Journal of Benefit-Cost Analysis (2025), 16: S2, 248–275
doi:10.1017/bca.2025.17

CAMBRIDGE UNIVERSITY PRESS

ARTICLE

Economic Efficiency-Based Benefit–Cost Analysis: Comments on Circular A-4

Donald Kenkel

Department of Economics, Brooks School of Public Policy, Cornell University, Ithaca, NY, USA
Email: dsk10@cornell.edu

Keywords: benefit-cost analysis; Circular A-4; economic efficiency

JEL Codes: D61

Abstract
This paper is based on public comments I submitted in 2023 to the Office of Management and Budget (OMB) on the draft revisions to its Circular A-4 guidance on "Regulatory Analysis." It includes my comments as submitted and a "prologue" and "epilogue" written after OMB published the 2023 version of Circular A-4. The major issues discussed in my and the other public comments on the 2023 revisions have been long been, and will remain, central to the practice of regulatory BCA. My public comments compare the 2023 revisions to the principles and practice of standard efficiency-based benefit–cost analysis (BCA). Standard BCA is a tool to evaluate whether regulations fix market failures and improve economic efficiency. The 2023 revisions to Circular A-4 depart from standard BCA in important ways.

1. Prologue to Kenkel Comment

In my first-day lecture in a Spring 2021 course on benefit–cost analysis (BCA), I told my students about the new Administration's first-day memo on BCA. I explained that over the course of the semester we would cover the same basic principles set forth in the 1993 Executive Order 12886 and reaffirmed in the 2021 Presidential Memo on Modernizing Regulatory Review. The first-day memo requested revisions to the Circular A-4 BCA guidelines to "reflect new developments in scientific and economic understanding…." The first-day memo was also a political document and signaled the new Administration's priorities for federal regulation. I gave the process the benefit of the doubt and looked forward to revisions to Circular A-4 that would modernize and improve its guidance while preserving the principles of standard efficiency-based BCA.

About 2 years later in 2023 when I read the draft revisions to Circular A-4, I viewed the document through the lens of mainstream economics. I found much to like in the proposed revisions. However, the more I studied the revisions, the more I came to realize that in important ways it no longer described the widely accepted principles and practice of standard

© The Author(s), 2025. Published by Cambridge University Press on behalf of Society for Benefit-Cost Analysis. This is an Open Access article, distributed under the terms of the Creative Commons Attribution licence (http://creativecommons.org/licenses/by/4.0), which permits unrestricted re-use, distribution and reproduction, provided the original article is properly cited.

https://doi.org/10.1017/bca.2025.17 Published online by Cambridge University Press

efficiency-based BCA. I also realized that the draft revisions were written by a committee with diverse backgrounds in economics, law, and politics. I submitted comments where I provided detailed documentation that explained what standard BCA is and how the proposed revisions departed from standard BCA. I offered the comments in the sincere hope that the departures from standard BCA were the unintended consequence of the difficult and lengthy committee-driven revision process.

This prologue and the epilogue are being finalized about another 2 years later, in early 2025. Another new Administration has issued an Executive Order that rescinded the 2023 revision of Circular A-4 and reinstated the 2003 version. My public comments reproduced below were submitted as constructive criticisms to improve the 2023 revisions. Some of the 2023 revisions modernized the Circular A-4 guidance. But major issues raised by the revisions – including the choice between economic efficiency-based BCA versus a broader social welfare function BCA – are not new. The major issues discussed in my and the other public comments on the 2023 revisions have been long been, and will remain, central to the practice of regulatory BCA.

2. Overview

I offer these comments on the draft guidance in the 2023 revised Circular A-4 as an academic economist with career-long teaching and research interests in benefit–cost analysis (BCA). Section 3 below discusses my expertise in more detail, which includes over 30 years of teaching BCA, peer-reviewed research in public economics and health economics, and service as the President of the Society for Benefit–Cost Analysis. In my professional opinion, the 2003 Circular A-4 guidelines for the regulatory impact analysis required by Executive Order 12866 have helped Federal agencies craft well-designed regulations that promote economic efficiency and other important social purposes without imposing excessive costs. The draft guidance includes many useful revisions that update, expand, and improve upon the guidance in the 2003 Circular A-4.

At the same time, however, the draft guidance includes a set of revisions that change the guidance so that in important ways it no longer describes the widely accepted and standard principles and practice of regulatory BCA. Standard BCA is a tool to evaluate whether regulations fix market failures and improve economic efficiency. The draft guidance departs from standard BCA in its discussion and treatment of non-monetized benefits and costs, behavioral biases and internalities, distributional analysis, and discounting. My comments below outline specific revisions needed to make the draft guidance consistent with standard BCA and other comments that I hope will be useful in this important work.

3. My expertise

To briefly summarize my expertise, I am an academic applied microeconomist who conducts research and teaches in the fields of public economics and health economics. I received my PhD in Economics from the University of Chicago in 1987, and throughout my career, I have had research and teaching interests in BCA. From 1987 to 1994 I regularly taught a course in BCA at Penn State University; from 1995 through the present, I regularly teach a course in BCA at Cornell University, where I am Andrew Dickson White Professor in the Department of Economics and the Brooks School of Public Policy.

In 2018, I served as the President of the Society for Benefit–Cost Analysis; prior to that service I was on the Society's Board of Directors from 2012 to 2014. Since 2016, I have been

https://doi.org/10.1017/bca.2025.17 Published online by Cambridge University Press

on the Editorial Advisory Board of the Journal of Benefit–Cost Analysis. I have regularly presented my research at the annual meetings of the Society for Benefit–Cost Analysis, as well as at the annual meetings of other associations including the American Economics Association. I have published my research in peer-reviewed journals including the Journal of Political Economy, the Journal of Economic Literature, the Journal of Benefit–Cost Analysis, the Journal of Health Economics, the Journal of Law and Economics, the Journal of Regulatory Economics, and the Review of Economics and Statistics.

In addition to my academic experience, I have contributed my expertise in BCA to support public policy. From 2018to 2019 I served as a Senior Economist specializing in regulation and health policy at the Council of Economic Advisers in the Executive Office of the President. From July 2019 to April 2020, I served as the Chief Economist at the Council of Economic Advisers. Prior to that service, in 2014 I served as a member of a Technical Expert panel that provided advice about issues in BCA to the Office of the Assistant Secretary for Policy and Evaluation, U.S. Department of Health and Human Services (2015) and Cutler et al. (2015). In 2015, I served as a Peer Reviewer of the OMB's Draft 2015 Report to Congress on the Benefits and Costs of Federal Regulation. In 2016, I spent my sabbatical as an Economic Policy Advisor on BCA at the Office of Policy, Planning, Legislation, and Analysis of the Food and Drug Administration.

4. Recommendation 1: The draft guidance should be revised to make all of its guidance consistent with standard BCA

The draft guidance includes a set of revisions that change the guidance so that in important ways it no longer describes the widely accepted principles and practice of standard BCA. In regulatory analysis, standard BCA is a tool to evaluate whether regulations fix market failures and improve economic efficiency. EO 12866 and the 2003 Circular A-4 guidance were firmly grounded in standard efficiency-based BCA. To describe standard BCA, I will reference and use direct quotations from a widely used undergraduate textbook (Boardman *et al.*, 2018), a widely used graduate textbook (Just *et al.*, 2004) and from the authoritative New Palgrave Dictionary of Economics.[1] Boardman *et al.* (2018) definition is that BCA:

> "provid[es] a framework for measuring efficiency…. a situation in which resources, such as land, labor, and capital, are deployed in their highest valued uses in terms of the goods and services they create. In situations in which analysts care only about efficiency, CBA provides a method for making direct comparisons among alternative policies. Even when goals other than efficiency are important, CBA serves as a yardstick that can be used to provide information about the relative efficiency of alternative policies."

Boardman et al. go on to provide a more formal definition of allocative, or Pareto, efficiency and explain the link between net benefits and Pareto efficiency. The abstract of the New Palgrave Dictionary entry on "Cost–Benefit Analysis" states that: "Cost–benefit analysis (CBA) is a collection of methods and rules for assessing the social costs and benefits of

[1] The undergraduate textbook is also widely used in professional masters' programs in public policy. As another indicator of their status as standard references, both textbooks are cited in the draft guidance, footnotes 4 (on page 5) and 26 (on page 15) respectively.

https://doi.org/10.1017/bca.2025.17 Published online by Cambridge University Press

alternative public policies. It promotes efficiency by identifying the set of feasible projects that would yield the largest net benefits to society." (Weimer, 2018) The introduction to the 2003 Circular A-4 (page 2) is strikingly consistent with the textbook and dictionary definitions:

> "BCA is a primary tool for regulatory analysis. Where all benefits and costs can be quantified and expressed in monetary units, BCA provides decision makers with a clear indication of the most efficient alternative, that is, the alternative that generates the largest net benefits to society (ignoring distributional effects). This is useful information for decision makes and the public to receive, even when economic efficiency is not the only or the overriding public policy objective."[2]

In contrast to standard definitions of BCA, the introductory explanation in the draft guidance (page 3) no longer contains any references to economic efficiency. Instead of describing BCA as a tool to identify the most efficient alternative, the draft guidance refers to identifying the alternative that generates "the greatest social welfare." Instead of the 2003 Circular A-4's parenthetical note that standard BCA ignores distributional effects, the draft guidance refers to "(including distributional impacts)" in benefits and costs when quantified and expressed in monetary units. Instead of explaining the value of monetized net benefits for regulatory decision-making, the draft guidance emphasizes that "while monetized net benefits are an important guide for agencies deciding what course of action to pursue, regulatory analysis should encompass additional relevant factors; in particular analyses should include any important non-monetized and non-quantified effects." In short, the draft guidance calls for a broad social welfare analysis. This is not the task that the tool of BCA is designed for.

The introduction's shift away from standard BCA continues through later sections of the draft guidance, especially in the discussions of the importance of non-monetized policy impacts, behavioral biases and internalities, distributional analysis, and discounting. The Preamble to the draft guidance suggests that: "Through revised guidelines, we seek to ensure than analytic guidance reflects new developments in economic and other scientific understanding." In this light, it is worth pointing out that many of the significant departures in the draft guidance from standard BCA do not reflect new developments in economics. From at least Harberger (1971) onwards, scholarly discussions of BCA have recognized that goals other than economic efficiency imply that there will be important non-monetized policy impacts. The use of distributional weights to quantify and express distributional impacts in monetized units was discussed by Weisbrod (1968). The Ramsey (1928) model leads to the Ramsey approach to the social discount rate. As will be explained in more detail in comments below, instead of reflecting new developments in economics, the draft guidance's departures from standard BCA reflect value judgments. In an important but partial exception, the draft guidance's discussion of behavioral biases and internalities reflects new developments in behavioral economics research. However, as again will be explained in more detail below, behavioral welfare economics has not developed sufficiently to provide robust guidance and methods for BCA, which leaves too much room for value judgements to drive the analysis.

[2] The 2003 Circular A-4 cites an older textbook by E.J. Mishan as its general source about BCA.

https://doi.org/10.1017/bca.2025.17 Published online by Cambridge University Press

Because standard BCA is a tool to evaluate whether regulations improve economic efficiency, it is important to precisely define economic efficiency. The undergraduate BCA textbook begins by defining Pareto efficiency: "An allocation of good is Pareto efficient if no alternative allocation can make at least one person better without making anyone else worse off." (Boardman *et al.*, 2018, pp. 27–28) BCA is a tool to identify whether regulations are potential Pareto improvements that pass the Kaldor-Hicks compensation principle: "a policy should be adopted if and only if those who will gain could fully compensate those who will lose and still be better off." (Boardman *et al.*, 2018, p. 32) A regulation with positive net benefits increases economic efficiency as defined by the Kaldor-Hicks compensation principle. The entry on "Cost–Benefit Analysis" in the New Palgrave Dictionary of Economics provides a concise definition that further highlights the central role of Pareto economic efficiency in BCA:

> "Public policies, such as infrastructure projects, social welfare programmes, tax laws and regulations, typically have diverse effects in the sense that people would be willing to pay something to obtain effects they view as desirable and would require compensation to accept voluntarily effects they view as undesirable. If, across all members of society, the total amount willing to be paid by those who enjoy desirable effects (benefits) exceeds the total amount needed to compensate those who suffer undesirable effects (costs), then adopting the policy would make it potentially possible to achieve a Pareto improvement on the status quo. If the benefits do not exceed the costs, then adopting the policy does not offer a potential Pareto improvement. How should such costs and benefits be determined? Cost–benefit analysis (CBA) is the collection of generally accepted methods and rules for assessing the social costs and benefits of alternative public policies." (Weimer, 2018).

The focus on economic efficiency in standard BCA does not reflect a value judgment that economic efficiency is the only, or even the most important, policy goal. Practitioners of standard BCA recognize the importance of distributional concerns and the value of human dignity, civil rights and liberties, and other criteria for evaluating regulations. However, economists cannot claim to have any special professional expertise to make value judgements about these criteria. As one of the founders of standard BCA put it, "If we are to take a (hopefully justified) professional price in our work [in BCA], we also must have the modesty and honesty not to claim for our profession more than we are particularly qualified to deliver." (Harberger, 1971).

While BCA is applied welfare economics, theoretical research in welfare economics explores the use of social welfare functions for policy evaluation. Social welfare functions can incorporate value judgements beyond potential Pareto efficiency and allow a more comprehensive ranking of alternative policy outcomes. The draft guidance refers to the goal of maximizing social welfare at various points in the text but does not specify a social welfare function to replace standard BCA. Just *et al.* (2004) graduate-level BCA textbook provides a useful chapter-long comparison of the Kaldor-Hicks compensation principle used in standard BCA versus the social welfare function approach. Just *et al.* (2004, p. 41) observe that: "Apparently, little hope exists for determining a social welfare function on which general agreement can be reached." [3] The chapter concludes that "the compensation principle is

[3] In addition to theoretical welfare economics, social welfare functions are also used by economists in the optimal taxation literature and in the climate change literature. Both literatures have failed to reach enough agreement about

https://doi.org/10.1017/bca.2025.17 Published online by Cambridge University Press

apparently the most widely applicable, yet also empirically practical, criterion." (Just *et al.*, 2004, p. 48) Feldman's (2018) entry on "Welfare Economics" in the New Palgrave Dictionary of Economics makes the same points.[4] Just, Hueth, and Schmitz focus their graduate-level textbook on standard BCA. In the concluding chapter, Just *et al.* (2004, p. 643) circle back to the social welfare function approach:

> "The intent of this book is much less ambitious than seeking the welfare function to define the ideal society. It provides, instead, a framework for analyzing the impacts of policy changes. The underlying view is that, at best, economists can point out the economic impact of policy changes, including distributional effects to the extent they can be empirically identified."

My detailed comments below are intended to help revise the draft guidance to return to the more modest but achievable goal of standard efficiency-based BCA, supplemented with a transparent approach to describe distributional effects.

Although my detailed comments identify key revisions that are needed, I stress that much of the discussion in the draft guidance is consistent with standard BCA. In regulatory analysis, the goal of standard BCA is to estimate the benefits and costs based on the preferences of the people affected by the regulatory actions. BCA is "an attempt to replicate for the public sector the decisions that would be made if private markets worked satisfactorily" (Haveman & Weisbrod, 1975, p. 71). BCA uses the information revealed in market transactions to guide public sector decisions. As Bernheim and Rangel (2005) put it: "When evaluating policies, we attempt to act as each individual's proxy, extrapolating his or her likely policy choices from observed consumption choices in related situations." Much of the draft guidance's discussion of the key concepts needed to estimate benefits and costs is consistent with these principles of standard BCA. The draft guidance begins with a clear explanation of the key concepts of opportunity cost, willingness to pay, and willingness to accept (page 28). The draft guidance emphasizes that "Market prices provide rich data for estimating benefits and costs…" (page 29). The draft guidance stresses that methods to estimate benefits and costs "based on observable tradeoffs that people actually make…. are well grounded in economic theory." (page 31). As a result, "Economists ordinarily consider market prices as the most accurate measure of the marginal value of goods and services to society." (page 32) In its core discussion of BCA methods, the draft guidance recognizes that

---

social welfare functions to guide policy. The utilitarian social welfare function approach used in some optimal taxation studies is closely related to the use of distributional weights in BCA. As will be discussed in detail below under Recommendation 6, economists who use social welfare functions in optimal taxation studies have tried to remain agnostic about the key value judgement that the approach shares with distributional weights. Botzen and van den Bergh (2014) review the use of social welfare functions in economics studies of climate change policy. Table 2 in Botzen and van den Bergh (2014) summarizes 14 different social welfare functions that reflect different criteria and value judgements. They conclude that: "It is a challenge to translate all relevant considerations about time preference, uncertainty, equity and substitution into a single welfare specification. In this sense, existing models are imperfect or incomplete…." (p. 28)

[4] Feldman (2018) reviews theoretical welfare economics research on the question: "Is there a reliable way to measure social welfare, or to derive the preferences of society from the preferences of individuals?" and concludes with a negative answer. For discussions of the "the practical problems of evaluating policy alternatives" Feldman refers readers to the Dictionary the entry on "Cost–Benefit Analysis" quoted above and the entry on the "Compensation Principle."

https://doi.org/10.1017/bca.2025.17 Published online by Cambridge University Press

the goal is to measure benefits and costs based on the preferences of the people affected by the regulatory actions, not based on value judgements inserted into the analysis.

5. Recommendation 2: The draft guidance should provide guidelines to the agencies about how to describe the tradeoffs between economic efficiency and non-quantified public policy criteria but should not allow agencies to make value judgements about those tradeoffs

The draft guidance departs from standard BCA in its treatment of non-quantified factors related to public policy criteria other than economic efficiency. Standard BCA uses monetized net benefits to summarize the economic efficiency of regulatory alternatives, supplemented with information about additional factors relevant to other public policy criteria. The draft guidance goes much further and states that when agencies are "*deciding what course of action to pursue*, regulatory analyses should … include any important non-monetized and non-quantified effects." (page 3, emphasis added). A few pages later, the draft guidance again instructs agencies to "exercise professional judgment in identifying the importance of now-quantified factors and *assess as best you can how they might change the rankings of alternatives* based on estimated net benefits." (page 5, emphasis added). In the section on distributional analysis, the draft guidance states that the distributional interest being pursued "*may lead an agency to select a regulatory alternative with lower monetized benefits* over another with higher monetized net benefits because of the difference in how those net benefits are distributed in each alternative." (page 64, emphasis added). In short, the draft guidance goes beyond telling agencies to describe tradeoffs and instead tells the agencies to make value judgements about the tradeoffs between economic efficiency and other public policy criteria.

The value judgements called for by the draft guidance require the agencies to place implicit monetary values on other public policy criteria. The implicit monetary values contradict another part of the draft guidance, that "It would not be appropriate to attempt to fully measure the value of human dignity, civil rights and liberties, or indigenous cultures through individual choice as measured by WTP or WTA." (page 44). A simplified version of the FDA's preliminary regulatory impact analysis of the proposed tobacco product standard to ban menthol cigarettes provides a hypothetical example. FDA estimates that the product standard will reduce smoking and secondhand smoke and estimates that the economic efficiency benefits of the 1,605 annual life-saving benefits from reducing the externality of secondhand smoke are worth $18.9 billion per year.[5] 85 percent of African-American smokers currently smoke menthol cigarettes, which will no longer be legally available after the menthol product standard. Recent history shows that illegal cigarette markets can lead to police violence against African-Americans, suggesting that the menthol product standard might lead to more civil liberties violations.[6] Hypothetically, suppose FDA estimates that the proposed menthol ban will lead to 5,000 new civil liberty violations annually. The regulatory alternative of no regulatory action foregoes $18.9 billion annual economic efficiency

[5] FDA estimates that the life-saving benefits of reduced secondhand smoke from the menthol tobacco standard are 1,605 lives per year; using an estimate that the value of a statistical life is $11.8 million, the monetized life-saving benefits are $18.9 billion per year.

[6] In July 2017 Eric Garner died during a police encounter related to an allegation of illegal cigarette sales. See American Civil Liberties Union (2021).

https://doi.org/10.1017/bca.2025.17 Published online by Cambridge University Press

benefits but avoids 5,000 new civil liberty violations. If FDA does not change its ranking of the two regulatory alternatives based on the civil liberty violations, it implicitly values 5,000 civil liberty violations as being worth less than $18.9 billion, that is that on average each civil liberty violation is worth less than $3.78 million.[7] The FDA and other agencies lack any empirical evidence or special expertise to make this value judgement. The standard BCA approach would be to present decision-makers and the public with estimates of the monetized net benefits that summarize the economic efficiency of the proposed regulatory and with quantified (but not monetized) estimates of the possible unintended consequences of civil liberty violations.

Similarly, the draft guidance that an agency may select a regulatory alternative based on how the net benefits are distributed requires the agency to make value judgements that place an implicit monetary value on the redistribution of income. To take another hypothetical example, suppose the net benefits of regulatory alternative A are $100 billion and accrue entirely to people in the top income quintile. Suppose the net benefits of regulatory alternative B are $25 billion and accrue entirely to people in the lowest income quintile. If an agency chooses to rank regulatory alternative B above alternative A based on the difference in how net benefits are distributed, it implicitly makes the value judgement that an efficiency loss of 75 percent is worthwhile when transferring income from the highest to the lowest income quintile. Once again, the agencies lack any special expertise to make this value judgement and should instead simply present decisionmakers and the public with the information about the tradeoff between economic efficiency and the distribution of net benefits.

It has long been recognized that standard BCA is intended to help decision-makers make difficult tradeoffs between economic efficiency and other public policy goals, not to make the decisions. Or as Katzen (2006), OIRA Administrator in the Clinton Administration, puts it, the results of BCA "are informative, but are not dispositive….."

Federal agencies should not make value judgements about difficult policy tradeoffs. Instead, the agencies should provide transparent information to elected officials and the public about the tradeoffs between economic efficiency and other public policy goals. Elected officials and the public have the rights and responsibilities that provide a broader perspective on proposed regulatory actions. For example, to address the unintended consequences of the proposed menthol ban, elected officials and the public can consider police and legal reforms beyond the scope of the FDA's statutory authority over tobacco products. Similarly, elected officials and the public can consider reforms to tax and expenditure policies that might provide a less inefficient way to improve the distribution of income.

6. Recommendation 3: The draft guidance should provide expanded guidance on estimating regulatory costs, including more discussion of estimating opportunity costs and the cumulative burden of regulation

The Preamble (page 8) states that: "A peer review of OMB's 2013 Report to Congress on the Benefits and Costs of Federal Regulations notes that Circular A-4 'provides very little

[7] To repeat, this is a hypothetical example. In its preliminary regulatory impact analysis, FDA "does not anticipate that a significant and consistently large supply of illicit menthol cigarettes would be available following rule implementation." (FDA, 2022, p. 206) In light of uncertainties about the extent of illicit supply, FDA requested comment including data and additional studies (FDA, 2022, pp. 213–214).

https://doi.org/10.1017/bca.2025.17 Published online by Cambridge University Press

guidance on estimating costs.'" The Preamble (pages 8–9) goes on to ask: "All else equal, a regulatory requirement will impose higher costs than what is observed from voluntary actions or inaction—if not in terms of direct spending, then in some other aspect of the broader phenomenon of opportunity cost…. Are there potential revisions to the Circular that would inform extrapolation from empirical evidence in such cases?"

I agree with the peer review comment that the 2003 Circular A-4 provides too little specific guidance on estimating costs. The revised guidance's discussion of developing benefit and cost estimates is broadly relevant, but often focuses on the challenges of estimating the benefits of regulations that produce public goods such as environmental quality and health. I recommend revisions to provide expanded guidance on estimating regulatory costs, perhaps in a new sub-section on the special challenges of developing cost estimates.

I also agree with the Preamble that measuring the broader phenomenon of opportunity cost is challenging, probably one of the most challenging parts of BCA. The challenges are inherent in the counter-factual nature of prospective BCA. Prospective BCAs must predict the behavior of firms in the regulated industry and other supply-side behavior, as well as the behavior of consumers of the product of the regulated industry and other demand-side behavior. As a first step, the draft guidance should be revised to clearly state the challenges to estimating opportunity costs and call agencies' attention to the importance of measuring them. The draft guidance should also be revised to discuss supply-side phenomena including regulatory barriers to entry, incentives for research and development and innovation, and the cumulative burden of regulation; and the implications of the supply-side phenomena for the opportunity costs created for consumers, workers, and other factors of production.

Economic research provides many examples where regulation create barriers to the entry of new firms, which leads to reduced competition, higher prices, and reduced consumer welfare. To take an example from my own area of research expertise, the FDA's Center for Tobacco Product's regulation of e-cigarettes creates costs that are prohibitively high for small manufacturers and vape shops. The FDA's regulatory impact analysis of its "deeming rule" extending tobacco regulations to e-cigarettes included estimates of the implications for market competition. The FDA (2016, Tables 11a and 12a) estimated that manufacturers will face costs between $182,000 and $2 million per application for e-liquids and between $286,000 and $2.6 million per application for delivery systems. The FDA estimated that rather than face these costs, between 50% and 87.5% of then-current manufacturers of e-liquids and 50% of then-current manufacturers of delivery systems will not enter the new regulated market. The opportunity costs of FDA regulation of e-cigarettes include the implications of regulation-induced entry costs for reduced market competition, prices, product variety, and ultimately consumer welfare. In markets where regulations create barriers to the entry of new firms, agencies should use estimates from economic research on industrial organization to estimate the impacts of reduced competition on market prices and thus the opportunity costs created for consumers.

Economic research also documents that regulation can reduce incentives for research and development and innovation. A long line of economic research explores the tradeoffs involved in FDA regulation of pharmaceuticals (Mulligan, 2022). A famous anecdote illustrates the opportunity costs of airline regulation. When the economist Alfred Kahn was the Chair of the Civil Aeronautics Board, he argued that deregulation would prompt airlines to innovate and ultimately lower prices and benefit consumers. Asked how the airlines would innovate, he replied along the lines "If I knew that, instead of deregulation I could just order those innovations." Subsequent research confirmed that Kahn's predictions

https://doi.org/10.1017/bca.2025.17 Published online by Cambridge University Press

were correct. Rose (2012, p. 376) refers to airline deregulation as "one of the greatest microeconomic policy accomplishments of the past fifty years" and credits deregulation as generating "lower average fares; greater numbers of flights, non-stop destinations, and passengers; dramatically different network structures; and increased productivity." When considering future regulations, agencies should seek the expertise of industry experts to predict the opportunity costs of research and development and innovation foregone because of increased regulation. Regulations create opportunity costs for consumers when they ban products, or when they discourage innovation that could have resulted in new products. On page 29 the draft guidance emphasizes that: "the opportunity cost of banning a product—for example, a consumer good, food additive, or hazardous chemical—is the forgone net benefit, including lost consumer and producer surplus…." Hausman (2003) discusses a standard approach to estimate the opportunity costs of banned products and foregone new products.

The draft guidance should also be revised to include a discussion of the opportunity costs created by the cumulative burden of regulation. Cass Sunstein, OIRA Administrator in the Obama Administration, recalled that:

> "Cumulative burdens may have been the most common complaint that I heard during my time in government. Why, people asked, are agencies unable to coordinate with one another, or to simplify their own overlapping requirements, or to work together with State and local government, so that we do not have to do the same thing two, five, or ten times?" (Sunstein, 2014, p. 588).

The cumulative burden of regulation is related to the economic concept of convex deadweight costs. Regulation affects productivity, wages, and profits in the regulated industry. Then, as capital and labor move in response to the compliance costs and incentive effects of the regulation, regulation affects productivity, wages, and profits in the economy as a whole. The effects of regulatory actions, taxes, and other market distortions accumulate multiplicatively within the industry and along that industry's supply chain, through what economists call "convex deadweight costs." The concept of convex deadweight costs is a well-established result in the economic analysis of taxation (Auerbach & Hines, 2002). Taxes impose a burden on the economy in excess of the tax revenues collected; the excess burden is also known as the deadweight cost, the deadweight loss, or the welfare loss due to taxation. The deadweight cost function is convex; if the tax is increased by 10 percent, the deadweight costs of the tax increase by more than 10 percent. The regulatory deadweight cost function is also convex. When agencies estimate the opportunity costs of a new regulation, it is crucial to consider pre-existing regulations of that industry and other industries in order to account for the cumulative burden of regulatory costs.

7. Recommendation 4: The draft guidance should not allow agencies to use behavioral biases or internalities as a key need for a regulation or as a key input in the quantification of regulatory benefits

The draft guidance departs from standard BCA by allowing agencies to use behavioral biases or internalities as a key need for a regulation (page 15) and as a key input in the quantification of regulatory benefits (page 19). Behavioral economics research integrates insights from psychology into neoclassical economics models of human behavior. Positive behavioral economics research has provided a rich set of testable predictions and empirical findings

https://doi.org/10.1017/bca.2025.17 Published online by Cambridge University Press

about human behavior, with many new scientific developments since the 2003 Circular A-4. However, the draft guidance's discussion of behavioral biases and internalities rests on behavioral welfare economics, that is normative economics.

In this section, I provide a general discussion of the challenges faced by behavioral welfare economics and then discuss two controversial examples in regulatory impact analysis – the behavioral BCA of tobacco regulatory policy, and behavioral economics-based assumptions about energy efficiency. Because of the ongoing challenges and controversies, the current state of behavioral welfare economics does not provide robust guidance and leaves too much room for value judgements to be used instead. Accordingly, the concepts of behavioral biases and internalities should not be key inputs into any regulatory impact analysis conducted under the guidance of Circular A-4.

The draft guidance (page 19) warns that the inherent challenge to using behavioral economics in regulatory impact analysis is that:

> "accounting for behavioral biases…requires a departure from an assumption that typically underlies regulatory analyses…that individuals optimize their own lifetime well-being subject to budget and other relevant constraints. 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."

The draft guidance's warning echoes early warnings by leaders in behavioral economics. Camerer *et al.* (2003 pp. 1211–1212) recognized the challenge of "paternalistic regulations" based on behavioral economics research:

> "Paternalism treads on consumer sovereignty by forcing, or preventing, choices for the individual's own good…. Recent research in behavioral economics has identified a variety of decision-making errors that may expand the scope of paternalistic regulation. To the extent that the errors identified by behavioral research lead people not to behave in their own best interests, paternalism may prove useful. But, to the extent that paternalism prevents people from behaving in their own best interests, paternalism may prove costly."

Bernheim and Rangel (2005) stress the need for a unified framework for making principled judgements about what constitutes a decision-making error:

> "[S]tandard welfare analysis is grounded in the doctrine of revealed preference. That is, we infer what people want from what they choose. When evaluating policies, we attempt to act as each individual's proxy, extrapolating his or her likely policy choices from observed consumption choices in related situations…. Behavioral economists have proposed a variety of models that raise issues concerning welfare evaluation. No consensus concerning appropriate standards and criteria has yet emerged…..One school of thought insists on strict adherence to the doctrine of revealed preference for the purpose of economic policy evaluation….A second school of thought holds that behavioral economics can in principle justify modifying, relaxing, or even jettisoning the principle of revealed preference for the purpose of welfare analysis."

Bernheim and Rangel (2005) go on to caution against the danger of using value judgements to determine whether people's observed choices are or are not in their own best interests:

https://doi.org/10.1017/bca.2025.17 Published online by Cambridge University Press

> However, there is also a danger. Revealed preference is an attractive political principle because it guards against abuse (albeit quite imperfectly in practice). Once we relax this doctrine, we potentially legitimize government condemnation of almost any chosen lifestyle on the grounds that it is contrary to a "natural" welfare criterion reflecting the individual's "true" interests. If we can classify, say, the consumption of an addictive substance as contrary to an individual's interests, what about choices involving literature, religion, or sexual orientation? If choices do not unambiguously reveal an individual's notions of good and bad, then "true preferences" become the subject of debate, and every "beneficial" restriction of personal choice becomes fair game. Given these dangers, if we are to relax the principle of revealed preference when evaluating public policy, it behooves us to set a high scientific threshold for reaching a determination, based on objective evidence, that a given problem calls for divergent positive and normative models.

A review article by Bernheim (2016) in the Journal of Benefit–Cost Analysis and a book by Weimer (2017), a leading expert on BCA, provide more recent in-depth discussions of the challenges and potential for behavioral BCA. Although both authors are optimistic about its potential, both also raise numerous concerns. Bernheim reviews theoretical and conceptual concerns about behavioral welfare economics. He proposes a behavioral revealed preference framework, where the first core task in the framework is to identify consumer decisions that merit deference, or what Bernheim refers to as the welfare-relevant domain. He stresses the need for a reasoned evidence-based foundation for the normative conclusion that a consumer decision does not merit deference, that is that the consumer is making a mistake. Bernheim (2016, p. 38–39) suggests that:

> many economists appear to think that the correct normative interpretation of a positive behavioral model is obvious. Consider, for instance, the familiar formulation of quasi-hyperbolic discounting…. Discussions of this model often employ heavily value-laden language, including phrases such as 'present bias' and 'self-control problems.'

Bernheim points out that one could instead make the value judgement that "true happiness is achieved by living in the moment" and wonders: "when economists advocate the long-run criterion as a general normative principle, one has to wonder whether this is simply a case of successful workaholics believing that everyone else ought to be more like them."

In the Preface to his book on behavioral economics and BCA, Weimer (2017, p. x) observes that the "gap between behavioral welfare economics and the craft of cost–benefit analysis remains large." The large gap partly reflects the research agenda of positive behavioral economics. Simon's (2018) entry on "Behavioral Economics" in the New Palgrave Dictionary of Economics explains that "behavioral economics is best characterized not as a single specific theory but as a commitment to empirical testing of the neoclassical assumptions of human behavior and to modifying economic theory on the basis of what is found in the testing process." The empirical testing often involves subtle predictions that are only testable through economic experiments. As a result, Weimer (2017, p. 135) observes that:

> "Laboratory experiments provide the bulk of the empirical evidence on deviations from neoclassical rationality. These experiments enjoy a high degree of internal

https://doi.org/10.1017/bca.2025.17 Published online by Cambridge University Press

> validity. Their external validity can sometimes be questioned because of the common use of students as subjects and the difference between laboratory and field settings. In particular, markets may mitigate to some extent the consequences of individual irrationality for the sorts of aggregate measures often employed in neoclassical prediction and valuation."

In a recent article on standing (what counts) in BCA, Boardman *et al.* (2022 pp. 1171–1172) propose that the "rebuttable principle of individual rationality" should be applied to the possibility that behavioral biases lead to consumer mistakes:

> "We contend that analysts should be cautious in changing standing to account for perceived anomalous behavior. Before doing so, analysts need to present strong empirical evidence that individuals are indeed making serious mistakes. For several reasons, markets and other institutions may produce rational results even when some of the participants act irrationally. Wherever possible, analysts should look for evidence of the anomalous behavior in markets as well as laboratory experiments."

As an illustration of the general concerns about behavioral welfare economics, the practical application of behavioral BCA to tobacco regulatory policy has proven to be quite controversial. FDA (2022) reviews prior research on behavioral BCA of tobacco regulatory policy in a 12-page appendix to its preliminary regulatory impact analysis of the proposed menthol cigarette product standard. Noting a "lack of consensus" and the complexity of modeling consumer decisions about an addictive good with an internality and cognitive bias problems, the preliminary regulatory impact analysis "does not estimate changes in consumer surplus stemming from the proposed menthol product standard." (FDA, 2022, p. 276) The appendix concludes with a list of 5 technical issues that need to be resolved in order to use behavioral BCA in regulatory impact analysis of tobacco regulation.

Two striking features of the tobacco BCA controversy highlight the need to limit the use of behavioral biases/internalities as key inputs into regulatory BCAs. First, compared to many other regulatory areas where behavioral biases might be relevant, the research base for behavioral BCA of tobacco regulation is relatively well-developed. The continuing controversy and lack of consensus caution against the wider use of behavioral BCA in regulatory impact analysis. FDA conducted a behavioral BCA for its 2010 preliminary regulatory impact analysis of a proposed rule requiring pictorial warning labels on cigarette packages and advertising; a revised version of the behavioral BCA was published in 2011 with the Final Rule. The FDA's behavioral BCA used results from a simulation conducted as part of a behavioral economics study of the demand for cigarettes (Gruber & Koszegi, 2004). Partly in response to the controversy around the tobacco BCA, the Office of the Assistant Secretary for Planning and Evaluation of the U.S. Department of Health and Human Services (2015) commissioned a white paper on behavioral BCA of addictive goods. The controversy is discussed in three peer-reviewed articles on behavioral BCA of tobacco products: Ashley *et al.* (2015)), Jin *et al.* (2015), and Levy et al. (2016). The 2015 OMB (2015, p. 56) Report to Congress on the Benefits and Costs of Federal Regulations cited the papers when making the point that: "revealed preference is generally the preferred conceptual approach for estimating costs and benefits, and any deviation from it should have an analytically supported, clearly

https://doi.org/10.1017/bca.2025.17 Published online by Cambridge University Press

explained reason." In 2022, FDA concluded that there was still a lack of consensus about how to conduct BCA of tobacco regulations.[8]

The second striking feature of the tobacco BCA controversy is that the FDA's preliminary regulatory impact analysis uses the lack of consensus to justify not quantifying any consumer surplus loss from banning menthol cigarettes. In the framework used in behavioral BCA of tobacco regulations, a ban causes zero consumer surplus loss only if cigarette demand is entirely irrational. By not quantifying the consumer surplus loss, the preliminary regulatory impact analysis tends to minimize the loss. The FDA approach is equivalent to assuming that all individual decisions to consume menthol cigarettes are mistakes that do not merit deference.[9] This contradicts the emphasis Bernheim and the OMB place on the importance of revealed preference and Weimer et al.'s rebuttable principle of individual rationality.

The tobacco BCA is not the only example of the controversial use of behavioral economics-based assumptions in regulatory impact analysis. Other prominent examples involve controversial assumptions that energy- and automobile fuel-efficiency standards create substantial benefits for irrational consumers who make systematic mistakes about the value of energy efficiency. After examining a set of regulatory initiatives from 2009 to 2011 by the Department of Energy, the EPA, and the Department of Transportation, Gayer and Viscusi (2013) concluded that:

> the preponderance of the assessed benefits is derived from agencies' assumption that consumers and firms act irrationally and that the government choices therefore better reflect the preferences of consumers than the choices consumers and firms would make themselves.

Sallee *et al.* (2016)) use evidence from used car prices and gasoline fluctuations to estimate consumer responsiveness to fuel efficiency. In their baseline specification they find that used car prices move one-for-one with future fuel costs, a result which is robust across a number of dimensions. While they note that their result relies on a set of assumed parameters, this is also true for prior studies in the literature. As a result:

> Thus, while the literature fails to consistently reject the null hypothesis of full valuation, the data cannot consistently rule out modest undervaluation, unless one takes a firm stand on underlying parameters that are themselves uncertain. What is clear from our results, in conjunction with the existing literature, is that a belief that consumers place a very low value on fuel economy is not supported by the data. Such a low valuation, however, would be required to rationalize the cost–benefit analysis employed in regulatory impact analyses of Corporate Average Fuel Economy (CAFE) standards.

[8] For full disclosure, I have an active research agenda conduction applied behavioral welfare economic analysis of tobacco regulatory policy. I hope that my and other economists' research will eventually establish a robust evidence base for use in tobacco regulatory BCA.

[9] The FDA approach is equivalent to assuming that even individual decisions to consume menthol cigarettes over non-menthol cigarettes are mistakes that do not merit deference. FDA predicts that after menthol is banned, most menthol smokers will switch to non-menthol cigarettes. These smokers would not gain any health benefits, because menthol per se is not harmful. FDA's preliminary regulatory impact analysis does not include any estimate of the consumer surplus losses of menthol smokers who switch to a less-preferred flavor of cigarette.

https://doi.org/10.1017/bca.2025.17 Published online by Cambridge University Press

EPA (2023) continues to use the controversial assumption in its recent draft regulatory impact analysis of vehicle emissions standards. The present value of the estimated fuel savings ranges from $450 billion to $890 billion and dwarf the benefits attributable to reduced emissions of criteria pollutants estimated to range from $63 billion and $280 billion (EPA, 2023, pp. xlv – xlvii and Table 5).[10]

The 2003 Circular A-4 (pages 37–38) used fuel savings as an example to provide guidance on the importance of careful consideration of market forces:

> For example, a requirement that engine manufacturers reduce emissions from engines may lead to technologies that improve fuel economy. These fuel savings will normally accrue to the engine purchasers, who also bear the costs of the technologies. There is no apparent market failure with regard to the market value of fuel saved because one would expect that consumers would be willing to pay for increased fuel economy that exceeded the cost of providing it. When these cost savings are substantial, and particularly when you estimate them to be greater than the cost associated with achieving them, you should examine and discuss why market forces would not accomplish these gains in the absence of regulation.

Consistent with the 2003 Circular A-4 guidance, EPA (2023, pp. 4-38) acknowledges the controversial nature of its assumption that an energy efficiency gap represents a market failure:

> The idea of the energy efficiency gap is that existing fuel saving technologies were not widely adopted even though they reduced fuel consumption enough to pay for themselves in short period of time. Conventional economic principles suggest that because the benefits to vehicle buyers of the new technologies would outweigh the costs to those buyers, automakers would provide them and people would buy them.

Like the tobacco BCA controversy, there are again two striking features of the energy efficiency gap controversy: first, decades of research had not yielded a consensus about whether the gap reflects consumer mistakes about the value of energy efficiency; second, in the absence of consensus, the EPA assumes consumer mistakes are widespread. The EPA reviewed research on consumer- and producer-side hypotheses that might explain the energy efficiency gap. On the consumer-side, EPA (2023, pp. 4–39) concludes that:

> "the research has not reached a consensus; results and estimates vary across a range of data types and statistical models. Thus, it is not clear how consumers incorporate fuel economy in their purchase decision, nor how consumer behavior might contribute to the energy efficiency gap."

Moreover, EPA also concludes that "Much less research has been conducted to evaluate the producer side of the market…."

Yet EPA (2023, pp. 4–39) acknowledges that one possible explanation for the apparent market failure is simply that "Consumers might prioritize other vehicle attributes over fuel economy in their vehicle purchase process." If this is the correct explanation, fuel-efficiency regulations force consumers to give up attributes that they value more highly than the fuel

[10] EPA also estimates that the emissions standards will yield substantial climate benefits.

https://doi.org/10.1017/bca.2025.17 Published online by Cambridge University Press

savings. Similarly, consumers might value attributes other than energy efficiency when making choices about dishwashers, gas stoves, and other household appliances. Counting the fuel savings and energy efficiency savings to consumers as benefits relies on the value judgements that energy efficiency is more important than the vehicle and product attributes that the consumers value and are forced to give up.

The assumption made by EPA and other agencies that consumer mistakes about energy efficiency are widespread violates current guidance in peer-reviewed economic research on the practice of BCA. The assumption violates Bernheim's argument that there should be a high scientific threshold and a reasoned evidence-based foundation for the normative conclusion that a consumer decision does not merit deference. The assumption also Weimer et al.'s rebuttable principle of individual rationality.

The ongoing challenges, controversies, and lack of consensus mean that behavioral welfare economics does not yet provide robust guidance for BCA and leaves too much room for value judgements to be used instead. The draft guidance should not allow agencies to use behavioral biases or internalities as a key need for a regulation or as a key input in the quantification of regulatory benefits. My recommended specific revisions are:

- The draft guidance should require that the discussion of the need for Federal regulatory action should normally identify and empirically quantify a significant neoclassical market failure (externalities, market power, asymmetric information, etc.).
- "Addressing behavioral biases" should be deleted from the list of common needs for regulation (bullet point at bottom of page 4).
- Theoretical results or laboratory research in behavioral economics should not be used as a "key input in [the] quantification of regulatory benefits." (page 19)

8. Recommendation 5: The draft guidance should require agencies to include a transparent discussion of how the net impacts of a regulation are distributed across income groups

Consistent with the 2003 Circular A-4, EO 12866, and standard practice in BCA, section 10 of the draft guidance "provides agencies undertaking distributional analysis of a regulation with information to assist them in doing so." (page 61) The Preamble states that: "We solicit comment on the expanded guidance on distributional analysis in the draft Circular A-4…." (The Preamble also asks about distributional weights; I discuss the draft guidance's proposal to allow the use of distributional weights separately, under my Recommendation 6.)

In this section, I make recommendations to improve the draft guidance on distributional analysis. Distributional analysis is useful because a regulation that improves economic efficiency and creates positive net benefits for society as a whole may still leave some people no better off or even worse off. Moreover, even among people who gain, the distribution of a regulation's net benefits might vary substantially. In most cases, agencies should use well-established tools and concepts from public economics to develop a transparent description of how the net impacts of a regulation are distributed across income groups.

Regulatory distributional analysis should use the well-established tools and concepts that public economics research uses to describe the distribution of tax burdens across income groups. As noted in the draft guidance (page 62), distributional analysis can usefully be conducted by quintiles or deciles of the income distribution. For each income group, the analysis will need to estimate the incidence of benefits, costs, and transfers. The net impacts

https://doi.org/10.1017/bca.2025.17 Published online by Cambridge University Press

on each income group can then be described in absolute terms and relative to the group's average income. Describing the net impacts this way provides information relevant to the normative principle of vertical equity and will help the public and policymakers understand the regulatory tradeoffs (if any) between economic efficiency and vertical equity.

In a typical case, the incidence of regulatory benefits across income groups will depend on the income-elasticity of demand for a public good like environmental quality or public safety. Even if the regulation yields the same per capita increment in the public good, willingness to pay for that increment will typically vary across income groups. If the public good is a normal good with an income elasticity greater than zero, willingness to pay increases with income, and regulatory benefits are higher in absolute terms for groups with higher incomes. If the public good is a necessity with an income elasticity between zero and unity, even though the regulatory benefits are lower in absolute terms for low-income groups, the regulatory benefits are larger relative to income for low-income groups. Such a distribution of regulatory benefits would be judged to improve vertical equity because it brings about greater equality. If the public good is a luxury with an income elasticity greater than one, the regulatory benefits are larger relative to income for high-income groups and the distribution of regulatory benefits would worsen vertical equity.

To the extent possible, agencies should use empirical estimates of income elasticities to estimate the incidence of regulatory benefits across income groups. The regulation's per capita increments in the public good might also vary across income groups. If so, the analysis should try to estimate both sources of variation to calculate their combined effect on the incidence of regulatory benefits. The regulation's per capita increment is likely to be higher for lower-income groups when the level of the public good was lower for them at baseline, for example when air quality is worse in low-income neighborhoods. However, even in such a case, if the public good is a luxury good it is possible that the regulatory benefits are larger relative to income for high-income groups.

Estimating the incidence of regulatory costs across income groups will typically involve two steps; first, estimating who ultimately bears the regulatory costs; second, estimating the distribution of the costs across income groups. The draft guidance (page 64) provides a useful example of the first step:

> "For example, if a regulation is expected to raise a manufacturer's costs of production, that manufacturer may be able to pass on a portion of those costs to its customers in the form of higher prices. The portion of the cost burden that remains with the manufacturer may be split between the owners of the manufacturer and its workers."

To continue to use that example, the second step of the distributional analysis would be to estimate how the costs to customers, owners, and workers are distributed across income groups. As with regulatory benefits, the incidence of customers' regulatory costs depends on the income elasticity of the demand for the manufacturer's product.

To the extent possible, agencies should use empirical estimates of who bears the regulatory costs and empirical estimates of the income elasticities of the regulated industry's product to estimate the incidence of regulatory costs. When regulatory costs are shifted to consumers of inferior goods and necessities, the distribution of regulatory costs will be like a regressive tax that worsens vertical equity. For example, Reanos and Wolfing (2018) estimate that increases in heating prices and electricity prices are regressive.

The draft guidance (page 64) provides a clear explanation of how to estimate the regulation's net impacts on each income group: "For each group, you should add benefits

https://doi.org/10.1017/bca.2025.17 Published online by Cambridge University Press

and transfers expected to be received by members of the group as a result of the regulation, and subtract costs and transfers expected to be paid by members." In the calculation of net benefits, the transfers cancel out across society as a whole, but that might not be true for each income group. The distribution of the regulation's net impact relative to income across income groups provides information on whether the regulation improves or worsens vertical equity.

On page 11 the Preamble states that:

> "In developing proposed revisions to Circular A-4, we 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."

I recommend that at the least, the revised guidance calls for agencies to generally include a discussion of the determinants of how the net impacts of a regulation are distributed across income groups. That is, agencies should normally discuss whether there is data on how the increment in the public good created by the regulation is distributed across income groups, the income elasticity of the demand for the public good, and the income elasticity of demand for the regulated industry's product. When the available data suggest that there could be important distributional effects, the agency should conduct as complete a distributional analysis as possible. In many cases, prior empirical studies or readily available data will provide estimates of the income elasticity of demand for the regulated industry's product. Because many regulated industries produce necessities, agencies should recognize that it will often be the case that the distributional costs are distributed regressively. Although a complete analysis of the distribution of regulatory benefits, costs, and transfers is preferable, a distributional analysis that only considers whether the regulatory costs are distributed regressively sheds some light on the tradeoff between economic efficiency and vertical equity.

9. Recommendation 6: The draft guidance should not allow agencies "to choose to conduct a benefit–cost analysis that applies weights to the benefits and costs accruing to different groups….." (p. 65).

The draft guidance departs from standard BCA by allowing agencies to use distributional weights. Distributionally weighted BCA is discussed as an option that agencies may choose on pages 65–66 of the draft guidance and on pages 12–16 of the Preamble. The Preamble asks: "Should OMB provide additional guidance on when, and using what methods, it would be most appropriate for agencies to undertake benefit–cost analysis weighted by income (or other measures of economic status)?"

In this section, I explain my recommendation against the use of distributional weights. The proposed use of distributional weights introduces non-transparent and extreme value judgements into BCA.

The non-transparency of distributionally weighted BCA is self-evident in the formula for the weights provided in the draft guidance's footnote 114 (page 65). Below, I provide calculations that provide more transparency about the value judgements.

The draft guidance's discussion of distributional weights incorrectly claims that the weights can empirically account for diminishing marginal utility of income. The discussion is incorrect because it confuses inter-personal and intra-personal utility comparisons. In the context of calculating distributional weights, the parameter the Draft Circular A-4 and

https://doi.org/10.1017/bca.2025.17 Published online by Cambridge University Press

Preamble refer to as the elasticity of marginal utility of income is more accurately referred to as the parameter of inequality aversion.[11]

The empirical studies of risk aversion and the income elasticity of the value of a statistical life listed in Preamble Table 1 (page 15) provide estimates of how intra-personal marginal utility diminishes with income but do not inform inter-personal utility comparisons. After providing a clear textbook discussion of the empirical approach to measure an individual's risk aversion and intra-personal marginal utility, McCloskey (1985, p. 60) describes inter-personal utility comparisons as "regrettably, meaningless." She concludes that the case for redistributing income from the rich to the poor "must rest directly on a moral premise that more equality of incomes is desirable, not indirectly on a pseudo-scientific comparison of happiness." Similarly, in the New Palgrave Dictionary of Economics entry on "Interpersonal Utility Comparisons," Nobel laureate Harsanyi (2018) 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."

Some scholars argue in favor of replacing standard BCA with distributionally weighted BCA to approximate a utilitarian or other social welfare function. In this line of research, empirical studies (including two studies cited in Preamble Table 1) use subjective well-being data to make interpersonal utility comparisons. A legal scholar and leading proponent of this approach, Matthew Adler, recognizes that: "Naturally, specifying distributional weights is a value-laden enterprise." (Adler, 2021) In his book on measuring social welfare, Adler (2019, p. 76) observes that: "The discipline of economics is not in consensus about interpersonal well-being comparisons…. Outside the [social welfare function] literature…economists are often skeptical of interpersonal comparisons." In a recent webinar he observed that "the only ones who think you can't make interpersonal [well-being] comparisons … are traditional economists."[12]

Moreover, the use of subjective well-being data in economic research to make interpersonal utility comparisons remains especially controversial. As noted in the Preamble (footnote 33), the use of subjective well-being data to make interpersonal utility comparisons has also been strongly criticized on empirical grounds. Oswald (2008) makes a fundamental criticism of the use of self-reported measures of subjective well-being or happiness to examine the marginal utility of income:

> My purpose is to suggest that, even conceptually, we have not, as a body of researchers, established that happiness is curved in income…. Future research may find a way empirically of proving that there is diminishing marginal utility of income. Yet currently what we have done is to show that reported happiness is a concave function of income. The key point is that we do not know the shape of the function relating reported happiness to actual happiness.[13]

Oswald (2008) develops a simple model to show that concavity of reported happiness in income does not prove concavity of actual happiness in income. If the happiness reporting function is also concave, for example, if respondents are reluctant to approach the upper

[11] The parameter of inequality aversion is related to the Atkinson index of income inequality.

[12] Brocher Foundation, Brocher Alumni Meetup #14 (March 2023). Healthy, Wealthy, and Wise: The Ethics of Benefit–cost analysis. https://www.youtube.com/watch?v=FhSznx594_U. Accessed June 8, 2023. Around minute 45:50.

[13] Oswald's criticism specifically includes one of the empirical studies cited in the Preamble Table 1.

https://doi.org/10.1017/bca.2025.17 Published online by Cambridge University Press

possible level on the questionnaire form, the concavity of actual happiness cannot be disentangled from the concavity of the reporting function.

In a more recent criticism of the use of subjective well-being data, Bond and Lang (2019) conclude:

> "We review and synthesize how some well-known results from statistics and micro-economic theory apply to such data and reach the striking conclusion that the results from the literature are essentially uninformative about how various factors affect average happiness."

Perhaps most relevant to the context of the draft guidance, after reviewing research that used subjective well-being data, Sunstein (2016, p. 117) OIRA Administrator in the Obama Administration, concluded that it:

> "involves far too much guesswork…. The most sensible conclusion is that studies of reported well-being cannot be used as anything like a substitute for cost–benefit analysis, and that they should not yet play a significant role in regulatory analysis."

Because there is not a strong empirical evidence base for making interpersonal utility comparisons, the draft guidance's proposed distributional weights remain a value judgment. The modern optimal tax literature uses social marginal welfare weights based on a generalized utilitarian social welfare function and assumptions about the parameter that governs the strength of inequality aversion, that is the value judgement in favor of the moral premise that more equality of income is desirable. The optimal tax literature is careful to acknowledge that the weights rest on value judgements, not on empirical evidence. For example, Allcott et al. (2019, footnote 10) explain that "the social marginal welfare weights reflect a policy-maker's or society's normative preference for reducing wealth inequality – they cannot be inferred by observing behavior." Lockwood and Weinzierl (2016, p. 310) explain that economists recognize that these value judgements are outside their professional expertise:

> "Economists are put in an awkward position when asked to calculate the welfare consequences of changes to economic policy or of shocks to the economy: we are asked to act as moral philosophers. Though we have largely converged on a standard approach to that task—i.e., by using a generalized form of utilitarianism—we have left room for a wide range of normative perspectives within that approach. For example, in optimal tax models we have tried to remain agnostic about the values of the so-called marginal social welfare weights that determine the value of transferring resources across individuals…. Choosing a more specific normative perspective, for example choosing the values of the marginal social welfare weights, remains an uncertain and basically unwelcome task…. When economists make such assumptions, they implicitly take a strong moral philosophical position."

Transparent calculations reveal that the draft guidance's recommendation that the parameter of inequality aversion equals 1.4 implies an extreme value judgement about the value of reducing inequality. Harberger (1978) points out that if the distributional weights truly reflect societal preferences, they imply the margin of inefficiency that would be acceptable when transferring income from higher-income groups to lower-income groups. Using the formula in the draft guidance's footnote 114 (page 65) and data on the U.S income quintiles, I

https://doi.org/10.1017/bca.2025.17 Published online by Cambridge University Press

calculate that the recommended distributional weight for the top quintile would be 0.186 and the recommended weight for the bottom quintile would be 10.739. To transparently illustrate the margin of inefficiency implied by these weights, consider a transfer of $1000 from the top quintile that delivered $20 to the bottom quintile, that is a 98% efficiency loss. The transfer results in positive distributionally weighted net benefits; the weighted costs to the top quintile are $186 and the weighted benefits to the bottom quintile are $215. As Harberger (1978, p. S113) concluded based on a much less extreme set of weights:

> "the result is to open the door to projects and programs whose degree of inefficiency by more traditional (unweighted) cost–benefit measures would (I feel confident) be unacceptable to the vast majority of economists and of the informed public."

The extreme value judgement in the recommended distributional weights is further evident in comparisons with the margin of inefficiency in U.S. transfer programs and the progressivity of the Federal income tax code. Using an estimate that it costs taxpayers approximately $1.50 to $2.00 to transfer $1 to a program recipient, Boardman *et al.* (2018, pp. 502–503) conclude that distributional weights assigned to the disadvantaged should not exceed 1.5 or 2 times the value assigned to the advantaged:

> Larger weights would imply acceptance of inefficient programs [or regulations] that are also inferior to simple transfer programs for redistributing income and rejection of efficient programs [or regulations] that allow the advantaged to enjoy net gains even when the disadvantaged could be fully compensated through income transfers for losses they suffer.

In contrast to Boardman et al.'s calculated upper bound of 2, in my calculations above the distributional weight assigned to the lowest income quintile is 58 times the weight assigned to the highest income quintile.

Another illustration of the extreme value judgement is to compare the inequality aversion parameter value of 1.4 to the degree of inequality aversion implied by the progressivity of the U.S. Federal income tax code. Allcott et al. (2019, p. 1613) use an inequality aversion parameter with a baseline value of 1.0 and calculate that the marginal income tax rates of the optimal income tax are much higher than current U.S. rates. The inequality aversion parameter that rationalizes the observed income tax code is about 0.25, reflecting much weaker redistributive motives than their baseline value of 1.0 or the draft guidance's recommended value of 1.4. Similarly, Lockwood and Weinzierl (2016, p. 46) compare the optimal tax rates to U.S. tax policy from 1979 to 2010 and conclude that tax policy since 1989 "has consistently implied less redistributive preferences…than are conventionally assumed to apply" in the optimal tax literature. A possible explanation is that instead of capturing U.S. society's preferences for redistribution, tax policy reflects special interests. However, Lockwood and Weinzierl (2016, p. 36) respond that:

> "…tax policy is a topic of frequent, repeated, and prominent debate, especially in the United States. This is especially true of the income tax and, within the income tax, the top marginal tax rate, which is often a major issue in presidential elections, for example. The likelihood of its broad distributional characteristics being set to serve narrow interests rather than to reflect the will of the public is thus arguably low, and we might plausibly hope to learn something about society's true preferences from the policy that comes out of such a public debate."

https://doi.org/10.1017/bca.2025.17 Published online by Cambridge University Press

10. Recommendation 7: The draft guidance should require all agencies to present the undiscounted annual time streams of benefits, costs, and transfers and the discounted present values of those streams using a common set of discount rates of 1.7%, 3%, 7%, and 10% (or similar range)

The draft guidance requires agencies to present the undiscounted annual time stream of benefits, costs, and transfers (page 74) and recommends a default discount rate of 1.7%. The draft guidance goes on to discuss alternative approaches to discounting (pages 76–83) but does not develop alternative values for discount rates. The draft guidance Preamble states (page 18): "We solicit comment on all aspects of this proposed revision, including the specific rates, parameters, and approaches discussed."

In this section, I will argue, mainly on practical grounds, that the draft guidance should require agencies to use a common set of discount rates of 1.7%, 3%, 7%, and 10% (or similar range). Under Recommendation 8, I will provide further discussion of the Ramsey approach to discounting.

Before discussing the practical problem of what discount rates to use, I will begin by noting that the revised guidance's discussion of discounting departs from the principles of standard BCA. First, as noted above, much of the discussion in earlier sections of the draft guidance is consistent with standard BCA. Standard BCA estimates the benefits and costs based on the preferences of the people affected by the regulatory actions. In those earlier sections, the draft guidance argues that: "Market prices provide rich data for estimating benefits and costs…. based on observable tradeoffs that people actually make…." However, the discussion of discounting seems to lose sight of these principles. The rationale for discounting (pages 74–75) does not ground the discussion in the basic economics of people's decisions about their consumption now and later. As in consumer theory more generally, these decisions reflect the consumer's preferences (in this case, their time preference) and the constraints given by their income and market prices (in this case, the market interest rate). If consumption now and later were perfect substitutes (a zero rate of time preference), given a positive market interest rate the optimal choice is to postpone all consumption to later. But consumption now and later are not perfect substitutes due to diminishing marginal utility of consumption. The consumer adjusts their consumption so that their rate of time preference equals the market interest rate. Standard BCA therefore uses a positive discount rate based on the rationale that time preference has been revealed in tradeoffs that people actually make in the market for savings and investment. The revised guidance's discussion of the rationale for discounting based on the historical increase in consumption over time and "pure time preference" provides a rationale for the Ramsey approach to discounting. As I discuss below under recommendation 8, the Ramsey approach reflects value judgements about an optimal societal decision rule and is not based on observable tradeoffs that people actually make.

The disconnection between the revised guidance's approach to discounting and observable tradeoffs that people actually make could lead BCAs to mistaken conclusions about the desirability of regulations. The Preamble (page 34) states that:

> "Proposed revisions to Circular A-4 would clarify that analysis modeling private behavior requires the use of appropriate private discount rates faced by the relevant population. Once necessary private discount rates are modeled, then the social discount rate can be applied to ascertain the social benefits and costs of a regulation."

https://doi.org/10.1017/bca.2025.17 Published online by Cambridge University Press

Many people from disadvantaged populations are only able to borrow at relatively high market interest rates, such as the rates charged on credit cards and payday loans. Even borrowing at high rates helps people by giving them more flexibility to handle their finances. In an earlier section, on page 29 the draft guidance follows standard BCA and explains that: "the opportunity cost of banning a product—for example, a consumer good, food additive, or hazardous chemical—is the forgone net benefit, including lost consumer and producer surplus…." However, if a social discount rate such as the proposed default rate of 1.7% were applied to the benefits and costs of banning credit card borrowing, the BCA would substantially under-estimate the opportunity costs the ban imposes on disadvantaged people who face high interest rates.

In a second departure from standard BCA, the revised guidance fails to connect the discussion of discounting with the basic definition of economic efficiency. Standard BCA is a tool to identify whether regulations are potential Pareto improvements in economic efficiency that pass the Kaldor-Hicks compensation principle. Goulder and Williams (2003) show that the return on capital before taxes – what they term the finance-equivalent rate – is the appropriate discount rate to use to evaluate if a policy that involves a tradeoff between current and future consumption is a potential Pareto improvement. Goulder and Williams emphasize that the basis for the finance-equivalent rate is empirical; it will equal the market interest rate adjusted for tax distortions in the markets for savings and investments. They distinguish the finance-equivalent discount rate from the social-welfare-equivalent discount rate based on a postulated social welfare function. The revised guidance's discussion again seems to implicitly depart from standard efficiency-based BCA to assume a broader social welfare function.

Turning to the practical problems, based on the Preamble's lengthy discussion, the large number of studies cited in the Preamble, and the even larger academic literature, there is clearly a lack of consensus about what discount rates to use in BCA. Other groups of experts in BCA and the closely related method of cost-effectiveness analysis recommend conducting sensitivity analysis based on a range of discount rates. The revised guidance's proposed default rate of 1.7% is around the lower bound of other group's recommended ranges. The Second Panel on Cost-Effectiveness in Health and Medicine recommends that a discount rate of 3% continue to be used for at least the next 10 years (Neumann et al., 2016, p. 379). The Second Panel also notes "considerable uncertainty" about the appropriate discount rate and that:

> "[i]n practice sensitivity analyses are performed by varying the rates…from the lower bound of 2% to 3% to an upper bound of 8% to 9%. This has been the standard of [cost-effectiveness analysis] practice within most industrialized countries and their assessment bodies….. (Neumann et al., 2016, p. 285).

The Gates Foundation Reference Case Guidelines for Benefit–Cost Analysis in Global Health and Development (2019) recommend sensitivity analysis of discount rates as follows:[14]

> "A standardized sensitivity analysis should be presented to test the implications of different discount rates, including a constant annual rate of 3 percent and a constant

[14] Bill and Melinda Gates Foundation, Reference Case Guidelines for Benefit–Cost Analysis in Global Health and Development. https://www.econ.umd.edu/sites/www.econ.umd.edu/files/pubs/BCA%20Guidelines%20Summary%20May%202019.pdf Accessed June 19, 2023.

https://doi.org/10.1017/bca.2025.17 Published online by Cambridge University Press

annual rate equal to twice the projected near-term gross domestic product (GDP) per capita growth rate."

According to IMF estimates, the near-term GDP growth rate for major advanced economies is 1.1% and the near-term GDP growth rate for emerging market and developing economies is 3.9%, with growth rates of 5.2% in China and 5.9% in India.[15] The Gates Guidelines recommendation thus corresponds to discount rates of 2.2% for advanced economies and 7.8% for developing economies, with discount rates of 10.4% for China and 11.8% for India.

Based on the use of 3% and 7% recommended by the 2003 Circular A-4 and the recommended ranges of other groups, I recommend that the draft guidance should require agencies to use a common set of discount rates of 1.7%, 3%, 7%, and 10% (or similar range). An important practical advantage is that using a common set of discount rates will make BCAs conducted following the revised guidance comparable to each other, comparable to regulatory BCAs conducted over the past 30 years, and comparable to new BCAs and cost-effectiveness analyses conducted by other groups. The OMB Reports to Congress on the Benefits and Costs of Federal Regulation provide useful information on the level and trends of regulatory benefits and costs. If new BCAs are conducted using 3% and 7% discount rates, future Reports to Congress will continue to provide directly comparable information over time (after making simple adjustments for inflation). The continued use of 3% and 7% would also provide greater transparency. For example, if only BCAs that use a discount rate of 1.7% were reported, many Federal regulations would appear to suddenly yield higher net benefits simply due to the mathematics of discounting.

11. Recommendation 8: The draft guidance should not allow agencies to choose to adopt the Ramsey approach to discounting (pages 76–77)

After its discussion of discounting in general, the draft guidance discusses what it terms "other appropriate approaches to discounting" and says that: "One common approach to discounting along these lines that you may choose to adopt is the Ramsey approach, with is based on the Ramsey model." (page 76).

The Ramsey discount rate cannot be calculated based on empirical evidence from economic research. Ramsey (1928) developed a model of a single, representative, infinitely lived agent, who is conventionally interpreted as "society." The Ramsey approach leads to a simple equation where the discount rate in year t, r_t, depends on the pure rate of social time preference ρ, the degree of inequality aversion η, and the growth rate in year t, g_t: $r_t = \rho + \eta\, g_t$. The intuition is that in addition to capturing society's pure time preference for current over future consumption in ρ, the second term in the Ramsey discount rate equation $\eta\, g_t$ captures a societal preference for current poorer consumers over future richer consumers.

To calculate the Ramsey discount rate thus requires two value judgements about ρ and η and a forecast of g_t. Some economists argue that the pure rate of social time preference ρ should be set to zero, on the argument that positive values for ρ amount to discrimination against future consumers based on their date of birth. A counterargument is that consumers'

[15] IMF World Economic Outlook. https://www.imf.org/external/datamapper/NGDP_RPCH@WEO/OEMDC/ADVEC/WEOWORLD. Accessed June 19, 2023.

https://doi.org/10.1017/bca.2025.17 Published online by Cambridge University Press

revealed preference for current over future consumption justify positive values for ρ. The difficult value judgement involved in the inequality aversion parameter η is discussed in detail above in the context of my Recommendation 5. Finally, the growth rate of the economy g_t is so difficult to forecast, especially over long time horizons, that this parameter also becomes almost a value judgement or at best a guess.

Epilogue

In January 2025, by Executive Order President Trump directed OMB to revoke the 2023 Circular A-4 and reinstate the 2003 Circular A-4. However, the major issues discussed in the public comments on the 2023 revisions have long been, and will remain, central to the practice of regulatory BCA. I would argue most fundamentally, it is clear from the 2023 revisions of Circular A-4 were intended to replace standard BCA with a social welfare function. Standard BCA is a tool to evaluate whether regulations fix market failures and improve economic efficiency. When the benefits of regulation are larger than its costs, the regulation improves economic efficiency in the precise sense that the people who gain the benefits could potentially compensate the people who bear the costs and still be better off themselves. Instead of economic efficiency, the 2023 Circular A-4 calls for Federal agencies to evaluate whether regulations improve social welfare.

As I discussed in my detailed comments, the discipline of economics is far from a consensus on precisely how to measure when a policy change improves social welfare. The finalized 2023 Circular A-4 is short on specifics about precisely how Federal agencies should evaluate tradeoffs when measuring welfare. In an important exception, Circular A-4's guidance about weighted BCA specifies a precise formula to make the tradeoff between economic efficiency and distributional concerns. The tradeoff will strike many as extreme; depending on how the benefits and costs are distributed, a regulation with costs more than 30 times larger than benefits will be measured as improving social welfare.

Because regulatory decisions always involve value judgments, the 2023 Circular A-4 guidance might be defended as simply a description of the then-current Administration's value judgments, summarized in a social welfare function. However, this defense is inconsistent with Circular A-4's stated purpose of providing guidance to Federal agencies on how to conduct evidence-based regulatory analysis under E.O. 12866. As a practical matter, the social welfare function approach transformed the 2023 Circular A-4 into a political document that must be revised whenever an administration changes, or even when the same administration changes its priorities. More fundamentally, the 2023 Circular A-4 shifted the responsibility for making value-laden tradeoffs in regulatory analysis away from democratically accountable decision-makers to unelected civil servants.

The first-day Presidential memo that launched the revisions to Circular A-4 called for recommendations to "ensure that regulatory review serves as a tool to affirmatively promote regulations…. and does not have harmful anti-regulatory or deregulatory effects…." In light of the first-day memo, it is reasonable to ask: Would the 2023 revisions to Circular A-4 have tilted the playing field towards more regulation? In the personal view of K. Sabeel Rahman, who served as the OIRA Associate Administrator (delegated the duties of the Administrator) through 2023, that was the intent: "These analytic updates [to Circular A-4] are not just about incorporating the latest best practices from social science and policy analysis; they also

https://doi.org/10.1017/bca.2025.17 Published online by Cambridge University Press

represent an attempt to reimagine analytical frameworks to better align with our contemporary understandings of economic and social policy."[16]

As events have unfolded, not very many regulatory impact analyses were completed under the guidance of the 2023 Circular A-4, so we will never know if it would have made the Federal regulatory review process more pro-regulatory. As should go without saying, that the tool of BCA should not be pro- or anti-regulatory or pro- or anti-deregulatory. I am optimistic that the current Administration and future administrations will continue to rely on unbiased BCAs that follow the principles set forth in the 1993 Executive Order 12886.

References

Adler, Matthew D. 2019. *Measuring Social Welfare: An Introduction*. Oxford: Oxford University Press, p. 76.

Adler, Matthew D. 2021. "Factoring Equity into Benefit-Cost Analysis." *The Regulatory Review*. https://www.theregreview.org/2021/04/26/adler-factoring-equity-benefit-cost-analysis/.

Allcott, Hunt, Benjamin B. Lockwood and Dmitry Taubinsky. 2019. "Regressive Sin Taxes, with an Application to the Optimal Soda Tax." *Quarterly Journal of Economics*, 1557–1626.

American Civil Liberties Union. 2021. "Letter of Concern From Over Two Dozen Justice, Law Enforcement, Legal, Drug Policy, and Directly Impacted Organizations." https://www.aclu.org/letter/coalition-letter-concern-hhs-menthol-cigarette-ban.

Ashley, Elizabeth M., Clark Nardinelli, and Rosemary A. Lavaty. 2015. "Estimating the Benefits of Public Health Policies That Reduce Harmful Consumption." *Health Economics*, *25*: 10.

Auerbach, Alan, and J. Hines Jr. 2002. "Taxation and Economic Efficiency." *Handbook of Public Economics*, *3*: 1347–1421.

Bernheim, B. Douglas. 2016. "The Good, the Bad, and the Ugly: A Unified Approach to Behavioral Welfare Economics." *Journal of Benefit-Cost Analysis*, *7*(1): 12–68.

Bernheim, B. Douglas and Antonio Rangel (2005). "Behavioral public economics: Welfare and policy analysis with non-standard decision makers." *National Bureau of Economic Research.Working Paper 11518*.

Boardman, Anthony E., David H. Greenberg, Aidan R. Vining, and David L. Weimer. 2022. "Standing in Cost-Benefit Analysis: Where, Who, What (Counts)?" *Journal of Policy Analysis and Management*, *41*(4).

Boardman, AE, *et al.* 2018. *Cost-Benefit Analysis: Concepts and Practice*, 5th edn. Cambridge United Kingdom; New York: Cambridge University Press.

Bond, Timothy N., and Kevin Lang. 2019. "The Sad Truth about Happiness Scales." *Journal of Political Economy*, *127*(4): 1629–1640.

Botzen, W.J. Wouter, and Jeroen C.J.M. van den Bergh. 2014. "Specifications of Social Welfare in Economic Studies of Climate Policy: Overview of Criteria and Related Policy Insights." *Environmental and Resource Economics*, *58*: 1–33.

Camerer, Colin, Samuel Issacharoff, George Loewenstein, Ted O'Donoghue, and Matthew Rabin. 2003. "Regulation for Conservatives: Behavioral Economics and the Case for 'Asymmetric Paternalism'." *University of Pennsylvania Law Review*, *151*: 101–144.

Cutler, David, Amber Jessup, Donald Kenkel, and Martha A. Starr. 2015. "Valuing Regulations Affecting Addictive or Habitual Goods." *Journal of Benefit-Cost Analysis*, *6*(2).

EPA. 2023. "*Multi-Pollutant Emissions Standards for Model Years 2027 and Later Light-Duty and Medium-Duty Vehicles.*"

FDA. 2016. "Deeming Tobacco Products to Be Subject to the Federal Food, Drug, and Cosmetic Act, as Amended by the Family Smoking Prevention and Tobacco Control Act; Restrictions on the Sale and Distribution of Tobacco Products and Required Warning Statements for Tobacco Products; Final Rule." *Federal Register*, *81*(90): 28974–29106.

FDA. 2022. "*Tobacco Product Standard for Menthol in Cigarettes Preliminary Regulatory Impact Analysis.*"

[16] K. Sabeel Rahman (2024). "Structural Change and Administrative Practice." https://isps.yale.edu/sites/default/files/files/Rahman-APEX-panel-draft-2-1-24-revised.pdf. Accessed July 9, 2024.

https://doi.org/10.1017/bca.2025.17 Published online by Cambridge University Press

Feldman, A.M. 2018. "Welfare Economics". In *The New Palgrave Dictionary of Economics*. London: Palgrave Macmillan. https://doi.org/10.1057/978-1-349-95189-5_1417.

Gayer, Ted, and W. Kip Viscusi. 2013. "Overriding Consumer Preferences with Energy Regulations." *Journal of Regulatory Economics*, *43*: 248–264.

Goulder, Lawrence H. and Roberton C. Williams (2003). The Substantial Bias from Ignoring General Equilibrium Effects in Estimating Excess Burden, and a Practical Solution. *Journal of Political Economy 111* (4): 898–937.

Gruber, Jonathan, and Botond Koszegi (2004). "Tax Incidence When Individuals Are Time-Inconsistent: The Case of Cigarette Excise Taxes." *Journal of Public Economics 88* (9–10): 1959–87.

Harberger, Arnold C. 1971. "Three Basic Postulates for Applied Welfare Economics: An Interpretive Essay." *Journal of Economic Literature*, *9*(3): 785–797.

Harberger, Arnold C. 1978. "On the Use of Distributional Weights in Social Cost-Benefit Analysis." *Journal of Political Economy*, *86* (2 Part 2: Research in Taxation): S87–S120.

Harsanyi, John C. 2018. "Interpersonal Utility Comparisons." In *The New Palgrave Dictionary of Economics*. London: Palgrave Macmillan. https://doi.org/10.1057/978-1-349-95189-5_1119.

Hausman, Jerry. 2003. "Sources of Bias and Solutions to Bias in the Consumer Price Index." *Journal of Economic Perspectives*, *17*(1): 23–44.

Haveman, Robert, and Burton Weisbrod. 1975. "Defining Benefits of Public Programs: Some Guidance for Policy Analysts." *Policy Analysis*, *1*(1): 169–196.

Jin, Lawrence, Don Kenkel, Feng Liu, and Hua Wang. 2015. "Retrospective and Prospective Benefit-Cost Analyses of U.S. Anti-Smoking Policies." *Journal of Benefit-Cost Analysis*, *6*(1): 154–186. Levy, Norton, and Smith (2016).

Just, Richard E., Darrell L. Hueth, and Andrew Schmitz. 2004. *The Welfare Analysis of Public Policy: A Practical Approach to Project and Policy Evaluation*. Cheltenham: Edward Elgar.

Katzen, Sally. 2006. "Cost-Benefit Analysis: Where Should We Go From Here?" *Urban Law Journal*, *33*(4).

Levy, Helen, Edward Norton, and Jeffrey Smith (2016). Tobacco Regulation and Cost-Benefit Analysis: How Should We Value Foregone Consumer Surplus? *American Journal of Health Economics 4* (1): 1– 25.

Lockwood, Benjamin B., and Matthew Weinzierl. 2016. "Positive and Normative Judgments Implicit in US Tax Policy, and the Costs of Unequal Growth and Recessions." *Journal of Monetary Economics*, *77*(2016): 30–47.

McCloskey, Deidre N. 1985. *The Applied Theory of Price*, 2nd edn. New York: Macmillan Publishing Co.

Mulligan, Casey. 2022. "Peltzman Revisited: Quantifying 21st-Century Opportunity Costs of Food and Drug Administration Regulation." *Journal of Law & Economics*, *65*(S2): S355–S387.

Neumann, Peter J., Theodore G. Ganiats, Louise B. Russell, Gillian D. Sanders, and Joanna E. Siegel (Eds.) 2016. *Cost-Effectiveness in Health and Medicine*, 2nd edn. New York: Oxford University Press.

Office of Management and Budget. 2015. 2015 Report to Congress on the Benefits and Costs of Federal Regulations and Agency Compliance with the Unfunded Mandates Reform Act. Accessed May 13, 2025. https://obamawhitehouse.archives.gov/sites/default/files/omb/inforeg/2015_cb/2015-cost-benefit-report.pdf.

Office of the Assistant Secretary for Policy and Evaluation, U.S. Department of Health and Human Services. 2015. "Valuing Utility Offsets to Regulations Affecting Addictive or Habitual Goods."

Oswald, Andrew J. 2008. "On the Curvature of the Reporting Function From Objective Reality to Subjective Feelings." *Economics Letters*, *100*(3): 369–372.

Ramsey, Frank P. 1928. "A Mathematical Theory of Saving." *The Economic Journal*, *38*(152): 543–559.

Reanos, Miguel A. Tovar, and Nikolas M. Wolfing. 2018. "Household Energy Prices and Inequality: Evidence from German Microdata Based on the EASI Demand System." *Energy Economics*, *70*: 84–97.

Rose, Nancy. 2012. "After Airline Deregulation and Alfred E. Kahn." *American Economic Review*, *102*(3): 376–380.

Sallee, James M., Sarah E. West, and Wei Fan. 2016. "Do Consumers Recognize the Value of Fuel Economy? Evidence From Used Car Prices and Gasoline Price Fluctuations." *Journal of Public Economics*, *135*: 61–73.

Simon, Herbert A. 2018. "Behavioural Economics". In *The New Palgrave Dictionary of Economics*. London: Palgrave Macmillan. https://doi.org/10.1057/978-1-349-95189-5_413.

Sunstein, Cass. 2014. "Opening Keynote Address: The Regulatory Lookback." *Boston University Law Review*, *94*: 579–602.

Sunstein, Cass. 2016. "Cost-Benefit Analysis, Who's Your Daddy?" *Journal of Benefit-Cost Analysis*, *7*(1): 107–120.

https://doi.org/10.1017/bca.2025.17 Published online by Cambridge University Press

Weimer, David. 2017. *Behavioral Economics for Cost-Benefit Analysis: Benefit Validity When Sovereign Consumers Seem to Make Mistakes*. Cambridge United Kingdom, New York: Cambridge University Press.
Weimer, David L. 2018. "Cost–Benefit Analysis." In *The New Palgrave Dictionary of Economics*. London: Palgrave Macmillan. https://doi.org/10.1057/978-1-349-95189-5_381.
Weisbrod, Burton. 1968. "Income Redistribution Effects and Benefit-Cost Analysis." In Chase, Samuel B. (Ed.) *Problems in Public Expenditure Analysis*, pp. 177–209. Washington, DC: Brookings Institution.

Cite this article: Kenkel, Donald. 2025. "Economic Efficiency-Based Benefit–Cost Analysis: Comments on Circular A-4." *Journal of Benefit-Cost Analysis* 16: 248–275, doi:10.1017/bca.2025.17

https://doi.org/10.1017/bca.2025.17 Published online by Cambridge University Press