB-2022-0014-0154; Public Citizen, OMB-2022-0014-0161; H. Spencer Banzhaf, OMB-2022-0014-0158; Air-Conditioning, Heating, and Refrigeration Institute (AHRI) et al., OMB-2022-0014-0166; Legal Priorities Project, OMB-2022-0014-3914; Catherine L. Kling, OMB-2022-0014-0761.

[227] Peer Review Report of Cary Coglianese. *See also* Peer Review Report of Glenn C. Blomquist.

[228] Environmental Defense Fund, OMB-2022-0014-0154.

[229] Public Citizen, OMB-2022-0014-0161.

[230] Don Kenkel, OMB-2022-0014-3910. *See also* Peer Review Report of W. Kip Viscusi.

[231] National Association of Home Builders, OMB-2022-0014-3901.

[232] H. Spencer Banzhaf, OMB-2022-0014-0158.

the "scope for agencies to cherry pick when to conduct such analyses" this commenter argued that OMB should nevertheless "provide guidance on what rules are significant enough to require distributional analyses."[233] Along these lines, another commenter argued that OMB should designate "future rulemakings expected to have significant regressivity effects" on "the poorest households" for mandatory distributional analysis by income; otherwise, the commenter argued, agencies will "conduct a regressivity analysis only when it suits their preferred regulatory outcome."[234] Articulating a contrary view, one group of commenters argued:

> The gap between the ideal and practice is largely a function of the challenge of conducting distributional analyses, particularly, analyses that are complete enough to be informative and not potentially misleading. In view of this challenge, the draft A-4 guidelines are appropriately nuanced about the use of distributional analysis in RIA and the form it might take, if it is used.[235]

However, this group of commenters argued that "[t]o the extent feasible," an "analysis focused on the lowest income groups should be required" (setting a standard income threshold).[236]

However, many commenters noted the difficulty of producing accurate distributional analyses. As one commenter put it:

> There are formidable conceptual and empirical challenges to identifying and estimating distributional effects. Simply determining who benefits and who bears the cost requires determining … the economic incidence of regulatory benefits and regulatory costs. 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.[237]

Or, as another commenter succinctly put it, "distributional analysis of regulatory costs is hard, and much work should be done to advance best practice[s]."[238] OMB agrees that these conceptual and empirical challenges can make production of distributional analyses infeasible for agencies in some circumstances. And in any event, agencies must tailor their analytical tools and approaches consistent with all relevant circumstances, including agencies' particular authorities. However, OMB anticipates that progress in analytic methods and data availability over time will help agencies to more easily overcome the challenges that distributional analysis can present in some situations. For example, in the particular case of "a regulation that requires producers to reduce carbon emissions" mentioned by the commenter quoted above, OMB notes

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[233] *Ibid.*
[234] American Chemistry Council, OMB-2022-0014-3909.
[235] Arthur Fraas et al., OMB-2022-0014-3917.
[236] *Ibid.*
[237] Peer Review Report of Joseph Cordes. *See also, e.g.*, Peer Review Report of Cary Coglianese; Peer Review Report of Glenn C. Blomquist.
[238] Peer Review Report of Glenn C. Blomquist.

that there has been substantial research progress on estimating the incidence of carbon abatement policies.[239]

Regarding whether to require distributional analyses of certain regulations, OMB emphasizes that regulatory actions can have differential effects on individuals and entities that can be broken up in myriad ways, including "income groups, race or ethnicity, sex, gender, sexual orientation, disability, occupation, or geography; or relevant categories for firms, including firm size and industrial sector)."[240] OMB continues to believe that no matter how a category of regulations is defined, not all regulations in that category will have important distributional effects along one or more of these characteristics. Case-by-case assessment is required. Further, OMB notes that because the data needed to produce a distributional analysis may be unavailable, a mandatory approach would not be appropriate. Although agency discretion is important, OMB notes that agencies may have to produce distributional analyses "when disaggregated analysis is required by the statute(s) under which the regulation is issued," and Circular A-4 encourages agencies to do so when "warranted by the need for regulatory action identified in [the agency's] regulatory analysis … or called for by an Executive Order."[241] Finally, OMB is confident, consistent with past practice, that agencies will generally not cease to produce reliable estimates of the distributional effects of a regulation if the agency previously produced and used such estimates in a prior regulation.

Other commenters thought that agencies should be at least required to justify why the agency is not conducting a distributional analysis, if they are not doing so.[242] OMB emphasizes, however, that there are many characteristics that distributional analysis could focus on. It is not clear that requiring agencies to explain why each form of distributional analysis is not being conducted would be advisable, as that could require dozens of time-consuming and low-value explanations. In addition, agencies face limited resources and are forced to make decisions about what agency actions to pursue, and what forms of analysis to develop for the actions they pursue, in light of those resource constraints. Distributional analysis is simply a subset of this general concern. A distinct requirement only attached to this one choice would fail to give OMB the flexibility to focus analytic attention where it would be most valuable during its review of each regulatory action.

Regarding the groups analyzed in distributional analyses, some commenters supported the proposed revisions' call for consistency in agencies' analyses of regulations.[243] Certain commenters argued for mandatory consideration of certain groups in distributional analyses.[244] These commenters differed regarding which groups should be included. One commenter argued that "in addition to income groups, … [a]t a minimum, we recommend that Circular A-4 provide

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[239] *See, e.g.,* Nils Ohlendorf et al., "Distributional Impacts of Carbon Pricing: A Meta-Analysis," *Environmental and Resource Economics* 78, 1-42 (2021).

[240] Draft Circular A-4 at 61.

[241] *Id*. at 62.

[242] *See, e.g.*, Dr. Eric Bettinger et al., OMB-2022-0014-0056; Environmental Defense Fund, OMB-2022-0014-0154; Center for Climate and Energy Solutions et al., OMB-2022-0014-0162; Attorneys General of New York et al., OMB-2022-0014-0169; National Association of Home Builders, OMB-2022-0014-3901; Legal Priorities Project, OMB-2022-0014-3914.

[243] *See, e.g.*, Business Roundtable, OMB-2022-0014-0062; H. Spencer Banzhaf, OMB-2022-0014-0158.

[244] *See, e.g.*, Environmental Defense Fund, OMB-2022-0014-0154; Catherine Kling, OMB-2022-0014-0761.

guidance that requires the consideration of distributional impacts among racial/ethnic groups" as well as "a standard set of additional socioeconomic indicators" including "unemployment, age, language, and education."[245] The same commenter also urged that "the analysis of proposed regulations and investments that specifically target, or have clear consequences on, certain demographic and socioeconomic groups should disaggregate benefits and costs among those groups."[246] In the other direction, one commenter noted that "although a typical assumption may be that what matter[s] is distribution by income group, this need not necessarily be the case, depending on the regulation under consideration."[247]

OMB appreciates support from commenters on the proposed revisions to Circular A-4's emphasis on the importance of consistency—where feasible and appropriate—in agency's definitions of the groups analyzed across distributional analyses. OMB continues to believe that because Circular A-4 applies across such a large number and variety of agencies and regulatory contexts, requiring that distributional analyses focus on a particular group would be inappropriate. The important dimension along which the distributional effects of a regulation vary may often differ across different regulations, as may data availability and other relevant factors, like statutory framework. That said, when such grounds for regulation-specific differences in agencies' approaches to distributional analyses do not exist, maintaining some consistency in how an agency defines distributional categories and groups across regulations may aid in the comparison of distributional consequences across regulations.

c. Weights and Benefit-Cost Analysis

The proposed revisions to Circular A-4 stated:

> In traditional benefit-cost analysis, the sum of the net benefits across society equals the aggregate net benefits of the regulation. Any approach to estimating aggregate net benefits uses distributional weights. An analysis that sums dollar-denominated net benefits across all individuals to measure aggregate net benefits—as the traditional approach generally does—adopts weights such that a dollar is equal in value for each person, regardless of income (or other economic status).[248]

But as noted in the Preamble, "[a] standard assumption in economics, informed by empirical evidence …, is that an additional $100 given to a low-income individual increases the welfare of that individual more than an additional $100 given to a wealthy individual."[249] This principle—known as diminishing marginal utility of income—gave rise to the recommendation in the proposed revision to Circular A-4 that "[a]gencies may choose to conduct a benefit-cost analysis that applies weights to the benefits and costs accruing to different groups in order to account for the diminishing marginal utility of goods when aggregating those benefits and costs."[250]

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[245] Environmental Defense Fund, OMB-2022-0014-0154.
[246] *Ibid.*
[247] Peer Review Report of Joseph Cordes.
[248] Draft Circular A-4 at 65.
[249] Preamble at 12.
[250] Draft Circular A-4 at 65.

The Circular noted, in further guidance to agencies, that consistency and clarity in such an analysis is important.

> If you decide to produce an estimate of net benefits utilizing such weights, you may treat it as your primary estimate of net benefits, or as a supplemental estimate. The same weights should be applied to benefits and costs consistently in each analysis, and the weights that you used in each analysis should be communicated clearly. As noted in the section "*Some General Considerations*" you should also present traditionally-weighted estimates (sometimes, albeit inaccurately, referred to as "unweighted" estimates) when conducting an analysis using weights that account for diminishing marginal utility.[251]

The Circular explained that "[o]ne practical approach to implementing weights that account for diminishing marginal utility uses a constant-elasticity specification to determine the weights for subgroups defined by annual income."[252] The proposed revisions to the Circular noted that "[i]f you are using population averages for benefits or costs, you should consider that such values may be implicitly weighted already, and strive to weight all benefits and costs consistently."[253]

Commenters offered a range of views on the new material on distributional weighting to capture the welfare effects of regulations.

Some commenters objected that the proposed revisions to the Circular did not go far enough. One commenter argued that the use of weights that reflect diminishing marginal utility should always be used "when it would not impose an undue burden on the agency" or "any time the estimated monetary value of the potential benefits exceeds $1 billion."[254] Another commenter argued that it is not clear that there are any circumstances under which "traditionally-weighted estimates would be justifiable or preferable" to estimates of net benefits that account for diminishing marginal utility.[255] Similarly, another commenter "believe[s] that the revisions didn't go far enough to make explicit and thoughtful weights the default option, *leaving the reflexive practice of using equal weights as a deficiency that the agency must defend if used*" (emphasis in original).[256] However, another commenter argued that while "[a]ccounting for diminishing marginal utility using distributional weighting does a better job of capturing the impact of a policy on the wellbeing of the people impacted by the policy," nevertheless "distributional weighting should be optional as opposed to mandated. Mandating distributional weighting may place additional analysis burden in some cases, as it requires knowing the income of the groups impacted by the policy."[257]

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[251] *Ibid.*

[252] *Ibid.*

[253] *Id*. at 66.

[254] Representative Rashida Tlaib, OMB-2022-0014-0046.

[255] Environmental Defense Fund, OMB-2022-0014-0154.

[256] Adam Finkel, OMB-2022-0014-0156.

[257] R. Daniel Bressler, OMB-2022-0014-3915 (citing R. Daniel Bressler and Geoffrey Heal, "Valuing Excess Deaths Caused by Climate Change," (Working Paper No. 30648, National Bureau of Economic Research, 2022), *https://www.nber.org/papers/w30648*).

OMB continues to believe that mandating the use of weights that account for the diminishing marginal utility of income would be inappropriate at this time. In some cases, the evidence used to estimate the incidence of a regulation's benefits and costs—for a variety of potential reasons—will be more appropriate for a supplementary analysis than a primary one. And as a commenter noted, there may be cases where such a requirement would burden agencies by requiring them to produce an analysis that would not be useful. Relatedly, one commenter argued that the use of such weights is "inflexible," because there may be cases when analyzing one regulation in isolation would fail to highlight future actions that will mitigate the negative consequences of the regulation, or when other forms of distributional analysis are the focus of the regulatory action.[258] But because the use of such weights is not mandatory, OMB believes that they are not an inflexible tool, and can simply not be used in circumstances where their use would not be feasible or appropriate.

A number of commenters were supportive of OMB's approach to accounting for diminishing marginal utility through the use of weights.[259] One commenter expressed a view that:

> The inclusion of distributional weighting for the purpose of overcoming the bias in benefit cost analysis created by diminishing marginal utility of income is commendable and should be preserved, against whatever criticism may be forthcoming. Distributional weighting is necessary to make benefit cost analysis a plausible means of improving social welfare; without such weighting, benefit cost analysis fails to advance social welfare and underweights the interest of the poor.[260]

One supportive commenter urged that OMB cite to more of the relevant literature setting forth the theory of distributional weighting.[261] A group of commenters noted their strong support for "implementing weights that account for diminishing marginal utility using a constant-elasticity specification to determine the weights for subgroups defined by annual income"; even if some members of the group "could quibble with the details," they argued that "the approach and

[258] 29 Business Community Organizations, OMB-2022-0014-3918.
[259] *See, e.g.*, David Autor et al., OMB-2022-0014-0021; Chris Behr, OMB-2022-0014-0032; Commissioner Rebecca Kelly Slaughter, OMB-2022-0014-0052; Daniel Acland, OMB-2022-0014-0078; Matthew Adler, OMB-2022-0014-0082; William Nordhaus, OMB-2022-0014-0089; Robert J. Brent, OMB-2022-0014-0122; E. Donald Elliott, OMB-2022-0014-0139; Dr. Josh Bivens and Dr. Heidi Shierholz, OMB-2022-0014-0142; Environmental Defense Fund, OMB-2022-0014-0154; Adam Finkel, OMB-2022-0014-0156; Center for Climate and Energy Solutions et al., OMB-2022-0014-0162; R. Daniel Bressler, OMB-2022-0014-3915; 102 Economists, OMB-2022-0014-3924; Rebecca Dell, OMB-2022-0014-0736; American Lung Association, OMB-2022-0014-0749; Better Markets, OMB-2022-0014-1568.
[260] Daniel Acland, OMB-2022-0014-0078.
[261] Matthew Adler, OMB-2022-0014-0082 (citing Matthew D. Adler, "Benefit-Cost Analysis and Distributional Weights: An Overview," *Review of Environmental Economics and Policy* 10, no.2 (2016): 264-85; Marc Fleurbaey and Rossi Abi-Rafeh, "The Use of Distributional Weights in Benefit-Cost Analysis: Insights from Welfare Economics," *Review of Environmental Economics and Policy* 10, no.2 (2016): 286-307; John Weymark, "Cost-Benefit Analysis," in *The Oxford Handbook of Well-Being and Public Policy*, ed. Matthew D. Adler and Marc Fleurbaey (Oxford: Oxford University Press, 2016), 47-81; Väinö Nurmi and Heini Ahtianen, "Distributional Weights in Environmental Valuation and Cost-Benefit Analysis: Theory and Practice," Ecological Economics 150 (2018): 217-28).

rationale articulated in the revised Circular A-4 is quite reasonable."[262] This group of commenters noted that, regardless of implementation, "most economists support the view that a $1 transfer to the poor generates more social surplus than a $1 transfer to the rich."[263] Some commenters noted that this kind of income weighting has been used by the government of the United Kingdom for decades.[264]

Still other commenters supported the use of weights that account for diminishing marginal utility in supplemental analyses but not primary analyses, citing the difficulty of producing distributional analyses, the lack of familiarity and newness of the practice for U.S. practitioners of benefit-cost analysis, the lack of precise consensus on the best estimate of the absolute value of the income elasticity of marginal utility, or the controversial response to estimating welfare changes rather than Kaldor-Hicks efficiency (which uses of an elasticity of zero).[265] As one commenter put it:

> Is [the use of an] elasticity of zero [as in the traditional approach] 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.[266]

OMB appreciates that traditional weights (weights that use an elasticity of marginal utility of zero for non-VSL benefits) can provide a useful anchoring point in an analysis, and Circular A-4 requires the production of estimates using traditional weights. However, in light of the twenty years that the previous version of Circular A-4 remained unchanged, OMB believes that it is important to allow agencies flexibility to use such estimates in primary analyses as the quantity and quality of distributional analyses improve and agencies become more familiar both with the practice in general (already in use in the U.K. for two decades[267]) and the empirical and theoretical foundations of the use of such weights in the economic literature (discussed, in part, below). OMB also emphasizes that even in cases where agencies choose to produce a weighted analysis, they "should also present traditionally-weighted estimates" just as, when presenting discounted values, they "should present the undiscounted annual time stream" of regulatory impacts.[268]

Some commenters noted that "one way to address some distributional concerns without the complication of [income] weights is to simply not vary WTP measures by [income] sub-

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[262] David Autor et al., OMB-2022-0014-0021.

[263] *Id.*

[264] *See, e.g.*, Representative Rashida Tlaib, OMB-2022-0014-0046 (citing Matthew D. Adler, "Benefit-Cost Analysis and Distributional Weights: An Overview," Review of Environmental Economics & Policy 10, no. 2 (2016): 264).

[265] *See, e.g.*, Peer Review Report of Robert S. Farrow; Peer Review Report of Glenn C. Blomquist; Matthew Kotchen, OMB-2022-0014-0114; H. Spencer Banzhaf, OMB-2022-0014-0158.

[266] Peer Review Report of Robert S. Farrow.

[267] H.M. Treasury, *The Green Book: Central Government Guidance on Appraisal and Evaluation* (2022), *https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1063330/Green_Book_2022.pdf*; H.M. Treasury, *The Green Book: Appraisal and Evaluation in Central Government* (2003), *https://webarchive.nationalarchives.gov.uk/ukgwa/20071204133059/http://www.hm-treasury.gov.uk/media/3/F/green_book_260907.pdf*.

[268] Circular A-4 (2023) at 66, 75.

group in the first place."[269] As one commenter wrote, "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."[270] First, OMB agrees that the use of WTP measures that do not vary by income can capture distributional concerns in a useful way. However, using average WTP values only for non-market goods (as recommended by the commenter)—if income group-specific WTP values for market goods are used at the same time—would capture the welfare consequences of regulatory alternatives in a coarser way than using income group-specific WTP values and income weights. Second, as OMB noted in the proposed revisions to the Circular, this approach to VSL "can be viewed as a way in which income weighting has long been integrated into the traditional approach to regulatory analysis."[271] But that is because the income elasticity of VSL approximates the absolute value of the income elasticity of marginal utility (see "*Estimating the Income Elasticity of Marginal Utility*"). As a result, analyses "should not apply income weights to such values of mortality risk reductions; they have already been weighted by income."[272] Accordingly, OMB notes that use of population-average valuations of benefits and costs for regulatory effects with valuations that do not approximate the absolute value of the income elasticity of marginal utility will be less accurate than the use of income-specific valuations and income weights (though, again, still potentially informative).

In cases when the analyst has a population-average measure of WTP (or WTA) for a good and has a good estimate of the elasticity of WTP with respect to income, the WTP measure can still be used in an income-weighted analysis. First, however, the population-average WTP measure needs to be stratified by income. An analyst can calculate WTP measures for each income level i using the formula

$$WTP_i = \overline{WTP}\left(\frac{\bar{y}_i}{y_{med}}\right)^{\eta}$$

where WTP_i is the WTP for income subgroup i, $\overline{WTP}$ is the population-average WTP, $\bar{y}_i$ is the median income for subgroup i, y_{med} is the U.S. median income, and η is the income elasticity of WTP for the good. With the measures of WTP_i, the analyst could then conduct an income-weighted analysis using the absolute value of the income elasticity of marginal utility (ε) estimate of 1.4 provided in Circular A-4.[273] The income-stratified measure could also be combined with WTP (or WTA) measures for other goods that are also income stratified.

A number of commenters were opposed to the approach on weights that account for diminishing marginal utility.

Some commenters voiced concerns about the feasibility of producing income-weighted estimates of regulatory net benefits, in light of the difficulty of producing distributional analyses of regulatory effects by income (see the discussion of this topic in "*Whether to Require Distributional Analyses*").[274] It is certainly the case that if an agency cannot produce such a

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[269] Peer Review Report of William Pizer. *See also* Peer Review Report of W. Kip Viscusi.
[270] Peer Review Report of William Pizer. *See also* Peer Review Report of W. Kip Viscusi.
[271] Draft Circular A-4 at 66, n.116.
[272] *Id*. at 66.
[273] Circular A-4 (2023) at 66-67.
[274] *See, e.g.*, Mary Sullivan, OMB-2022-0014-0029; Susan Dudley, OMB-2022-0014-0129.

distributional analysis by income, it cannot produce an income-weighted analysis. And as noted in "*Whether to Require Distributional Analyses*," there are substantial empirical and theoretical impediments to producing distributional analyses of regulatory benefits and costs. However, OMB reiterates its view that, over time, progress in analytic methods and data availability will help agencies to overcome these difficulties and make such analysis more feasible. As one commenter put it, "the basic concept behind the approach" on income weighting "is extremely well established and the use of the concept is becoming more established in recent years" in the "economic literature."[275]

One commenter presented concerns that, in the absence of clearer language, OMB's guidance could be misinterpreted:

> 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.[276]

To avoid this implication, OMB has made edits to Circular A-4 to clarify that "[a]gencies should not treat estimates using weights that account for diminishing marginal utility as primary if they are less informative about the welfare effects of the regulation than traditionally-weighted estimates."[277]

Certain commenters argued that benefit-cost analysis should focus on identifying regulatory alternatives that are most Kaldor-Hicks efficient, not most welfare-improving; or, relatedly, noted that adopting regulations that maximize social welfare could require adopting regulations that are far less Kaldor-Hicks efficient (by definition), which they opposed.[278] The proposed revisions to Circular A-4, in describing the relative merits of benefit-cost analysis and cost-effectiveness analysis, noted that benefit-cost analysis "is generally the more informative of the two types of analysis, because it is a better way of capturing the effects of regulations on social welfare."[279] OMB believes that it is appropriate for benefit-cost analysis to retain a focus on the effects of regulations on social welfare. OMB emphasizes that, consistent with Executive Order 12866, considerations other than social welfare may be relevant to an agencies' selection among regulatory alternatives.[280] One commenter also noted that benefit-cost analysis already routinely deviates from Kaldor-Hicks assumptions, e.g., by using one VSL for individuals of varying incomes rather than income-specific VSL.[281] Another group of commenters pointed out

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[275] Peer Review Report of Kenneth Gillingham.
[276] Peer Review Report of Cary Coglianese.
[277] Circular A-4 (2023) at 66.
[278] *See, e.g.*, Peer Review Report of William Pizer; Peer Review Report of Joseph Cordes; Mary Sullivan, OMB-2022-0014-0029; Susan Dudley, OMB-2022-0014-0129; Western Energy Alliance, OMB-2022-0014-0155; American Petroleum Institute et al., OMB-2022-0014-0168; Don Kenkel, OMB-2022-0014-3910; 29 Business Community Organizations, OMB-2022-0014-3918; Catherine L. Kling, OMB-2022-0014-0761.
[279] Draft Circular A-4 at 4.
[280] Executive Order 12866 of September 30, 1993 (Regulatory Planning and Review), 58 Fed. Reg. 51,735 (Oct. 4, 1993).
[281] Peer Review Report of William Pizer. *See also* Peer Review Report of W. Kip Viscusi.

that the Kaldor-Hicks potential compensation criterion can be incoherent for projects with long time horizons because "potential compensations that [can] never transpire are not much use to those who suffer the negative consequences of a policy and the idea that those most affected by far-future … damages will actually be compensated strains credulity."[282]

Some commenters felt that the use of weights reflecting the diminishing marginal utility of income would increase the uncertainty of the net benefits estimate or inject controversy (from opponents) that would outweigh the benefits of their use.[283] OMB believes that such concerns are better addressed in the context of particular regulations, rather than by removing discussion of the analytic approach from Circular A-4.

Certain commenters also felt that "[p]resenting the weighted estimates alongside the traditionally-weighted estimates could be confusing and make it more difficult for the public to know how the decisions were being made."[284] OMB disagrees with these commenters; by presenting both traditionally-weighted estimates and income-weighted estimates, agencies are likely to be able to more clearly explain and relate their analysis of a regulation's monetized effects on social welfare—by comparison to the traditionally-weighted estimate—to the policy decision that was informed by the analysis. Presentation of both estimates may be particularly helpful in clarifying where agencies made decisions on the basis of considerations other than social welfare.

Certain commenters argued that income weights should not be used because estimation of the income elasticity of marginal utility is not precise enough to eliminate uncertainty.[285] See "*Estimating the Income Elasticity of Marginal Utility*" below for more detail on this estimate. Relatedly, one group of commenters argued that such estimates will not be fully precise because "the marginal utility of income is determined by many variables, such as the presence of non-monetized amenities and the economic conditions that consumers face, e.g., the energy required to heat homes in cold versus warm climates."[286] Another group of commenters noted that "some measure of lifetime income is a preferable measure, especially when looking at policies that affect the young or old."[287] Conversely, one commenter argued that, even to the extent that some uncertainty over the exact value of the elasticity remains, "[i]t is better to be roughly right than precisely wrong …. Precisely wrong in this context would be to continue a practice that assumes the marginal benefit of additional income to a homeless individual and a multi-billionaire are equivalent."[288] OMB agrees with commenters that, like many inputs to benefit-cost analyses, the estimate of the absolute value of the income elasticity of marginal utility is not without uncertainty; the point estimate is only an estimate of central tendency. Further, OMB agrees with commenters that marginal utility depends on more than income, and that a measure of lifetime income (if available) would often be more informative than an estimate of annual income.

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[282] Geoffrey M. Heal, Noah Kaufman, and Antony Millner, OMB-2022-0014-0100.

[283] *See, e.g.*, Robert N. Stavins, OMB-2022-0002; Richard Morgenstern et al., OMB-2022-0014-0031.

[284] Mary Sullivan, OMB-2022-0014-0029.

[285] *See, e.g.*, Business Roundtable, OMB-2022-0014-0062; Marvin Phaup, OMB-2022-0014-0058.

[286] Arthur Fraas et al., OMB-2022-0014-3917.

[287] Paul Joskow et al., OMB-2022-0014-0096.

[288] Representative Rashida Tlaib, OMB-2022-0014-0046 (quoting (roughly) Carveth Read, *Logic: Deductive and Inductive*, 4th ed. (London: Alexander Moring Ltd., 1908), 351 ("It is better to be vaguely right than exactly wrong.")).

However, OMB also agrees with the comment that the perfect should not be the enemy of the good; much like the simplifying assumption of an iso-elastic utility function, the use of annual income (which is widely measured in the data and is the common measure used to estimate the elasticity of marginal utility, as discussed in "*Estimating the Income Elasticity of Marginal Utility*") in income-weighted analysis allows for a great deal of additional insight into the welfare effects of a regulation relative to traditionally weighted estimates, even if that insight is not perfect.

One commenter opposing the use of weights that account for diminishing marginal utility argued that income-weighted net benefit estimates are difficult to interpret.[289] OMB disagrees. Income-weighted estimates of net benefits are interpretable as the regulation's effect on total welfare, where welfare is denominated in units of dollars for the median American. By contrast, traditional net benefit estimates—though now familiar—are in fact more difficult to interpret. Kaldor-Hicks efficiency estimates of net benefits roughly (i.e., ignoring the Scitovsky paradox, etc.) represent the amount of dollars that could be hypothetically transferred from the winners of a regulatory change to the losers of the regulatory change, up to the point where the winners become indifferent to the change. OMB notes that some scholarship has argued that, going beyond Kaldor-Hicks efficiency estimates of net benefits, traditionally-weighted net benefit estimates lack a straightforward interpretation.[290] The interpretation of traditionally-weighted estimates of net benefits is at least, in OMB's view, less straightforward than consistently income-weighted estimates of net benefits. Given that there has been little difficulty caused by the challenges of interpreting traditionally-weighted estimates of net benefits, OMB is not substantially concerned that the interpretation of income-weighted net benefit will cause greater difficulty.

The same commenter also argued that the net benefits of income-weighted estimates will depend on the granularity of the calculations.[291] OMB agrees, but notes that this problem is not specific to income weighting. It exists wherever more disaggregated information would lend insight into overall estimates of benefits and costs, such as when estimating cumulative exposure to health risks, differential effects on small and large businesses, dose-response effects, or (as this commenter has noted in prior research) climate change impacts.[292] Accordingly, OMB believes this is primarily an argument for generally using the most granular information about benefits and costs (all else being equal), as discussed in "*Expanded Guidance on Producing Distributional Analyses.*"

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[289] Peer Review Report of William Pizer.

[290] *See* R. Daniel Bressler and Geoffrey Heal, "Valuing Excess Deaths Caused by Climate Change," (Working Paper No. 30648, National Bureau of Economic Research, 2022), *https://www.nber.org/papers/w30648*; Daniel Hemel, "Regulation and Redistribution with Lives in the Balance," *The University of Chicago Law Review* 89, no. 3 (2022): 649-734.

[291] Peer Review Report of William Pizer.

[292] Kevin Rennert et al., "The Social Cost of Carbon: Advances in Long-term Probabilistic Projections of Population, GDP, Emissions, and Discount rates," *Brookings Papers on Economic Activity* (2021): 230 ("[C]limate damages are most appropriately estimated at a regional (or even local) scale. Thus, they require geographically disaggregated estimates of GDP and population.").

Some of the comments argued that interpersonal comparisons of welfare are impossible or meaningless.[293] One of these commenters wrote: "Nobel laureate John Harsanyi observes that 'Many economists and philosophers take the view that our limited information about other people's minds renders it impossible for us to make meaningful interpersonal comparisons of utility.'"[294] OMB notes that in the very same piece, Harsanyi went on to criticize these economists and philosophers, concluding:

> But even if our judgements of interpersonal comparisons can easily be *mistaken*, this does not imply they are *meaningless* …. [These] economists and philosophers … have greatly exaggerated the difficulties we face in making interpersonal utility comparisons with respect to the utilities and disutilities that people derive from ordinary commodities and, more generally, from the ordinary pleasures and calamities of human life…. But, fortunately, very few of our … public political decisions depend on … exceptionally difficult interpersonal comparisons of utility.[295]

One commenter argued that interpersonal comparisons of welfare are not fully verifiable.[296] Relatedly, another commenter argued that such comparisons were "controversial," and noted that happiness studies—while suggestive evidence of diminishing marginal utility of income—have demonstrated heterogeneity in income elasticities of happiness between the most-happy and least-happy at different levels of income.[297] Similarly, a different commenter argued that the "empirical evidence making comparisons across different individuals is less clear" and cast doubt on the use of self-reported subjective wellbeing measures given their inconsistency with VSL measures.[298]

Several commenters who were of the opposite view presented two lines of reasoning. One line of reasoning focused on the fact that all analyses—including traditionally-weighted analyses—assume the meaningfulness of interpersonal comparisons:

> 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

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[293] *See, e.g.*, Mary Sullivan, OMB-2022-0014-0029; Howard Beales, OMB-2022-0014-0087; Susan Dudley, OMB-2022-0014-0129; Don Kenkel, OMB-2022-0014-3910. Several of these comments cited Deirdre N. McCloskey, *The Applied Theory of Price*, 2nd ed. (New York: Macmillan Publishing Company, 1985).

[294] Don Kenkel, OMB-2022-0014-3910 (quoting John C. Harsanyi, "Interpersonal Utility Comparison," in *Utility and Probability*, ed. John Eatwell, Murray Milgate, and Peter Newman (London: Palgrave Macmillan, 1990), 128-33).

[295] John C. Harsanyi, "Interpersonal Utility Comparison," in *Utility and Probability*, ed. John Eatwell, Murray Milgate, and Peter Newman (London: Palgrave Macmillan, 1990), 132.

[296] Arthur Fraas et al., OMB-2022-0014-3917 (citing Daniel J. Acland and David H. Greenberg, "Distributional Weighting and Welfare/Equity Tradeoffs: A New Approach," Journal of Benefit-Cost Analysis 14, no. 1 (2023): 68-92). Daniel Acland's public comment on this question is presented in a block quotation in the next paragraph.

[297] Peer Review Report of Glenn C. Blomquist (citing Mathew A. Killingsworth, Daniel Kahneman, and Barbara Mellers, "Income and Emotional Well-being: A Conflict Resolved," *Proceedings of the National Academies of Sciences* 120, no. 10 (2023): 1-6).

[298] Peer Review Report of W. Kip Viscusi. OMB believes that to the extent that these two lines of evidence are inconsistent, that provides an argument for considering both lines of evidence in estimating the absolute value of the income elasticity of marginal utility. *See "Estimating the Income Elasticity of Marginal Utility"* below.

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….

[T]he 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 [income] 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.[299]

A second line of reasoning emphasized the appropriate default assumption runs counter to this "flawed argument" about interpersonal comparability:

distributional weighting does not require interpersonal comparability at the individual level, but only at the group level. Because the effects of a policy on any given group are aggregated across the group in benefit cost analysis, all that matters is that the individuals in one group be, on average, of the same type as the individuals in the other affected groups…. The assumption that, on average, the members of different groups are roughly the same with respect to the welfare value of any given number of distributionally-weighted dollars should, in my opinion, be the default assumption, and any claim that this assumption does not hold in any particular regulatory context should be accompanied by some kind of supporting evidence.[300]

OMB agrees that the appropriate default assumption is that individuals are similar to one another, and therefore observed evidence on the income elasticity of marginal utility is best explained by commonalities in the diminishing marginal utility of income (absent a persuasive and evidence-backed alternative explanation).

Some commenters argued against the use of cardinal utility altogether. One argued that "if you ask an economist what 'modern' means in welfare economics, as often as not the answer will focus on the theory of revealed preference and the use of ordinal utility functions,"[301] i.e., that individuals can only be described as having an ordering of preferences (ordinal utility), without a meaningful numerical relationship of utilities amongst those preferences (cardinal utility). Similarly, another commenter argued that the "proposed Circular and its Preamble each fail to justify the use of the interpersonal utility function that underlies" weights reflecting diminishing marginal utility, "despite neoclassical economics' longstanding opposition to

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[299] Peer Review Report of Kenneth Gillingham.
[300] Daniel Acland, OMB-2022-0014-0078.
[301] Brian Mannix, OMB-2022-0014-0160.

interpersonal utility comparisons."[302] OMB agrees that as of the late 1930s, "modern" welfare economics—distinguishing itself from the early 20th century ideas of Pigou and the late 19th century ideas of Marshall—advanced the idea that only ordinal utility functions are identifiable.[303] But more recently, cardinal utility has become widespread in economics.[304] Two uses of cardinal utility that are particularly relevant for regulatory analysis are discrete choice models (widely used to estimate preferences over regulatory alternatives)[305] and quasilinear utility (which ensures equivalence between welfare changes measured by equivalent or compensating variation and the more widely used consumer surplus).[306] Moreover, by 1947, von Neumann and Morgenstern had proved that with relatively weak assumptions, an individual's ordinal utility function will imply a cardinal utility function (or affine transformation thereof).[307] By the mid-1950s, Harsanyi had published work connecting the von Neumann-Morgenstern approach to cardinal measures of social welfare.[308] In the seventy years since, welfare economics has seen an explosion of further research on these ideas. OMB takes no views on debates within that literature, other than noting that there are likely to be circumstances where it would be useful for Federal agencies to estimate changes in social welfare when conducting benefit-cost analyses of regulations.

Certain commenters argued that the use of weights that reflect diminishing marginal utility, rather than weights that value dollars equally for high-income and low-income individuals alike, is not measuring welfare, but rather is a normative choice.[309] OMB believes that—for the reasons just discussed—measuring welfare (like measuring Kaldor-Hicks efficiency) is a descriptive endeavor. Standard textbook treatments of the subject, however, note that any descriptive inquiry (whether into Kaldor-Hicks efficiency or welfare maximization) becomes normative when used as the basis for a policy decision: "following [Kaldor-Hicks]

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[302] 29 Business Community Organizations, OMB-2022-0014-3918. Relatedly, one commenter wrote that "economists are incapable of making" these "interpersonal utility comparisons between groups" to "generate an estimate of social welfare." American Petroleum Institute et al., OMB-2022-0014-0168.

[303] *See, e.g.*, Nicholas Kaldor, "Welfare Propositions of Economics and Interpersonal Comparisons of Utility," *The Economic Journal* 49, no. 195 (1939): 549-52; J.R. Hicks, "The Foundations of Welfare Economics," *The Economic Journal* 49, no. 196 (1939): 696-712.

[304] *See* Roy Allen and John Rehbeck, "Identification with Additively Separable Heterogeneity," *Econometrica* 87, no. 3 (2019): 1021-54, for discussion of many settings that assume cardinality.

[305] Daniel McFadden, "Economic Models of Probabilistic Choice," in *Structural Analysis of Discrete Data with Econometric Applications*, ed. Charles F. Manski and Daniel McFadden (Cambridge, MA: The MIT Press, 1981), 198-272.

[306] Richard E. Just, Darrell L. Hueth, and Andrew Schmitz. *The Welfare Economics of Public Policy: A Practical Approach to Project and Policy Evaluation*, (Cheltenham: Edward Elgar Publishing, 2004), 119.

[307] John von Neumann and Oskar Morgenstern, *Theory of Games and Economic Behavior*, 2nd ed. (Princeton: Princeton University Press, 1947). This work assumed objective probabilities. For the extension to individuals' subjective probabilities, *see* Leonard J. Savage, *The Foundations of Statistics* (Hoboken, NJ: John Wiley & Sons, 1954).

[308] *See* John C. Harsanyi, "Cardinal Welfare, Individualistic Ethics, and Interpersonal Comparisons of Utility," *Journal of Political Economy* 63, no. 4 (1955): 309-21; John C. Harsanyi, "Cardinal Utility in Welfare Economics and in the Theory of Risk-taking," *Journal of Political Economy* 61, no. 5 (1953): 434.

[309] *See, e.g.*, Peer Review Report of William Pizer; James Broughel, OMB-2022-0014-0095; Susan Dudley, OMB-2022-0014-0129; H. Spencer Banzhaf, OMB-2022-0014-0158 (citing Lionel Robbins, *An Essay on the Nature and Significance of Economic Science*, 2nd ed. (London: Macmillan, 1935)); Brian Mannix, OMB-2022-0014-0160; Don Kenkel, OMB-2022-0014-3910.

criteria without actually paying compensation necessarily involves a value judgment implying equal welfare weights among the individuals that are aggregated."[310]

One commenter noted that "[i]t is important that recognizing declining marginal utility of income is not the same as deciding that maximizing (arithmetic) average utility is the societal goal."[311] OMB agrees with this commenter, and notes that producing estimates of regulations' effects on welfare does not imply that society should have the goal of maximizing social welfare. As noted in Executive Order 12866, "agencies should select those approaches that maximize net benefits," which include "qualitative measures of costs and benefits that are difficult to quantify, but nevertheless essential to consider," including "equity[], unless a statute requires another regulatory approach."[312] As a different commenter argued, adjusting for diminishing marginal utility does not "imply any judgment about the relative importance of the welfare of the poor and the welfare of the wealthy"; it "simply eliminate bias," and using such weights is appropriate because views about the appropriate "distribution of *welfare* lie outside benefit cost analysis."[313] Or as another group of commenters put it:

> To be very clear about this, for good or bad, the recommendations on distributional weighting in Circular A4 do not constitute ideological judgements that the welfare of poorer households should be prioritized over richer households. Instead, these recommendations aim to correct a clear analytical and empirical error made in too much BCA today – the failure to account for the declining marginal utility of income.[314]

These commenters argue that "[i]t would be regulatory malpractice to not account for" diminishing marginal utility through weights.[315] OMB reiterates its conclusion that efforts to estimate changes in welfare are a descriptive (positive) exercise, not a normative (prescriptive) one, and a potentially relevant focus for regulatory analyses.

Regarding the implementation of income weights, several commenters noted that income weighting when some categories of benefits or costs are estimated on the basis of population-average WTP/WTA values may be more complicated.[316] As noted in the proposed revisions to the Circular, agencies should "strive to weight all benefits and costs consistently"; if agencies are "using population averages for benefits or costs … such values may be implicitly weighted already" and agencies should strive to account for those weights. Some commenters provided step-by-step directions for agencies on how to adjust income weights when some categories of benefits or costs are valued using population averages.[317] OMB appreciates commenters who

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[310] Richard E. Just, Darrell L. Hueth, and Andrew Schmitz, *The Welfare Economics of Public Policy: A Practical Approach to Project and Policy Evaluation*, (Cheltenham: Edward Elgar Publishing, 2004), 646.

[311] Peer Review Report of William Pizer (also noting equal sacrifice views on taxation; see "*Estimating the Income Elasticity of Marginal Utility*" regarding consideration of this normative view).

[312] Executive Order 12866 of September 30, 1993 (Regulatory Planning and Review), 58 Fed. Reg. 51,735 (Oct. 4, 1993).

[313] Daniel Acland, OMB-2022-0014-0078.

[314] Dr. Josh Bivens and Dr. Heidi Shierholz, OMB-2022-0014-00142.

[315] *Ibid*.

[316] *See, e.g.*, Richard Morgenstern, et al., OMB-2022-0014-0031

[317] *See, e.g.*, Chris Behr, OMB-2022-0014-0032; Daniel Acland, OMB-2022-0014-0078.

raised these points or provided reference materials. While OMB believes that these materials are overly detailed for inclusion in Circular A-4, OMB looks forward to working with agencies on implementation of the new material in the Circular.

A number of comments noted the importance of using measures of income that include government taxes and payments from transfer programs when estimating the income weight that applies to income groups.[318] OMB agrees with these comments—which the proposed revisions to the Circular had previously only noted with respect to taxes, but not transfer program payments[319]—and has made edits to the Circular to explicitly reflect this point.

d. Estimating the Income Elasticity of Marginal Utility

For agencies developing income-weighted estimates of regulatory net benefits, the proposed revisions noted that "OMB has determined that 1.4 is a reasonable estimate of the income elasticity of marginal utility for use in regulatory analyses."[320] The Preamble explained that this estimate was derived from a survey of empirical evidence regarding risk aversion, self-reported happiness measures, the elasticity of intertemporal substitution, and the income elasticity of the value of statistical life (VSL).[321]

Some commenters were supportive of the 1.4 estimate.[322] As one commenter put it, "the proposed approach is reasonable and I believe that it would be difficult to find a much-preferable approach."[323] One commenter noted that "the U.K government uses an elasticity of marginal utility of 1.3, Acland and Greenberg [(2022] recommend 1.5, and the revised Circular proposes 1.4."[324] Another commenter noted that since OMB's proposed revisions were published, Acland and Greenberg (2022) was revised and published in 2023, with an updated meta-analysis estimate of 1.6; "[i]nasmuch as [that] estimate may contribute to OMB's preferred estimate of 1.4, [the] revised estimate might suggest a higher recommended value."[325] However, a number of commenters stated that in their view, OMB's estimate "has a limited basis," seemed too large, or should be "better supported by a more comprehensive literature review."[326] As noted below, OMB has based its current estimate on a more comprehensive review of the evidence.

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[318] *See, e.g.*, Peer Review Report of Robert S. Farrow; Daniel Acland, OMB-2022-0014-0078; Howard Beales, OMB-2022-0014-0087; American Petroleum Institute et al., OMB-2022-0014-0168.

[319] Draft Circular A-4 at 64, n.110.

[320] *Id*. at 65-66.

[321] Preamble at 12-15.

[322] *See, e.g.*, Peer Review Report of Kenneth Gillingham; David Autor et al., OMB-2022-0014-0021; Dr. Josh Bivens and Dr. Heidi Shierholz, OMB-2022-0014-0142; R. Daniel Bressler, OMB-2022-0014-3915.

[323] Peer Review Report of Kenneth Gillingham. *See also* David Autor et al., OMB-2022-0014-0021 ("Of course, in practice the implementation of such an approach requires assuming a specific functional form and definition of subgroups (such as annual income). While we could quibble with the details, the choice of which again is necessarily one of many reasonable implementations, in our opinion the approach and rationale articulated in the revised Circular A-4 is quite reasonable.").

[324] Representative Rashida Tlaib, OMB-2022-0014-0046.

[325] Daniel Acland, OMB-2022-0014-0078.

[326] Richard Morgenstern et al., OMB-2022-0014-0031. For similar comments, see Business Roundtable, OMB-2022-0014-0062; Timothy Fitzgerald, OMB-2022-0014-0117; Robert J. Brent, OMB-2022-0014-0122;

More specifically, some commenters argued against the use of evidence from studies of the income elasticity of VSL to estimate the absolute value of the income elasticity of marginal utility, as under certain theoretical specifications the income elasticity of VSL should exceed the absolute value of the income elasticity of marginal utility (by a small amount).[327] However, OMB notes that the empirically measured income elasticity of VSL is, in fact, somewhat lower than other sources of empirical evidence that sheds light on the absolute value of the income elasticity of marginal utility.[328] Moreover, similar lines of reasoning can be applied to different methods for estimating the income elasticity of marginal utility. For example, moving from the assumption of constant relative risk aversion (CRRA) utility to Epstein-Zin utility leads to smaller estimates of the elasticity of intertemporal substitution and larger estimates of risk aversion.[329]

In light of these considerations, the possibility that the income elasticity of VSL is somewhat upwardly biased does not provide a strong reason—at this time—to exclude this line of evidence from the estimate. OMB continues to believe that consideration of the income elasticity of VSL is relevant to developing the soundest estimate of the absolute value of the income elasticity of marginal utility. Conversely, one commenter argued for only considering evidence from the income elasticity of VSL.[330] OMB believes, however, that—given measurement difficulties inherent in all lines of evidence—other sources of evidence are also relevant to the estimation of the absolute value of the income elasticity of marginal utility, since they all (given various assumptions) should approximate the same value. Accordingly, the inclusion of more relevant lines of evidence will help to produce the soundest possible estimate.

One commenter argued against reliance on Havranek et al. (2015) specifically, noting that "if we think of [the elasticity of intertemporal substitution, or] EIS as the inverse of the elasticity of marginal utility of income, this approach assumes that the inverse of an average is equal to the average of the inverse, which is, in general, not correct."[331] OMB agrees with the commenter that this is a weakness of relying on the Havranek et al. (2015) article (or others like it), and has ceased reliance on this estimate.

To further strengthen the foundation for the estimate of the absolute value of the income elasticity of marginal utility in Circular A-4, OMB began with the data set of elasticity estimates from Acland and Greenberg (2023), which is the most up-to-date and comprehensive survey of the relevant literature on the income elasticity of marginal utility.[332] Acland and Greenberg

Environmental Defense Fund, OMB-2022-0014-0154; Center for Climate and Energy Solutions et al., OMB-2022-0014-0162.

[327] *See, e.g.*, Louis Kaplow, "The Value of a Statistical Life and the Coefficient of Relative Risk Aversion," *Journal of Risk and Uncertainty* 31, no. 1 (2005): 23-34; Daniel Acland, OMB-2022-0014-0078 (citing Louis R. Eeckhoudt and James K. Hammitt, "Background Risks and the Value of a Statistical Life," *Journal of Risk and Uncertainty* 23, (2001): 261-79). These sources were also cited and discussed in the Preamble at 14.

[328] Preamble at 15.

[329] Larry G. Epstein and Stanley E. Zin, "Substitution, Risk Aversion, and the Temporal Behavior of Consumption and Asset Returns: An Empirical Analysis," *Journal of Political Economy* 99, no. 2 (1991): 263-86.

[330] Peer Review Report of Robert S. Farrow.

[331] Daniel Acland, OMB-2022-0014-0078.

[332] Daniel Acland and David H. Greenberg, "The Elasticity of Marginal Utility of Income for Distributional Weighting and Social Discounting: A Meta-analysis," *Journal of Benefit-Cost Analysis* 14, no. 2 (2023): 386-405.

(2023) collected 1,711 estimates from 158 separate studies from the U.S. and U.K. using data sources evaluating six lines of evidence: the inverse of the elasticity of intertemporal substitution, Frisch elasticity, relative risk aversion, elasticity of subjective wellbeing measures, expert elicitation, and the assumption that income tax rates are set to equivalize equal welfare loss across the population (equal sacrifice). For the preferred estimate, as noted above, OMB believes that it is appropriate to consider evidence on the income elasticity of VSL, and have added 3 estimates from 3 studies with U.S. data to capture that line of evidence.[333] In addition, because of OMB's focus on providing a descriptive (positive) estimate, OMB's preferred estimate eliminates evidence from expert elicitation (which may include experts' normative views and may effectively-double count the studies experts were aware of[334]) and the equal sacrifice income taxation estimates (which are set based on a normative presumption about income taxation, rather than on the basis of revealed or stated preference evidence). In the process of replicating Acland and Greenberg, OMB also found and removed 75 duplicate estimates. This results in a dataset with 1,636 estimates from 158 separate studies, in total, across five lines of evidence: the inverse of the elasticity of intertemporal substitution, Frisch elasticity, relative risk aversion, elasticity of subjective wellbeing measures, and VSL elasticity. The result is an estimate of 1.4.

When listed to two decimal places (for comparison with robustness checks), this value is 1.37. To illustrate the robustness of this estimate to modeling choices, OMB has considered two groups of variations to this preferred specification. First, varying the country of focus. If the data is restricted to only U.S. studies—excluding U.K. studies—the resulting estimate would be 1.42. Second, varying the lines of evidence considered. If expert elicitation evidence was added, the resulting estimate would be 1.37. If equal sacrifice income taxation estimates were added, the resulting estimate would be 1.39. If both expert elicitation evidence and equal sacrifice evidence were added, the resulting estimate would be 1.39. If VSL elasticity estimates were excluded, the resulting estimate would be 1.50.

If, as in Acland and Greenberg (2023)'s primary specification, VSL elasticity estimates were excluded and expert elicitation and equal sacrifice income taxation were included, the resulting estimate would be 1.6. Acland and Greenberg (2023) also provide additional information on the effect of excluding the highest and lowest 10% of estimates (resulting estimate of 1.6), excluding the highest and lowest 20% of estimates (resulting estimate of 1.7), or using only micro-data studies rather than aggregate data studies (resulting estimate of 1.8).

OMB believes that the primary estimate of 1.4 is not only supported on the basis of 1,636 estimates across 158 studies, but also robust to other modeling choices.

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[333] Anna Alberini et al., "Does the Value of a Statistical Life Vary with Age and Health Status? Evidence from the United States and Canada," *Journal of Environmental Economics and Management* 48, no. 1 (2004): 769-92; Phaedra S. Corso, James K. Hammitt, and John D. Graham, "Valuing Mortality-risk Reduction: Using Visual Aids to Improve the Validity of Contingent Valuation," *Journal of Risk and Uncertainty* 23, no. 2 (2001): 165-84; James K. Hammitt and Kevin Haninger, "Valuing Fatal Risks to Children and Adults: Effects of Disease, Latency, and Risk Aversion," *Journal of Risk and Uncertainty* 40, no. 1 (2010): 57-83. Estimates from VSL meta-analyses did not come exclusively from the U.S. or U.K. and were excluded.

[334] The sole expert elicitation study—which discusses the relevance of experts' normative views—is Moritz A. Drupp et al., "Discounting Disentangled," *American Economic Journal: Economic Policy* 10, no. 4 (2018): 109-34.

10.   Treatment of Uncertainty

As the Preamble noted:

> Two important changes in the proposed revisions to this section of Circular A-4
> include no longer stating that an assumption of risk-neutrality is generally
> appropriate, and providing more guidance on how to calculate risk-adjusted
> benefit or cost values when willingness-to-pay or willingness-to-accept values do
> not already reflect individuals' risk preferences.[335]

This material, while a change from Circular A-4 (2003), essentially added back material
previously covered in the 1996 "Economic Analysis of Federal Regulations Under Executive
Order 12866" guidance document.[336] Like the proposed revisions to the Circular, that guidance
noted that "[u]nder the standard assumption in economic theory that individuals make choices
among outcomes subject to risks to maximize expected utility, risk aversion is incorporated into
net benefits estimates by expressing benefits and costs in terms of their certainty equivalents."[337]
The proposed revisions noted, "[n]evertheless," that

> there are a variety of circumstances in which risk aversion may not be material to
> your analysis and you could appropriately assume risk neutrality. First, and
> perhaps most commonly, when a regulation has modest effects on each person or
> group that is affected, or when a regulation's net benefits are almost identical in
> different states of the world, it will often be reasonable to ignore risk preferences
> in your analysis because the consequences of incorporating them would be
> negligible…. Second, when people are already fully insured against a risk or
> could choose to be so, regulations affecting that risk may not offer any additional
> insurance benefits to the affected population. {This result may not hold if the
> transaction costs of becoming fully insured are substantial.} … Finally, as noted
> previously, while risk aversion is widespread, there may be contexts in which
> some people are risk-neutral or risk-seeking. If there is evidence that this is the
> case in a context that is relevant to your regulation, you should alter your analysis
> accordingly.[338]

The proposed revisions also recommended that agencies calculate certainty-equivalent values for
uncertain costs and benefits. Use of certainty-equivalent valuations—and particularly the
comparison between their use and the use of a risk-adjusted discount rate—are discussed further
in "*Accounting for Risk When Discounting.*"

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[335] Preamble at 16.
[336] Office of Management & Budget, *Economic Analysis of Federal Regulations Under Executive Order 12866*
(Jan. 11, 1996), *https://georgewbush-whitehouse.archives.gov/omb/inforeg/riaguide.html*. This guidance document
"was drafted by an RWG [Regulatory Working Group] interagency working group chaired by Joe Stiglitz of CEA
and then-General Counsel of the Department of Transportation, Steve Kaplan." Sally Katzen, *Memoranda for
Members of the Regulatory Working Group -- Economic Analysis of Federal Regulations Under Executive Order
No. 12866* (Jan. 11, 1996), *https://obamawhitehouse.archives.gov/omb/memoranda_rwgmemo/*.
[337] Office of Management & Budget, *Economic Analysis of Federal Regulations Under Executive Order 12866* (Jan.
11, 1996), *https://georgewbush-whitehouse.archives.gov/omb/inforeg/riaguide.html*.
[338] Draft Circular A-4 at 71-72 (footnote added in braces).

OMB solicited comment "on all aspects of these proposed revisions, and" noted "that many of these topics are interrelated."[339]

Many commenters were supportive of the proposed revisions to this section.[340] Some commenters specifically highlighted the removal of the assumption of risk neutrality, and the acknowledgement of risk aversion, as a key improvement to the section.[341] One comment approvingly noted that while risk neutrality is applicable "when the losses are spread broadly across the population," if "individuals incur substantial losses, their personal risk aversion does come into play and is a legitimate concern when monetizing benefits for financial losses."[342] Some commenters suggested that OMB provide more detail on how agencies could estimate certainty-equivalent valuations.[343] OMB has provided more mathematical detail on how to perform this calculation in the final Circular A-4.[344]

Certain commenters were critical of the removal of the presumption of risk neutrality. One critical comment stated that:

> We believe that agencies only rarely provide certainty-equivalent benefit and cost estimates, in part because it is highly impractical to do so and few academic analyses have implemented this approach. We recommend that OMB provide informative and successful examples of applications of certainty-equivalent (aka option value) approaches to federal regulations. OMB should also use such examples to show how certainty-equivalent approaches lead to estimates that are more conceptually sound and materially different than the more common expected surplus estimates.[345]

OMB notes that calculation of certainty-equivalent valuations in the academic literature or regulatory analyses is not novel.[346] OMB also believes that the additional mathematical detail that it has provided on how to perform this calculation verifies how certainty-equivalent approaches can lead to estimates that are more accurate and substantially differ from expected value calculations, particularly when individuals face large uninsurable risks.[347]

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[339] Preamble at 16.

[340] *See, e.g.*, Peer Review Report of Kenneth Gillingham; Peer Review Report of Cary Coglianese; Peer Review Report of Robert S. Farrow; H. Spencer Banzhaf, OMB-2022-0014-0158; Eli Fenichel, OMB-2022-0014-0084.

[341] *See, e.g.*, Peer Review Report of W. Kip Viscusi; Peer Review Report of Cary Coglianese; Robert N. Stavins, OMB-2022-0014-0002; David Autor et al., OMB-2022-0014-0021; James Rising, OMB-2022-0014-0057; Gopi Goda, OMB-2022-0014-0147; Environmental Defense Fund, OMB-2022-0014-0154; R. Daniel Bressler, OMB-2022-0014-3915; 102 Economists, OMB-2022-0014-3924.

[342] Peer Review Report of W. Kip Viscusi.

[343] *See, e.g.*, Robert N. Stavins, OMB-2022-0014-0002; R. Daniel Bressler, OMB-2022-0014-3915.

[344] Circular A-4 (2023) at 74, n.149.

[345] Arthur Fraas et al., OMB-2022-0014-3917. *See also* Peer Review Report of Kenneth Gillingham.

[346] *See, e.g.*, Jarl Kind, W.J. Wouter Botzen, and Jeroen C.J.H. Aerts, "Accounting for Risk Aversion, Income Distribution and Social Welfare in Cost-Benefit Analysis for Flood Risk Management," WIREs Climate Change 8, no. 2 (2017): e446; Agricultural Marketing Service, *Transparency in Poultry Grower Contracting and Tournaments*, 87 Fed. Reg. 34,980 (June 8, 2022).

[347] Circular A-4 (2023) at 74, n.149.

Another commenter wrote that:

> It is true that individuals facing a small number of trials may exhibit risk aversion (or risk seeking) behavior, but regulatory policy, and the BCA that support it, are concerned with treatments across large populations. There, the expected value, which reflects objective probabilities based on the average payoff over many trials, is more relevant and appropriate.[348]

To the extent this commenter is arguing that small effects on individuals reduce the need to consider risk preferences, OMB agrees, and notes that this point was expressed in the proposed revisions: "when a regulation has modest effects on each person or group that is affected … it will often be reasonable to ignore risk preferences in your analysis because the consequences of incorporating them would be negligible."[349] To the extent this commenter is implying that regulations never have potential effects on individuals of a magnitude where risk aversion is relevant to consider, OMB disagrees; risks reduced by regulations can be concentrated and large enough that consideration of risk aversion can meaningfully affect the magnitude of the estimated benefit or cost. This commenter also wrote that:

> a move away from the standard risk neutral presumptions here appears to depart from the guidance elsewhere in the document to use regulation to correct behavioral biases…. Risk aversion is a behavioral heuristic that may be ingrained in humans (for good evolutionary reasons), but it leads to irrational choices in the modern context[350]

OMB believes that this comment does not use the term "risk aversion" in the standard, textbook fashion that the proposed revisions to the Circular follows.[351] Standard risk neutral presumptions are contrary to the standard presumptions of utility maximization, as any standard utility function implies risk aversion. To the extent this reflects a conflation of loss aversion—a canonical behavioral bias related to individuals irrationally treating losses differently than similar gains— with risk aversion, which is a standard feature of a rational utility function, the proposed revisions to the Circular note, people "exhibit various decision-making biases, such as … loss aversion," whereas "risk aversion is widespread, and is consistent with common models of rational preferences."[352]

> Another critical group of commenters argued:

> The new guidance completely changes the default assumption regarding societal risk neutrality and justifies its position based on individual behavior such as the purchase of life insurance and fire insurance. However, the proposed circular

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[348] Susan Dudley, OMB-2022-0014-0129. *See also* Peer Review Report of William Pizer.

[349] Draft Circular A-4 at 72.

[350] Susan Dudley, OMB-2022-0014-0129.

[351] *See, e.g.*, Jack Meyer, "Chapter 3 - The Theory of Risk and Risk Aversion," in *Handbook of the Economics of Risk and Uncertainty*, ed. Mark J. Machina and W. Kip Viscusi (2014), 99-133.

[352] Draft Circular A-4 at 19, 71. Another potential confusion may exist between risk aversion and ambiguity aversion, in the form associated with the Ellsberg paradox. *See* Daniel Ellsberg, "Risk, Ambiguity, and the Savage Axioms," *The Quarterly Journal of Economics* 75, no. 4 (1961): 643-69.

could have just as easily provided examples of risk seeking behavior that would suggest that risk seeking is widespread. Either way it is unclear how OMB discerns that when individual and firm behavior is aggregated it is more likely risk averse than risk neutral.[353]

OMB disagrees with these commenters. As noted previously, any standard utility function (i.e., one that is concave) will produce risk aversion. In addition, there is robust empirical evidence of individuals' risk aversion, as noted in the proposed revisions to Circular A-4.[354] General risk-loving preferences would be inconsistent with economic theory and the majority of the relevant evidence; OMB is aware that there are contexts where individuals may be—or may behave as if they are—risk-loving, but these are the exception rather than the rule, as noted in the proposed revisions to the Circular.[355] Regarding firms, the draft revisions to the Circular noted that they may or may not exhibit different risk preferences than the individuals who own them due to their legal structure, tax incentives, or other factors.[356] This comment also stated that it is "unclear how an agency should calculate benefits (costs) under different risk assumptions."[357] OMB hopes that the additional clarity provided in the final Circular, by presenting the mathematics of such calculations, alleviates this concern.

Similarly, a group of commenters claimed that "[a] presumption of risk aversion is arbitrary," citing literature critical of the precautionary principle.[358] As reviewed in the previous paragraph, a presumption of risk aversion is well-founded on theoretical and empirical grounds. It is distinct from the precautionary principle, which is generally understood to urge a degree of caution in excess of the welfare-maximizing choice.

Some commenters were critical of efforts to account for uncertainty using quantitative methods at all.[359] OMB disagrees with these commenters, and believes that quantitative approaches to the analysis of uncertainty can shed a great deal of light on the welfare effects of regulatory alternatives.

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[353] American Petroleum Institute et al., OMB-2022-0014-0168.

[354] Draft Circular A-4 at 71 (citing Charles A. Holt and Susan K. Laury, "Chapter 4 - Assessment and Estimation of Risk Preferences," in *Handbook of the Economics of Risk and Uncertainty*, ed. Mark J. Machina and W. Kip Viscusi (2014), 135-201.).

[355] *Id*. at 72. As OMB noted in 1996, "[t]ypically total expected net benefits and risk premia are calculated on the basis of a representative set of individual preferences." Office of Management & Budget, Economic Analysis of Federal Regulations Under Executive Order 12866 (Jan. 11, 1996), *https://georgewbush-whitehouse.archives.gov/omb/inforeg/riaguide.html*.

[356] Draft Circular A-4 at 71.

[357] American Petroleum Institute et al., OMB-2022-0014-0168.

[358] 29 Business Community Organizations, OMB-2022-0014-3918 (citing Cass R. Sunstein, "Beyond the Precautionary Principle," *University of Pennsylvania Law Review* 151, no. 3 (2003): 1057; John Graham, Heritage Foundation, *The Perils of the Precautionary Principle: Lessons from the American and European Experience* (Jan 15, 2004), *https://www.heritage.org/government-regulation/report/the-perils-the-precautionary-principle-lessons-the-american-and*).

[359] Sidney A. Shapiro, Amy Sinden, and James Goodwin, OMB-2022-0014-0151.

11.   Discount Rates

a.   General Approach

The proposed revisions to Circular A-4 outlined three primary rationales for approaches to discounting future streams of benefits and costs: declining marginal utility of consumption, pure time preference, and the potential for regulations that affect capital to have different effects than regulations that affect consumption.[360] It also noted:

> Special ethical considerations arise when comparing benefits and costs across generations. Although most people demonstrate time preference in their own consumption behavior, which may vary by the good or service at hand, it may not be appropriate for society to demonstrate a similar preference when deciding between the well-being of current and future generations. Future citizens and residents who are affected by such choices cannot take part in making them, and today's society must act with some consideration of their interest.

> Some believe that it is ethically impermissible to discount the utility of future generations…. To account for these special ethical considerations, an extensive literature uses a "prescriptive" approach to long-term discounting, determining the appropriate degree of weight that society should place on the welfare of future generations.[361]

The Preamble elaborated on this point:

> The primary argument for the use of a descriptive approach in the context of benefit-cost analysis is that it enables policymakers "to base resource allocation on the tradeoffs that society actually makes." For this reason, Circular A-4 [(2003)] recommends—and the proposed revisions would continue to recommend—a descriptive approach to discounting in many circumstances; the remainder of this discussion will focus on descriptive approaches, while recognizing it reflects just one strand of the discounting literature…. [U]se of financial market rates [is] primarily justified because they are a real price at which many individuals, and society as a whole, can trade off consumption over time. In addition, the use of an observable rate helps to establish an objective evidentiary basis for the specific parameters the government uses when developing the analytical basis for policymaking.[362]

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[360] Draft Circular A-4 at 74-75.
[361] *Id*. at 80-81 (citing Antony Millner and Geoffrey Heal, "Choosing the Future: Markets, Ethics, and Rapprochement in Social Discounting," *Journal of Economic Literature* 61, no. 3 (2023): 1037-87; J. Paul Kelleher and Gernot Wagner, "Prescriptivism, Risk Aversion, and Intertemporal Substitution in Climate Economics," *Annals of Economics and Statistics* 132 (2018): 129-49; Partha Dasgupta, "Discounting Climate Change," *Journal of Risk and Uncertainty* 37, no. 2/3 (2008): 141-69; Kenneth J. Arrow et al., "Intertemporal Equity, Discounting and Economic Efficiency," in *Climate Change 1995: Economic and Social Dimensions of Climate Change, Contribution of Working Group III to the Second Assessment Report of the Intergovernmental Panel on Climate Change*, ed. James P. Bruce, Hoesung Lee, and Erik F. Haites (Cambridge: Cambridge University Press, 1996), 125-44).
[362] Preamble at 18-19.

Some commenters urged OMB to embrace a more prescriptive (normative) approach to discounting, as opposed to a descriptive (positive) approach to discounting.[363] Other commenters supported descriptive (positive) approaches to discounting.[364] OMB continues to believe that it is generally important for agencies to produce analysis that "enables policymakers 'to base resource allocation on the tradeoffs that society actually makes.'"[365] "For this reason, Circular A-4 recommends … a descriptive approach to discounting in many circumstances," even "while recognizing it reflects just one strand of the discounting literature."[366]

Relatedly, some commenters urged OMB to adopt a discount rate that excludes the pure rate of time preference that individuals exhibit: either on ethical grounds (that current generations' impatience is not a valid basis for discounting the welfare of future generations), or on the grounds that a pure rate of time preference amounts to a behavioral bias.[367] OMB's decision to generally recommend a descriptive approach to discounting (which excludes such ethical considerations) has already been discussed. Regarding the notion that the pure rate of time preference is a manifestation of a behavioral bias, OMB notes that the pure rate of time preference is likely at least partially capturing rational considerations, such as an individual's mortality risk (or, at a minimum, societal extinction risk). As such, some positive pure rate of time preference is likely appropriate (whether referred to as such, or as a separately-named component of the discount rate). If the evidence used to estimate discount rates contain an element of behavioral bias in the form of impatience, OMB agrees with commenters that it is a potential source of upward bias in the estimation. However, OMB does not believe that it is currently feasible to disentangle any behavioral bias component of the observed market rates that are used to estimate the discount rate.

b. Estimation of the Social Rate of Time Preference (SRTP)

To summarize the more detailed explanations and responses to comments below, commenters provided different responses to OMB's approach to estimating the SRTP, which closely mirrored the approach OMB took in Circular A-4 (2003). Many commenters supported OMB's proposed approach to estimating the SRTP, and the estimate itself. Some commenters argued for adjustments that would lower the SRTP estimate, such as adjusting for behavioral biases, zero lower bound periods, liquidity premia, term premia, default risk, and taxation of income on Federal debt instruments. In OMB's view, attempting to make such adjustments is not worth the potential for error. OMB acknowledges that, with respect to those considerations, its estimate of the SRTP may be upwardly biased. Some commenters argued for adjustments that would increase the SRTP estimate, such as adjusting for liquidity, modifying the retrospective averaging period, rounding upward, or using a different inflation index. In OMB's view,

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[363] *See, e.g.*, James Broughel, OMB-2022-0014-0095; Geoffrey M. Heal, Noah Kaufman, and Antony Millner, OMB-2022-0014-0100; Cameron Hepburn, Nicholas Stern, and Joseph Stiglitz, OMB-2022-0014-0123.

[364] *See, e.g.*, Peer Review Report of Kenneth Gillingham; James Stock, OMB-2022-0014-0081.

[365] Preamble at 18.

[366] *Ibid*. OMB noted that agencies might find a positive approach appropriate when using "an economic model in which the evolution of the discount rates is endogenous," but also that "[s]pecial ethical considerations arise when comparing benefits and costs across generations." Draft Circular A-4 at 76, 80.

[367] *See, e.g.*, Gabriel Weil, OMB-2022-0014-0003; Dr. Josh Bivens and Dr. Heidi Shierholz, OMB-2022-0014-0142.

attempting to make most of these adjustments is not worth the potential for error; however, adjusting the SRTP estimate to better account for inflation is appropriate, raising OMB's proposed estimate from 1.7% to 2.0%.

i. Use of Real Rates of Return on Long-Duration Government Debt

The proposed revisions to Circular A-4 stated:

> One approach assumes that the real (inflation-adjusted) rate of return on long-term U.S. government debt provides a fair approximation of the social rate of time preference. It is the rate available on riskless personal savings and is therefore a rate at which individuals may increase future consumption at the expense of current consumption. It is also the rate at which society as a whole can trade current consumption for future consumption.[368]

For "simplicity, transparency, and tractability," the proposed revisions to Circular adopted the use of this approach and "one default rate for social rate of time preference for all effects from the present through 30 years into the future."[369] As the Preamble noted, the proposed revisions to Circular A-4 "would retain the method for calculating the social rate of time preference" used by Circular A-4 in 2003 "and update[e] the 30-year average using data from 1993 to 2022, except that the 10-year Treasury Inflation-Protected Securities (TIPS) yield would be used for the years it is available (2003-2022)."[370] For more on the choice of instrument, see "The Use of TIPS versus Treasuries" below.

Commenters offered a variety of views on the use of U.S. federal debt instruments generally as a proxy for the risk-free rate available to personal savings and the use of such a rate as a proxy for the SRTP. Several commenters praised the choice to stick to the 2003 approach.[371] Similarly, a number of commenters supported the 1.7% SRTP estimate as reasonable, in line with empirical evidence on changes in market rates in recent decades, and either supported by— or consistent with—the best view of the economic literature.[372] Some commenters stated that it is well established in the economic literature that safe government debt, like Treasuries, are a "fair approximation" for the SRTP.[373]

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[368] Draft Circular A-4 at 75-76. The phrase "long term" can be used both to describe the longest-duration government assets and natural rate of interest that would exist after a period of time that would allow transitory shocks to pass, as in the "long-run" government debt or r* literature (often estimated to be about 5-30 years), and discounting *after* such a time (generally, more than 30 years in the future). OMB has striven to make clear, from context, which concept of "long term" it is referring to at all times.

[369] *Id*. at 76.

[370] Preamble at 19.

[371] *See, e.g.*, Robert N. Stavins, OMB-2022-0014-0002; H. Spencer Banzhaf, OMB-2022-0014-0158. *See also* Peter H. Howard et al., "U.S. Benefit-Cost Analysis Requires Revision," *Science* 380, no. 6647 (2023): 803 (cited in Center for Climate and Energy Solutions et al., OMB-2022-0014-0162).

[372] *See, e.g.*, Peer Review Report of Joseph Aldy; Robert N. Stavins, OMB-2022-0014-0002; David Autor et al., OMB-2022-0014-0021; Cameron Hepburn, Nicholas Stern, and Joseph Stiglitz, OMB-2022-0014-0123.

[373] Peer Review Report of William Pizer.

Certain commenters urged that it is the rate of return on capital that provides the most appropriate guide to the estimation of the SRTP.[374] This line of reasoning presumes that the opportunity cost of regulatory benefits or costs is capital investment. However, such capital investment is much riskier than nearly risk-free U.S. government debt; part of the higher yield on capital investment reflects compensation for this additional risk, known as the risk premium. A discount rate that is appropriate for certainty-equivalent benefits and costs (i.e., benefits and costs that already are valued to reflect risk) would not include this risk premium. In addition, the opportunity cost of a regulation's effects will not universally be capital investment; some of a regulation's benefits and costs are best modeled as falling on consumption, rather than capital. Further, as the Preamble noted, the return to capital "likely reflects returns to market power, uninternalized externalities, and other market distortions."[375] For discussion of how the Circular addresses the issues of risk and capital effects, see "*Accounting for Risk When Discounting*" and "*Accounting for Effects on Capital When Discounting*" below.

Certain commenters urged OMB to abandon the long-standing use of federal debt securities as a guide to the SRTP, on the basis that many Americans do not own such securities.[376] However, another commenter noted:

> 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.[377]

As one summary in the literature notes, "direct holdings of Treasuries are a relatively insignificant form of Treasury holdings, accounting for between less than 1% and 2% across the age groups."[378] Instead, "[m]ost households hold Treasuries indirectly," through vehicles such as pension funds.[379] And across age groups, the second through fifth income quintiles (top 80%) own relatively similar amounts of Treasuries as a percentage of net wealth, and even the first quintile (bottom 20%) owns a non-negligible—albeit smaller—amount of Treasuries as a

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[374] *See, e.g.*, Kenneth Watson, OMB-2022-0014-0113; Don Kenkel, OMB-2022-0014-3910; 29 Business Community Organizations, OMB-2022-0014-3918.

[375] Preamble at 25 n.80 (citing Council of Economic Advisers, *Discounting for Public Policy: Theory and Recent Evidence on the Merits of Updating the Discount Rate* (Jan. 2017) , *https://obamawhitehouse.archives.gov/sites/default/files/page/files/201701_cea_discounting_issue_brief.pdf*).

[376] *See, e.g.*, Peer Review Report of Glenn C. Blomquist; Arthur Fraas et al., OMB-2022-0014-3917; Alliance for Automotive Innovation, OMB-2022-0014-0067; 29 Business Community Organizations, OMB-2022-0014-3918.

[377] Peer Review Report of Kenneth Gillingham (supporting a SRTP of 2%).

[378] Yu-Ting Chiang and Jesse LaBelle, "Which Households Are Most Exposed to the Inflation "Tax"?," *On the Economy Blog, Federal Reserve Bank of St. Louis* (June 27, 2023), *https://www.stlouisfed.org/on-the-economy/2023/jun/which-households-most-exposed-inflation-tax*.

[379] *Ibid.*

percentage of net wealth.[380] Regardless, OMB agrees with the latter commenter quoted above that the quantity of Treasuries owned by various groups is not the critical question, just as the ownership of other goods is not a critical question when using their market price to estimate benefits or costs. Treasuries are the market price at which individuals can make nearly risk-free loans, including low-income individuals.[381]

Many of the commenters critical of using federal debt securities urged OMB to instead look to evidence—such as retiring military personnel pay package selection, used car purchasers, or energy-using durable goods—yielding discount rate estimates ranging as high as 20% or 54%.[382] However, as stated in the Preamble, OMB has significant concerns about the use of such studies to estimate the SRTP. In addition to the literature cited in the Preamble that calls into question whether such results are truly estimating individuals' time preferences,[383] OMB sought comment on whether "analysis of such data sources may suffer from omission bias, in that factors contributing to these individual behaviors may not have been adequately captured in the estimation process"—such as behavioral biases and information asymmetries—in addition to an individual's true rate of time preference.[384] Commenters addressed neither the cited literature nor OMB's request for comment on whether the analyses in these papers captured all relevant factors. Commenters did note that more than 94% of consumers hold balances in liquid, low-risk savings accounts or similar accounts.[385] These options currently have average nominal rates of 0.46% or below (although they provide benefits—e.g., through banking services—that Federal debt securities do not).[386] OMB continues to believe that evidence other than from federal debt securities is not an appropriate basis for either the estimation of sub-group time preferences or the SRTP, due to both the inconsistency with evidence from financial markets and also the potential discrepancies reflecting behavioral biases or other irrelevant factors.

Similarly, certain commenters urged OMB to consider the high interest rates charged on credit card debt, payday loans, or mortgages as a guide to estimating the SRTP.[387] Relatedly, certain commenters urged that regulatory benefits and costs that accrue to low-income individuals be discounted at substantially higher rates given evidence (such as the use of high-interest debt instruments) that low-income individuals exhibit a higher pure rate of time

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[380] *Ibid.*

[381] *Ibid.*

[382] *See, e.g.*, Peer Review Report of Glenn C. Blomquist; Arthur Fraas et al., OMB-2022-0014-3917; Alliance for Automotive Innovation, OMB-2022-0014-0067.

[383] Preamble at 24 n.74 (citing Susan Payne Carter et al., "Time to Repay or Time to Delay? The Effect of Having More Time before a Payday Loan is Due," *American Economic Journal: Applied Economics* 14, no. 4 (2022): 91-126; National Academies of Sciences, Engineering, and Medicine, *Review of Methods Used by the U.S. Department of Energy in Setting Appliance and Equipment Standards* (Washington, DC: The National Academies Press, 2021); Annamaria Lusardi and Olivia S. Mitchell, "The Economic Importance of Financial Literacy: Theory and Evidence," *Journal of Economic Literature* 52, no. 1 (2014): 5-44; Johannes Haushofer and Ernst Fehr, "On the Psychology of Poverty," *Science* 344, no. 6186 (2014): 862-67. *See also,* Stephan Meier and Charles Sprenger, "Present-biased Preferences and Credit Card Borrowing," *American Economic Journal: Applied Economics* 2, no. 1 (2010): 193-210; Jesse M. Shapiro, "Is There a Daily Discount Rate? Evidence From the Food Stamp Nutrition Cycle," *Journal of Public Economics* 89, no. 2-3 (2005): 303-25.

[384] Preamble at 24.

[385] Arthur Fraas et al., OMB-2022-0014-3917

[386] Federal Deposit Insurance Company, *National Rates and Rate Caps: Revised Rule* (October 16, 2023), *https://www.fdic.gov/resources/bankers/national-rates/index.html*.

[387] *See, e.g.*, Don Kenkel, OMB-2022-0014-3910; National Association of Home Builders, OMB-2022-0014-3901.

preference.[388] OMB first reiterates that other factors—such as behavioral biases, information asymmetries, or the value of other (e.g., banking/liquidity) services—may explain such behavior. OMB also reiterates that such interest rates are risk-inclusive—i.e., they reflect the potential for partial or complete default on the loan—and are not an appropriate guide to estimation of the SRTP for two reasons. First, the potential of default (including strategic default on collateralized loans, such as mortgages) is a component of the loan price. Second, on top of the component of the risk-inclusive rate that captures the probability of default (a measure of expected value) risk preferences will also play a role in dictating the risk premium (the spread between the risk-free rate and the risk-inclusive rate); a lender is more likely to find that borrowers default when the economy is generally doing worse, and vice-versa. For more on risk and discounting, see "*Accounting for Risk When Discounting*" below.

Finally, one commenter argued that evidence based on the real rates of return on long-duration government bonds should be considered alongside "rates on high grade, non-Treasury bonds," which the commenter argued "have fallen, but not by as much as Treasuries."[389] OMB notes that the degree to which high grade non-Treasury bonds yields' have changed varies with the source of data examined (e.g., Bank of America AAA versus Moody's Aaa corporate bonds).[390] However, both vary fairly tightly with the return to Treasury bonds, with higher rates indicating the presence of greater default risk (see "*Accounting for Risk When Discounting*" below). Further, the fact that over short periods the yields in different sources of corporate bonds vary indicates that the riskiness of the included instruments is driving the majority of the variation. In addition, if the risk premium is varying over time, such yields will be affected by changes in the risk premium.[391] Accordingly, given the role of default risk in shifting non-Treasury bond yields over the business cycle—and secularly across business cycles—OMB does not think that corporate bond yields add relevant insight into the SRTP estimate beyond long-duration government bond yields.

ii.   The Use of TIPS versus Treasuries

The Preamble noted that the 2003 "Circular A-4's approach combines an ex-ante measure of return (10-year Treasury notes) with an ex-post measure of inflation (CPI)," an inconsistency that reduces the accuracy of the SRTP estimate.[392] It argued for "incorporating Treasury Inflation-Protected Securities [TIPS] return data for the years" after its introduction in 2003, as "TIPS offers protection against inflation risk by indexing the bond's principal to CPI inflation." The Preamble noted that "[h]ad OMB retained the original approach from Circular A-4 (2003) for all years 1993-2022 (in other words, continuing to use 10-year Treasury rates and CPI even in the years when TIPS data is available), the estimated social rate of time preference would have

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[388] *See, e.g.*, American Petroleum Institute et al., OMB-2022-0014-0168.
[389] Peer Review Report of William Pizer.
[390] "FRED Economic Data," Federal Reserve Bank of St. Louis, *https://fred.stlouisfed.org/graph/?g=18cmj*.
[391] For discussions of the time-varying nature of the risk premium and its sources, see, e.g., Ricardo J. Caballero, Emmanuel Farhi, and Pierre-Olivier Gourinchas, "Rents, Technical Change, and Risk Premia Accounting for Secular Trends in Interest Rates, Returns on Capital, Earning Yields, and Factor Shares," *The American Economic Review* 107, no. 5 (2017): 614-20; Gauti B. Eggertsson, Jacob A. Robbins, and Ella Getz Wold, "Kaldor and Piketty's Facts: The Rise of Monopoly Power in the United States," *Journal of Monetary Economics* 124 (2021): S19-S38.
[392] Preamble at 20.

instead been 1.4%" rather than 1.7%.[393] However, the Preamble noted that other ex-ante measures of real rates can be generated, such as through surveys of inflation expectations, and "solicit[ed] comment on the relative merits of [these] two ex-ante measures of real rates."[394]

The choice to use TIPS for the period that they are available, rather than continuing the use of Treasuries less CPI inflation, was supported by many commenters.[395] By comparison, the use of Treasuries less CPI inflation or other (e.g., inflation survey-based) ex ante measures of real rates received little support from commenters. In light of the strong support of commenters, OMB has retained the approach of using TIPS when available.

iii. SRTP Estimation and the Business Cycle

Certain commenters urged OMB to use a higher estimate of the SRTP in light of recessionary periods that have occurred in the last 30 years and monetary policy measures employed by the Federal Reserve during those periods of time.[396] However, other commenters noted that "long-standing decline[s] in real interest rates and market projections" supported the updated SRTP estimate.[397]

In OMB's view, the available evidence does not support the argument that monetary policy or recessions in the averaging window provide a substantial basis for doubting the 30-year average of 10-year TIPS (and before 2003, of 10-year Treasuries minus inflation). First, with respect to the period covered, the Preamble previously noted that claims that low rates are "due to the policy response to the Great Recession (which started in 2007)" cannot account for the fact that "the decline began 20 years prior to the Great Recession."[398] Indeed, "there has been a persistent decline in real interest rates over the last 40 years" and the 10-year TIPS was already "below 3% [in] 2003, and have remained lower than that level since then even as nominal rates have recently increased."[399] Second, the sign of the potential bias of monetary policy in the period covered is at least ambiguous. While there are circumstances in which monetary policy can temporarily drive the short-term real interest rate below the natural rate of interest (also

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[393] *Id*. at 20-21.

[394] *Id*. at 22.

[395] *See, e.g.*, Peer Review Report of Kenneth Gillingham; Business Roundtable, OMB-2022-0014-0062; James Stock, OMB-2022-0014-0081; William Nordhaus, OMB-2022-0014-0089. Relevantly for those that are concerned about model-based approaches to estimating the SRTP—see "*Ramsey Discounting*" below—one comment noted that TIPS yields are similar to Ramsey model-based estimations of the SRTP, under certain parameterizations. Dr. Josh Bivens and Dr. Heidi Shierholz, OMB-2022-0014-0142.

[396] *See, e.g.*, Peer Review Report of Joseph Cordes; Peer Review Report of W. Kip Viscusi; Peer Review Report of Robert S. Farrow; Peer Review Report of Christina D. Romer; Howard Beales, OMB-2022-0014-0087; The Buckeye Institute, OMB-2022-0014-0107; Joshua Rauh, OMB-2022-0014-0119; Institute for Energy Research, OMB-2022-0014-3913; Arthur Fraas et al., OMB-2022-0014-3917.

[397] 102 Economists, OMB-2022-0014-3924. *See also, e.g.*, Peer Review Report of Kenneth Gillingham; James Stock, OMB-2022-0014-0081.

[398] Preamble at 19 (citing Council of Economic Advisers, *Discounting for Public Policy: Theory and Recent Evidence on the Merits of Updating the Discount Rate* (Jan. 2017), *https://obamawhitehouse.archives.gov/sites/default/files/page/files/201701_cea_discounting_issue_brief.pdf*). Notably, that report—which predated any monetary policy following the COVID-19 pandemic—concluded, based on available evidence, that the SRTP should be "at most 2 percent."

[399] Preamble at 18.

known as r-star, *r**, or *R**), the situation faced by the Federal Reserve during the periods commenters cite seems to be the reverse: when nominal rates were constrained by the zero lower-bound, real rates were kept sub-optimally high. For example, the Federal Reserve Bank of Atlanta's Wu-Xia Shadow Federal Funds Rate estimate shows the zero lower-bound artificially increasing real rates from June of 2009 to November 2015 and from September 2020 to January 2022.[400] To the extent that 10-year yields include market expectations about periods when monetary policy is stuck at the zero lower-bound—as it was during these periods—this would upwardly bias the SRTP estimate relative to the use of the natural rate of interest. Third, the Preamble notes that there are situations, such as "times of economic turbulence," during which current market values may not be the best guide to estimating the SRTP.[401] To the extent that there are concerns about using market estimates, one can look to model-based estimates, such as the Federal Reserve Bank of New York's estimate of the natural rate of interest. The Federal Reserve Bank of New York's regularly updated Laubach-Williams (2003) model estimates a 1.1% natural rate of interest (in PCE inflation terms) in Q2 of 2023, below Circular A-4's 2.0% estimate of the SRTP (adjusting for the PCE-CPI inflation difference, as discussed below).[402] Similar models of the long-run natural rate of interest—such as that found in Del Negro, Giannone, and Tambalotti (2017)—produce estimates that range from less than 1% to 1.8% (in PCE inflation terms).[403] To summarize, OMB does not think this argument holds merit; as one commenter put it, "[t]he 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)."[404]

One commenter argued that periods where TIPS is lower than 1% should be excluded from the average used to estimate the SRTP, on the basis of concerns that during "flight to safety" periods (such as after recession) yields are anomalously low.[405] OMB reiterates the points in the prior paragraph that cast doubt on the unrepresentativeness of rates during flight to safety periods following recessions. In addition, the rationale for taking a 30-year average is to even out year-to-year variation that could introduce excessive volatility or inaccuracy in the estimation of the SRTP (see "Choice of Retrospective Averaging Window" below). To take out unusually low years from an average, without taking out unusually high years from an average, risks upwardly biasing the average and undermining the point of taking a retrospective average.

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[400] "Wu-Xia Shadow Federal Funds Rate," Federal Reserve Bank of Atlanta, *https://www.atlantafed.org/cqer/research/wu-xia-shadow-federal-funds-rate*.

[401] Preamble at 21.

[402] "Measuring the Natural Rate of Interest," Federal Reserve Bank of New York, *https://www.newyorkfed.org/research/policy/rstar*. Regarding this measure's use of a PCE measure of inflation, see Thomas Laubach and John C. Williams, "Measuring the Natural Rate of Interest," *The Review of Economics and Statistics*, 85, no.4 (2003): 1063-70.

[403] Katie Baker et al., "The Post-Pandemic r*," *Liberty Street Economics* (August 9, 2023), *https://libertystreeteconomics.newyorkfed.org/2023/08/the-post-pandemic-r/*. Regarding this measure's use of a PCE measure of inflation, see Marco Del Negro et al., "Safety, Liquidity, and the Natural Rate of Interest," *Brookings Papers on Economic Activity* (Spring 2017): 235-316.

[404] Peer Review Report of Kenneth Gillingham (citing Maurice Obstfeld, "Natural and Neutral Real Interest Rates: Past and Future," *10th Asian Monetary Policy Forum, Singapore* (May 26, 2023), *https://abfer.org/media/abfer-events-2023/ampf/MauriceObstfeld_Natural-Rates-of-Interest.pdf*).

[405] Business Roundtable, OMB-2022-0014-0062. A similar argument was put forward by another commenter with respect to "negative annual values for TIPS." American Chemistry Council, OMB-2022-0014-3909.

iv. <u>Liquidity and Illiquidity</u>

Certain commenters argued that the SRTP estimate should be increased to account for the illiquidity of the streams of benefits and costs produced by government regulations.[406] One commenter put the point this way:

> Tradable, liquid securities will transact at a price premium (yield discount) relative to the value of illiquid, non-tradeable cash flows. It is well-known that illiquid assets trade at considerable discounts relative to liquid assets. While TIPS are not the most liquid of government securities …, they are a tradable, liquid asset, whereas the benefit and cost streams associated with government regulations are not. There is no agreed upon measure of what discount should be applied to a non-tradable stream of payments versus a tradable one of otherwise equivalent risk. Amihud et al (2015) find that a spread of 0.45%-0.82% separates the most liquid and least liquid global stocks, but his baseline is securities that are still to some extent traded or tradable. The additional yield that would need to be added to the TIPS yield to be appropriate for discounting completely untraded cash flows would be substantially more than this.[407]

OMB agrees with these commenters that it is important to account for the liquidity premia of different instruments used to measure the SRTP. However, OMB disagrees with these commenters on the need to increase the SRTP estimate to account for liquidity premia, because commenters did not recognize that the benefits and costs in regulatory analyses are valued using measures of WTP and WTA, which already reflect the liquidity of the underlying benefit or cost. For example, many regulatory benefits come in the form of health benefits. Regulatory beneficiaries cannot sell a health benefit to another person for a cash return. As a result, regulatory beneficiaries have a lower WTP for health benefits than they would if they could sell them for cash. To illustrate this, consider a hypothetical where individuals gained the option to frictionlessly sell reductions in asthma risk that result from regulatory actions. In such a scenario, regulatory beneficiaries' WTP for such asthma risk reductions would increase because beneficiaries would have an additional option, i.e., the choice to either take the regulatory benefit in the form of a cash payout or in the form of avoided asthma.[408] As such, applying a liquidity premium when discounting asthma benefits or costs would be double-counting. The same applies to other regulatory benefits and costs. Note that certain regulatory effects, such as compliance costs or cost-savings, are fully liquid (an individual's willingness to pay for a dollar is a dollar; an individual's willingness to accept losing a dollar is a dollar). Thus, because benefits and costs are measured in terms of WTP and WTA, their illiquidity (or liquidity) is already reflected in their value.

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[406] *See, e.g.*, Peer Review Report of Christina D. Romer; Joshua Rauh, OMB-2022-0014-0119.
[407] Joshua Rauh, OMB-2022-0014-0119 (citations omitted).
[408] Note that it is not correct to assume that because individuals' WTP to be free of asthma is measured in dollars, the regulatory benefit is fully liquid. The dollars are fully liquid, but the liquidity of the good or service being valued varies. The WTP to be free of asthma, with an option to reverse one's decision and receive a cash payout while continuing to have asthma, should be strictly higher than the WTP to be free of asthma with no such option.

Accordingly, it would be most appropriate to estimate the default SRTP using a financial instrument with a liquidity premium of zero. As such, the positive liquidity premium of the 10-year TIPS noted in the comment quoted above biases the appropriate estimate of the SRTP upwards, as "[t]his liquidity effect has averaged around 30bp since the start of the TIPS pricing series."[409] However, as the liquidity premia on TIPS can vary over the business cycle and its magnitude varies across measurement approaches,[410] OMB does not think it is advisable at this time to attempt to correct for the 10-year TIPS liquidity premia.

v.   Choice of Inflation Index

In the proposed revisions to Circular A-4, OMB hewed to the 2003 approach to estimating the SRTP, including its use of a consumer price index (CPI) inflation measure. However, OMB specifically "solicit[ed] comment on the most appropriate inflation index to use in such estimation methods, and how to adjust interest rate or inflation data sources that use CPI or [personal consumption expenditures] PCE inflation values (e.g., TIPS, Federal Reserve PTR, etc.) if a different inflation index is more appropriate."

Certain commenters argued that the use of CPI inflation in the estimation of the SRTP is sub-optimal, as it biases estimates of the SRTP downward relative to inflation indices that more accurately capture changes in the price level of consumption over time.[411] Several of these commenters specifically argued that OMB should replace CPI with the PCE price index, citing (among other reasons) the fact that it be better accounts for how consumers substitute some goods and services for others as prices change.[412] The use of PCE inflation was also supported by the Council of Economic Advisers in 2017, which stated that "because investors in nominal bonds are concerned about their future real purchasing power, the inflation rate relevant for pricing those bonds is the change in the PCE deflator, which is closer to an ideal index of money's purchasing power than is the fixed-weight Consumer Price Index."[413]

OMB agrees with these commenters that PCE is a more appropriate inflation index for the estimation of the SRTP than CPI is. Adjusting CPI measures (TIPS, or CPI directly) into a PCE-equivalent value requires an adjustment reflecting the expected spread between the two

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[409] Joshua Rauh, OMB-2022-0014-0119. However, as the comment notes, this effect would not be a source of bias for the years where TIPS are not used.

[410] *See, e.g.*, Stefania D'Amico, Don H. Kim, and Min Wei, "Tips from TIPS: The Informational Content of Treasury Inflation-Protected Security Prices," *Journal of Financial and Quantitative Analysis* 53, no. 1 (2018): 395-436; Don Kim, Cait Walsh, and Min Wei, "TIPS from TIPS: Updates and Discussions" *FEDS Notes*, *Board of Governors of the Federal Reserve System* (May 21, 2019), *https://www.federalreserve.gov/econres/notes/feds-notes/tips-from-tips-update-and-discussions-20190521.html* (dataset regularly updated at *https://www.federalreserve.gov/econres/notes/feds-notes/DKW_updates.csv*); Martin M. Andreasen, Jens H. E. Christensen, and Simon Riddell, "The TIPS Liquidity Premium," *Review of Finance* 25, no. 6 (2021): 1639-1675.

[411] *See, e.g.*, Peer Review Report of Christina D. Romer; Michael J. Boskin, OMB-2022-0014-0009; Business Roundtable, OMB-2022-0014-0062; Howard Beales, OMB-2022-0014-0087; American Petroleum Institute et al., OMB-2022-0014-0168; American Chemistry Council, OMB-2022-0014-3909.

[412] Business Roundtable, OMB-2022-0014-0062; Howard Beales, OMB-2022-0014-0087; American Petroleum Institute et al., OMB-2022-0014-0168; American Chemistry Council, OMB-2022-0014-3909.

[413] Council of Economic Advisers, *Discounting for Public Policy: Theory and Recent Evidence on the Merits of Updating the Discount Rate* 5 (Jan. 2017), *https://obamawhitehouse.archives.gov/sites/default/files/page/files/201701_cea_discounting_issue_brief.pdf*.

measures over the prospective periods being measured. One simple approach would be to average CPI and PCE inflation over the period the SRTP is estimated (currently, 1993-2022), and adjust the SRTP estimate by that amount; this would yield an adjustment of 0.4%. However, for the same reasons that OMB believes that the use of TIPS and other methods of measuring inflation *ex ante* rather than *ex post* improves the accuracy of the SRTP estimate, this is not OMB's preferred approach. Janson, Verbrugge, and Binder (2020) develop and take an average of eight models predicting the CPI-PCE differential, with a result of 0.29%, which is almost exactly identical to the historical average CPI-PCE difference since 1978 of 0.30%.[414] In light of this finding, OMB is adopting a constant 0.3% CPI-PCE differential adjustment in its estimate of the SRTP.

vi. Choice of Instrument Duration

Just as the 2003 Circular A-4 used 10-year Treasury instruments in its estimation, the proposed revisions used 10-year TIPS in its estimation of the SRTP. The Preamble noted that

> yields from longer-dated assets may provide an estimate that may be more appropriate for a regulation with a longer horizon. For example, 30-year Treasury bonds can be used to obtain a longer-horizon estimate of the social rate of time preference instead of the 10-year Treasury notes. This switch from a 10-year asset to a 30-year asset may provide more insight for regulations with longer time horizons, but those insights may come at the expense of greater distortions from term premia (which will generally bias longer rates upwards relative to shorter rates), and data is available for fewer years historically.[415]

Similar arguments apply to the choice between 10-year and 30-year TIPS instruments. OMB solicited comment regarding "whether OMB should consider using yields for longer-lived assets than 10-year [bonds] for estimating the social rate of time preference."[416]

One group of commenters argued for consideration of longer-duration instruments, stating that while "[a] portion of the higher yield on 30-year bonds may reflect a term premium, … it is arguable those higher yields also reflect longer-run social time preferences not captured by 10-year bond yields."[417] Another group of commenters disagreed, arguing that while "[t]he yield will be slightly higher" as a result of "the additional premium investors require to accept the longer-term instrument," the "return on 30-year Treasury bonds over a 30-year retrospective period will behave much like the average return for 10-year Treasuries over this time period."[418]

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[414] Wesley Janson, Randal Verbrugge, and Carola Conces Binder, "*The CPI–PCEPI Inflation Differential: Causes and Prospects*," *Economic Commentary* 2020-06 (2020): 1-7.

[415] Preamble at 21 (citing Michael D. Bauer and Glenn D. Rudebusch, "The Rising Cost of Climate Change: Evidence from the Bond Market," *The Review of Economics and Statistics* 105, no. 5 (2023): 1255-70).

[416] *Id*. at 22.

[417] Richard Morgenstern et al., OMB-2022-0014-0031. *See also* Peer Review Report of William Pizer (emphasizing that the error on longer-term regulatory effects is greater if longer-duration bonds accurately reflect the longer-term SRTP).

[418] Arthur Fraas et al., OMB-2022-0014-3917.

Given the fact that the Federal Reserve Bank of New York's Laubach-Williams model estimates a 1.1% natural rate of interest in Q2 of 2023 (as discussed in "SRTP Estimation and the Business Cycle"), OMB believes that the higher yields on 30-year TIPS than on 10-year TIPS are likely to largely reflect term premia rather than distinctive longer-run social time preferences. Term premia—in essence, a different kind of risk premia, capturing compensation for the risk of the value of a long-term bond fluctuating over time (if not held until maturity)—are not appropriate to include in the estimate of the SRTP. Further, given the difficulties in estimating the term premium and the longer time series over which 10-year TIPS are available relative to 30-year TIPS, OMB believes that there is not sufficient reason to move away from the use of 10-year TIPS or attempt to adjust for term premia. However, OMB agrees that the term premia on 10-year TIPS—relative to shorter-maturity instruments—biases the SRTP estimate upwards.

vii. Default Risk

Certain commenters noted that Treasuries are not fully risk-free, as they are subject to both inflation and default risk.[419] One commenter urged OMB to move away from the use of U.S. debt instruments if market perceptions of the risk of default were to appreciably rise.[420]

While the use of TIPS addresses the problem of inflation risk, OMB agrees that TIPS are not fully free of default risk, and that the SRTP is slightly upwardly biased as a result. OMB does not believe that the benefits of attempting to adjust for market valuations of default risk—or substituting alternative instruments in place of Federal government debt instruments, as a proxy for the risk-free SRTP—would outweigh the administrability costs and potential error produced by such an attempt. Were market perceptions of the risk of U.S. default on its debt instruments to appreciably rise, OMB could reevaluate this conclusion.

viii. Pre-tax Versus Post-tax Yields

One commenter argued that the SRTP estimate should be lower, as it should be estimated using after-tax yields and not, as the revisions to Circular A-4 proposed, "on a pre-tax basis."[421]

> Tax-free municipal bonds typically bear interest rates that are significantly lower than those on comparable taxable Treasury securities, in spite of being generally considered to have higher credit risk. For both the investor and the federal government, the effective discount rate implied by a taxable Treasury security is the interest rate after applicable federal taxes, not the before-tax interest rate.[422]

OMB agrees with this commenter that accounting for yields on a pre-tax basis upwardly biases its SRTP estimate, meaning that discounted values will be biased toward over-valuing near-term impacts relative to impacts that occur farther in the future. However, as the proposed revisions to Circular A-4 stated, "[t]he pre-tax return is appropriate for these purposes because the marginal

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[419] *See, e.g.*, Alliance for Automotive Innovation, OMB-2022-0014-0067; Center for Climate and Energy Solutions et al., OMB-2022-0014-0162; Arthur Fraas et al., OMB-2022-0014-3917.
[420] Center for Climate and Energy Solutions et al., OMB-2022-0014-0162.
[421] Draft Circular A-4 at 76.
[422] Peter Kelly, OMB-2022-0014-3916.

tax rate on interest is modest for much of the population, and borrowers cannot deduct personal interest."[423] OMB continues to believe that the potential bias of using a pre-tax return measure is small in magnitude, and that the downsides of attempting to correct for this bias (due to its small size and the resource-intensive task of estimating its magnitude with accuracy, which would involve complications such as identifying the relevant tax rate for the portion of bonds held directly versus as part of retirement savings) would outweigh the benefits of attempting to do so.

ix. Choice of Retrospective Averaging Window

The Preamble explained that the proposed revisions to Circular A-4 maintained the use of a 30-year retrospective averaging period, but solicited comment on "the advantages and disadvantages of longer or shorter retrospective averages" when estimating the SRTP.[424] Insofar as the SRTP should track market rates and thereby capture real rates of return available to individuals, current market rates are a first-best guide to the SRTP.[425] Similarly, as the Preamble noted, given that "[t]he efficient markets hypothesis implies that a retrospective average of rates cannot outperform the current forward-looking market rate as the best estimate of the risk-free rate over the relevant time horizon."[426] However, as the Preamble also noted, there may be "times of economic turbulence" during which current market values are not be the best guide to estimating the SRTP.[427] OMB solicited "comment on whether OMB should retain or modify the 30-year retrospective average time horizon" when estimating the SRTP.[428]

Certain commenters echoed the Preamble's discussion of the trade-off in the length of the retrospective averaging window used to estimate the SRTP.[429] One commenter noted that

> there is a literature that simultaneously models business cycle variation in the real rate and longer-term drifts in R*, see for example del Negro, Giannone, Giannoni, and Tambalotti, "Safety, Liquidity, and the Natural Rate of Interest," *Brookings Papers on Economic Activity*, Spring 2017…. However, a disadvantage of using an approach like del Negro et al for the purpose at hand is that the estimate of R* depends on modeling assumptions.[430]

The Del Negro, Giannone, and Tambalotti (2017) and Laubach-Williams (2003) models of r* were discussed above in "SRTP Estimation and the Business Cycle." Despite the advantages of using such approaches, the commenter noted that "an advantage of the 30-year average approach is that its assumptions are very simple and transparent."[431] OMB agrees that the simplicity and transparency of using a retrospective average, rather than a model-based estimate, renders it more appropriate for the estimation of the SRTP in Circular A-4.

[423] Draft Circular A-4 at 76, n.144.
[424] Preamble at 21.
[425] The average value of the 10-year TIPS in July 2023 was 1.6%, below the 1.7% 30-year retrospective average.
[426] Preamble at 21 (citing Eugene F. Fama, "Efficient Capital Markets: A Review of Theory and Empirical Work," *The Journal of Finance* 25, no. 2 (1970): 383-417).
[427] Preamble at 21.
[428] *Id*. at 22.
[429] *See, e.g.*, James Stock, OMB-2022-0014-0081; Paul Joskow et al., OMB-2022-0014-0096.
[430] James Stock, OMB-2022-0014-0081.
[431] *Ibid.*

Commenters differed on how to weigh the advantages and disadvantages of longer or shorter retrospective averages. One group of commenters "recommend development of forward-looking procedures for determining recommended discount rates," arguing:

> While smoothing can avoid short-term fluctuations in recommended discount rates that introduce noise, it hides the fact that the costs and benefits of introducing a regulation at any particular time may depend importantly on the state of the economy at that time, which will be reflected in expected future interest rates.[432]

Another commenter offered that "[c]onceptually, a discount rate should be based on market conditions that prevail at the time of the RIA" and that "truly risk-free inflation linked government streams of cash flow should be discounted at a risk-free yield curve," while still noting that "it is understandable for ease of implementation that OIRA wishes to set a fixed rate."[433] One group of commenters argued that while "the 3 percent estimate is outdated, and a lower rate is justified based on the evolution of market conditions over the past 20 years" they did not believe that the SRTP changes as quickly as the 30-year average has and urged a longer averaging window that would slow the SRTP's responsiveness to new developments.[434] By contrast, another commenter argued that "the 30-year retrospective average is a reasonable balance between" the advantages and disadvantages of longer or shorter retrospective averages, capturing both changes in "the long-term real rate (R*)" and the fact that "estimating R* from such a short window … will be subject to business cycle fluctuations."[435] Certain commenters advocated for longer retrospective averaging periods to further reduce the influence of business cycle fluctuations.[436]

When weighing the benefits and costs of different averaging periods, OMB concludes that there is not sufficiently strong justification to alter the 30-year retrospective averaging period used in Circular A-4 (2003). A 30-year average continues to provide a reasonable balance between the advantages and disadvantages of longer or shorter retrospective averages. Such averaging (and the use of a single rate for short term discounting, as opposed to a full yield curve) does decrease the ability of discount rates to reflect the particular state of the yields available in the economy at a point in time. However, there are persuasive arguments that not only real yields available at a point in time, but the underlying long-term real rate of interest, are relevant to the welfare analysis of the regulation's future impacts. A 30-year retrospective average allows the SRTP to capture this longer-term component, yet—unlike much longer retrospective average periods—is short enough that as years go by, the SRTP can evolve to reflect changes in the underlying long-term real natural rate of interest. Capturing such changes is important: although some commenters noted that extending the time horizon by a few decades

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[432] Paul Joskow et al., OMB-2022-0014-0096. *See also* Marvin Phaup, OMB-2022-0014-0058.

[433] Joshua Rauh, OMB-2022-0014-0119.

[434] *See* Richard Morgenstern et al., OMB-2022-0014-0031.

[435] James Stock, OMB-2022-0014-0081.

[436] *See, e.g.*, Peer Review Report of W. Kip Viscusi; Peer Review Report of Christina D. Romer; American Petroleum Institute et al., OMB-2022-0014-0168; American Chemistry Council, OMB-2022-0014-3909; Arthur Fraas et al., OMB-2022-0014-3917.

would raise the SRTP estimate,[437] extending to even longer horizons would substantially lower the estimate. For example, a 35- or 40-year average would raise the average from 1.7% (for 30 years) to 2.0% or 2.6% respectively.[438] The Preamble noted that using data for the 55 years from 1968 to 2022, the average rate was 2.2%.[439] But as the Preamble also noted: "Dimson et al. (2017) have collated historical interest rate data and find that over the period 1900-2016 the global average real interest rate for relatively risk-free assets was approximately 0.8%."[440]

x. Updating the SRTP and Rounding the Estimate

In the Preamble, OMB "specifically solicit[ed] comment on the frequency of subsequent updates to the proposed recommended rates or guidance, as well as the form of updates such as through separate notices, appendices to Circular A-4, or other suitable vehicles."

This question relates to concerns that certain commenters raised that rounding to the tenths place communicated excessive precision.[441] As one commenter noted, "OMB could carefully consider both the level of precision given the stability of the underlying data, as well as how frequently to update the discount rate estimate."[442]

Commenters varied on how frequently they favored updates to the SRTP estimate. Commenters suggested five to ten years,[443] three years,[444] and annually.[445]

OMB believes that using an SRTP that rounds to the tenths place—an additional degree of precision relative to 2003—both provides a more accurate estimate and allows for regular updating without the more disruptive changes to agency analysis that would result from rounding to, for example, the ones place. That is, contrary to one commenter's view that "we would not want to change the discount rate every time this calculation yields a different answer"—arguing for rounding the discount rate to a "whole number"[446]—OMB believes that the modest changes entailed by updating every three years and rounding to the tenths place reduces instability and avoids cases where the best available estimate of the SRTP could change by a large amount due solely to rounding.[447] For example, a sudden update that shifted the SRTP estimate by a whole

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[437] *See, e.g.*, Peer Review Report of Christina D. Romer; Arthur Fraas et al., OMB-2022-0014-3917.

[438] As noted previously, these values incorporate a CPI measure of inflation, rather than a PCE measure.

[439] Preamble at 21.

[440] *Id.* at 22 (quoting Giles Atkinson et al., *Cost Benefit Analysis and the Environment: Further Developments and Policy Use* (Paris: OECD Publishing, 2018): 217).

[441] *See, e.g.*, Peer Review Report of Kenneth Gillingham; Peer Review Report of Joseph Cordes; Peer Review Report of W. Kip Viscusi; Peer Review Report of William Pizer; Richard Morgenstern et al., OMB-2022-0014-0031. This concern was also expressed by one group of commenters with respect to the long-term discount rate schedule as well. Paul Joskow et al., OMB-2022-0014-0096.

[442] Richard Morgenstern et al., OMB-2022-0014-0031.

[443] *See, e.g.*, Peer Review Report of William Pizer; Richard Morgenstern et al., OMB-2022-0014-0031; Harold Furchtgott-Roth and Kirk R. Arner, OMB-2022-0014-0140.

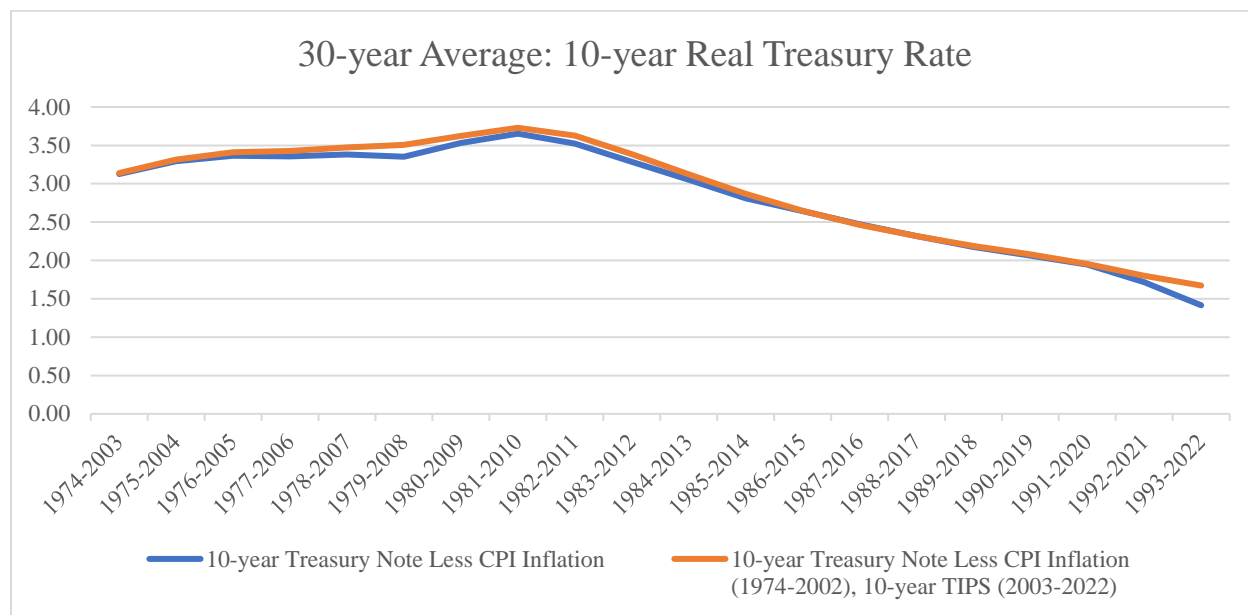[444] *See, e.g.*, Business Roundtable, OMB-2022-0014-0062.

[445] *See, e.g.*, Greg Rock, OMB-2022-0014-0065; H. Spencer Banzhaf, OMB-2022-0014-0158.

[446] Peer Review Report of William Pizer.

[447] While the 2003 version of Circular A-4 rounded its SRTP estimate from 3.1% to 3%, Circular A-94 has presented its annually updated discount rates for cost-effectiveness, lease purchases, and related analyses to the

number—from, e.g., 2% to 3% if the underlying SRTP estimate shifted from 2.49% to 2.51%—could create substantial practical difficulties, and would reduce the accuracy of regulatory analyses.

Three-year updates are also consistent with OMB's conclusion in "Choice of a Retrospective Averaging Window" that a 30-year retrospective average appropriately balances the benefits of using more recent data against the year-to-year instability in that data. Were OMB to update less frequently, the data forming the basis would fall further out of date. OMB provided the following figure in the Preamble to illustrate how the 30-year average has changed since 2003[448]:

30-year Average: 10-year Real Treasury Rate

Legend: 10-year Treasury Note Less CPI Inflation; 10-year Treasury Note Less CPI Inflation (1974-2002), 10-year TIPS (2003-2022)

In addition, as noted by one commenter,[449] Circular A-94's discount rates in Appendix C have been updated annually and rounded to the tenths place for decades. However, OMB appreciates that small annual updates may present comparatively large burdens on agencies relative to the advantages of such an approach. For that reason, OMB has decided to update the SRTP estimate every three years, rounded to the tenths place, in the Appendix to Circular A-4. Circular A-94's discount rates in Appendix D will also be updated every three years, in sync with Circular A-4. The next update will occur in 2026, and every three years thereafter. As noted in "*Long-term Discounting*," OMB will also include a default long-term discount rate schedule in the Appendix, which will also be updated every three years.

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tenths place since 1992. *See* Office of Management & Budget, *Benefit-Cost Analysis of Federal Programs; Guidelines and Discounts*, 57 Fed. Reg. 53,519, 53,528 (Nov. 10, 1992); Office of Management & Budget, *Table of Past Years' Discount Rates from Appendix C of OMB Circular No. A-94*, (Dec. 12, 2022), *https://www.whitehouse.gov/wp-content/uploads/2023/02/discount-history.pdf*.

[448] Preamble at 20.
[449] Center for Climate and Energy Solutions et al., OMB-2022-0014-0162.

xi. The Use of Multiple Discount Rates

Certain commenters called for Circular A-4 to provide guidance that agencies should use multiple discount rates to illustrate the sensitivity of the net benefits estimate to different discounting assumptions (and for comparability over time).[450] By contrast, another commenter pointed out that listing two default discount rates in the 2003 version of Circular A-4 led to incorrect analyses and "myths" about how the rates should be used.[451]

As the Preamble noted, the use of a higher 7% discount rate was recommended in 2003 "because in certain circumstances, the costs 'of a regulation … displace or alter the use of capital in the private sector,' whereas the benefits largely do not affect capital in those certain circumstances."[452] This was adopted as an approximation for the shadow price approach, which Circular A-4 (2003) noted is "the analytically preferred method" of accounting for capital effects.[453]

By recommending the use of a closed-economy shadow price of 1.2 when regulations are likely to have a substantial incidence on capital, Circular A-4 now advises agencies to (effectively) use *three* discount rates when analysis of capital effects is called for (i.e., (1) a discount rate of 2% combined with a shadow price of 1; (2) a discount rate of 2% combined with a shadow price of 1.2 applied to costs; and (3) a discount rate of 2% combined with a shadow price of 1.2 applied to benefits). As Li and Pizer (2021) show, applying a shadow price of capital to (longer-term) benefits or (nearer-term) costs is equivalent to using a lower or higher discount rate (respectively).[454] OMB therefore believes that commenters' concerns have been fully addressed by the Circular's approach.[455] By contrast, combining these approaches (e.g., two discount rates and three shadow prices assumptions, for six total assumptions; or three discount rates and three shadow price assumptions, for nine total assumptions) would add workload and confusion for agencies and those reading regulatory analyses, with little to no value from the additional estimates produced. As noted in Circular A-4, in addition to present values of costs and benefits, agencies "should present the undiscounted annual time stream" of regulatory impacts[456]; doing so is the best method for facilitating consideration of the net benefits estimate's sensitivity to a range of discount rate assumptions (by enabling analysis of any discount rate, or, e.g., calculation of a break-even discount rate).

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[450] *See, e.g.*, Peer Review Report of Joseph Aldy; Peer Review Report of Cary Coglianese; Peer Review Report of W. Kip Viscusi; Peer Review Report of William Pizer; Peer Review Report of Glenn C. Blomquist; Harold Furchtgott-Roth and Kirk R. Arner, OMB-2022-0014-0140; Don Kenkel, OMB-2022-0014-3910. For example, one commenter noted that the "Gates Foundation Reference Case Guidelines for Benefit-Cost Analysis in Global Health and Development (2019) recommend sensitivity analysis of discount rates" that include "a constant annual rate of 3 percent and a constant annual rate equal to twice the projected near-term gross domestic product (GDP) per capita growth rate," i.e., "2.2% for advanced economies" like the United States. Don Kenkel, OMB-2022-0014-3910.

[451] Brian Mannix, OMB-2022-0014-0160

[452] Preamble at 24 (quoting Circular A-4 (2003) at 33).

[453] Circular A-4 (2003) at 33.

[454] Qingran Li and William A. Pizer, "Use of the Consumption Discount Rate for Public Policy over the Distant Future," *Journal of Environmental Economics and Management* 107 (2021): 102428.

[455] In the absence of such capital effects, OMB believes that the presentation of such an analysis would be misleading.

[456] Circular A-4 (2023) at 75.

c. Accounting for Risk When Discounting

Risk intersects with discounting in at least three ways that are helpful to separate. First, estimates of the SRTP are sometimes based on instruments with yields that reflect risk premia. As noted in the Preamble, this biases the estimate of the SRTP upwards, as it is "meant to apply to a risk-free (or, e.g., certainty-equivalent) stream of regulatory benefits and costs."[457] Second, regulatory benefits and costs may reflect what economists call "idiosyncratic risk": risk that is, theoretically, capable of being priced and accounted for through insurance. "However—due to incomplete markets, the existence of uninsurable risks, and other distortions—full insurance may not be obtainable, and it is generally not appropriate to presume the existence of full insurance unless there is evidence that it is present."[458] In such cases, accounting for idiosyncratic risk may be important in the calculation of certainty-equivalent benefits and costs. Third, the net benefits of regulations may be correlated (positively or negatively) with changes in aggregate social welfare: this is known as "systemic risk." For example, the net benefits of regulation may be higher when social welfare otherwise rises (i.e., a positive correlation), or the net benefits may be higher when social welfare otherwise falls (i.e., a negative correlation). Often, metrics such as per capita GDP are used as a proxy for social welfare when assessing systematic risk. In theory, certainty-equivalent valuations should capture not just idiosyncratic risk, but also systematic risk.

The Preamble noted that some have argued for risk to be captured by discount rates rather than certainty-equivalent valuations of benefits and costs.

> In principle, a general approach to selecting discount rates can account for certain forms of risk by estimating an economy-wide systematic risk premium and the regulation-specific correlation of regulatory benefits and costs with that systematic risk, combining the two to obtain a regulation-specific discount rate. However, the parameters necessary to pursue such an approach are difficult to estimate, the approach inherently offers limited flexibility in modeling changes to risk over time (e.g., it is only valid if uncertainty grows exponentially over time), and this type of risk is not always the most material type of risk in regulatory analysis.[459]

OMB solicited comment on whether higher discount rates should be used to account for systematic risk (or lower discount rates should be used to account for reductions in systematic risk).[460]

Several commenters argued that the calculation of certainty-equivalent values that capture systematic risk is impractical and more difficult relative to applying a higher discount

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[457] Preamble at 25.

[458] Draft Circular A-4 at 72.

[459] Preamble at 33. OMB had similarly noted in 1996, "Uncertainty that increases systematically over time will result in certainty equivalents that fall systematically over time; however, these decreases in certainty equivalents will mimic the effects of an increase in the discount rate only under special circumstances." Office of Management & Budget, *Economic Analysis of Federal Regulations Under Executive Order 12866* (Jan. 11, 1996), *https://georgewbush-whitehouse.archives.gov/omb/inforeg/riaguide.html*.

[460] Preamble at 33.

rate.[461] OMB notes that this sets up an unequal comparison. Calculation of certainty-equivalent benefits and costs is akin to estimation of regulation-specific correlations of net benefits and changes in aggregate welfare. One group of commenters argued that while determining regulation-specific systematic risk correlations "would entail additional costs for agencies, especially during a transition period," such correlations could be determined in a way that "entails modest additional costs to the government" by having "[a]gencies draw on the professional expertise that has developed to support valuations in the private sector."[462] But OMB notes that the economic literature lacks consensus on the appropriate systematic risk premium—see below—or average regulatory correlations with changes in social welfare (this correlation is often referred to as the "beta"). Calculation of such regulation-specific correlations is no less difficult than the calculation of certainty-equivalent values; in fact, agencies may have experience that is more relevant to calculating certainty-equivalent benefits and costs that capture systematic risk (e.g., from projecting how regulatory benefits and costs change as income varies across affected individuals or changes over time).

One commenter similarly argued that "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."[463] However, OMB notes that the use of certainty-equivalent values is more flexible (and therefore has a greater potential for accuracy) than risk-adjusted discount rates. Risk-adjusted discount rates assume that uncertainty grows at an exponential rate while certainty-equivalent values can reflect a wider set of risks occurring at different points in time. Use of a single risk-adjusted discount rate can also lead decisionmakers astray if they are comparing two projects with different patterns of risk over time. The fact that certainty-equivalent valuation coincides with risk-adjusted discount rates in the simplest cases, and is more flexible than risk-adjusted discount rates in more complicated cases, led one study to conclude that "[o]n a conceptual level, therefore, the certainty-equivalent framework appears superior to the use of a constant, risk-adjusted discount rate, since it is applicable in a wider variety of situations."[464]

That same commenter also argued that "[i]n practice, corporations overwhelmingly use a risk-adjusted discount rate approach," indicating that this provided evidence for the practicality of such an approach.[465] To support the statement, the commenter referred to citations from a recent working paper and specifically referenced one published article.[466] The published article does not support the commenter's claim. It shows that the most common method firms report using to assess uncertainty is sensitivity analysis, followed by subjective assessments by

[461] *See, e.g.*, Peer Review Report of Christina D. Romer; Alliance for Automotive Innovation, OMB-2022-0014-0067; Paul Joskow et al., OMB-2022-0014-0096; Marvin Phaup, OMB-2022-0014-0058; Marcel Boyer and Christian Gollier, OMB-2022-0014-0132.

[462] Paul Joskow et al., OMB-2022-0014-0096.

[463] Peer Review Report of Christina D. Romer.

[464] Alexander A. Robichek and Stewart C. Myers, "Conceptual Problems in the Use of Risk-Adjusted Discount Rates," *The Journal of Finance* 21, no. 4 (1966): 727-30.

[465] Peer Review Report of Christina D. Romer.

[466] Niels Joachim Gormsen and Kilian Huber, "The Cross-Section of the Perceived Cost of Capital," (unpublished paper, 2023); Emery A. Trahan and Lawrence J. Gitman, "Bridging the Theory-Practice Gap in Corporate Finance: A Survey of Chief Financial Officers," *Quarterly Review of Economics and Finance* 35, no. 1 (1995): 73-87.

management. Fewer than half of the firms report using discount rate adjustments, and among the subsample of firms that engaged in a more heterogenous set of business activities, the most commonly used method was cash flow adjustments (like certainty equivalents).[467] The working paper also does not support the commenter's claim.[468]

In any case, OMB noted in the proposed revisions to Circular A-4 that agencies "may find this conceptual framework [of adjusting the discount rate to account for regulation-specific risk] useful in specific regulatory contexts"[469] and continues to affirm that agencies may find the estimation of regulation-specific betas (given a systematic risk premium estimate) useful in specific regulatory contexts.

Regarding the potential use of an average risk premium to add to the SRTP—reflecting an economy-wide systematic risk premium and average regulatory net benefits correlation (beta)—commenters' views varied.

One group of commenters argued that much of the observed gap between predicted risk premia and observed risk premia (i.e., the equity premium puzzle, which is discussed below) arises from individual (i.e., idiosyncratic) risks that have "no real bearing on the correct discount rates that should be used for social evaluation of regulatory changes."[470] They cite to Grant and Quiggin (2003)[471] for the proposition that these sources of equity premia "should condition how we think about using market returns for stocks in assessments of public investments and regulations"[472]; in Grant and Quiggin's model, a discount rate with a beta of zero is first-best.

Certain commenters argued that at least for regulations affecting climate change, the correlation of regulatory net benefits with aggregate changes in social welfare (i.e., the climate beta) is likely to be negative.[473] These commenters did not suggest a risk adjustment to the discount rate in general, or climate regulations specifically; a negative correlation would imply a lower discount rate applied to estimates of the social cost of greenhouse gas emissions.

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[467] Emery A. Trahan and Lawrence J. Gitman, "Bridging the Theory-Practice Gap in Corporate Finance: A Survey of Chief Financial Officers," *Quarterly Review of Economics and Finance* 35 no. 1 (1995): 79.

[468] The working paper relies on data from a second working paper (Niels Joachim Gormsen and Kilian Huber, "Corporate Discount Rates," (Working Paper No. 31329, National Bureau of Economic Research, June 2023), *https://www.nber.org/papers/w31329*). The data for both papers come from corporate conference call transcripts. To find sections of the transcripts related to corporate discounting, the authors searched for a list of keywords and kept only paragraphs that included those keywords. The keyword list employed by the authors did not include terms related to the phrase "certainty equivalent," and the list did not include terms for risk or uncertainty aside from "expected return," "expected rate of return," and "expect a return." In classifying the data from paragraphs that the authors did extract, they again did not record any information related to the use of certainty equivalents (*see* A15). Therefore, the paper is not able to assess the relative rate at which firms adjust for risk using certainty equivalents versus risk-adjusted discounting because it did not gather the relevant data for making that comparison.

[469] Draft Circular A-4 at 83.

[470] Dr. Josh Bivens and Dr. Heidi Shierholz, OMB-2022-0014-0142.

[471] Simon Grant and John Quiggin, "Public Investment and the Risk Premium for Equity," *Economica* 70, no. 277 (2003): 1-18.

[472] Dr. Josh Bivens and Dr. Heidi Shierholz, OMB-2022-0014-0142.

[473] *See, e.g.*, Peer Review Report of Christina D. Romer; Cameron Hepburn, Nicholas Stern, and Joseph Stiglitz, OMB-2022-0014-0123; Dr. Josh Bivens and Dr. Heidi Shierholz, OMB-2022-0014-0142.

Another commenter stated that "there seems to be no clear consensus in the literature even for climate change" whether the beta is positive or negative, "which is the topic where this correlation has been studied the most."[474] A negative beta would imply that the appropriate risk-adjusted discount rate should be lower than the risk-free SRTP. The commenter continued by noting that "[g]oing 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."[475]

One commenter suggested that OMB adopt the systematic risk premium (2.5%, after adjusting for leverage) and average beta (0.45) that Circular A-94 adopted for government investments (1.1%, when multiplied).[476] The commenter did not provide evidence that the beta on regulations matches the beta on government investments, which was the basis for Circular A-94's estimate; OMB does not believe that the beta on regulations matches the beta on government investments.[477] However, this same commenter endorsed the use of a Ramsey model for regulations "where significant consequences extend beyond 50 years" to handle risk adjustment endogenously. This is the case even despite—as the commenter noted—the fact that this approach yields a systematic risk premium of 0.3% (or 0.1% when multiplied by the same beta estimate).[478] The commenter's views did not indicate that the commenter believed these two recommendations—while differing by an order of magnitude—could be squared with one another on the basis that risk premia decline substantially from the near-term to the long-term (more than 50 years in the future). Indeed, the commenter opined that some literature "points to a rising term structure depending on persistent uncertainty about long-term economic growth," i.e., rising systematic risk over longer time horizons.[479]

One commenter noted that "Jorda et al. (2019) provides strong evidence of a [systematic] risk premium of at least several percentage points."[480] More specifically, Jordà et al. (2019) found an equity risk premium over the period 1870-2015 of 3.8% (geometric mean) or 5.9% (arithmetic mean).[481] But the commenter did not present a view on the average correlation

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[474] Peer Review Report of Kenneth Gillingham.

[475] *Ibid.*

[476] Draft Circular A-94 at 30. Note that other commenters, unlike OMB, generally did not provide leverage-adjusted estimates of the systematic risk premia when using evidence from equity markets. OMB continues to believe that when it is appropriate to estimate a risk premium, as in Circular A-94, such leverage adjustments are an important and appropriate component of the estimate.

[477] As Circular A-4 discussed, "the benefits of many Federal investments are positively correlated with future economic outcomes," such as when the Federal government invests in construction of a bridge or tunnel. The benefits of the bridge or tunnel—in terms of the increased marginal value of trips that result from the new bridge or tunnel (commercial or leisure travel)—are likely to be higher when times are better, economic growth is higher, incomes are higher, and therefore the commerce flowing through the bridge and the value of people's time is higher. By contrast, "for many regulations, an appropriate risk premium adjustment to the discount rate would be negligible (or negative), as many regulations provide their largest value to society when mitigating the harms of a number of risks or market inefficiencies in bad states of the world." Draft Circular A-4 at 83.

[478] Peer Review Report of William Pizer. Betas may need to be re-normalized based on the systematic risk premium estimated; it is not clear that the commenter thinks that regulatory net benefits have an average beta that is lower than, or higher than, 0.45 in a Ramsey model estimate.

[479] *Ibid.*

[480] Arthur Fraas et al., OMB-2022-0014-3917.

[481] Òscar Jordà et al., "The Rate of Return on Everything, 1870–2015," *The Quarterly Journal of Economics* 134, no. 3 (2019): 1225-98.

between regulatory net benefits and changes in equity prices (i.e., average regulatory beta), given that estimate of the equity risk premium.

One commenter supported an upwards adjustment to the SRTP of "much less" than the equity risk premium, which the commenter opined was about 6%.[482] The commenter reasoned that "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 returns."[483] The commenter guessed "[v]ery tentatively" that the total adjustment "should perhaps be between roughly one-half and two percentage points." "But," the commenter continued, "this is obviously highly speculative; much more analysis would be needed to obtain the precise number to be used."[484]

One commenter supported the use of a 5-6% systematic risk premium based on U.S. stock market returns and 20-year government bond yields from 1926 to 2021 or other published work.[485] This commenter supported the use of betas ranging from zero to three, and a SRTP of 3%, resulting in three risk-inclusive discount rates: 3%, 8.5%, and 14%.[486] This commenter argued that betas of two or more (discount rates of 14% or more) are particularly appropriate for regulations that involve green energy, as "research on venture capital investments" in these areas "find[] betas of two or above."[487] The commenter argued that "the discount rate the investor applies to the cash flows capture the time value of money and the risk associated with the technology delivering on its promises. As such, that discount rate is also the best discount rate to apply to expected future streams of social benefits."[488] OMB notes, however, that this commenter did not address whether such market rates on venture capital investments appropriately capture the correlation of the social value, rather than the private value, of the investment with the aggregate change in social welfare. OMB disagrees with the commenter's claim, as it would seem to be the case, at a minimum, that green energy firms receiving venture capital investment—by virtue of creating a product that reduces a negative externality—will not capture the full social value of the product. Such firms are also likely to be leveraged, which distorts the beta estimate above what would be relevant for the evaluation of regulatory costs and benefits.

One commenter supported the use of a 6-7% systematic risk premium based on financial and real corporate capital returns of 7-8% from 1928 and 1948 to 2022, respectively.[489] Another commenter favored even higher rates, citing the irreversibility of many federal regulations and private sector hurdle rates, to urge an upper-bound discount rate of 20%.[490] OMB reiterates that these rates are risk-inclusive and therefore do not provide evidence on the risk-free SRTP. Such high risk premia also lead to risk-free discount rate estimates that are too low to be consistent with observable market rates from Treasuries. For example, the same commenter recommending

[482] Peer Review Report of Christina D. Romer.

[483] *Ibid*.

[484] *Ibid*.

[485] Joshua Rauh, OMB-2022-0014-0119.

[486] *Ibid*.

[487] *Ibid*.

[488] *Ibid*.

[489] William Nordhaus, OMB-2022-0014-0089.

[490] James Broughel, OMB-2022-0014-0095.

a 7-8% risk-inclusive rate also recommended a risk-free rate of 1%. Other commenters were critical of using corporate capital returns or hurdle rates to determine the discount rate on the basis that returns to investments could also reflect factors in addition to systematic risk, such as market power, that are not relevant to the social discount rate.[491]

One commenter on the issue strongly disagreed with Ramsey model-based (CCAPM) estimates of the systematic risk premium that imply a systematic risk premium of less than 0.2%.[492] This gap is known as the equity premium puzzle (or capital premium puzzle), and as the commenter noted, "[w]hile there are many proposals for dealing with the puzzle, none has succeeded."[493] This commenter argued that "[f]or a risk profile that is intermediate in size … it is appropriate to use a risk premium that is the economy-wide risk premium times a 'beta' that reflects the correlation of the risk with the risk in the economy as a whole," i.e., 1.0.[494] However, the same commenter argued that investments in "natural-gas turbines, power plant investments, subsidies for wind and solar projects, energy conservation projects, and other similar climate-related investments" likely have a beta of 0.5.[495] The commenter did not provide a citation for the claim that regulatory net benefits on average correlate with average economy-wide changes in social welfare (a beta of one), or the claim that climate-related investments' net benefits correlate with a beta of one-half.

One commenter argued that the use of a shadow price of capital greater than 1.0, given that "it may not even be necessary to make an adjustment for deferred investment in capital, even in a (partly) closed economy," could be an alternative way of reflecting systematic risk adjustment.[496] See "*Accounting for Effects on Capital When Discounting*" below.

A number of commenters emphasized that OMB's guidance should not ignore that regulations' net benefits could have positive or negative correlations with increases in social welfare.[497] Regulations with net benefits that negatively correlate with increases in social welfare would have risk-inclusive discount rates that are lower than the estimate of the risk-free SRTP. One group of commenters argued that "estimating income-elasticities of net benefits may be a complex task, in particular when no data is available," but that OMB could solve this problem by providing "sectoral betas" by regressing "in log sectoral added value on the change in log GDP to estimate the sectoral beta."[498] However, OMB notes that sector value added (and GDP) will often not capture key determinants of welfare changes; the two can even be anti-correlated, as when reductions in pollutants have benefits that exceed the costs reflected in a decline in GDP. Accordingly, while such an approach may be more feasible for government investments with

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[491] *See, e.g.*, Dr. Josh Bivens and Dr. Heidi Shierholz, OMB-2022-0014-0142.

[492] William Nordhaus, OMB-2022-0014-0089.

[493] *Ibid.*

[494] *Ibid.*

[495] *Ibid.*

[496] Peer Review Report of Kenneth Gillingham.

[497] *See, e.g.*, Peer Review Report of Christina D. Romer; James Stock, OMB-2022-0014-0081; Eli Fenichel, OMB-2022-0014-0084; Cameron Hepburn, Nicholas Stern, and Joseph Stiglitz, OMB-2022-0014-0123; Marcel Boyer and Christian Gollier, OMB-2022-0014-0132.

[498] Marcel Boyer and Christian Gollier, OMB-2022-0014-0132 (citing Frédéric Cherbonnier and Christian Gollier, "Risk-adjusted Social Discount Rates," *The Energy Journal* 43, no. 4 (2022)).

benefits and costs that almost entirely reflected in GDP, it has limited application to the regulatory context where benefits and costs are often not reflected in GDP.

After reviewing these comments, OMB's judgment is that there are no well-developed and accepted estimates for regulation-specific net benefit correlations with social welfare (betas), averages of net benefit betas for categories of regulations, or even an average beta across all regulations (given an economy-wide systematic risk premium). The use of an average beta value would also be of great concern to OMB, as many regulations' net benefits may have a negative correlation with changes in social welfare (i.e., have insurance value). As a result, not only the magnitude, but also potentially the sign, of the appropriate average regulatory systematic risk adjustment is uncertain. As one commenter put it, "[i]t seems unwise to have an arbitrary risk *premium* added to the discount rate because often regulations might actually merit a risk *discount*" (emphasis added).[499]

Further, the magnitude of the economy-wide systematic risk premium is also uncertain, with estimates ranging from single-digit basis points (as in certain calibrated Ramsey models) to hundreds of basis points (using equity market data), or even higher. While producing such an estimate is resolvable in the context of Circular A-94's focus on government investments—given evidence in economic sectors closest to government investments in equity markets—no clear resolution is available in the context of regulations, where it is not possible to identify economic sectors with returns similar to regulatory net benefits. Disagreement among commenters is not surprising. For decades, the equity/capital premium puzzle has been, and continues to be, a puzzle.[500] And even if the economy-wide systematic risk premium were known with reasonable certainty, or an estimate of the equity risk premium to be used (as in Circular A-94), OMB reiterates that no commenter provided a well-justified method for estimating the correlation between regulatory net benefits and changes in aggregate welfare (regulatory beta) for any regulatory effect other than the mitigation of—or exacerbation of—climate change effects.

This leads OMB to conclude, as it did in 1996, that as a general matter "the discount rate should not be adjusted to account for the uncertainty of future benefits and costs"; instead, "allowance for uncertainty should be made by adjusting the monetary values of changes in benefits or costs (for the year in which they occur) so that they are expressed in terms of their certainty equivalents."[501] When certainty equivalents are not calculated in a way that fully captures risk (including both idiosyncratic and systematic risk), risk should be thought of like other regulatory effects for which agencies lack reliable measurements: that is, as a non-

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[499] Eli Fenichel, OMB-2022-0014-0084.

[500] *See, e.g.*, Narayana R. Kocherlakota, "The Equity Premium: It's Still a Puzzle," *Journal of Economic Literature* 34, no. 1 (1996): 42-71; Christian Julliard and Anisha Ghosh, "Can Rare Events Explain the Equity Premium Puzzle?" *The Review of Financial Studies* 25, no. 10 (2012): 3037-76; Òscar Jordà, Moritz Schularick, and Alan M. Taylor, "The Total Risk Premium Puzzle," (Working Paper No. 25653, National Bureau of Economic Research, March 2019), *https://www.nber.org/papers/w25653*.

[501] Office of Management & Budget, *Economic Analysis of Federal Regulations Under Executive Order 12866* (Jan. 11, 1996), *https://georgewbush-whitehouse.archives.gov/omb/inforeg/riaguide.html*. This guidance document "was drafted by an RWG [Regulatory Working Group] interagency working group chaired by Joe Stiglitz of CEA and then-General Counsel of the Department of Transportation, Steve Kaplan." Sally Katzen, *Memoranda for Members of the Regulatory Working Group -- Economic Analysis of Federal Regulations Under Executive Order No. 12866* (Jan. 11, 1996), *https://obamawhitehouse.archives.gov/omb/memoranda_rwgmemo/*.

monetized benefit or cost. OMB believes that it would be inappropriate to advise agencies at this time, as a default, to add a risk premium that cannot be well-justified on the basis of the current economic literature. More progress on quantification may be possible as the economic literature improves.

OMB notes that, to the extent that certain commenters' guesses that an average regulation has a positive beta are correct—which is not an established finding in the economic literature—and agencies do not account for systematic risk through the use of certainty-equivalent valuations or by estimating a systematic risk premium and regulation-specific beta, this would downwardly bias Circular A-4's estimate of the discount rate.[502] But, as explored elsewhere in this document, other factors—such as behavioral biases, zero lower bound periods, liquidity premia, term premia, default risk, and taxation of income on Federal debt instruments—bias the SRTP estimate (and thus the discount rate) upwards. All of these potential biases are also best thought of as potential unquantified sources of bias in an analysis.

Future progress in economics may allow for further strides in quantification of these factors in subsequent revisions to Circular A-4.

d. *Accounting for Effects on Capital When Discounting*

As noted in the Preamble, uncertainty about the extent to which regulatory effects displace capital investment and thereby have a greater knock-on effect on consumption motivated the use of a 7% discount rate in the 2003 version of Circular A-4.[503] However, "the social rate of time preference estimate in the revised guidance is meant to apply to a risk-free (or, e.g., certainty-equivalent) stream of regulatory benefits and costs, whereas the 7% rate used to estimate the opportunity cost of capital represents a pre-tax rate of return that is not risk-free."[504] For more on risk and discounting, see "*Accounting for Risk When Discounting*" above. Notably, the 2003 version of Circular A-4 did not discuss the potential for regulatory effects to induce capital investment, in which case a lower—not higher—discount rate would have been more appropriate.[505] One commenter emphasized that public policy can have complementary effects on economic activity, stating that "[n]ational defense, roads and infrastructure, clean air and water, [and a] stable climate, all underpin [the] economic stability and success of the U.S. market."[506] As the Preamble also notes, the method used to derive the 7% rate "likely reflects returns to market power, uninternalized externalities, and other market distortions."[507] More to the point, OMB's "preliminary conclusion [was] that this uncertainty with respect to the effects of regulation on capital flows continues to exist, but can be accounted for more accurately through the use of the shadow price of capital approach," as had been noted in 2003 as well.[508] As the proposed revisions to the Circular stated,

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[502] Of course, if the average regulation has a zero—or even negative—beta, this would not be the case.
[503] Preamble at 25.
[504] *Ibid.*
[505] Qingran Li and William A. Pizer, "Use of the Consumption Discount Rate for Public Policy over the Distant Future," *Journal of Environmental Economics and Management* 107 (2021): 102428.
[506] Eli Fenichel, OMB-2022-0014-0084.
[507] Preamble at 25 n.80.
[508] *Id*. at 25.

OMB has consistently noted that the "shadow price" approach is "analytically preferred" since 1992. *See* Office of Mgmt. & Budget Circular A-94 [1992], at 9; Office of Mgmt. & Budget, *Economic Analysis of Federal Regulations under Executive Order 12866* (Jan. 11, 1996), *https://georgewbush-whitehouse.archives.gov/omb/inforeg/riaguide.html*; Office of Mgmt. & Budget, Circular A-4, *Regulatory Analysis* 33 (Sept. 17, 2003).[509]

The shadow price of capital (SPC) approach converts all benefits and costs into consumption-equivalent values before discounting.

As noted in the proposed revisions to Circular A-4, OMB proposed that when evaluating regulations that are anticipated to have substantial incidence on capital, agencies should use—as a default—two shadow prices of capital. The first, 1.0, reflects "an open economy estimate with perfect capital mobility … and is functionally equivalent to assuming that foreign capital flows offset any displacement or inducement of capital."[510] As the Preamble noted, support for such an assumption appears in the economic literature (footnotes added in braces):

In 1990, Lind concluded that it is "inappropriate to assume that there will be much crowding out of private investment through higher interest rates" and that "[t]he crowding out that has been the focus of most of the closed economy models does not appear to be very important to the analysis of the social discount rate." {Robert C. Lind, "Reassessing the Government's Discount Rate Policy in Light of New Theory and Data in a World Economy with a High Degree of Capital Mobility," *Journal of Environmental Economics and Management* 18, no. 2 (1990): S-15 to S-16.} In 1994, Lesser and Zerbe concluded that "the supply of capital is highly elastic" given capital market openness, and that "[p]rivate capital in an open economy comes primarily at the expense of consumption, not from crowding out of private capital"; accordingly, a shadow price of capital approach would use a value of one and discount at "the consumer's rate of time preference in an open economy." {Jonathan A. Lesser and Richard O. Zerbe, "Discounting Procedures for Environmental (and Other) Projects: A Comment on Kolb and Scheraga," *Journal of Policy Analysis and Management* 13, no. 1 (1994): 150; see also id. at 152 ("As long as the fraction of project costs coming from private capital is not large, and as long as the ratio between this fraction and the fraction of benefits returning to private capital is within a broad range, ordinary benefits and costs may simply be discounted by the [social rate of time preference] with a sensitivity test …. The high degree of elasticity in capital markets means that … it will be sufficient to discount ordinary benefits and costs by the [social rate of time preference]. Even if there were some crowding out of private investment, a procedure that discounted ordinary benefits and costs by the [social rate of time preference] and then performed a sensitive test would be all that was required.").} Since the 1990s, U.S. capital markets have generally become more open. {Menzie D. Chinn and Hiro Ito, "What Matters for Financial Development? Capital Controls, Institutions, and Interactions," *Journal of Development Economics* 81,

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[509] Draft Circular A-4 at 78, n.156.
[510] *Id*. at 79.

no. 1 (2006): 163-92 (data through 2020 available at
http://web.pdx.edu/~ito/Chinn-Ito_website.htm); International Monetary Fund,
Annual Report on Exchange Arrangements and Exchange Restrictions 2021
(2022).}

As the proposed revisions to Circular A-4 noted, the second recommended SPC, 1.2,
reflects "a closed economy estimate with no foreign capital flows." OMB cited a range of
literature emphasizing closed-economy estimates of the SPC of 1.1 to 1.3 to motivate this
approach.[511] When this default is used, the guidance advised agencies to test their "analysis's
sensitivity to assumptions about the incidence of regulatory effects on capital by analyzing two
outer-bound cases: one assuming all benefits and no costs fall on capital, and another assuming
all costs and no benefits fall on capital."[512] This approach would help agencies identify
"circumstances in which agencies may consider additional steps, such as more detailed
discussions or, to the extent feasible, estimation of an appropriate shadow price of capital or of
the likely incidence of regulatory effects on capital in a particular regulatory context."[513] As
noted in the Circular (footnotes added in braces):

> In certain cases, it may be clear that that your regulation likely has little or no
> incidence on capital, {This happens if a regulation is unlikely to significantly
> impact private investment rather than consumption, such as when regulatory costs
> will predominantly be passed through to consumers and do not affect investment
> decisions.} or the magnitudes of costs and benefits falling on capital are the same
> in every period. {Mark A. Moore et al., ""Just Give Me a Number!" Practical
> Values for the Social Discount Rate," *Journal of Policy Analysis and
> Management* 23, no. 4 (2004): 792 (citing Jonathan A. Lesser and Richard O.
> Zerbe, "Discounting Procedures for Environmental (and Other) Projects: A
> Comment on Kolb and Scheraga," *Journal of Policy Analysis and Management*
> 13, no. 1 (1994): 140-156).} In such cases, you can simply discount at the social
> rate of time preference.

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[511] See Preamble at 26-27 n.88:
> See Richard G. Newell, William A. Pizer, and Brian C. Prest, "The Shadow Price of Capital:
> Accounting for Capital Displacement in Benefit-Cost Analysis" (Resources for the Future 2022)
> (citing Qingran Li and William A. Pizer, "Use of the Consumption Rate for Public Policy over the
> Distant Future," Journal of Environmental Economics and Management 107 (2021): 102428); see
> also Jonathan A. Lesser and Richard O. Zerbe, "Discounting Procedures for Environmental (and
> Other) Projects: A Comment on Kolb and Scheraga," Journal of Policy Analysis and Management
> 13, no. 1 (1994): 152 ("even in the absence of an open economy where the savings rate represents
> the contribution of private capital to projects, and where there were almost no returns of benefits
> to private capital, a sensitivity adjustment of 10 percent applied to costs would almost certainly
> cover the range of results that would be produced by a full [shadow price of capital] calculation");
> Mark A. Moore et al., ""Just Give Me a Number!" Practical Values for the Social Discount Rate,"
> Journal of Policy Analysis and Management 23, no. 4 (2004): 805 (recommending a shadow price
> of capital of 1.1 "as a best estimate" and use of shadow prices of 1.0 and 1.3 "in sensitivity
> analysis").

[512] Draft Circular A-4 at 79.

[513] *Id*. at 80.

OMB also sought comment on alternative models and parameters that could be used to estimate the SPC.[514]

The use of a shadow price of capital to capture capital effects was supported by many commenters.[515] Some commenters emphasized that a rate—like the 7% rate in the 2003 version of Circular A-4—that reflects the average return to capital includes risk premia and market power, and is therefore inappropriate to use as an estimate of the social discount rate.[516] One commenter noted that, "[d]epending on the distortions" such as "market power" present in the economy that give rise to the fact that "the risk-adjust rate of return on capital" does note equal "the consumption rate," "it may not even be necessary to make an adjustment for deferred investment in capital, even in a (partly) closed economy."[517] Certain commenters, including the authors of Newell et al. (2022), supported the use of a lower SPC of 1.1, on the basis of more recent research in Newell et al. (2023).[518] One commenter argued that "the proposed SPC value of 1.2 … is appropriate and well-grounded in the literature, as is the proposed A-4 implementation through sensitivity analysis."[519] Another commenter urged the use of a slightly high-end SPC range, 1.2-1.3, on the basis of a similar methodology as Newell et al. with slightly different parameters.[520] Still another commenter urged the use of a SPC of 1.4 on the basis of the high-end of results in Newell et al. (2023).[521] After considering the academic literature and these comments, OMB continues to believe that a SPC value of 1.2 is a well-supported and conservative outer-bound estimate of the likely SPC, and is appropriate for use in regulatory analyses to test the sensitivity of the regulatory analysis to the regulation-specific displacement of capital and SPC.

The only commenters to address the alternative model and parameters that OMB solicited comments on argued that the parameters were inappropriate, as they include a risk premium that should not be included in estimation of the SPC.[522]

One group of commenters noted that the SPC "is sensitive to inputs and should vary depending on the rule."[523] While OMB agrees—and has emphasized the value of a regulation-

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[514] Preamble at 27-28.

[515] *See, e.g.*, Peer Review Report of Kenneth Gillingham; Peer Review Report of Joseph Cordes; Peer Review Report of William Pizer; Robert N. Stavins, OMB-2022-0014-0002; Richard Morgenstern et al., OMB-2022-0014-0031; Business Roundtable, OMB-2022-0014-0062; Center for Climate and Energy Solutions et al., OMB-2022-0014-0162; American Chemistry Council, OMB-2022-0014-3909; American Lung Association, OMB-2022-0014-0749.

[516] *See, e.g.*, Peer Review Report of Kenneth Gillingham; Dr. Josh Bivens and Dr. Heidi Shierholz, OMB-2022-0014-0142; Center for Climate and Energy Solutions et al., OMB-2022-0014-0162.

[517] Peer Review Report of Kenneth Gillingham.

[518] *See, e.g.*, Richard Morgenstern et al., OMB-2022-0014-0031; Timothy Fitzgerald, OMB-2022-0014-0117 (citing Richard G. Newell, William A. Pizer, and Brian C. Prest, "The Shadow Price of Capital: Accounting for Capital Displacement in Cost Benefit Analysis," (Working Paper No. 31526, National Bureau of Economic Research, August 2023), *https://www.nber.org/papers/w31526*). Note that OMB adjusting its estimate of the SRTP up (from 1.7% to 2.0%) also would have the effect of lowering any estimate of the SPC by a small amount relative to the estimate produced in the proposed revisions to the Circular.

[519] Peer Review Report of William Pizer.

[520] Business Roundtable, OMB-2022-0014-0062.

[521] American Chemistry Council, OMB-2022-0014-3909.

[522] Peer Review Report of Kenneth Gillingham; Peer Review Report of William Pizer.

[523] Arthur Fraas et al., OMB-2022-0014-3917.

specific estimate of the SPC and capital incidence—it is not feasible or desirable for agencies to devote analytic resources to that determination in every case. OMB believes that the defaults it has put forward help to identify cases where further analysis along those lines are likely to be most informative.

One commenter objected the use of an SPC without the precise specification of the underlying parameters used to arrive at that SPC.[524] OMB described the evidence used to arrive at an SPC of 1.2 above.[525] Because the estimate relies on a variety of different approaches, parameterizations, and modeling assumptions across economic literature published on the shadow price of capital that OMB believes is highest-quality and most relevant, no specific set of parameters can be provided by OMB. OMB disagrees with the view that a value supported by a range of approaches should not be adopted, in favor of one specific model and set of parameters.

Some commenters criticized the SPC estimate on the basis that the literature underlying it uses estimates of the average savings rate (in national income and product accounts, generally around 20%) rather than the marginal savings rate, arguing that a rate of 80% would be more appropriate.[526] One problem with this argument is that such a marginal savings rate would imply—given the estimates of other parameters that are used in the SPC estimation literature—that the SPC does not converge, i.e., that the appropriate SPC is infinite.[527] A second problem with this argument is that while the average marginal propensity to save—the flip side of the marginal propensity to consume—is much more difficult to identify and estimate than the average savings rate; indeed, it is likely context-specific, varying with the salience and context of the shock to wealth or income.[528] Just as the 7% discount rate in 2003 reflected the more readily-measurable average return to capital—rather than an attempt to measure the marginal return to capital, which would likely be lower, as firms will tend to make more profitable investments before less profitable ones—it may be appropriate to use the more readily-measurable average savings rate to estimate this parameter. Indeed, estimation using average values of both parameters is likely to partially offset the errors from using an average return to capital and an average savings rate (rather than marginal rates). A third problem with this argument is that the best available evidence of the marginal propensity to save in the context of changes in the value of capital are not consistent with this 80% estimate. The most context-relevant and high-quality evidence that OMB is able to identify on this question found that the elasticity of consumption with respect to changes in housing net worth (a dominant form of capital ownership for Americans) during the housing collapse of 2006-09 was 0.6 to 0.8, consistent with a marginal

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[524] National Association of Home Builders, OMB-2022-0014-3901.

[525] *See supra* note 511. *See also* Richard G. Newell, William A. Pizer, and Brian C. Prest, "The Shadow Price of Capital: Accounting for Capital Displacement in Cost Benefit Analysis," (Working Paper No. 31526, National Bureau of Economic Research, August 2023), *https://www.nber.org/papers/w31526*.

[526] *See, e.g.*, James Broughel, OMB-2022-0014-0095; American Petroleum Institute et al., OMB-2022-0014-0168.

[527] For example, in the model of Qingran Li and William A. Pizer, "Use of the Consumption Rate for Public Policy over the Distant Future," *Journal of Environmental Economics and Management* 107 (2021): 102428, if the savings rate is not less than or equal to the ratio of the depreciation rate of capital to the sum of the depreciation rate of capital and the return to capital, the result is explosive.

[528] For example, survey evidence indicates that recipients of reductions in payroll tax withholding (effective each pay period) likely consume less out of the increased funds than recipients of one-time stimulus checks. *See* Claudia R. Sahm, Matthew D. Shapiro, and Joel Slemrod, "Check in the Mail or More in the Paycheck: Does the Effectiveness of Fiscal Stimulus Depend on How It Is Delivered?" *American Economic Journal: Economic Policy* 4, no. 3 (2012): 216-50.

savings rate out of housing net worth of 20% to 40%.[529] This result is roughly in line with savings rate estimates used in the estimation of the SPC.

A group of commenters proposed using the Kolb and Scheraga (1990) approach, which would—among other things—assume that all initial regulatory costs accrue to capital and no benefits accrue to capital.[530] OMB re-emphasizes that increased investment can be a benefit of a regulation, and decreased investment can be a cost of a regulation; both benefits and costs can also reduce consumption, as when benefits are purely experiential or costs are passed-through to consumers. Accordingly, such an approach fails to identify the range of circumstances where the SPC may be relevant to the analysis. OMB is not adopting this approach.

One group of commenters argued that perfect capital mobility lower-bound SPC of 1.0 is not plausible for two reasons. First, the commenters argued that Feldstein and Horioka (1980)'s finding of high saving retention coefficients implies that capital is not highly mobile internationally.[531] However, OMB notes that recent research has shown that since 1980, Feldstein and Horioka's finding has weakened, and international capital mobility has increased.[532] Further, the wedge between U.S. Treasury yields and synthetic dollar yields on other low-risk sovereign debt track each other incredibly tightly, with Du, Im, and Schreger (2018) finding that U.S. Treasury yields were just 8 basis points (0.08%) higher than other G10 countries since the Great Recession.[533] OMB believes that, regardless of ongoing debate over saving retention coefficients, the evidence on rising capital mobility presented here and presented in the Preamble[534] more than provide a strong basis for consideration of the lower-bound SPC of 1.0. Second, as a theoretical matter, the commenters asserted that "while the global capital market is integrated, domestic credit constraints, imperfect information, and risks differentiate domestic capital markets" and thus domestic markets are characterized by "imperfections in the credit markets and differential sectoral risks more akin to a closed economy model with sector-specific rates of return."[535] OMB agrees that not all regulated entities may be

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[529] Atif Mian, Kamalesh Rao, Amir Sufi, "Household Balance Sheets, Consumption, and the Economic Slump," *The Quarterly Journal of Economics* 128, no. 4 (2013): 1687-1726.

[530] Arthur Fraas et al., OMB-2022-0014-3917.

[531] Arthur Fraas et al., OMB-2022-0014-3917 (citing to David F. Burgess and Richard O. Zerbe, "Appropriate Discounting for Benefit-Cost Analysis," *Journal of Benefit-Cost Analysis* 2, no. 2 (2011): 1-20; which in turn cites to David F. Burgess, "Comment on 'The Economic Opportunity Cost of Capital for Canada: An Empirical Update, by Glenn P. Jenkins and Chun-Yan Quo', in *Discount Rates for the Evaluation of Public Private Partnerships*, ed. David F. Burgess and Glenn P. Jenkins (Montreal and Kingston: McGill-Queen's University Press, 2010), 289-97; citing further to Martin Feldstein and Charles Horioka, "Domestic Saving and International Capital Flows," *The Economic Journal* 90, no. 358 (1980): 314-29).

[532] *See, e.g.*, Domenico Giannone and Michele Lenza, "The Feldstein-Horioka Fact" *NBER International Seminar on Macroeconomics* 6, no. 1 (2009): 103-17.

[533] Wenxin Du, Joanne Im, and Jesse Schreger, "The U.S. Treasury Premium," *Journal of International Economics* 112 (2018): 167-81.

[534] Preamble at 26 (citing Menzie D. Chinn and Hiro Ito, "What Matters for Financial Development? Capital Controls, Institutions, and Interactions," *Journal of Development Economics* 81, no. 1 (2006): 163-92 (data through 2020 available at "The Chinn-Ito Index," Menzie Chinn and Hiro Ito, *http://web.pdx.edu/~ito/Chinn-Ito_website.htm*); International Monetary Fund, *Annual Report on Exchange Arrangements and Exchange Restrictions 2021* (July 7, 2022), *https://www.imf.org/en/Publications/Annual-Report-on-Exchange-Arrangements-and-Exchange-Restrictions/Issues/2022/07/19/Annual-Report-on-Exchange-Arrangements-and-Exchange-Restrictions-2021-465689*).

[535] Arthur Fraas et al., OMB-2022-0014-3917.

able to borrow at prevailing risk-free rates.[536] While "returns will reflect sector-specific risk premia"[537]—no one would expect risky start-ups to have returns equal to safe blue-chip stocks—that is not relevant to the calculation of the SPC; see "*Accounting for Risk When Discounting.*" To the extent that firms are unable to access banking services (or offer debt in public markets) that offer competitive yields, that could drive a regulation-specific impact on certain capital to have a distinct SPC. But given regulated entities' widespread access throughout the United States to multinational banks and banks offering similar rates and services,[538] OMB continues to think that a lower-bound SPC is appropriate to consider. That is the case even though the true SPC may be somewhat higher than exactly 1.0 due to these frictions (but likely much lower than the SPC of 1.2 estimated to reflect a closed economy model and recommended in Circular A-4 for an upper-bound sensitivity analysis).

Certain commenters criticized consideration of a lower-bound SPC of 1.0 in light of recent limitations on foreign investment between China and the United States, and "the rise of populism and nationalism around the world in recent years" causing "capital markets [to] have become less open."[539] No quantitative analysis was provided to support this claim, or the relevant importance of such a shift (given, e.g., pre-existing capital controls that China has long had in place). By contrast the Preamble noted that "U.S. capital markets have generally become more open" to foreign flows since scholarship motivating the estimate of a shadow price of capital of 1.0 was published in the 1990s.[540] Accordingly, OMB is of the view that commenters' arguments have not been well-substantiated. Indeed, given the high degree of capital mobility in the United States and highly liquid international capital markets, OMB's view is that the open economy lower-bound SPC estimate of 1.0 is likely closer to the correct value than a closed-economy estimate.

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[536] Low-risk corporate borrowers are generally able to borrow at rates similar to Treasury rates, although even low-risk corporate borrowers are likely to have at least some priced-in default risk. "FRED Economic Data," Federal Reserve Bank of St. Louis, *https://fred.stlouisfed.org/graph/?g=17KWJ*.

[537] Arthur Fraas et al., OMB-2022-0014-3917.

[538] For example, the National Federation of Independent Businesses (NFIB)'s survey shows that, of all small businesses reporting that either all of their borrowing needs were satisfied or all of their borrowing needs were not satisfied (that is, excluding those not seeking loans) over the preceding three months, over the last five years, 91% have reported that all of their borrowing needs were satisfied. National Federation of Independent Businesses, *Small Business Economic Trends* 14 (July 2023), *https://strgnfibcom.blob.core.windows.net/nfibcom/SBET-July-2023.pdf*. Small firms are generally riskier than larger firms, however (see "*Accounting for Risk When Discounting*"), and therefore despite their widespread access to competitive loan rates, face higher borrowing costs due to that risk. For more detail, see "Availability of Credit to Small Businesses - October 2022," Board of Governors of the Federal Reserve System, updated Nov. 10, 2022, *https://www.federalreserve.gov/publications/2022-october-availability-of-credit-to-small-businesses.htm*.

[539] *See, e.g.*, Alliance for Automotive Innovation, OMB-2022-0014-0067; Arthur Fraas et al., OMB-2022-0014-3917.

[540] Preamble at 26 (citing Menzie D. Chinn and Hiro Ito, "What Matters for Financial Development? Capital Controls, Institutions, and Interactions," *Journal of Development Economics* 81, no. 1 (2006): 163-92 (data through 2020 available at "The Chinn-Ito Index," Menzie Chinn and Hiro Ito, *http://web.pdx.edu/~ito/Chinn-Ito_website.htm*); International Monetary Fund, *Annual Report on Exchange Arrangements and Exchange Restrictions 2021* (July 7, 2022), *https://www.imf.org/en/Publications/Annual-Report-on-Exchange-Arrangements-and-Exchange-Restrictions/Issues/2022/07/19/Annual-Report-on-Exchange-Arrangements-and-Exchange-Restrictions-2021-465689*).

e. *Ramsey Discounting*

In Section 12.b.ii of the proposed revisions to Circular A-4, titled "Alternative Approaches," the Circular discussed Ramsey discounting—and extensions to Ramsey discounting—as an alternative, structural model-based approach to discounting that differs from the financial market data-focused or statistical approaches discussed previously. However, as the Preamble noted, one difficulty with taking a

> descriptive approach to parameterizing the Ramsey formula is that one "implication of the Ramsey equation is that the discount rate is inherently linked to the growth rate of the economy." National Academies of Sciences, Engineering, and Medicine, Valuing Climate Damages: Updating Estimation of the Social Cost of Carbon Dioxide (Washington, DC: The National Academies Press, 2017): 163. However, observed risk-free rates in financial markets do not appear to be correlated with the growth rate of the economy. Olivier Blanchard, Fiscal Policy Under Low Interest Rates (forthcoming, MIT Press 2023); James D. Hamilton et al., "The Equilibrium Real Funds Rate: Past, Present, and Future," *IMF Economic Review* 64, no. 4 (2016): 660-707. Another difficulty emerges if calibrating the Ramsey equation to market rates, as reasonable estimates of near-term growth projections and of the elasticity of marginal utility may be most consistent, in the Ramsey formula approach, with an estimated negative rate of time preference, which is not plausible. Both of these difficulties likely reflect that the simplicity of the basic Ramsey approach omits (descriptively) important variables that partially determine the risk-free rate.[541]

The Preamble also noted that "[a] survey of discounting experts found that most experts do not apply the assumptions embedded in the Ramsey formula when advising on social discount rates, suggesting factors beyond the basic Ramsey formula are important."[542] The Preamble solicited comment on the Ramsey approach to estimating the SRTP, and "on whether there is an academic consensus on appropriate calibration or estimation procedures to determine these underlying parameters, and on alternative economic models that could be used."[543]

One group of commenters stated that the "Ramsey approach outlined" in the proposed revisions "as an alternative to the default approach to the social rate of time preference in the revised Circular A-4" was "less natural over a 30-year horizon where market interest rates exist."[544] A separate comment argued that "when market rates are available, it is prudent to rely on them rather than on an economic or statistical model, which necessarily will have modeling judgment involved. For this reason, for near-term rates, it is sound to rely on observed market rates."[545] Relatedly—but in the context of long-term discounting, see "*Long-term Discounting*" below—the same commenter noted that the use of a Ramsey-based formula requires assumptions

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[541] Preamble at 23 n.69. *See also* Draft Circular A-4 at 77 n.149.
[542] *Id*. at 23 n.72 (citing Moritz A. Drupp et al., "Discounting Disentangled," *American Economic Journal: Economic Policy* 10, no. 4 (2018): 109-34).
[543] Preamble at 24.
[544] David Autor et al., OMB-2022-0014-0021.
[545] James Stock, OMB-2022-0014-0081.

about "the functional specification of utility, which is unknown" and that "any functional form for aggregate consumption makes a great many assumptions which are heavily debated in the literature."[546] While noting the normative theoretical appeal of a Ramsey approach, this commenter urged that "a positive (statistical) approach" to discounting "be used," at least "for official purposes" by OMB.[547] Another commenter noted that "it is not necessarily clear that a real time value of money should be related to the current expected long-term rate of economic growth," as the Ramsey model implies.[548]

Another group of commenters argue that "Ramsey discounting appropriately accounts for correlated risks" between consumption growth and regulatory net benefits.[549] By contrast, another commenter argued that "optimal growth models of the Ramsey-Cass-Koopmans variety ('Ramsey model') … significantly underestimates the necessary risk premium."[550] For more on systematic risk, see *Accounting for Risk When Discounting*" above. Regardless, the former group of commenters stated that "OMB's proposal to permit agencies to use a Ramsey discounting approach when appropriate, but only after conferring with OMB, is sensible."[551] OMB is adopting its proposal, in line with this group of commenter's views.

Regarding OMB's request for comments on whether there is a consensus on appropriate calibration or estimation of the Ramsey model, one commenter stated that "[a]lthough the Ramsey formula has been in the economics literature since 1928, no consensus appears to have been reached concerning parameter values, with a wide range of possible parameter values (see Drupp et al. 2018 and Weitzman 2001)."[552] The same commenter urged OMB, if in the alternative it endorsed parameterization of Ramsey, to at least adopt one of two extensions to the Ramsey formula that account for (different forms of) adjustment for uncertainty.[553] Another commenter argued that the simplicity of the Ramsey formula excludes economic dynamics that play an important role in determining the appropriate social discount rate.[554] Other commenters gave voice to similar concerns about the lack of definitive parameterizations of the Ramsey formula, and argued that the Ramsey formula is a better guide to prescriptive discounting rather than descriptive discounting.[555]

In light of the concerns above, OMB has decided to reduce Circular A-4's discussion of the Ramsey approach at this time, while noting the potential utility of model-based approaches that endogenize the discount rate. OMB believes that this balances the potential virtues of using such model-based approaches in appropriate circumstances with the virtues of setting a default approach to discounting that is descriptive and reflects real interest rate data in the Treasury and TIPS markets.

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[546] *Ibid.*
[547] *Ibid.*
[548] Sam Gutterman, OMB-2022-0014-0108.
[549] Richard Morgenstern et al., OMB-2022-0014-0031.
[550] William Nordhaus, OMB-2022-0014-0089
[551] Richard Morgenstern et al., OMB-2022-0014-0031.
[552] Sam Gutterman, OMB-2022-0014-0108.
[553] *Ibid.*
[554] Arthur Fraas et al., OMB-2022-0014-3917.
[555] *See, e.g.*, American Petroleum Institute et al., OMB-2022-0014-0168; Don Kenkel, OMB-2022-0014-3910.

f. Long-term Discounting

The proposed revisions to Circular A-4 echoed the 2003 version of the Circular by noting:

> Special ethical considerations arise when comparing benefits and costs across generations. Although most people demonstrate time preference in their own consumption behavior, which may vary by the good or service at hand, it may not be appropriate for society to demonstrate a similar preference when deciding between the well-being of current and future generations. Future citizens and residents who are affected by such choices cannot take part in making them, and today's society must act with some consideration of their interest.[556]

The proposed revisions continued by noting that "[s]ome believe that it is ethically impermissible to discount the utility of future generations," which can be implemented by adopting a prescriptive approach to discounting.[557] However, as noted above in "*General Approach*," the proposed revisions generally recommended a descriptive approach to discounting.

> Separately, the proposed revisions noted (footnotes added in braces):

> A distinct reason for discounting the benefits and costs accruing to future generations at a lower rate is uncertainty about the appropriate value of the discount rate. {*See* Kenneth J. Arrow et al., "Should Governments Use a Declining Discount Rate in Project Analysis?," *Review of Environmental Economics and Policy* 8, no. 2 (2014): 145-163. Note that in a Ramsey model approach, discussed previously, incorporation of uncertainty about shocks to *g* leads to an extended Ramsey formula that also exhibits a declining discount rate.} Private market rates provide a reasonably reliable reference for determining the rate at which society is willing to trade consumption over time within a few decades, but for extremely long time periods no comparable private rates exist. {Property is one of the few assets that may be held over very long time horizons, and there is evidence of a downward-sloping term structure of discount rates for real estate. *See* Stefano Giglio et al., "Climate Change and Long-Run Discount Rates: Evidence from Real Estate," *Review of Financial Studies* 34, no. 8 (2021): 3527-3571 (parameterizing a real risk-free rate of about 1% over near-term time horizons, and finding declining rates for risky real estate over longer time horizons). Inter-vivos wealth transfers to subsequent generations and stated-preference studies on people's attitudes about discount rates over long time horizons also suggest that market data that end at shorter horizons may not

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[556] Draft Circular A-4 at 80.

[557] *Id*. at 80-81. *See also* Preamble at 28 ("One study surveyed economists regarding their judgment on what social discount rate should be used for long-lived projects. The lower-bound estimates ranged as low as -3% and the upper-bound estimates ranged as low as 0%, indicating that ethical considerations play a role in economists' selection of social discount rate when the welfare of future generations is at stake." (citing Moritz A. Drupp et al., "Discounting Disentangled," *American Economic Journal: Economic Policy* 10, no. 4 (2018): 109-34)).

capture societal preferences that are relevant to long-term discount rates. *See* Richard L. Revesz & Matthew R. Shahabian, "Climate Change and Future Generations," *Southern California Law Review* 84, no. 5 (2011): 1097-1163.} Because future changes in the social rate of time preference are uncertain but correlated over time, the certainty-equivalent discount rate will have a declining schedule. {Uncertainty about long-term growth rates can also be understood as causing a precautionary response to save more for the future, and increased rates of savings correspond to a lower discount rate. *See* Maureen L. Cropper et al., "Declining Discount Rates," *American Economic Review* 104, no. 5 (2014): 538-543.}[558]

To capture this insight numerically, the Preamble noted that "OMB is considering including a default schedule of rates in revisions to Circular A-4," while noting that agencies may choose to take another approach in analysis of particular regulations.[559] The proposed schedule of rates "was generated by OMB, adapting the model from Bauer and Rudebusch (2021) with the starting interest rate initialized at" the SRTP estimate.[560] OMB provided technical detail on how this model was developed in the Preamble.[561] OMB proposed to provide a schedule over a 150-year

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[558] Draft Circular A-4 at 81.

[559] Preamble at 29.

[560] *Ibid.*

[561] "Bauer and Rudebusch (2021) model the interest rate in each year as the sum of a slow-moving trend component and a cyclical component. The slow-moving trend component is a random walk. OMB simulates 100,000 paths for the interest rate, calculates the expected discount factor across these paths, and computes the forward rates consistent with this path of expected discount factors." Preamble at 29-30.

> More concretely, the rates in this table approximate certainty-equivalent rates for a model in which interest rates are fixed at the near-term estimated value of the social rate of time preference for 30 years and subsequently follow an unobserved components specification with trend and cyclical components, as in Bauer and Rudebusch (2021). OMB assumes innovations in the random walk are normally distributed with mean of zero and variance of 0.04; the cyclical component is an AR(1) process, with the AR parameter set to 0.7, and innovations normally distributed with mean of zero and variance of 0.9. The variance of the innovations in the random walk is chosen to be conservative (0.04); larger variance leads to more volatile estimates of the equilibrium real interest rate and causes the discount rate to decline more rapidly (though as discussed below, the model also imposes a non-negativity constraint, which ultimately limits the decline). The estimation is less sensitive to choices regarding the specifications of the other parameters.

> Interest rates are constrained to be non-negative in each year. The specification of the non-negativity constraint is influential in determining the results. As demonstrated by Newell and Pizer (2003), if negative interest rates are allowed, the resulting discount rate can become negative. Different modeling exercises adopt different approaches to specifying the non-negativity constraint; if a laxer constraint were imposed (e.g., only requiring that there be no cumulatively negative discount rates), the discount rate would fall more sharply. See Michael D. Bauer and Glenn D. Rudebusch, "The Rising Cost of Climate Change: Evidence from the Bond Market," The Review of Economics and Statistics (2021); Richard G. Newell and William A. Pizer, "Discounting the Distant Future: How Much Do Uncertain Rates Increase Valuations?," *Journal of Environmental Economics and Management* 46, no. 1 (2003): 52-71; and Martin L. Weitzman, "Gamma Discounting," *The American Economic Review* 91, no. 1 (2001): 260-71 for related analyses.

Preamble at 30, n.98.

horizon (with rates extending beyond this time period available from OMB upon agency request).[562] The use of a model "using data from 'historical interest rates' in financial markets to project uncertainty in the path of future rates" rather than "focusing on uncertainty in the underlying growth rate or other parameters" is consistent with the use of financial market data to estimate the SRTP.[563] OMB specifically solicited comment on its proposed default approach and other approaches to long-term discounting.[564]

Certain commenters argued that lower long-term discount rates *only* reflect prescriptive, rather than descriptive considerations.[565] However, while Circular A-4 discusses prescriptive considerations for lower long-term discount rates, its suggested long-term discount rate schedule reflects only the *descriptive* consideration of how uncertainty in the evolution of the discount rate over time reduces the certainty-equivalent discount rate. As another commenter put it, "[h]olding the discount rate constant into the deep future (the current approach) is not justified by economic or statistical methods, and the proposed A-4 is right to move from that method."[566]

Another group of commenters were concerned "that the adoption of a declining discount rate schedule can lead to temporal inconsistencies."[567] However, as Arrow et al. (2014)—cited in the proposed revision to Circular A-4[568]—note, this argument is only true "if the [declining discount rate] schedule does not change over time."[569] The reasoning is intuitive: the declining schedule is a function of uncertainty, and as time passes, analysts learn new information and uncertainty decreases. Or as Arrow et al. (2014) puts it: "a reversal of the outcome of the benefit-cost analysis *due to new information* would not constitute time inconsistency."[570] However, Arrow et al. (2014) emphasize, accordingly, that governments "should regularly update estimates of the [declining discount rate] as more information becomes available, thus eliminating the problem of time inconsistency."[571] For that reason, OMB is updating the long-term discount rate schedule every three years, along with the SRTP. See "Updating the SRTP" for more detail.

Another commenter argued that "OMB also should clarify that a declining discount rate schedule should not be used when agencies apply a certainty-equivalent approach, since the calculation of certainty-equivalent net benefits implicitly assumes" the effects of a declining discount rate factor "and will thus naturally decline over time reflecting an expected slowdown in long-term economic growth."[572] OMB notes that this commenter is not correct. As Arrow et al. (2014) stated, their "focus on the time pattern of risk-free discount rates" makes the assumption that "the stream of benefits and costs associated with a" regulation has "been

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[562] *Id*. at 31.

[563] *Ibid*.

[564] *Id*. at 32.

[565] Alliance for Automotive Innovation, OMB-202200014-0067; 29 Business Community Organizations, OMB-2022-0014-3918.

[566] James Stock, OMB-2022-0014-0081.

[567] Arthur Fraas et al., OMB-2022-0014-3917.

[568] Draft Circular A-4 at 81.

[569] Kenneth J. Arrow et al., "Should Governments Use a Declining Discount Rate in Project Analysis?," Review of Environmental Economics and Policy 8, no. 2 (2014): 145-63.

[570] *Ibid*. (emphasis in original).

[571] *Ibid*.

[572] Center for Climate and Energy Solutions et al., OMB-2022-0014-0162.

converted to certainty-equivalents."[573] It is in the context of making this assumption that Arrow et al. (2014) concluded that in both an extended Ramsey model approach and a macro-financial approach, "the arguments in favor of a [declining discount rate] are compelling."[574] This is simple to illustrate by considering a case where benefits and costs have zero idiosyncratic or systematic risk; the certainty-equivalent discount rate still declines, because the discount rate still uncertain. In essence, an agency should calculate both a certainty-equivalent value of benefits and costs, and a certainty-equivalent value of the discount rate, to accurately calculate the present value of future benefits and costs.

One commenter argued that empirical evidence cited on declining rate structures over long time horizons cannot disentangle declining risk premia from declining real rates, and therefore the use of declining discount rates should not be embraced.[575] Another commenter argued that, in certain models, systematic risk creates a "rising term structure depending on persistent uncertainty about long-term economic growth." Yet, despite those model-based results, OMB notes that empirical evidence from very long-term yields on real estate—a risky (and large) asset class—demonstrate declining term structures out to 100 years.[576] Accordingly, the proposition that systematic risk premia are rising over time is not well-established. Regardless, it is the case that—putting systematic risk premia to the side—growing uncertainty about the discount rate mechanistically decreases the certainty-equivalent discount rate over time.[577] Systematic risk premia are addressed outside of the long-term discounting context above in "*Accounting for Risk When Discounting.*"

Certain commenters supported declining discount rates more generally,[578] or supported the proposed long-term discount rate schedule approach in particular.[579] One commenter noted that, relative to a Ramsey approach to discounting—see "*Ramsey Discounting*" above—the

> Bauer-Rudebusch model does not require a functional form for utility and is instead based on estimates of empirically identified objects (the variances of the permanent and transitory components and the mean reversion parameter of the transitory component[]). The BR model captures the high degree of persistence in interest rates by specifying R* as a random walk, which is a commonly made assumption, e.g. del Negro et al (2017, cited above).

> Bauer-Rudebusch model is, to the best of my knowledge, the only serious effort to take the Weitzman (1998; cited in draft A-4) empirical observation (applying

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[573] Kenneth J. Arrow et al., "Should Governments Use a Declining Discount Rate in Project Analysis?," *Review of Environmental Economics and Policy* 8, no. 2 (2014): 145-63.

[574] *Ibid.*

[575] Joshua Rauh, OMB-2022-0014-0119.

[576] Stefano Giglio et al., "Climate Change and Long-Run Discount Rates: Evidence from Real Estate," *The Review of Financial Studies* 34, no. 8 (2021): 3527-71.

[577] Martin L. Weitzman, "Why the Far-Distant Future Should Be Discounted at Its Lowest Possible Rate," *Journal of Environmental Economics and Management* 36, no. 3 (1998): 201-08.

[578] *See, e.g.*, Paul Joskow et al., OMB-2022-0014-0096; Sam Gutterman, OMB-2022-0014-0108.

[579] *See, e.g.*, James Stock, OMB-2022-0014-0081; Eli Fenichel, OMB-2022-0014-0084; Cameron Hepburn, Nicholas Stern, and Joseph Stiglitz, OMB-2022-0014-0123; Center for Climate and Energy Solutions et al., OMB-2022-0014-0162.

Jensen's inequality to the definition of the long-term rate) to the data and then compute[] very long term implied rates in an empirically plausible model.[580]

The commenter caveated that that they "expect that that this paper will stimulate considerably more research on this topic, and that improvements could well emerge from that research" and that Circular A-4 should be revised in the future to benefit from improvements that emerge.[581] The same commenter also noted that the correlation between the net benefits of a regulation and future consumption (welfare) growth is not captured by such a model. Other commenters were more supportive of the use of Ramsey models to generate appropriate discount rates for regulations with long-run effects, citing their use in the economic literature, or even (inaccurately) suggesting that only the Ramsey model can be used to generate long-term declining rates.[582] See "*Accounting for Risk When Discounting*" for more on this topic.

One group of commenters argued that given "developments in economic theory over the past two decades"—as discussed in the Preamble[583]—and "changes in thinking and evidence on the social rates of time preference," see "Choice of Retrospective Averaging Window" above, it is reasonable to project further declines in the SRTP.[584] As a result, they favored the use of long-term discount rates "at lower levels, potentially at or around 0.5%."[585] Other commenters also favored the use of even lower discount rates for long-term regulatory impacts.[586] For the reasons discussed in "Choice of Retrospective Averaging Window" above, however, OMB believes that its SRTP estimate is the best estimate of the SRTP to project through the long term at this time.

Given largely supportive comments from commenters on the use of the model, and mixed views from commenters on alternative models, OMB is adopting the long-term model proposed in the Preamble in Circular A-4. As noted previously, OMB will be updating the long-term discount rate schedule every three years, along with the SRTP, in an Appendix to the Circular.

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[580] James Stock, OMB-2022-0014-0081.

[581] *Ibid.*

[582] Peer Review Report of Kenneth Gillingham; Peer Review Report of William Pizer.

[583] Preamble at 21, n.60 (citing Gauti B. Eggertsson, Neil R. Mehrotra, and Jacob A. Robbins, "A Model of Secular Stagnation: Theory and Quantitative Evaluation," *American Economic Journal: Macroeconomics* 11, no. 1 (2019): 1-48; Łukasz Rachel and Lawrence H. Summers, "On Secular Stagnation in the Industrialized World," *Brookings Papers on Economic Activity* (Spring 2019): 1-54).

[584] Cameron Hepburn, Nicholas Stern, and Joseph Stiglitz, OMB-2022-0014-0123.

[585] *Ibid.*

[586] *See, e.g.*, Sidney A. Shapiro, Amy Sinden, and James Goodwin, OMB-2022-0014-0151; Eli Fenichel, OMB-2022-0014-0084.